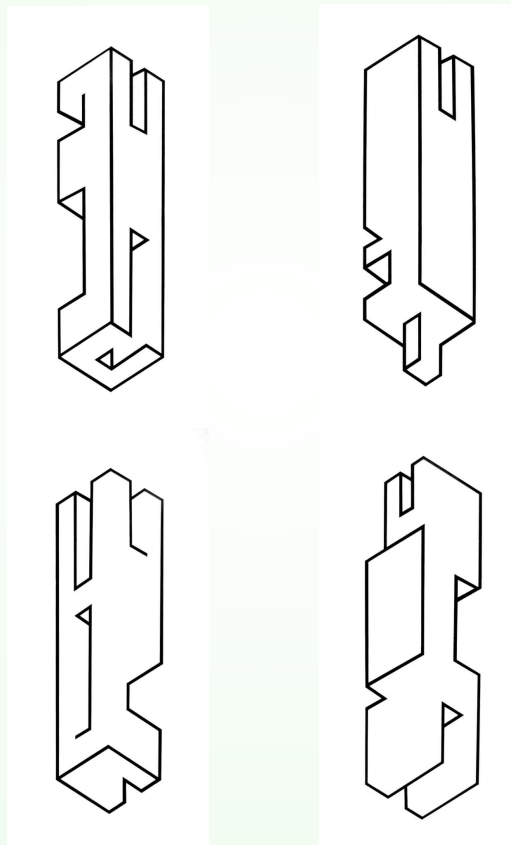


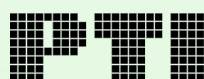
Annals of Computer Science and Information Systems
Volume 34

Proceedings of the Third International Conference on Research in Management & Technovation

**December 16–17, 2022
Da Nang City, Vietnam**



**Viet Ha Hoang, Vijender Kumar Solanki,
Nguyen Thi Hong Nga, Shivani Agarwal (eds.)**



Annals of Computer Science and Information Systems, Volume 34

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Annals of Computer Science and Information Systems, Volume 34
Proceedings of the Third International Conference on Research in
Management & Technovation

WEB: ISBN 978-83-965897-8-1

ISSN: 2300-5963

DOI: 10.15439/978-83-965897-8-1

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THE third edition of International Conference on Research in Management and Technovation (ICRMAT2022), held on December 16-17 in Swinburne Vietnam Alliance Program in Da Nang city, Vietnam. Prior to this, the first edition of ICRMAT was held in India and the second edition was held at Hanoi University of Industry, establishing an international forum that brought together researchers and executive practitioners in the fields of Management, Accounting, and other related areas to the topic of the conference.

ICRMAT-22 gathered quality research articles that used scientific and appropriate research methods. The results have made many new contributions, both in theory and practice. The topics presented at the seminar by thematic sessions were engaging and stimulated plenty of discussion from the participating scientists. The contents under the topics of management include innovative business management in the new normal; business management with sustainability orientation; leadership in the industry 4.0; management in higher education sector; issues of managing innovation capacity and human capitals in various business sectors. The topics of accounting, finance and banking also provide interesting discussions on corporate governance and cash flow management; the digitalization capabilities for financial enterprises, the ethical issues in accounting and auditing, the involvement of cultural factors, and other contents related to the accounting and financial management for enterprises. Topics of marketing also provide insights into customers and business operations by enterprises in the digital age. They include understanding customers' adoption of apps for purchases, insights from Gen Z for effective business performances, dynamics of marketing communication management in the digital era. As for business administration and economics in the context of the post Covid-19 pandemic, great attention from researchers was received by a series of articles and presentations at the conference regarding how the innovative management practices were applied by enterprises in various contexts as response to the complicated situation of Covid-19 and the contents related to the issues of implementation of social responsibility in business administration and leadership capacity of small and medium enterprises.

At the ICRMAT 2022, more than 150 manuscripts from countries around the world such as US, Australia, South Korea, Indonesia, Poland, Japan, Taiwan, Malaysia, India and Vietnam were received for the participation in this scientific event, with the presence of several prestigious researchers, who put forth ideas on new changes and development in the field of business administration, along with emerging trends in economic research in management, tourism, marketing, logistics, human resource management, finance and banking, and accounting. All in all, this is an ideal forum to present your own ideas and achievements to researchers globally. The ICRMAT 2022 has attracted the attention of the research community and selected 53 manuscripts after the rigorous review rounds to presentation in conference.

In order to make ICRMAT 2022 a grand success, we appreciate the professional cooperation and support between Swinburne Vietnam and those involved during the preparation of the conference:

We are thankful to our knowledgeable keynote speakers *Mr. John Spence* - America's top 50 leaders to watch from USA; *Prof. Timothy Marjoribanks* - Associate Dean of Research Department, Swinburne University of Technology, Australia; *Ms. Dang Thuy Ha* - Director of NielsenIQ, Vietnam; *Ms. Ana Le My Nga* - President of WeAngles Ventures, Vietnam; *Dr. Chamila Perera* - Faculty member of Swinburne Business School and Co-chair of Principles for Responsible Management Education (PRME) Community of Practice, Swinburne University of Technology, Australia; *Dr. Shivani Agarwal* from KIET Group of Institutions, India; and *Dr. Jose Antonio C. Santos* - University of Algarve, Portugal for sharing about emerging issues in management and technovation.

Our gratitude *Prof. Marcin Paprzycki*, Systems Research Institute, Polish Academy of Sciences, Poland; *Prof. Dr. Vijender Kuma Solanki* CMR Institute of Technology, Hyderabad, TS, India; *Dr. Shivani Agarwal*, KIET Group of Institutions, Ghaziabad (Delhi-NCR) India; *Dr. Nguyen Thi Dieu Linh* from Hanoi University of Industry; *Dr. Nguyen Thi Hong Nga* from Hanoi University of Industry for their continuous support in terms of research and guidance. Lastly, our sincere thanks to the participation of all local and international experts, who have expressed their interests and submitted articles, contributing greatly to the success of the conference. With deep gratitude and excitement towards authors for sharing knowledge, on behalf of the organizers, we look forward to continuing to have your cooperation and companionship in the future.

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International Conference on Research in Management & Technovation

December 16–17, 2022. Da Nang City, Vietnam

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Social Capital development amongst college and university students in online and classroom education

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Abstract—Social capital is linked to academic performance and education satisfaction, and also forms the foundation of students' future business networks. It is postulated that social capital development amongst college and university students is influenced by education delivery modes in the form of online and classroom education. The Covid-19 pandemic that started in March 2020 and subsequent prolonged periods of physical lockdowns in many countries has forced colleges and universities that customarily practice classroom education to shift to online education temporarily. This situation has created a “natural experiment” whereby classes or programs from the same college or university that were previously conducted in classrooms (in-person) are now conducted online. There are three (3) objectives of this research. First objective is to investigate and determine the social capital development of students in online education. Second objective is to analyse the influence of social capital on students' academic success and education satisfaction. Third objective is to generate and propose policies to foster social capital development. A quantitative research approach is employed and the respondent pool comprises students from colleges and universities in Malaysia. The data gathering instrument is an online questionnaire administered with the informed consent of participants. Approximately 300 participants is targeted, which exceeds the statistical minimum requirement of 166 participants. This enhanced respondent pool will further strengthen the accuracy, validity and robustness of the data analysis, findings and recommendations. The variables include Family Capital, Faculty Capital, Peer Capital, Academic Performance and Education Satisfaction. The data will be analyzed with appropriate statistical tools such as structural equation modeling (SEM). The anticipated findings are envisaged to generate policies on promoting social capital development among students in colleges and universities internationally.

Index Terms—Social capital, academic performance, education satisfaction, online education, classroom education.

I. INTRODUCTION

The concept of social capital has its roots amongst the ancient Greek philosophers with the legendary Aristotle pro-

claiming that we humans are “social animals”. In social science, the idea of social capital resides in the field of sociology, but has expanded into the fields of political science, public policy, business and economics. The founding fathers of sociology, Tonnies, Weber, and Durkheim, defined social capital in terms of the individual's place in society, social relations, and social order [1]. There are variations in contemporary definitions and one commonly used is “stocks of social trust, norms, and networks that people can draw upon in order to solve common problems” [2]. In this definition, social capital is derived from relationships among individuals, and are formed, developed and nurtured from daily interactions and experiences. Social capital influences academic performance and career advancement, and in the context of the latter, the component of networking is central. Networking points towards to goal-directed behavior such as building and cultivating informal relationships to obtain career and material benefits [3]. Among students, the basis of their future career and business networks rests on their cultivation of social capital during their studies [4]. Social capital and business networks are crucial for workplace readiness, particularly for business students [5, 6].

Social capital amongst college and university students provides current and future benefits. The current benefits are its links with academic performance and education satisfaction [7, 8]. The presence of social capital, reflected in friendships and good relationships with faculty and others, is conducive for peer learning, informal learning, socialization and personal satisfaction [9]. The future benefit is its development into business networks when the student graduates and enters the working world. Business networks or relationships with commercial benefits play an important role in career and business success as it enables information exchange, knowledge access and resource optimization [10, 11].

It is postulated that social capital development amongst college and university students is influenced by education delivery modes in the form of online or classroom education, and this forms the focus of this research. Online education is defined as education primarily conducted via “the use of information and communication technologies to deliver educational opportunities to a student in a location other than a school” [12]. Classroom education is defined as education primarily conducted in a traditional, physical classroom where “one or more students are in a setting in which either an instructor is physically present with the students or a representative of an approved school is physically present with the students [13]. Apart from differences in education delivery mode, the physical and social context also differs as in online education students are based at home, and in classroom education students are based at college or university campuses. These different modes of education delivery are not mutually exclusive. Students in online education might be required to physically attend some practical classes or tutorials, and correspondingly, students of classroom education might be required to attend some online lectures and workshops. Nonetheless, the education delivery mode of academic programs can be distinguished as predominantly online or classroom.

The Covid-19 pandemic that started in March 2022 and subsequent prolonged periods of lockdowns or movement control order (MCO) as is known in Malaysia has forced colleges and universities that customarily practice classroom education to shift to online education temporarily. This situation has created a “natural experiment” whereby classes or programs from the same college or university that were previously conducted in classrooms (in-person) are now conducted online. In other words, the variables of institution (colleges or universities) and student cohort (the same colleges or universities attract the same student cohorts) are kept relatively constant with the only difference being the education delivery mode. This situation differs from comparing different colleges or universities that practices different education modes. In different colleges or universities, their programs and student cohorts are different making direct comparisons difficult.

The importance of social capital is well-established but to the authors’ knowledge there is no research that specifically compares student social capital between online and classroom education delivery modes of the same college or university. The Covid-19 pandemic and lockdown or movement control order provides a rare opportunity to investigate the effects of online and classroom education towards student social capital with other variables such as education institution, academic program, student cohort and teaching faculty kept constant. Appropriate policy recommendations can then be derived from the envisaged findings to foster social capital development amongst students.

II. LITERATURE REVIEW

The notion of social capital has long historical roots with legendary Greek philosopher Aristotle proclaiming that “man is by nature a social animal” [14] (author’s note: what Aristotle meant by ‘man’ probably included men and women who are free as opposed to slaves who were not con-

sidered human in ancient Greek society). “Capital” is something that has value to people and other forms include economic and human capital. Social capital resides in one’s relationships with other people, as compared with economic capital that resides in monetary and material assets, and human capital that resides in knowledge and intellect. Social Capital Theory asserts the existence and importance of social capital defined as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition.” [15]. Social capital can be developed, accumulated, transmitted and converted to other types of capital [16].

In the industrial economy, the traditional factors of production are land, capital and labour. We are currently in the post-industrial, knowledge-based economy, and the factors of production have changed to intellectual capital, social capital and creative capital [17]. Social capital, as developed into networking, relationship formation and information accessibility, is an important success factor in career, business and personal development [10, 11, 18]. In the context of business, social capital forms the basis of business networks that is crucial for business development and personal growth [18, 19]. Among the benefits of business networks are shared knowledge, opportunities, connections, increased confidence and raised profile [9, 20].

The literature on social capital is wide as social capital is a sociological construct that can be applied in various contexts such as business [21, 22], healthcare [23, 24] environmental conservation [1], corporate social responsibility [25], poverty-alleviation [26, 27, 28], nation-building [29], crowdfunding [30] and others. In the context of students, social capital provides current benefits as it supports academic success as students leverage upon it for peer learning and guidance [31, 7, 8], and also future benefits as it plays an important role in career and business success [10, 11, 18]. Social capital among students is further categorized into family capital, peer capital and faculty capital [32, 33].

Family capital is defined as the accumulation of family “capitals” that arise in family interactions [34]. When applied towards education, family capital leads to intrinsically motivated learning, better educational outcomes and better incomes [33, 35, 36]. Access to family capital is linked to the educational qualification of parents [37], and parents’ educational qualification is correlated with higher education enrolment and completion of their children [38, 39, 40]. Families are the primary source of financial support for students [41], and when there is adequate financial support, students typically have more focus on their studies leading to better academic performance [32, 36, 42, 43, 44].

Peer capital reside in the bonding ties of friendships. The physical layout and teaching environment at university customarily promotes peer capital formation [32]. Living together in on-campus dormitories and residence halls encourages formation of close and long-lasting friendships. Various on-campus student clubs, societies, sports teams and other organizations further promote socialization and interaction [45]. As a result, friendships which provide both information-related social capital and social support are developed, particularly for full-time students living on-campus

[33]. Studying together with peers enhances performance [46, 47], increases understanding of the academic content [49], reduces examination related anxiety [49] and overall results in better outcomes [31, 50]. Peer capital also influences students' social adjustment to a university [51, 52, 53, 54], and this also contributes to academic success [31, 55, 56, 57].

Faculty capital for students reside in the support they receive from faculty and staff. This support comes in various forms which includes advice to students, information sharing, academic feedback, career guidance and personal motivation [32, 58]. A positive relationship between faculty capital and academic success is shown in the majority of studies [9, 56, 59, 60, 61], with some showing otherwise [55].

Social capital in students is also linked to education satisfaction. Education satisfaction comprises both extrinsic and intrinsic components. Extrinsic components are related to academic achievement and career success, and intrinsic components are related to personal satisfaction and well-being. Current organizational research has indicated that education satisfaction is correlated with career success [62, 63, 64, 65, 66, 67, 68, 69].

Student satisfaction is influenced by the following key factors - interaction among students, interaction between student and instructor, and interaction between student and academic material [70]. Interaction is mediated by the education delivery mode. The majority of current studies explored student satisfaction in online and classroom education in different institutions or different academic programs within an institution. Direct comparisons are difficult as many other factors such as institution type, academic program and student cohort influence student satisfaction. A notable exception is a research by Reference [71] whose findings indicate that while student satisfaction was high for both online and classroom education, students in the online course were less satisfied with eight (8) criteria related to student satisfaction with instructor rapport, course excellence, peer interaction, and self-perceived knowledge gains. The students in that study had a choice of selecting online or classroom education delivery modes, this current research differs in that students and instructors do not have a choice during the Covid-19 pandemic.

III. METHODOLOGY

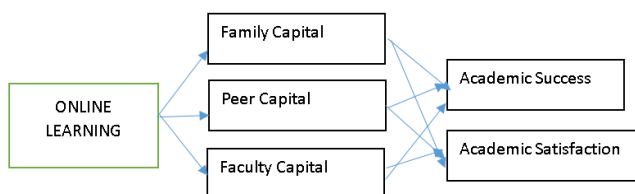


Fig. 1 Theoretical Framework

With reference to the theoretical framework above (Fig. 1), the methodology employs a mono method quantitative survey. This explanatory research will be hypothesizing and testing the cause-effect relationship [72] between social capital development and academic achievement. Target population and the unit analysis of the research is individual stu-

dents from certificate to degree level in four (4) private colleges and universities in Malaysia. The minimum requirement of sample size is 166 by calculating through the priori power analysis as suggested by Reference [73] and [74] using G*Power 3.1 program which is designed to efficiently determine an appropriate and valid sample size for statistical tests that are powered for biomedical science, behavioural and social study. The study will deploy a judgmental and snowball sampling method for the questionnaire [75] and use a cross sectional time horizon method for data collection. A Google form [76] is created and its link shared and emailed to students. All the survey questions are adopted or adapted from prior studies with proven validity and reliability. The construct instrument validity of family capital, peer capital, faculty capital, and academic achievement are designed based on past research [41, 77, 78, 79]. The questionnaire consists of 6 sections; Section 1: Introduction and Consent, Section 2: Background Information, Section 3: Family Capital, Section 4: Faculty Capital, Section 5: Peer Capital and Section 6: Academic Performance and Satisfaction. Sections 3 to 6 uses a Likert Scale consisting of a 5 points range, with 1 point for "strongly disagree" to 5 points for "strongly agree".

This study will employ a mixture of Statistical Package for Social Science (SPSS) version 26 [80] for descriptive analysis on the distribution of data and Smart PLS (Partial Least Square) version 3.0 [81] for multivariate statistical analysis in identifying relationship between measured variables and the latent construct. A measurement model will be used to assess the adequacy of the collected data in the first stage of building process of the model as recommended by Reference [82]. Three elements will be examined under this model which are reliability, convergent validity and discriminant validity [83].

REFERENCES

- [1] T. A. Wong, M. R. Bustami and S. M. Salleh, "Applying Social Capital Theory on Conservation Policies of Protected Areas: A Case Study of Penang, Malaysia," *International Journal of Business and Society*, vol. 23, no. 1, pp. 172-187, 2022.
- [2] R. E. Lang and S. P. Hornburg, "What is social capital and why is it important to public policy?," *Housing Policy Debate*, vol. 9, no. 1, pp. 1-16, 1998.
- [3] C. Gibson, J. Hardy and M. Buckley, "Understanding the role of networking in organizations," *Career Development International*, vol. 19, no. 2, pp. 146-161, 2014.
- [4] S. Choi, "Breaking through the glass ceiling: Social capital matters for women's career success?," *International Public Management Journal*, vol. 22, no. 2, pp. 295-320, 2019.
- [5] A. A. Boat, A. K. Syvertsen and P. C. Scales, P. C., "The role of social capital in promoting work readiness among opportunity youth," *Children and Youth Services Review*, vol. 131, p. 106270, 2021.
- [6] M. Moshtari and E. Vanpoucke, "Building successful NGO-business relationships: a social capital perspective," *Journal of Supply Chain Management*, vol. 57, no. 3, pp. 104-129, 2021.
- [7] J. Temple, "Growth effects of education and social capital in the OECD countries," *Historical Social Research/Historische Sozialforschung*, pp. 5-46, 2002.
- [8] S. Valenzuela, N. Park and K. F. Kee, "Is There Social Capital in a Social Network Site?: Facebook Use and College Students' Life Satisfaction, Trust, and Participation," *Journal of Computer-Mediated Communication*, vol. 14, pp. 875-901, 2009.
- [9] D. J. Almeida, A. M. Byrne, R. M. Smith, and S. Ruiz, "How relevant is grit? the importance of social capital in first-generation college students' academic success," *Journal of College Student Retention: Research, Theory & Practice*, vol. 23, no. 3, pp. 539-559, 2019.

- [10] P. S. Adler and S.-W. Kwon, "Social Capital: Prospects for a new concept," *Academy of Management Review*, vol. 27, no. 1, pp. 17–40, 2002.
- [11] S. C. de Janasz, and M. L. Forret, "Learning the art of networking: A critical skill for enhancing social capital and career success," *Journal of Management Education*, vol. 32, no. 5, pp. 629–650, 2008.
- [12] "Online education definition," *Law Insider*. [Online]. Available: <https://www.lawinsider.com/dictionary/online-education>. [Accessed: 22-Sept-2022].
- [13] "Classroom education definition," *Law Insider*. [Online]. Available: <https://www.lawinsider.com/dictionary/classroom-education>. [Accessed: 22-Dec-2022].
- [14] M. Velasquez, *Philosophy: A text with readings*, Cengage Learning, 2016.
- [15] P. Bourdieu, *The Forms of Capital. Handbook of Theory and Research for the Sociology of Education*, J. Richardson ed., New York: Greenwood, 1986.
- [16] J. S. Coleman, "Social Capital in the Creation of Human Capital," *The American Journal of Sociology*, vol. 94, pp. S95–S120, 1988.
- [17] C. Ember and M. Ember, *Cultural Anthropology (14th edition)*, New Jersey: Prentice Hall/Pearson, 2015.
- [18] B. Urban, M. Murimbika and D. Mhangami, "Immigrant entrepreneurship with a focus on human and social capital as determinants of success: evidence from South Africa," *Journal of Entrepreneurship in Emerging Economies*, in-press, 2022.
- [19] B. O. Imhanrenialena, O. D. Cross, W. Ebhotemhen, B. I. Chukwu and E. S. Oforkansi, "Exploring how social capital and self-esteem shape career success among women in a patriarchal African society: the case of Nigeria," *International Journal of Manpower*, in-press, 2022.
- [20] R. Rodrigues, C. L. Butler and D. Guest, "Antecedents of protean and boundaryless career orientations: The role of core self-evaluations, perceived employability and social capital," *Journal of Vocational Behavior*, vol. 110, pp. 1–11, 2019.
- [21] P. Cooke and D. Wills, "Small Firms, Social Capital and the Enhancement of Business Performance Through Innovation Programmes," *Small Business Economics*, vol. 13, pp. 219–234, 1999.
- [22] R. Lee, "Social capital and business and management: Setting a research agenda," *International Journal of Management Reviews*, vol. 11, no. 3, pp. 247–273, 2009.
- [23] P. Have and A. Shiell, "Social capital and health promotion: a review," *Social Science & Medicine*, vol. 51, no. 6 pp. 871–885, 2000.
- [24] I. Kawachi, S. V. Subramaniam, and D. Kim, *Social Capital and Health*, New York: Springer, 2007.
- [25] T. A. Wong and M. R. Bustami, "A Case Study of Micro Businesses in Jelutong Wet Market in Penang, Malaysia: Implications for CSR Scholarship," *Journal of Business Ethics*, vol. 165, pp. 535–546, 2019.
- [26] C. Grootaert, D. Narayan, V. N. Jones and M. Woolcock, *Measuring Social Capital An Integrated Questionnaire*, Washington D.C.: The International Bank for Reconstruction and Development / The World Bank, 2004.
- [27] D. Narayan and M. F. Cassidy, "A dimensional approach to measuring social capital: development and validation of a social capital inventory," *Current Sociology*, vol. 49, no. 2, pp. 59–102, 2001.
- [28] T. Healy, "The measurement of social capital at international level," *Social Capital: The Challenge of International Measurement Series of the Organisation for Economic Co-operation and Development (OECD)*. Paris: OECD, 2002.
- [29] N. Nixon, A. F. Heath and L. Desigis, "The ties that bind: social capital in Bosnia and Herzegovina," *National Human Development Report 2009*, 2009.
- [30] G. Giudici, M. Guerini and C. Rossi-Lamastra, "Reward-based crowdfunding of entrepreneurial projects: the effect of local altruism and localized social capital on proponents' success," *Small Business Economics*, vol. 50, no. 2, pp. 307–324, 2018.
- [31] C. Stadtfeld, A. Vörös, T. Elmer, Z. Boda and I. J. Raabe, "Integration in emerging social networks explains academic failure and success," *Proceedings of the National Academy of Sciences*, vol. 116, no. 3, pp. 792–797, 2019.
- [32] J. Brouwer, E. Jansen, A. Flache, and A. Hofman, "The impact of social capital on self-efficacy and study success among first-year university students," *Learning and Individual Differences*, vol. 52, pp. 109–118, 2016.
- [33] S. Mishra, "Social networks, social capital, social support and academic success in higher education: A systematic review with a special focus on 'underrepresented' students," *Educational Research Review*, vol. 29, p. 100307, 2020.
- [34] T. T. Swartz, "Family capital and the invisible transfer of privilege: Intergenerational support and social class in early adulthood," *New Directions for Child and Adolescent Development*, no. 119, pp. 11–24, 2008.
- [35] A. Gamoran, H. K. Miller, J. E. Fiel and J. L. Valentine, "Social Capital and Student Achievement: An Intervention-Based Test of Theory," *Sociology of Education*, vol. 94, no. 4, pp. 294–315, 2021.
- [36] Z. Li and Z. Qiu, "How does family background affect children's educational achievement? Evidence from Contemporary China," *The Journal of Chinese Sociology*, vol. 5, no. 1, pp. 1–21, 2018.
- [37] M. S. Rodríguez, C. Tinajero and M. F. Páramo, "Pre-entry characteristics, perceived social support, adjustment and academic achievement in first-year Spanish university students: A path model," *The Journal of Psychology*, vol. 151, no. 8, pp. 722–738, 2017.
- [38] T. Abada and E. Y. Tenkorang, "Pursuit of university education among the children of immigrants in Canada: The roles of Parental Human Capital and social capital," *Journal of Youth Studies*, vol. 12, no. 2, pp. 185–207, 2009.
- [39] M. Ashtiani and C. Feliciano, "Access and mobilization: How social capital relates to low-income youth's postsecondary educational (PSE) attainment," *Youth & Society*, vol. 50, no. 4, pp. 439–461, 2018.
- [40] A. S. Kim, S. Choi, and S. Park, "Heterogeneity in first-generation college students influencing academic success and adjustment to higher education," *The Social Science Journal*, vol. 57, no. 3, pp. 288–304, 2020.
- [41] J. J. Arnett, *Emerging adulthood: The winding road from the late teens through the twenties*, Oxford University Press, 2014.
- [42] W. Cheng, W. Ickes, and L. Verhofstadt, "How is family support related to students' GPA scores? A longitudinal study," *Higher Education*, vol. 64, no. 3, pp. 399–420, 2012.
- [43] J. Liu, P. Peng and L. Luo, "The relation between family socioeconomic status and academic achievement in China: A meta-analysis," *Educational Psychology Review*, vol. 32, no. 1, pp. 49–76, 2020.
- [44] J. Roksa and P. Kinsley, "The role of family support in facilitating academic success of low-income students," *Research in Higher Education*, vol. 60, no. 4, pp. 415–436, 2019.
- [45] X. N. Deng, Y. Fernández and M. Zhao, "Social media use by first-generation college students and two forms of social capital: a revealed causal mapping approach," *Information Technology & People*, 2021.
- [46] D. Cole and A. Espinoza, "Examining the academic success of Latino students in science technology engineering and mathematics (STEM) majors," *Journal of College Student Development*, vol. 49, no. 4, pp. 285–300, 2008.
- [47] B. Wong, "By chance or by plan?: The academic success of nontraditional students in higher education," *Aera Open*, vol. 4, no. 2, p. 2332858418782195, 2018.
- [48] R. T. Palmer, D. C. Maramba and T. E. Dancy II, "A qualitative investigation of factors promoting the retention and persistence of students of color in STEM," *Journal of Negro Education*, vol. 80, no. 4, pp. 491–504, 2011.
- [49] V. Tinto, "Enhancing student success: Taking the classroom success seriously," *Student Success*, vol. 3, no. 1, p. 1, 2012.
- [50] D. Pérez II, and K. B. Taylor, "Cultivando logradores: Nurturing and sustaining Latino male success in higher education," *Journal of Diversity in Higher Education*, vol. 9, no. 1, p. 1, 2016.
- [51] V. M. Buote, S. M. Pancer, M. W. Pratt, G. Adams, S. Birnie-Lefcovitch, J. Polivy, and M. G. Wintre, "The importance of friends: Friendship and adjustment among 1st-year university students," *Journal of Adolescent Research*, vol. 22, no. 6, pp. 665–689, 2007.
- [52] R. Deil-Amen, "Socio-academic integrative moments: Rethinking academic and social integration among two-year college students in career-related programs," *The Journal of Higher Education*, vol. 82, no. 1, pp. 54–91, 2011.
- [53] D. Orta, E. Murguía and C. Cruz, "From struggle to success via Latina sororities: Culture shock, marginalization, embracing ethnicity, and educational persistence through academic capital," *Journal of Hispanic Higher Education*, vol. 18, no. 1, pp. 41–58, 2019.
- [54] C. M. Zhao and G. D. Kuh, "Adding value: Learning communities and student engagement," *Research in Higher Education*, vol. 45, no. 2, pp. 115–138, 2004.
- [55] E. Etcheverry, R. A. Clifton and L. W. Roberts, "Social capital and educational attainment: A study of undergraduates in a faculty of education," *Alberta Journal of Educational Research*, vol. 47, no. 1, 2001.
- [56] G. D. Kuh, T. M. Cruce, R. Shoup, J. Kinzie and R. M. Gonyea, "Unmasking the effects of student engagement on first-year college grades

- and persistence," *The Journal of Higher Education*, vol. 79, no. 5, pp. 540-563, 2008.
- [57] S. B. Robbins, K. Lauver, H. Le, D. Davis, R. Langley and A. Carlstrom, "Do psychosocial and study skill factors predict college outcomes? A meta-analysis," *Psychological Bulletin*, vol. 130, no. 2, p. 261, 2004.
- [58] E. R. Kahu and K. Nelson, "Student engagement in the educational interface: understanding the mechanisms of student success," *Higher Education Research & Development*, vol. 37, no. 1, pp. 58-71, 2018.
- [59] S. Brooman and S. Darwent, "Measuring the beginning: A quantitative study of the transition to higher education," *Studies in Higher Education*, vol. 39, no. 9, pp. 1523-1541, 2014.
- [60] M. Meeuwisse, S. E. Severiens and M. P. Born, "Learning environment, interaction, sense of belonging and study success in ethnically diverse student groups," *Research in Higher Education*, vol. 51, no. 6, pp. 528-545, 2010.
- [61] S. E. Schwartz, S. S. Kanchewa, J. E. Rhodes, G. Gowdy, A. M. Stark, J. P. Horn, M. Parnes and R. Spencer, "'I'm having a little struggle with this, can you help me out?': Examining impacts and processes of a social capital intervention for first-generation college students," *American Journal of Community Psychology*, vol. 61, pp. 166-178, 2018.
- [62] T. A. Judge and R. D. Bretz Jr, "Political influence behavior and career success," *Journal of Management*, vol. 20, no. 1, pp. 43-65, 1994.
- [63] T. A. Judge, D. M. Cable, J. W. Boudreau and R. D. Bretz Jr, "An empirical investigation of the predictors of executive career success," *Personnel Psychology*, vol. 48, no. 3, pp. 485-519, 1995.
- [64] C. Kirchmeyer, "Determinants of managerial career success: Evidence and explanation of male/female differences," *Journal of Management*, vol. 24, no. 6, pp. 673-692, 1998.
- [65] G. Santisi, P. Magnano, S. Platania and T. Ramaci, "Psychological resources, satisfaction, and career identity in the work transition: an outlook on Sicilian college students," *Psychology Research and Behavior Management*, vol. 11, p. 187, 2018.
- [66] S. E. Seibert, J. M. Crant and M. L. Kraimer, "Proactive personality and career success," *Journal of Applied Psychology*, vol. 84, no. 3, p. 416, 1999.
- [67] T. Tuononen, A. Parpala and S. Lindblom-Ylänne, "Graduates' evaluations of usefulness of university education, and early career success—a longitudinal study of the transition to working life," *Assessment & Evaluation in Higher Education*, vol. 44, no. 4, pp. 581-595, 2019.
- [68] D. B. Turban and T. W. Dougherty, "Role of protégé personality in receipt of mentoring and career success," *Academy of Management Journal*, vol. 37, no. 3, pp. 688-702, 1994.
- [69] S. J. Wayne, R. C. Liden, M. L. Kraimer and I. K. Graf, "The role of human capital, motivation and supervisor sponsorship in predicting career success," *Journal of Organizational Behavior*, vol. 20, no. 5, pp. 577-595, 1999.
- [70] Y. Kuo, A. E. Walker, B. R. Belland and K. E. E. Schroder, "A Predictive Study of Student Satisfaction in Online Education Programs," *International Review of Research in Open and Distributed Learning*, vol. 14, no. 1, pp. 16-39, 2013.
- [71] L. S. Hale, E. A. Mirakian and D. B. Day, "Online vs. classroom instruction: Student satisfaction and learning outcomes in an undergraduate allied health pharmacology course," *Journal of Allied Health*, vol. 38, no. 2, pp. 36E-42E, 2009.
- [72] K. H. Pherson and R. H. Pherson, *Critical Thinking for Strategic Intelligence*, 2nd ed., California: CQ Press, 2020.
- [73] J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed., Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1988.
- [74] F. Faul, E. Erdfelder, A. Buchner and A. G. Lang, "Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses," *Behavior Research Methods*, vol. 41, no. 4, pp. 1149-1160, 2009.
- [75] I. Etikan, R. Alkassim and S. Abubakar, "Comparison of snowball sampling and sequential sampling technique," *Biometrics and Biostatistics International Journal*, vol. 3, no. 1, p. 55, 2016.
- [76] B. Simanjuntak and T. Limbong, "Using Google form for student worksheet as learning media," *International Journal of Engineering & Technology*, vol. 7, no. 3.4, pp. 321-324, 2018.
- [77] M. J. Dufur, T. L. Parcel and K. P. Troutman, "Does capital at home matter more than capital at school? Social capital effects on academic achievement," *Research in Social Stratification and Mobility*, vol. 31, pp. 1-21, 2013.
- [78] G. Salimi, E. Heidari, M. Mehrvarz, and A. A. Safavi, "Impact of online social capital on academic performance: exploring the mediating role of online knowledge sharing," *Education and Information Technologies*, pp. 1-22, 2022.
- [79] A. Y. Yu, S. W. Tian, D. Vogel and R. C. W. Kwok, "Can learning be virtually boosted? An investigation of online social networking impacts," *Computers & Education*, vol. 55, no. 4, pp. 1494-1503, 2010.
- [80] C. IBM, *IBM SPSS Statistics for Windows, Version 26.0*, Armonk, NY: IBM Corp, 2019.
- [81] C. M. Ringle, S. Wende and J. M. Becker, "SmartPLS 3. SmartPLS GmbH, Boenningstedt," *Journal of Service Science and Management*, vol. 10, no. 3, pp. 32-49, 2015.
- [82] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson and R. L. Tatham, *Multivariate Data Analysis*, 7th ed., Upper Saddle River: Pearson Prentice Hall, 2009.
- [83] J. T. K. Loo, P. H. Lee and A. L. Low, "Impact of Transformational Leadership and the Mediating Effect of Employees' Perception of Organizational Change on Affective, Normative and Continuance Commitment," *Journal of Business and Social Review in Emerging Economies*, vol. 3, no. 2, pp. 185-198, 2017.

Innovation Capacity, International Experience, and Export Performance of SMEs in the Field of Information Technology of Vietnam

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Abstract—Although there are many assessments of the innovation capacity of enterprises, there is still a lack of assessment of the innovation capacity of small and medium enterprises in the information technology sector related to the 4th industrial revolution. The structure must be determined from a practical point of view using existing innovation capacity studies. Therefore, this study aims to improve understanding of the characteristics of innovation capacity in the context of small and medium enterprises in the field of information technology by reviewing the empirical literature. This article presents international experiences, assessment models, and the applicability of models to the characteristics of small and medium-sized enterprises in the field of information technology. With the main contribution, the article identifies an overview of growing research around the world on innovation capacity and lessons learned for small and medium enterprises in Vietnam. The research results will contribute to improving understanding of the special characteristics of the innovation capacity of small and medium enterprises in the field of information technology and especially in the context of the 4th industrial revolution. The described innovation capacity characterization can guide further studies by providing criteria for how innovation capacity in small businesses can be understood. Furthermore, using the findings of this assessment, managers can improve the innovation capacity of their businesses by acknowledging many aspects of innovation capacity.

Index Terms—Innovation Capability, Systematic review, Innovation performance, Performance management, SME.

I. INTRODUCTION

In the contemporary era, firms of all industries have been forced to develop innovation with the sole aim of maintaining their presence and enduring their continuity. Any firm that has lagged in the innovation sector has found it rough to stay at par with the others that have taken the initiative to take advantage of the advancement of technology. A commitment to innovation is being regarded as critical to the survival and prosperity of small firms and entrepreneurial ventures; it inspires their growth. Studies on this phenomenon have focused on the concept of innovation capability [1]. Innovation capability has been defined as the potential of a firm to create not only unique but also valuable products or knowledge. According to Oura et al., innovation capability is a firm's ability to unceasingly transform ideas and knowledge into new products, processes, as well as systems for not only its benefit but also for its partners or stakehold-

ers. Empirical research has indicated that firms' future performance is to a greater extent tied to the implementation of innovation activities. In this sense, there exists a positive relationship between the implementation of innovation activities and how firms perform in the future [2]. Firms make use of resources and capabilities to create innovations in the form of novel products, processes, and services. However, some firms outdo others as they prove to be better at reproducing innovation achievement. From these definitions, innovation capability revolves around small businesses' objective to stay at par with large and established businesses; it is points to one direction of small firms aiming to compete with larger competitors who possess relatively more resources. The capabilities and resources firms need to prosper in developing new products, processes, and services are different for different firms, which justifies why some outdo others.

Notably, the current accounts of innovation capabilities overlap with the concept of dynamic capabilities. For this reason, it has been challenging to distinguish between these two concepts. On their part, dynamic concepts stand for a pervasive concept within the field of strategic management. Dynamic capability defines the capability of enterprises to incorporate, shape, and reconfigure both internal and external competencies in an attempt to counter rapidly changing settings [2]. Conceptualizing innovation has, in the modern era, emerged as a complex field of research, drawing the attention of numerous researchers. However, a consensus has not been attained in the literature, and the dire necessity to clearly bring out what type of capabilities fuel innovation in firms, as well as how firms attain these capabilities and utilize them. Some studies have reviewed research on organizational innovation, while others have divided such review into radical and incremental innovation [2]. At the same time, they have presented numerous factors that impact decisions on the development of products. Again, some researchers have provided insights into the innovativeness terminology and technological innovation topology. To achieve this, a review of literature on new product development, marketing, and engineering has taken center stage. At the same time, some researchers have opted for the reviews of innovation

management measurement, with their key objective being to construct a frame that can be employed in assessing firm-level innovation activity. Another lot of researchers have taken a more general approach in their review, whereby they have concluded with a stretched framework of organizational innovation that creates a connection between leadership and innovation as a process on one end and as an outcome on the other. Lastly, some studies have majored in open innovation, that is, a specific innovation type [2].

Nonetheless, innovation capability analyses in SMEs context do not exist, in spite of the abundance of innovation reviews as aforementioned. In this sense, there is a need for search review, given the fact that innovation capability is not uniform in small and large business entities — it has been found to be sophisticated [3].

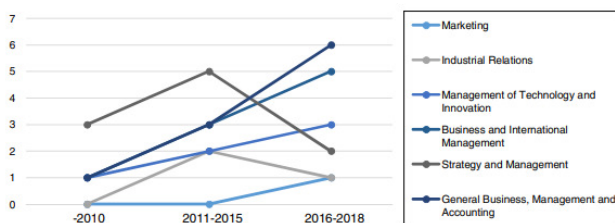


Fig. 1 Trends of Innovation Capability Research in SME Context.

The existing innovation capability categories typically take into consideration a certain form of innovation. For instance, in the case of comprehensive innovation capability, there is a product or process innovation. Some researchers have grouped innovation capability into either incremental or radical. Others have prioritized evaluating the capability of the firm to innovate by identifying its capabilities. As such, it would be significant to approach the concept of innovation capability from a practical point of view. This can be done through referencing existing innovation research. This study's primary goal has been to enhance the comprehension of the characteristics of innovation capability in SMEs perspective. At the outset, the research adds to the literature by as it identifies the conditions under which business ventures and entities with relatively lower resources are more likely to show high innovation capability. Furthermore, the research adds to the literature by taking the contemporary comprehension of innovation capability to another level.

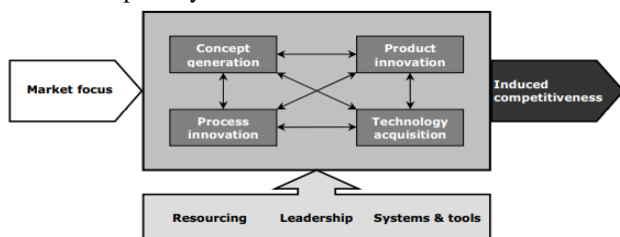


Fig. 2 Process of Innovation Capacity in SMEs

The paper is structured into: characteristics of SMEs in the field of Information Technology; introduction and analysis of methods as well as tools for assessing innovation capacity of enterprises; analysis and recommendations on the application of tools or methods to assess innovation capacity for information technology enterprises; and the recommendation of a set of indicators to evaluate innovation capacity for enterprises.

II. CHARACTERISTICS OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE FIELD OF INFORMATION TECHNOLOGY

There is little to dispute that Information Technology (IT) has advanced in the recent past and continues to be dynamic and sophisticated. With this skyrocketing sophistication, however, managers regard it as a key tool when it comes to competition; they take it as a competitive tool that can help create a gap between them and their competitors depending on how best they strategize on them. In this connection, investment in IT by firms has witnessed a rapid increase in the recent past. Small and medium-sized enterprises that are more determined to survive and continue despite the significant competition from more established firms have been at the forefront of implementing IT in their operations [2]. IT has been found to significantly influence firms' ability to outdo each as far as marketing themselves is concerned — firms have utilized IT as a tool to hold their ground as far as competition is concerned. Linking strategy to IT has to a greater extent, allowed firms to compete more effectively.

A study by Saunila has established a direct link between firm performance and IT; it has established a direct connection between investments in IT capabilities and firms' financial performance [1]. With the knowledge that prior studies concentrated on established and more resourceful corporations, there is a great gap in the case of SMEs. Questions have been raised on whether the results that have gotten on large corporations also represent the smaller firms. However, given the more flexible managerial capabilities of SMEs, it is presumed that the chances of IT adoption success are relatively higher. It is perceived that the relatively less complex nature of small businesses is more likely to see positive financial benefits as a result of IT adoption [1]. This means that smaller firms are better positioned to benefit from investing in IT and, as such, should effectively utilize it to exploit emerging technologies. But, a question has been raised: what are the characteristics that SMEs and medium-sized enterprises that have invested in IT should exhibit? The performance of firms is enhanced when there exist interactions among the elements of a system. Systems' complementary factors function in such a way that the returns of doing more of one thing depend on what is done with others. In this connection, a firm's successes or failure (Overall performance) cannot be tied to failure or adoption of IT; a committed investment in IT does not guarantee firms productivity and growth without complementary developments [4].

Innovation functions in a similar manner in that firms cannot prioritize innovation without influencing organizational

structures and systems. For instance, given innovation involves substantial risk-taking, successful implantation demands making considerable systemic alterations in firms to enhance risk [4]. Similarly, the chances are high that a strategy that majors in innovation will call for some level of flexibility in its organizational structure. Flexibility in procedures and processes, open communication channels, decentralized and informal decision-making, loosely identified job descriptions as well as coupled decision leakages are all characteristics of innovation. For a firm to be in a position to sustain innovation and incorporate it as an inevitable component of strategy, it must ensure all necessary resources are available for new products.

Moreover, it should provide collaborative structures and solutions aimed at solving problems and addressing challenges in a creative way, and link with existing businesses. SMEs with the capacity to timely respond and carry out innovation activities flexibly and rapidly have huge command in the competition stage. Furthermore, firms that possess relatively fewer resources with the ability to effectively manage, coordinate, and redeploy both internal and external competencies do well when it comes to competition. Although SMEs top the list of enterprises that commit to innovations, empirical innovation research has concentrated on large enterprises.

TABLE I

CHARACTERISTICS OF INNOVATION CAPACITY OF SMES IN THE FIELD OF IT

No	INNOVATION CAPACITY OF SMES	
	INNOVATION KEYS	DESCRIBE
1	Management	In most cases, SME owners are the managers. In this connection, there is room for rapid decision-making. Moreover, the managers can quickly and effectively respond to favorable opportunities while willing to take the risk. Adopting IT is one of these favorable opportunities that SMEs incorporate into their operations with ease; in-depth consultations common in large corporations are avoided here.
2	Marketing	SMEs are able to respond not only promptly but also efficiently to rapidly changing market demands. Moreover, they are more close to customers. Therefore, being effective market manipulators, SMEs are in a position to identify which technologies fit their marketing demands with ease.
3	Internal Communication	SMEs are more enabled to adopt technologies that can provide efficient internal communication. Notably, efficient communication, even if it is between two people, is important for the success of a firm; it can go a long way toward solving internal problems. Similarly, it has the ability to enable managers to identify the firm's external changes.
4	External Communication	With their limited resources, SMEs are not better positioned to identify and use important external resources, IT being one of them. Moreover, the ability of SMEs to absorb knowledge is relatively weaker.
5	Financial Resources	It is challenging for SMEs to attract capital as investors may see a greater financial risk. Understandably, SMEs are not in a position to disperse risk through multiple portfolios or projects. In this sense, their innovation capacity

		is low; IT implementation requires a significant amount of resources.
6	Growth	It tends to be challenging for SMEs to access external funds to meet their rapidly growing needs. One of these needs is the implementation of IT in their operations. Again, this signifies that the innovation capacity of SMEs is lower.
7	Scale Economy	In some economies of scale, there is a huge barrier to entry for SMEs. In this connection, their innovation capacity faces a big challenge in such economies.
8	Government Regulation	Understandably, it is never easy to deal with sophisticated regulatory of authorities. For SMEs, it is costly to comply with complex government policies, so their innovation capacity cannot match large enterprises.

However, there exists a significant difference between innovations in these two categories of businesses. SMEs are more enabled to respond to changes in demand since their organizational structures are more flexible [2]. Additionally, small and medium-sized firms tend to have close relationships with customers. In this regard, they are able to detect market changes more effectively and efficiently than larger corporations. At the same time, SMEs can combine product specialization with the flexibility of production, which can go long toward evading most of the obstacles to mass production. Unlike large enterprises, SMEs are not challenged by changes in technology. Generally, some of the areas through which the characteristics of the innovation capability of SMEs in the field of IT can be brought out include management, marketing, internal communication, external communication, financial resources, growth, scale economy, and government regulation [4].

III. ANALYSIS OF METHODS AND TOOLS FOR ASSESSING INNOVATION CAPACITY OF ENTERPRISES

Business capability entails the resources, abilities, and knowledge that an enterprise accrues over time and directly links to the accomplishment of its goals. In this connection, the first step towards analyzing the drivers of innovation is collecting data on business capabilities; most of the firms' innovation activities and their success are supported by business capabilities.

A. *Resources of the Firm*

The resources at the disposal of a firm go a long way toward influencing its ability to accomplish its goals. Notably, businesses pursue their objectives by engaging in varied types of activities with which innovation-related activities are part. Some of the resources here include both physical and intangible assets, workforce, available financial resources, and accumulated experience in carrying out business activities.

1) *Firm Size*: The size of a firm is the one determinant of its innovation capability [5]. Since these are small and medium-sized firms, size here can be measured in terms of the volume of turnover and the number of employed individuals.

In this connection, in assessing the innovation capacity of an enterprise, it is always advisable to collect data on both turnover (or the equivalent in the financial sector) and employment. Employment data can be obtained in terms of headcount but should be based on full-time equivalents (FTE) [5]. Furthermore, firm size can be measured in terms of the assets at its disposal, which is fundamental for analyzing productivity.

2) *Business Assets*: Assets range from tangible fixed assets, intangible fixed assets, and current assets to goodwill assets. Current assets here include inventories, receivable accounts, and cash [5]. To assess a firm's innovation capability in this category, one should consider the resources that the firm has total control over and are set to continue being productive for not less than one year. The key sources of asset data include financial statements such as the gross carrying amount of tangible assets and the book value of tangible fixed assets. It is worth noting regulatory licenses to exploit resources fall in this category.

3) *Age*: The age of a firm is another key factor that can tell the innovation capability of a firm. Firstly, a firm's age captures the entire experience the firm has accumulated for the entire period it has been in operation. In this sense, firms that have operated for a long tend to be associated with a larger stock of experience compared to the enterprise, which is just picking momentum. Majorly, the experience here can be expressed in terms of implementing changes and approaching problems. Logically, the more a firm operates, the more it goes through changes and the more it is faced with incidences that demand not only timely but also effective decision-making. On the other hand, firms with a relatively shorter duration of operation have little experience on how to approach such incidences; they tend to depict lower adjustment to incidences and are adversely hit by organizational inertia. In measuring a firm's age, both practical and conceptual challenges are put into consideration. Another factor that should be considered here is the number of years the firm in question has been in operation, that is, economically active. This sets the platform to assess the duration of the firm has accumulated experience [5]. Notably, there is a difference between the years the firm has been existed, and the years the firm has been economically active; the former may not give a correct picture since some firms are established legally but do not start operating right away. Therefore, assessment in terms of a firm's age should be based on the period it has engaged in any business activity. Additionally, information on how the firm in question was established should be considered. It is worth noting that some methods of business establishment significantly influence innovation and strategies.

4) *Financing and ownership*: Another major tool for assessing the innovation capability of a firm is its internal sources of finances. Firms that have realized economies of scale are more likely to face minimal challenges to invest in new activities aimed at bringing in even more profits. Such activities are those relating to innovation. The significant factors to consider when measuring a firm's internal financial

resources include the equity ratio and the profit margin [5]. On the same note, a firm's internal financing data is useful in the interpretation of its external financial resources as well as access to the financial markets. On ownership status, it has been found to significantly influence a firm's access to resources. For instance, firms that have merged or are part of an enterprise group can have easier access to resources compared to firms that stand on their own on financial matters. In this category, the data that should be considered include:

- a. Whether the firm is a member of an enterprise group or a stand-alone enterprise.
- b. Whether the firm has ties to any multinational enterprise and, if yes, whether the multinational group is located abroad or in the same country.
- c. The origin of the firm's ultimate owner; whether they are locals or foreigners.
- d. Whether the firm is listed on the stock exchange; if yes, information on the concentration of ownership should be considered.

5) *Management Capabilities*: A firm's management capability is another tool that is used to assess its innovation capability — its ability to adopt innovations, undertake innovation activities, and produce innovation outcomes. In this category, the firm's competitive strategy and the managerial capabilities employed in the overall implementation of that strategy.

6) *Business Strategy*: A firm's strategy of operation entails objective formulation and the identification of policies necessary to accomplish these objectives. Strategic objectives set the course for the intended outcomes over the long-term or even the mid-term [5]. On the other hand, strategic policies cover the ways through which a firm gives itself a competitive advantage over its competitors. Some of the notable strategic choices include: competition on quality or price, market leadership, approach to incidences (risks), level of openness, transformation, and creation of a brand. Notably, a firm's general strategies for the achievement of goals are connected to its innovation objectives, thus, data obtained here can be used in the assessment of its innovation capability.

7) *Organizational and Managerial Capabilities*: Organizational and managerial capabilities include an enterprise's internal capacity and competence to mobilize, command, and exploit available resources for the attainment of business objectives. These capabilities are closely related to innovation capability, and as such, a closer look at them can go a long way toward assessing a firm's innovation capability.

8) *Innovation Management Capabilities*: Logically, it is challenging for an enterprise to adopt something it cannot manage — initiate, develop, and achieve results from it. In this connection, looking into the enterprise's ability to pursue ideas for innovation, align varied innovation activities, allocate the necessary resources, manage innovation activities, and monitor the results can be a crucial indicator of its innovation capability.

9) *Workforce Skills and Human Resource Management*: It is indisputable that humans are the most fundamental

resource for innovation; they are the source of new ideas and creativity. The whole process of innovation calls for varied skills and the collaboration of different people [5]. Therefore, analysis of an enterprise's workforce qualifications, occupational structure, and competencies can offer an accurate assessment of its capacity to innovate. Understandably, the only way an enterprise can get a creative workforce is by embracing effective and healthy human resource management practices. Hence, an enterprise's human resource management policies can talk much about its potential to innovate.

10) Technological Capabilities: The improved characteristics of innovation can be attributed to the utilization of modified technology. This new technology has the potential to create new markets and fresh opportunities for innovation. When it comes to innovation capability assessment, technical expertise, design capabilities, and capabilities related to digital technologies and data analytics are of particular interest [5]. Technical expertise entails an in-depth knowledge and ability to utilize technology. Notably, this knowledge is derived from qualifications and skills. Design capabilities, on the other hand, are concerned with planning and designing procedures as well as technical specifications for new products and processes. In this category, expertise with emerging technologies should be considered. In the contemporary technological world, artificial intelligence (AI) and quantum computing is needed expertise for any enterprise that wishes to stay ahead of competitors. By collecting generic information on an enterprise's degree of technical expertise and identifying the percentage of its workforce with design abilities can be an indicator of its innovation capability. At the same time, data on the enterprise's capabilities to use digital technologies can be used to tell more about its potential to innovate. Digitalization offers a wealth of innovation opportunities for enterprises [6]. An enterprise boasting technical expertise, design capabilities, capabilities related to digital technologies, and expertise with emerging technologies is considered to be at a high level of innovativeness. On the contrary, a firm that lacks any or all of these capabilities in its workforce cannot be considered as having the potential to see a breakthrough in innovation.

B. Methods of Assessing Innovation Capability

The field of innovation capacity measurement has witnessed substantial research both at the country and enterprise levels [7]. Considering the innovation process as inputs, activities, and outputs, the majority of these researches have assessed the innovativeness of firms in terms of either the innovation process inputs or innovation process outputs. Nevertheless, this approach has been associated with bottlenecks, especially in the case of SMEs as well as companies in underdeveloped countries such as Vietnam. The overall measure of innovation capacity for enterprises has been the level of research and development (R&D) expenditures [8]. This is an input to innovation processes and does not basically result in innovations. Considering it incorporates unsuccessful R & D efforts, these expenditures may lead to higher figures which may not depict the actual innovation

capacity of an enterprise; they result in overestimation of the enterprise's innovativeness capacity [8]. Moreover, R&D factories are not the sole creators of all new products and processes; innovations can be triggered by either a self-discovery idea or a unique problem [9]. In the event of such scenarios, measuring an enterprise's innovation capacity through R&D expenditures will definitely put it at an innovativeness level lower than the actual level. A study by Jugend et al. identifies that R&D data utilized in measuring the potential of enterprises to innovate tend to favor established enterprises. Small and medium-sized firms, in most cases, fall on the wrong side of this approach because they may either be omitted or infrequent [10]. Patent data is one of the transitional output methods which has repetitively been employed in measuring enterprises' innovativeness. But, instead of this approach measuring innovation, it counts on inventions [11]. Since innovation is the result of an invention, measuring the latter does not put enterprises at their right innovativeness levels [9]. Measuring the innovation capability of a firm using the patent approach may result in an overestimation of the level of innovativeness as inventions that have not materialized into innovations may be included. Additionally, the tendency of the patent is not uniform for all industries, a reason to associate the approach with inconsistencies [12]. Such reasons as high costs force some firms to prefer safeguarding their innovations through such techniques as technological complexity, maintaining lead time over competitors, and upholding secrecy [13]. Therefore, patent data is not a suitable measurement of firms' innovation capability due to the fact that not all innovations are patentable. Innovation count and firm-based surveys are the output-based approaches to measuring the innovation capability of enterprises [13]. In the former, data on innovation is gathered and counted from specialized journals, novel processes and products, databases, and announcements, and other specialized sources. Thus, it is considered an objective approach [14]. Firm-based surveys, on their part, are subjective since surveys, as well as interviews, are conducted on enterprises. Nevertheless, both these methods have a drawback. For instance, the innovation count approach, in practice, tends to lack a balance between product innovations and process innovations; it has been found to favor product over process innovations [15]. Furthermore, it prioritizes radical innovations over incremental ones [12]. At the same time, the innovation count approach does not account for innovations that fail to succeed and does not embrace a relative analysis of innovation performance [13]. On the other hand, the methodology utilized by firm-based surveys measures firms' innovativeness or newness by asking questions whose response depends on the respondents' interests. For instance, they may present such questions as to whether they have engaged in innovation activities. Since there is no technique to confirm whether the response is right or wrong, this approach is not purely accurate [16]. The Analytic Hierarchy Process (AHP) and the Analytic Network Process (ANP) are other approaches used to measure the innovation capability of enterprises. Notably, these approaches measure

intangible criteria of which innovativeness is part [16]. Inarguably, when strategic business decisions succeed, they provide the appropriate operational actions for the right markets. In this connection, strengths, weaknesses, opportunities, and threats (SWOT) analysis is used to examine where a firm performs well and where it is set to fail. Innovation is one of the strengths of a business as it can go a long way toward helping it accomplish its goals [14].

TABLE II
PAIRWISE COMPARISON SCALE

Intensity of importance	Explanation
1	Two criterion contribute equally to the objective
3	Experience and judgement slightly favor one over another
5	Experience and judgement strongly favor one over another
7	Criterion is strongly favored and its dominance is demonstrated in practice
9	Importance of one over another affirmed on the highest possible order
2, 4, 6, 8	Used to represent compromise between the priorities listed above

AHP and ANP approaches are useful in this analysis and, therefore, can be used to assess the level of innovativeness of an enterprise. AHP is a multicriteria decision-making technique that breaks down complicated problems into structures of multiple criteria, objectives, and alternatives. This approach is effective in measuring innovation capability due to the fact that subjectivity is involved [17]. One of the drawbacks of this approach is that innovation does not exist physically and cannot be shown as precise numbers; it is challenging to determine the measuring criteria [18].

On the other hand, ANP uses pairwise comparisons with judgments that represent the dominance of one element over another with respect to the common properties between them [19]. Notably, this approach is a generalization of the AHP. Many decision problems involve interaction and dependence on both higher and lower-level elements [19]. Unlike AHP, which is a unidirectional hierarchy structure, ANP facilitates multifaceted interrelationships among decision levels as well as attributes [19].

C. Recommendation of Indicators to Evaluate Innovation Capacity for Enterprises

According to Zahoor and Al-Tabbaa, an individual's definition of innovation influences the way they measure it [17]. Innovation is more than a brilliant idea, given that an idea only works after being acted upon; they require to be realized and add value for them to be regarded as innovation. Some of the recommendations of indicators to evaluate the potential of innovation for enterprises include: Customer involvement; Interaction between functions; Team climate; Innovation methodology; Innovation rewards.

1) Customer Involvement

There is little to dispute those ideas, however great they are, cannot be significant without the customer. In this sense, when firms involve customers in their innovation processes, they are more likely to realize the objectives of such innovations. Everybody involved in the entire process should have an in-depth understanding of customers' reality. Therefore, enterprises should assess their level of innovativeness by examining the extent to which they involve customers in their business operations, particularly when imple-

menting new strategies. Enterprises that involve their customers in nearly all aspects that are concerned with their satisfaction are better positioned to witness success in innovation. On the contrary, the chances of enterprises that abstract everything from the customer attaining a high innovativeness level are low.

2) Interaction Between Functions

Innovative break throughs happen at the convergence of varied functions. In a business setup, there are many functions and processes, and innovation integrates the majority of them. Therefore, the innovation process is directly connected to these functions and processes. The implication is that enterprises' innovation capability should be assessed based on the manner these functions and processes are synchronized. Communication and interaction between different departments of an enterprise are essential as they facilitate the transfer of knowledge, support exploration, stream operations, and facilitate the exploration of results [20].

3) Team Climate

Great ideas are born when different teams or even individuals come together. In this regard, the climate of teams goes a long way toward influencing their innovation capability. A good team climate characterized by collaborative problem solving, openness and commitment to goals impacts innovation capability positively. On the contrary, a team climate marred by decisions, work overload, and inadequate time affects innovation capability negatively. Therefore, as a way of assessing enterprises', the climate of different teams should be considered.

4) Innovation Methodology

Innovation calls for creativity, and creativity calls for time. In this sense, for enterprises to witness a breakthrough in innovation, they should allocate not only adequate financial resources but also time to the entire process. Furthermore, innovation demands a balance between creativity and structure, that is, too much system restrains the creativity and vice versa. The chances are high for great ideas to be realized when an enterprise has a little structure. In this connection, an evaluation of the structure adopted by an enterprise can be a significant indicator of its innovation capability. If an enterprise has a complicated structure, it is an indication that its level of innovativeness cannot match a different enterprise that has adopted too little structure.

5) Innovation Rewards

Patents take center stage in the innovation capability of enterprises. Though this assessment alone may fall short of giving the true picture of an enterprise's level of innovativeness, it should be considered. Enterprises that have previously been rewarded for innovations are more likely to witness a breakthrough in a new venture compared to enterprises that have no history of rewarding innovation.

IV. CONCLUSION

This paper has discussed four main concepts of innovation capability from the SME perspective in Vietnam. Firstly, it identifies some of the characteristics of small and medium-sized enterprises in the field of Information Technology. Secondly, it has analyzed the methods and tools for

assessing the innovation capability of enterprises. Thirdly, it has analyzed the application of tools or methods to assess enterprises' level of innovativeness. Lastly, it has recommended a set of indicators to evaluate innovation capacity for enterprises.

This research contributes to the widespread study of innovation capability. From the findings of the research, SMEs in Vietnam that have stepped in to develop innovative outputs have provided the ground to sustain competitive advantage. Also, it is evident that innovation as processes and innovations as outcomes are well established in the small enterprise context. These findings reveal that SMEs in Vietnam can take advantage of the numerous forms of innovation capabilities in their attempt to accomplish their business goals.

In the next studies, we will continue to develop tools to assess the innovation capacity of information technology enterprises, thereby providing recommendations to support enterprises to implement technological innovation. It is up to managers or the top decision-makers of enterprises to identify what works for them best; they are obliged to base their innovation choices on the needs of their respective businesses.

REFERENCES

- [1] M. Saunila, "Innovation capability in SMEs: A systematic review of the literature," *J. Innov. Knowl.*, vol. 5, no. 4, pp. 260–265, 2020, doi: 10.1016/j.jik.2019.11.002.
- [2] M. M. Oura, S. N. Zilber, and E. L. Lopes, "Innovation capacity, international experience and export performance of SMEs in Brazil," *Int. Bus. Rev.*, vol. 25, no. 4, pp. 921–932, 2016, doi: 10.1016/j.ibusrev.2015.12.002.
- [3] D. A. de J. Pacheco, C. S. ten Caten, C. F. Jung, J. L. D. Ribeiro, H. V. G. Navas, and V. A. Cruz-Machado, "Eco-innovation determinants in manufacturing SMEs: Systematic review and research directions," *J. Clean. Prod.*, vol. 142, pp. 2277–2287, 2017, doi: 10.1016/j.jclepro.2016.11.049.
- [4] D. R. Shaw and T. Allen, "Studying innovation ecosystems using ecology theory," *Technol. Forecast. Soc. Change*, vol. 136, pp. 88–102, 2018, doi: 10.1016/j.techfore.2016.11.030.
- [5] OECD/Eurostat (2019), "Measuring business capabilities for innovation", in *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th Edition, OECD Publishing, Paris/Eurostat, Luxembourg.
- [6] D. D. T. Pham, P. Paillé, and N. Halilem, "Systematic review on environmental innovativeness: A knowledge-based resource view," *J. Clean. Prod.*, vol. 211, pp. 1088–1099, 2019, doi: 10.1016/j.jclepro.2018.11.221.
- [7] E. Costa, A. L. Soares, and J. P. De Sousa, "Information, knowledge and collaboration management in the internationalization of SMEs: A systematic literature review," *Int. J. Inf. Manage.*, vol. 36, no. 4, pp. 557–569, 2016, doi: 10.1016/j.ijinfomgt.2016.03.007.
- [8] F. Rossi, A. Caloffi, A. Colovic, and M. Russo, "New business models for public innovation intermediaries supporting emerging innovation systems: The case of the Internet of Things," *Technol. Forecast. Soc. Change*, vol. 175, no. July 2020, p. 121357, 2022, doi: 10.1016/j.techfore.2021.121357.
- [9] C. Lee and J. Hwang, "The influence of giant platform on content diversity," *Technol. Forecast. Soc. Change*, vol. 136, pp. 157–165, 2018, doi: 10.1016/j.techfore.2016.11.029.
- [10] D. Jugend, P. D. C. Fiorini, F. Armellini, and A. G. Ferrari, "Public support for innovation: A systematic review of the literature and implications for open innovation," *Technol. Forecast. Soc. Change*, vol. 156, no. December 2019, p. 119985, 2020, doi: 10.1016/j.techfore.2020.119985.
- [11] D. D. T. Pham, P. Paillé, and N. Halilem, "Systematic review on environmental innovativeness: A knowledge-based resource view," *J. Clean. Prod.*, vol. 211, pp. 1088–1099, 2019, doi: 10.1016/j.jclepro.2018.11.221.
- [12] M. G. Russell and N. V. Smorodinskaya, "Leveraging complexity for ecosystemic innovation," *Technol. Forecast. Soc. Change*, vol. 136, no. February, pp. 114–131, 2018, doi: 10.1016/j.techfore.2017.11.024.
- [13] Y. S. Su, Y. Kajikawa, M. Tsujimoto, and J. Chen, "Innovation ecosystems: Theory, evidence, practice, and implications," *Technol. Forecast. Soc. Change*, vol. 136, no. September, pp. 14–17, 2018, doi: 10.1016/j.techfore.2018.08.009.
- [14] S. Mamonov and R. Peterson, "The role of IT in organizational innovation – A systematic literature review," *J. Strateg. Inf. Syst.*, vol. 30, no. 4, p. 101696, 2021, doi: 10.1016/j.jsis.2021.101696.
- [15] J. Luo, "Architecture and evolvability of innovation ecosystems," *Technol. Forecast. Soc. Change*, vol. 136, no. June 2017, pp. 132–144, 2018, doi: 10.1016/j.techfore.2017.06.033.
- [16] A. Mardani, D. Kannan, R. E. Hooker, S. Ozkul, M. Alrasheedi, and E. B. Tirkolaee, "Evaluation of green and sustainable supply chain management using structural equation modelling: A systematic review of the state of the art literature and recommendations for future research," *J. Clean. Prod.*, vol. 249, 2020, doi: 10.1016/j.jclepro.2019.119383.
- [17] N. Zahoor and O. Al-Tabbaa, "Inter-organizational collaboration and SMEs' innovation: A systematic review and future research directions," *Scand. J. Manag.*, vol. 36, no. 2, p. 101109, 2020, doi: 10.1016/j.scaman.2020.101109.
- [18] M. L. Moore, S. von der Porten, R. Plummer, O. Brandes, and J. Baird, "Water policy reform and innovation: A systematic review," *Environ. Sci. Policy*, vol. 38, pp. 263–271, 2014, doi: 10.1016/j.envsci.2014.01.007.
- [19] B. Walrave, M. Talmar, K. S. Podoyntsyna, A. G. L. Romme, and G. P. J. Verbon, "A multi-level perspective on innovation ecosystems for path-breaking innovation," *Technol. Forecast. Soc. Change*, vol. 136, no. September 2015, pp. 103–113, 2018, doi: 10.1016/j.techfore.2017.04.011.
- [20] D. Vrontis and M. Christofi, "R&D internationalization and innovation: A systematic review, integrative framework and future research directions," *J. Bus. Res.*, vol. 128, no. December 2018, pp. 812–823, 2021, doi: 10.1016/j.jbusres.2019.03.031.

The role of teacher leaders in language classrooms: a case study in National Academy of Education Management, Vietnam

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Abstract—In this research, the notion of teacher leadership is introduced to the National Academy of Education Management in Vietnam. The main goals of this study are to examine teacher leadership from the perspective of EFL teachers. They further describe the many leadership positions that EFL teachers fill in this environment. They also examine difficulties with teacher leadership in Vietnam's institutional hierarchies. Twelve EFL instructors were provided with their perspectives on teacher leadership strategies in the National Academy of Education Management environment as study participants. Open-ended questionnaires and semi-structured interviews were the two data collecting methods used to gather qualitative data. The data were then thematically analyzed, yielding four significant categories and one central theme. The research results indicate that teacher leadership is a novel idea in the Vietnamese EFL environment. Given that EFL educational leaders deal with a number of difficulties, such as a significant administrative workload and a lack of autonomy, the effects of hierarchical structures on teacher leadership practices are obvious. They could overcome these difficulties and enhance organizational performance by utilizing intragroup shared leadership tactics.

Index Terms—EFL context; ELT; hierarchical leadership structures; instructional leadership; teacher leadership.

I. INTRODUCTION

The phenomenon of teacher leadership, which was described as being caused by the increasing professional expectations of schools, is "the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the goal of increased student learning and achievement"[9]. However widespread in Western environments, teacher leadership gives teachers the power to alter their schools and perform a range of leadership responsibilities. Teacher leaders consider both the success of their schools and their students' achievement.

The ability of teacher leaders to take on significant tasks, influence changes and innovations, and act as a liaison between administrative leadership and fellow teachers makes teacher leadership positions like curriculum co-ordinator, subject specialist, tutor, and instructor trainer crucial to the growth of educational institutions. Creating and maintaining a professional culture, a sense of social cohesiveness, According to [27], the main objectives of teacher leadership roles are to foster professional trust among teachers. Education organizations all over the world have been encouraged to delegate leadership and provide them the authority to contribute to their organizations' effectiveness because of their crucial role in schools' day-to-day operations.

Although teacher leadership is valued in general education, it is uncommon in the field of teaching English as a second language (ELT). [5] and [26] conducted empirical investigations into this concept in ELT, indicating a paucity of research in this area. According to [23], For teacher leadership in ELT, a conceptual shift is required from hierarchical and conventional leadership models to more vertical and shared leadership models.

Additionally, according to [11], to address universal concerns in the ELT community and attain proficient excellence, every ELT professional should engage in a range of involved responsibilities. They will be able to assist both the expansion of their business and the ELT sector by doing this. The numerous manifestations of teacher leadership and the varied duties that English language instructors carry out as teacher leaders at EFL schools don't seem to be the subject of enough empirical study. As a result, by examining the concept from the viewpoint of EFL instructors, this research adds to the corpus of knowledge on ELT teacher leadership. This comes from the standpoint of teacher leaders in a Vietnamese EFL environment.

II. THEORETICAL FRAMEWORK

Since the early 1990s, the concept of teacher leadership has gained notoriety. [2]; [3]; [24], and the literature on educational leadership and management has documented its various characteristics and manifestations [6]. John Dewey coined the phrase "teacher leadership" to describe educators' active participation in governing bodies in schools. Teacher leadership techniques had a three-phase development throughout the 1980s educational reform movement.

The first group of instructors served in more formal capacities and with greater top-down control in the early 1980s included department heads, master teachers, and union representatives. Leaders and educators both have influence. Additionally, in order to "increase the efficiency of school operations," tight bureaucratic structures promoted managerialism and reduced oversight of teachers and teacher leaders [30]. ELT specialists had a difficult time finding jobs during this time in education, and numerous ESL instructors had trouble rising to positions of authority.

In order to correct the problems with the first wave of teacher leadership, which "acknowledged the role of teachers as instructional leaders" [19]. Thanks to their scholastic knowledge and skills, teachers were able to take on leadership positions in the classroom as team leaders, curriculum designers, experts in professional development, and men-

tors. Despite the fact that this wave acknowledged teachers' knowledge, their positions were nevertheless seen as the continuation of hierarchical roles [19].

The third wave emerged in the 1990s and is now referred to as an emerging kind of teacher leadership in international educational organizations. In contrast to the preceding two waves, this one places more emphasis on teachers' leadership responsibilities in helping to progress the teaching profession and enhance institutions via teamwork.

A. Definitions of teacher leadership

According to [16], experts agree that the development of an operational definition of teacher leadership in the field is still in its infancy. Teacher leadership also includes developing practices, working with associates to bring about modification, gathering and utilizing data in collaborative systems, and assisting in producing and sharing specialized knowledge [4]. Teacher leaders often require knowledge in disciplines like curriculum creation, professional development, and assessment to improve teaching and learning. According to [20], teacher leadership combines with teachers' knowledge, abilities, and attitudes to increase student achievement. The fundamental qualities of teacher leaders are also highlighted and briefly defined in [1].

The concept is most often used to define a teacher's personal agency, usually in relation to classroom management and pedagogy, but it may also be used to indicate a colleague's larger collegial impact, curriculum creation, and policy formulation inside or outside of schools. Organizations or groups of teachers with a mandate to lead in terms of practice and policy might be referred to as teacher leadership.

According to [1]), transformational leaders allow their co-workers to undertake things that they would not typically do on their own to better their professional practice [24]. This is consistent with [14] views of teacher leadership as an enabling element, as demonstrated by teacher leaders' collegial influence on bettering their professional practices.

According to [30], it is the process through which instructors encourage their coworkers, administrators, and other school community members to improve teaching and learning strategies to support student learning and success (p. 287-288). The concept underpinning [30] emphasizes the critical part that context plays in teachers' leadership development and training.

The promotion of teacher leadership in educational institutions can be aided by contextual factors like school management ([15]; [24]; [30]). The ideas presented by [30]) are thus appropriate for this study's context since teacher leaders provide leadership inside the classrooms and extracurricular and are not entirely disassociated from classroom instruction.

Moreover, their pedagogical and professional knowledge provides them with leadership responsibilities, allowing them to affect co-workers and collaborate to accomplish institutional results.

B. The Teacher leader roles

Most theories in this field come from the United States (e.g., [8]; [30]), where teachers execute diverse management and instructional leadership responsibilities [13]. These

roles, which aim to execute institutional objectives and are comparable to the first and second waves of teacher leadership, include department heads, advisors, trainers, curriculum developers, faculty leader, and topic coordinators([12]; [21];).

In a similar vein, [30] found four positions associated with the first and second waves in their narrative of research on teacher leadership: administrators, curriculum specialists, staff developers, and mentors for aspiring teachers.

Teacher leaders work with their peers to support organizational growth and the professional development of their peers in more unofficial leadership positions such peer mentoring, leading a new team, establishing action-oriented study teams, and contributing to the creation of the curriculum. [8]

Because it seems there is little research in the field of ELT on teachers' perceptions of their leadership positions, these findings will enable close a gap in the literature.

C. The lack of teacher leadership due to hierarchy

It might be challenging to achieve teacher leadership under more conventional and top-down management systems because it fosters a cooperative culture. Bureaucratic, top-down, and hierarchical school cultures are obstacles to cooperation, learning, and progress, according to the literature [14].

According to [19], work done by teacher leaders may be negatively impacted by organizational traits and structural elements. For instance, in technocratic processes, administrative overload, a lack of professional autonomy and assistance, and rising obligations typically lead to burnout, hamper instructional leadership, and cause instructors to feel excluded and less committed to their colleagues.[7].

Teachers' discontent and lack of confidence in such positions, which are seen as continuations of top management, add to this isolation.

It is challenging to develop a typical objective and attain the best possible harmony of formalization, centralization, and standardization in schools because bureaucratic institutions usually encourage control and responsibility [22].As a result, companies have trouble developing a supportive, effective workplace.

This report will assist in bridging the research gap that exists in ELT addressing the influence of hierarchical leadership structures on the leadership styles of EFL instructors.

D. ELT instructor leadership

Instructor leadership is generally recognized in general education, it has gotten less attention in ELT. The idea of language teachers exercising leadership in educational contexts has been documented. [5] examined how the authentic leadership paradigm affected programs for teacher preparation.

Their findings revealed that instructors were unaware of the concept of classroom leadership; nonetheless, it was ingrained in a variety of educational methods and traits. [5] ascribed the phenomena to teacher leadership curricula being missing from teacher education programs. Therefore, they argued that a distinct leadership model may aid instructors in resolving the particular issues related to teaching English as a foreign language.

[11] investigated EFL instructors' opinions of themselves as educational leaders in Turkish context. They obtained data using a mixed-method methodology, which assisted them in identifying top targets for teaching heads in order to attain English language teaching and learning outcomes. It also emphasized the importance of developing and leading staff to compete with global challenges in this profession.

Research has shown that English language teachers (EFL) must have passion, rapport, purpose, balance, and adaptability to succeed in the Korean school system [26] .

Furthermore, Korean EFL learners recognize leadership differently than traditional leaders and its influence beyond classroom activities.

According to the research stated above, the ELT sector is expanding daily, so managing language institutions and programs has become increasingly difficult for ELT experts. The growth of scholastic leadership in ELT, especially in hierarchical leadership systems, has become crucial for addressing the challenges of twenty-first-century education. This study's goal is to add to the field of study, which will address the subsequent research questions.

(1) How do English language instructors in Vietnam assume their personal leadership duties and the concept of "teacher leadership"?

(2) At the National Academy of Education Management in Vietnam, what is meant by "teacher leadership" and what role-related difficulties are connected to teacher leadership positions?

III. THE CONTEXT OF THE STUDY

Vietnam's public and private educational systems are under the direction of the Ministry of Education and Training. It is organized into five levels: preschool, elementary school, secondary school, high school, and higher education. Twelve years of basic education make up formal education. Colleges, regional and national institutions and academies (collectively referred to as universities), and research institutes authorized to award doctoral degrees make up Vietnam's national higher education system. The Vietnamese higher education system provides programs at a variety of levels, including bachelor's degrees from universities and academies, master's degrees from universities, academies, and research institutes, and doctorate degrees from the same establishments.

National Academy Of Education Management is a public university established on April 3, 2006. The institution is currently focusing on training 5 majors: Educational Management, Educational Psychology, Educational Economics, Education and Information Technology. This is considered a leading university in educational management science in the university system in Vietnam. Currently, the Academy of Educational Management is training doctorates and masters in Educational Administration, masters in clinical psychology and information technology.

IV. RESEARCH DESIGN

A. Participants

All 14 head teachers employed as full-time teaching staff of the English department from the National Academy of

Education Management were invited; however, the research only included 12 participants. Data was gathered via moderately structured interviews that were recorded on a digital recorder and stored on a personal electrical device that required a password to access them. The audio recordings were given code numbers. All interviewees were sent the transcriptions to double-check and clarify if needed. All 12 teachers answer the questionnaires including eight open-ended questions released online on Google forms to investigate untapped categories more thoroughly and provide the data with more depth.

B. Data collections and analysis

The study was conducted using a qualitative approach, which was determined to be the best data collection strategy. The authors' use of a case study approach within a qualitative research framework allowed them to investigate the societal problem of leadership in reality with the possibility that the borders between the environment and the phenomena are not well defined (Yin, 2011). The main method for acquiring qualitative data was semi structured interviews, which were supplemented by an online survey on google forms. The open-ended survey was mostly used to go further into the data and explore unsaturated categories. The questions were developed in light of our observations of the institution's practices and the major themes noted in the body of research on teacher-leader development.

NVivo 10 was employed as the tool to analyze data from interview transcripts and survey results. The process was carried out in the following steps.

To gain an overview of the data, we first read the transcripts. This helped us become ready to code the data. In short, the reading accurately captured the profession-related backgrounds, leadership skills, and historical positions of teacher leaders.

The second step entailed a more in-depth review of the transcripts to code them in accordance with the suggestions. During the first coding phase, which was performed without preconceived notions, there were 181 initial open codes. Using Nvivo nodes, we found recurring patterns and issued initial codes. The same coding was used to contain more recurrent patterns, passages, extracts, and consistencies.

Following the two rounds of open coding, 119 codes were organized into 18 broad categories in the second step of the study, which contained codes with similar principles. This study's only four topics included: the consequences of bureaucracy, organizational hierarchy, instructional leadership responsibilities, and leadership comprehension. Because we returned to the codes and improved and renamed them, Iterative coding was used throughout and changed the way we wrote them to better reflect the conversation of the interviews.

V. RESULTS

It is remarkable that the majority of the participants do not appear to understand its intention or purpose, considering that the National Academy Of Education Management's main objective is to research the subject of "teacher leadership". When questioned about the precise duties that teacher leaders performed in various divisions, The participants rec-

ommended ten operational and ten instructional tasks. Seven interviewees said that their responsibilities were instructional in character since they were experts in a particular field, while the remaining interviewees believed that their positions were operational and managerial in nature. Silva et al(2000) 's classification of these tasks as part of the first of three teacher leadership waves corresponds well with these operational and instructional qualities.

TABLE 1

Teacher leaders' responsibilities at the National Academy of Education Management	
Managing roles	Academic roles
Checking attendance	Conducting PD courses/workshops
Facilitating classroom issues	Developing curriculum
Evaluating teachers	Mentoring
Scheduling timetable	Supervising
Being in charge of exams	Giving presentations at workshops
Checking quality assurance	Developing teaching materials
Performing learning managing system	Writing test papers
Counselling	Joining academic research group
Organizing webinars and seminars	Publishing papers

The statistics also imply that five operational participants go above and above the call of duty to influence others and complete tasks. The leadership structures and practices of the National Academy of Education Management are significantly disclosed, and the teaching staff's opinions of the top-level leadership model further explain this. The participants mentioned the National Academy of Education Management's top-down management structure, which is managed by a group of people who exercise power and regulate the system. Two people did not think the management structure was entirely top-down, despite the fact that 10 participants said it was rigid. They assumed that the management structure's description included details on regular interactions and viewpoint exchanges between teacher leaders and senior management.

Additionally, the findings show that teacher leaders' lack of support and appreciation leads to tension and frustration. Ten participants express these worries. The findings also demonstrate how teacher leaders lack autonomy as a result of excessive bureaucracy, which limits their jobs to administrative tasks. However, nine of them believe that such power does not assist them gain the trust of teachers or close the gap between teachers and upper management. One believes that teacher leaders at The National Academy of Education Management may have been able to influence other instructors and impose institutional regulations as a result of their hierarchical leadership roles.

Eight respondents proposed that the hierarchical leadership structure had a favorable impact on their leadership positions in spite of the challenges listed in Table 2. For instance, this approach enables a teacher to organize his pro-

TABLE 2

Number	Obstacles conducting job responsibilities
1	Absence of competent assistance
2	Governance and responsibility
3	Bureaucracy
4	Lack of independence
5	Scarcity of gratitude
6	Absence of collaboration
7	Admin workload

fessional work more effectively and give duties to other teachers and group members. There is evidence that the hierarchical leadership model adds stress and bureaucracy, but it also aids teacher leaders at the National Academy of Education Management in their strategic planning.

VI. DISCUSSIONS

A. A system of hierarchical leadership at the National Academy of Education Management

It can be seen how teacher leadership functions at the National Academy of Education Management thanks to the participants' assessments of top- and middle-level leadership techniques. The outcomes show that the organization follows a typical top-down management approach, which influences leadership behaviors. Effective teacher leadership is typically hampered by the organization's top-down, bureaucratic processes.

As shown in Table 2, the study has identified a number of administrative issues that participants relate to teacher leadership responsibilities at the National Academy of Education Management. The administrative burden of the teacher leaders appears normal, since much of their time is devoted to paperwork, record-keeping, and ensuring policy conformity. Because administrative tasks are highly standardized and leave a little possibility for leadership within the positions, the variety of administrative responsibilities indicates increased responsibility in higher education.

The participants have benefited from the present hierarchies because it has provided them with a clear framework, a strategy, and a plan to support their management role. Additionally, it has made them more aware of the complexity of both professional and cultural life and explained their tasks, provided them a way to proceed, and clarified their tasks.

Although it may come as a surprise, strict bureaucratic systems can occasionally help individuals be guided and organizational goals to be fulfilled.

B. Indications for ELT teacher leaders

Although teacher leadership is top-down, qualitative data suggest that teacher leaders in different groups share or divide leadership responsibilities.

Although their places in the system give them influence, teacher leaders want collaboration among group members and subordinates to accomplish organizational objectives. Their willingness to work together also displays their expert understanding of how shared commitments have increased their achievement. Given how bureaucratic rules hinder col-

laboration among faculty heads, teacher leaders seek to create a trustworthy rapport with their group members in order to foster a comfortable working atmosphere.

The research has identified several administrative issues that participants relate to teacher leadership responsibilities at the National Academy of Education Management as they are currently being offered. The teacher leaders' administrative workload seems to be a typical problem, as much of their time is spent on paperwork, keeping records, and assuring policy adherence. The variety of administrative responsibilities shown here is a sign of improved accountability in the higher education sector as a whole since too many administrative duties tend to be standardized and leave little room for leadership within the roles.

To raise understanding of the importance of teacher leadership in ELT among language teachers, teacher leaders in middle level leadership roles, administrative leadership, and policy makers, this study introduces the notion of teacher leadership. Indeed, it advances knowledge of how teacher leadership has acted as a catalyst for change, with those in such roles influencing change, cooperating with colleagues, and influencing organizational outcomes. This study has given EFL teacher leaders a basis to see their leadership duties from a different viewpoint and match their practices with worldwide standards since additional research is needed to identify these characteristics of teacher leadership in EFL/ESL environments.

With the findings of this study, EFL teacher leaders now carry a solid platform on which to build their practices in accordance with international norms and take a new perspective to their role as leaders. Further research is needed on the traits of teacher leadership in EFL/ESL environments. The ELT professionals who currently hold teacher leadership positions and those who may in the future may improve their leadership skills and understand the nature of teacher leadership and the difficulties associated with using it in EFL contexts.

C. Limitations of the study

A case study technique was decided upon since the current study is context-bound and aims to identify the characteristics that aid EFL teacher leaders in developing their leadership skills. However, a more thorough study using a life history approach, or a narrative research method may compile teacher leaders' varied experiences in ELT which may differ from the existing findings. It can be believed that the case study approach has not been fully utilized because semi-structured interviews and an open-ended questionnaire were used, and a variety of qualitative methods could have added more depth to the data. As a result, future research can take into account using a multi-methods case study approach to examine teacher leadership, which may increase the data's rigor and decrease subjectivity.

VII. CONCLUSION

While a top-down management structure might have detrimental effects on educational institutions, in major institutions like the National Academy of Education Management, it might be regarded as an efficient method of management where more than 25 EFL instructors operate and

adhere to a hierarchical structure that benefits various stakeholders to carry out their given tasks in a straight line. Additionally, under a normal, top-down management style, it is possible to implement middle-level participatory leadership methods, which can help teacher leaders reduce the side effects of top-down regulations. Because hierarchical leadership predominates at the top, it may be advantageous for EFL teacher leaders to develop their leadership skills and, to some extent, be able to successfully carry out their leadership obligations.

REFERENCES

- [1] Bangs, J., & MacBeath, J. (2012). Collective leadership: The role of teacher unions in encouraging teachers to take the lead in their own learning and in teacher policy. *Professional Development in Education*, 38(2), 331–343. <https://doi.org/10.1080/19415257.2012.657879>
- [2] Barth, R. S. (1990). Improving schools from within. Teachers, parents, and principals can make the difference.
- [3] Diamond, J. B., & Spillane, J. P. (2016). School leadership and management from a distributed perspective: A 2016 retrospective and prospective. *Management in Education*, 30(4), 147–154. <https://doi.org/10.1177/0892020616665938>
- [4] Frost, D. (2010). Teacher leadership and educational innovation. *Zbornik Instituta Zapedagoskaistrazivanja*, 42(2), 201–216. <https://doi.org/10.2298/ZIPI1002201F>
- [5] Greenier, V. T., & Whitehead, G. E. (2016). Towards a model of teacher leadership in ELT: Authentic leadership in classroom practice. *RELC Journal*, 47(1), 79–95. <https://doi.org/10.1177/0033688216631203>
- [6] Gümüş, S., Bellibaş, M. S., Esen, M., & Gümüş, E. (2018). A systematic review of studies on leadership models in educational research from 1980 to 2014. *Educational Management Administration & Leadership*, 46(1), 25–48. <https://doi.org/10.1177/1741143216659296>
- [7] Harris, A., & Muijs, D. (2004). Improving schools through teacher leadership. McGrawHill Education.
- [8] Katzenmeyer, M., & Moller, G. (2001). Awaken the sleeping giant: Helping teachers develop as leaders. Corwin Press.
- [9] Katzenmeyer, M., & Moller, G. (2009). Awaken the sleeping giant: Helping teachers develop as leaders. Corwin Press.
- [10] Kavakli, N., & Arslan, S. (2019). Revisiting the role of an EFL teacher as an educational leader: Conceptions and perceptions. *Academia.edu*. Retrieved on 29th April 2020.
- [11] Liu, J. (2008). Preface to. *Leadership in English language teaching and learning*. In C. Coombe, M. L. McClaskey, L. Stephenson, & J. N. Anderson (Eds.), *Leadership in English language teaching and learning*. The University of Michigan Press.
- [12] Margolis, J., & Doring, A. (2012). The fundamental dilemma of teacher leader-facilitated professional development. Do as I (kind of) say, not as I (sort of) do. *Educational Administration Quarterly*, 48(5), 859–882.
- [13] Muijs, D., Chapman, C., & Armstrong, P. (2013). Can early careers teachers be teacher leaders? A study of second-year trainees in the teach first alternative certification programme. *Educational Management Administration & Leadership*, 41(6), 767–781. <https://doi.org/10.1177/1741143213494188>
- [14] Murphy, J. (2007). Teacher leadership: Barriers and supports. In T. Ownsend (Ed.), *International handbook of school effectiveness and improvement: Review, reflection and reframing*. Springer Science & Business Media.
- [15] Nguyen, D., Harris, A., & Ng, D. (2019). A review of the empirical research on teacher leadership (2003–2017). *Journal of Educational Administration*, 58(1), 60–80. <https://doi.org/10.1108/JEA02-2018-0023>
- [16] Poekert, P., Alexandrou, A., & Darbianne, S. (2016). How teachers become leaders: An internationally validated theoretical model of teacher leadership development. *Research in Post-Compulsory Education*, 21(4), 307–329. <https://doi.org/10.1080/13596748.2016.1226559>
- [17] Sanocki, S. J. (2013). The process of how teachers become teacher leaders and how teacher leadership becomes distributed within a school: A grounded theory research study [PhD thesis]. Western Michigan University.
- [18] Sams, D. A. (2010). An analysis of leadership beliefs and practices of 25 TESOL leaders [PhD thesis]. Indiana University of Pennsylvania.

- [19] Silva, D., Gimbert, B., & Nolan, J. (2000). Sliding the doors: Locking and unlocking possibilities for teacher leadership. *The Teachers College Record*, 102(4), 779–804. <https://doi.org/10.1111/0161-4681.00077>
- [20] Swanson, J., Elliott, K., & Harmon, J. (2011). *Teacher leader stories: The power of case methods*. Corwin Press.
- [21] Thompson, C., & Wolstencroft, P. (2015). Promises and lies: An exploration of curriculum managers' experiences in FE. *Journal of Further and Higher Education*, 39(3), 399–416. <https://doi.org/10.1080/0309877X.2013.858676>
- [22] Tschannen-Moran, M. (2009). Fostering teacher professionalism in schools the role of leadership orientation and trust. *Educational Administration Quarterly*, 45 (2), 217–247. <https://doi.org/10.1177/0013161X08330501>
- [23] Underhill, A. (2005). Learning leadership and ELT today. *Humanising Language teaching*, 7(1).
- [24] Wasley, P. A. (1991). *Teachers who lead: The rhetoric of reform and the realities of practice*. Teachers College Press.
- [25] Wenner, J. A., & Campbell, T. (2017). The theoretical and empirical basis of teacher leadership: A review of the literature. *Review of Educational Research*, 87(1), 134–171. <https://doi.org/10.3102/0034654316653478>.
- [26] Whitehead, G. E., & Greenier, V. T. (2019). Beyond good teaching practices: Language teacher leadership from the learners' perspective. *TESOL Quarterly*, 53(4), 960–985. <https://doi.org/10.1002/tesq.526>
- [27] Wieczorek, D., & Lear, J. (2018). Building the "Bridge": Teacher leadership for learning and distributed organizational capacity for instructional improvement. *International Journal of Teacher Leadership*, 9 (2), 22–47.
- [28] Yin, R. K. (1994). *Case study research: Design and methods*. SAGE Publications.
- [29] Yin, R. K. (2011). *Applications of case study research*. Sage.
- [30] York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*, 74(3), 255–316. <https://doi.org/10.3102/00346543074003255>

Factors influence students' attitudes toward AI-based innovative solutions

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Abstract—As technology improves, it appears that academic machine instructors will be used in many jobs in future of education. Despite the fact that the existing research does not clearly define the idea of machine lecturers. Nonetheless, given the current era of education, it appears to be critical to begin thinking about this concept. Machine units are technologies with a specific level of agency, suggesting that they will play a specific function in communication. Lecturers are frequently thought of as those who encourage and help others to improve their emotional and learning behavior via data collecting, advancement, and moral shaping. The machine teacher model may be broadly characterized as a technological design that helps and interacts with a person in boosting affective and learning behavior through numerous techniques, as supported by these two notions. In this paper, different factors will be examined to determine whether these will have certain effects on college students attitudes toward AI teaching assistants.

Index Terms—AI, Machine Teacher, Novelty value, Innovativeness, Interaction, Loyalty.

I. INTRODUCTION

Artificial Intelligence (AI) has become popular in every "novel" of life, demonstrating its essential role in education, a top priority field in every country worldwide. In recent years, the demand for online education has been increasing. A new technology called machine teacher or artificial intelligence teaching assistant has been developed. AI teaching assistants have appeared in coursework and delivered efficient outcomes, especially at this moment when the Covid 19 pandemic has put students and teachers alike in difficult on-line teaching situations.

An AI teaching assistant is considered a practical assistant for learners and teachers, helping knowledge always to be learned and absorbed. Knowledge is always open, and actively supported in the learning and research process; we just need to sit at home, and turn on the phone to be able to study and work remotely. In particular, being able to maintain teaching and learning activities at all educational levels in general, even during the Covid pandemic from the beginning of 2020 up to now, by online form, is a clear demonstration as a breakthrough in the application of technology in education. The school system is implementing artificial intelligence into the teaching platform based on the virtual management platform, capturing the benefits of Deep Learning science research products. Some illusions that aid but are not realistic include Siri, Cortana, and Google's Alexa.

Our main aim was to understand how college students might react to the concept of a mechanical professor. The present study focuses on a teaching assistant who is a machine instructor. The study also examines the factors af-

fecting the students' attitudes toward using AI teaching aids. Based on the original theoretical framework of the research, novelty value and innovativeness are proposed to have positive impacts on Interactions that influence Behavioral loyalty to AI teaching assistants, sequentially.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Generally, the traditional interaction with the direct verbal method in the classroom between learning mentors and students is inefficient in the modern era [36]. Edwards C. [13] suggest that the allowance of technology blended into the curriculum generates more communication features for users via chat and online talk. Hence, incorporating AI products into educational interaction could be viewed as the appropriate solution to improve the efficiency of interaction between teachers, lecturers, and mentors with students, which is a global trend. AI software and product (e.g., social robots) are already widely used as a tool for teacher assistance, tutors, and peers in learning classrooms worldwide [48]. The novelty of this educational method is promised to increase users' interest compared with the traditional ones [44]. This literature review will examine the factors that impact the way teachers and students access AI, not only to experience the newfangled environment of education but also to improve the interaction between the users or users toward robots and AI products.

A. The novelty value of AI teaching assistants in building the network of interaction

The construction of interaction between human and AI products is a critical point in determining the feasibility of technological teaching assistants. Previously, instructional communication between humans and robots was primarily based on the synthesis of objective factors (e.g., immediacy, creditability, teaching clarity, humor) to optimize human-robot interaction (HRI) [13]. The construction of novelty value in using AI should have focused on this application's feasibility in different cases. For example, immediacy in communication in HRI was only ensured when AI and its application via software or metal form (robot) generated familiarity for users in the using process without any hesitance [21]. Hence, when the response of AI products to the needs of users is ensured, interaction efficiency will be enhanced. Looking at the novelty of using AI, Edwards, C [12] states that AI gradually generates a friendly educational setting via the format of social robots to be capable of appropriately relaying information to students better than traditional media. Overall, when creating novelty value to improve user inter-

action, it must be generated at the user's convenience and prioritize the application of AI. However, "Is it enough to persuade the mindset modification about AI's value in the educational field?" The uniqueness in teaching methods and education systems will clarify the role of social robots and AI products in orientating the right assistant. In an academic interview conducted in 2011 by Winter, P[50] that the uniqueness in educational teaching will enhance the interaction thanks to the rising interest from the perceiver toward the communicator. Simplifying this view, identity could be defined as irreplaceable by imposing on users' mindsets about the value of AI products (e.g., social robots) with their role only offered for this user segment. Thanks to its uniqueness, people will have well-sentiment and good interaction with this technological educational method.

B. Innovativeness And Interaction

The definitions and the measurements of innovativeness were introduced to generate the "newness" of innovation [34]. The basic definitions of innovativeness were also developed on the scale and in-depth understanding of the innovation linked with the technology [16]. Already, innovation in education has been investigated to promote online satisfaction during the learning process with interaction measurement via AI products (e.g., robots and learning software [2]. In general, innovativeness directly facilitates the penetration of AI and its applications and improves user interaction and the AI product. It is examined by Rampersad G. [41] with academic research to establish the connection and multilateral effect of the potentiality of innovativeness with using AI in the educational field. This research clarifies the hypothesis that innovativeness positively affects interaction in using AI. Additionally, innovativeness in utilizing and optimizing AI products is also mentioned in the statement. As a result, the question "What type of innovation could positively affect the interaction and use of AI process?" Before deciding on an answer, it is necessary first to perceive the question. The value of innovation in using AI and its application in teaching assistants is described as "essential abilities" that require students to be able to solve new challenges and generate new ideas (WEC 2016). Applying skill in the generation of innovation is critical for developing innovation in the use and interaction with AI. Rampersad G. [41] emphasized that innovation is also an opportunity for adaptation. Rampersad G. [41] noted that innovation is also an opportunity for transformation for the users, especially students accessing AI. Nonetheless, it requires multiple skills that students have to satisfy the development of AI products, problem-solving, and critical thinking. To clarify this conclusion, within the growth of Artificial Intelligence (AI), users must strive to adapt and transform AI values to optimize personal benefits [47]. As a result, the innovativeness of using AI in educational assistance must begin with users' awareness of the value of bettering themselves. Problem-solving is essential for difficulties related to challenges in developing solutions using technology in education [42]. While critical thinking facilitates evaluating the using-AI efficiency, they adapt to the requirements [26]. Subsequently, the general assessment of the innovativeness of using AI for educational assistance reflects not only the role of generat-

ing new products to solve and simplify the process of using AI but also the motive to promote the improvement of users, particularly students when receiving the development of learning technology.

C. Loyalty to Artificial Intelligence

The application of artificial intelligence (AI) may alter consumer behavior. Innovation threatens trust and loyalty in AI products in the digital technology era. This is explained, for this analysis, by the consistent speed in technological growth with the incessant introduction and updating of AI products that generate a diversity of choices. Nonetheless, it could not obscure whether people believe AI and AI generate reliability for people's experiences. Initially, the connection between trust and loyalty in customer psychology is determined by the adequacy of faith generated. Hence, trust building is essential before examining and evaluating the extent of loyalty of customers toward products [18]. Particularly related to using AI solutions, establishing the loyalty measurement scale is crucial to developing the construction of innovation [33]. The measurement scale based on research by McMullan, R. also emphasized consistency between the systems, including phase stages responsible for representing the truthfulness aspect of judging and measuring loyalty.

Furthermore, users' loyalty was determined based on AI's experiences. Clients who have used a product or new technology without incident may continue to use the product or technology [45]. In clear expression, achieving users' loyalty to products, especially in the educational field via AI products (e.g., social robots, teaching software), requires the establishment of the quality and applicability of the product for clients. For example, student trust in an AI-powered curriculum results from meeting students' needs through the feature that supports their work. Hence, building trust is interwoven to enhance the efficiency of educational solutions [5]. Take an overview of the relevant aspects to achieve loyalty to AI-designed products. The generated attraction and privacy are the ultimate missions that AI's solution must ensure. The generated interest motivates students to follow and have a sentiment about the online learning technological application [24].

At the same time, privacy is the crucial point that determines whether to make the decision process stay in experience with AI products and optimize the benefit that AI generates. Privacy via the access and publication of personal data causes the fear of being used [15]; [30]. The AI proposed solution is successful because it relies on the guarantee of a private network set up to ensure the personal information of users and students does not leak. However, to accomplish this mission, the implementation of users' privacy on AI products (e.g., chatbots, online learning apps) should have been imposed [25]. As a result, the development of AI threatens the workforce's job, as the original purpose of AI was to provide convenience and reduce the workload for humans. However, robot and automatic processes directly threaten human work due to the working principle of robots without any weariness and interruption up to 24 hours per day. McClure, P.K. [31] stated that AI and its products should play a role as assistants rather than the leading role.

In the educational system, AI solutions to facilitate the work of lecturers and teaching support with current products such as chatbots, online learning platforms, and learning apps are focused on their benefits for teaching work. This client segment will commit to using AI products for their work. However, AI products like robots play a role as teachers and lecturers that contribute to the unemployment process of the labor force. There is no loyalty and commitment established.

D. Machine Teacher

With the development of technology, the long-term nature of educational background is likely to expand with the introduction and adoption of academic lecturers in machine shape in diverse functions (e.g., teaching assistant, tutorial advisor). To firmly emphasize, the conceptualization of this notion is crucial in the initial period, especially in the educationally innovative era, despite the fact that there is a lack of research to outline the concept of machine teachers. Machine units are somehow defined as technologies that include a precise level of agency and serve a specific function in the communication process [14]. Regarding lecturers, lecturers are often cited as people who generate and assist others in improving their emotional and learning behaviors via acquiring knowledge, progress, or even moral development [3]. Meanwhile, the machine teacher model can be clarified by the support of the two above ideas, concluding the following definition as a technology design that aids humans in improving their emotional and cognitive behavior through a variety of means through the learning acquirement of students.

The term "machine teacher" can be expressed in many types, particularly embodied or incorporeal representatives. Embodied or incorporeal representative are two of the types that the term "machine teacher" expresses when expressing its function. Generally, "embodiment" can be generated in the progressive transformation of physical manifestation or presence to become the system requirement [40]. Hence, the proper implementation of the machine teacher requires the presence of a possible and attainable machine instructor that is physical, virtual, or hybrid. The proposal of a physically manifested machine can be utilized and constructed based on biological components (e.g., steel, acrylic). Already, the record of existing examples of a physically manifested machine, namely NAO, is a machine that interacts in specific educational environments by using an embodiment. A computer system that generates a visually distinct being solely presented on a screen might also be considered the confluence of technology and virtual embodiment [29]. In a similar case, the role of an academic machine lecturer can be responsible for a form generated from a combination of physical embodiment and disembodiment. While non-embodied instructional machine teachers interact using a variety of separate possibilities, robots with physical manifestations are combined with specialized digital devices to represent simulated entities on display.

For instance, VNU Chatbot and Duolingo are both viewed as machine disembodiment in the eyes of VNU students. It is clear to predict an increase in the use of machine lecturers sooner rather than later because of the increasing availability and ubiquity of online courses at numerous edu-

cational levels. Typified instructional machines, whether immaterial or realized, will be crucial in the current web-based world. However, it is unknown how pupils could respond to machine teachers.

E. The impact of anthropomorphism on consumer desire to utilize AI teaching assistant

According to Guthrie [19], anthropomorphism is imputing imagined behavior or real attributes, such as inspirations, expectations, or sympathies, to non-human professionals. Recent research has revealed a complex relationship between leverage and consumers' willingness to personalize things. This word is not very uncommon considering how many robots have been created and trained to converse with people on their own. The robots were limited by the preset timetable of their master.

Moreover, the proposal that constructing artificial social networks or giving technology human-like characteristics may improve users' subsequent interactions. Goetz and Kiesler [17] discovered that people preferred amiable, gregarious, and sociable robots over serious or introverted robots. Moreale and Watt [35] noted that "I believed that a humanized internal helper program would enhance users' capacity to learn the software and provide beneficial guidance in any situation". In a wilderness survival experiment, participants responded more positively and attentively to interfaces that featured more human expressions [4].

The client's capacity to utilize humanoid attribution in particular addresses a sizable stream in advertising writing. Numerous marketing academics have looked on the implications of humanoid attribution for customers' desire to utilize it. According to Waytz et al., [49] clients have higher faith in human-AI administration professionals than non-human ones

According to De Visser et al. [11], humanizing administration experts boosts the intelligent efficacy between AI administration professionals and clients. Essentially, Yuan and Dennis [52] examined the effects of overtly human factors on consumers' willingness to purchase and reached a sound result. The favourable effect of humanoid attribution on consumers' recognition of or ability to use them is supported by a number of experimental findings from other advertising studies.

Overall, the current research proposes four hypotheses based on constructed conceptual framework of the study

H1: The novelty value of AI has a positive impact on the students' interactions

H2: The innovative of AI solutions has a positive impact on the students' interactions

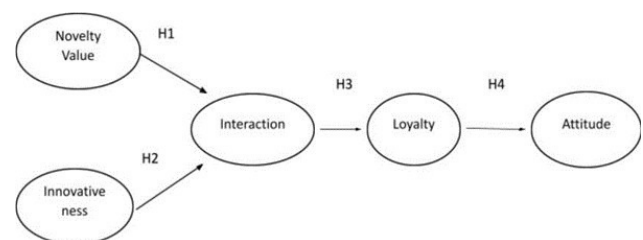


Fig. 1 Conceptual Framework.

H3: Students' high level of interactions will result in the loyalty of AI solution

H4: The loyalty of students will lead to a positive attitude toward using AI solutions

III. METHODOLOGY

The first 200 undergraduate students from an international university made up the original sample size. The total sample size was 165 after the removal of 12 responses, which failed the participant's check, and 23 incomplete responses. Given that it exceeds the required sample size of 100, additional analysis is appropriate [21]. Table 2 displays the respondents' descriptive data. A suitable non-probability sampling process was chosen since it seemed like the most practical choice and is the one used by researchers the most. Screening questions were used to identify whether the respondents used Grammarly for their reports on their computers.

The novelty value, innovation, engagement, and loyalty questions that followed. On average, each respondent needed eight to ten minutes to complete the survey. The MS Team platform was used to operate undergraduate students and collect statistics. The first through fourth years of study are covered by them. The students have been advised to use the AI tool by the lecturers during their 10-week course of study. Advised AI teaching assistant at the moment can be related as Grammarly, Google Translator, Cortana, and Google Voice. These are trustworthy educational environments and credible sources of psychological information.

TABLE I
DEMOGRAPHICS

Variable	Definition	Frequency	Percentage
Gender	Female	97	58.79
	Male	68	41.21
Attend AI-related training or courses	Attend before	126	76.36
	Do not Attend AI-related training or courses	39	23.64

The majority of the assessments in this study were on a 7-point Likert scale. Compared to the 5-point Likert scale, the 7-point Likert scale captures more variety. Most of the items were derived from well-known sources, ensuring the measures' reliability and validity. Table 3 lists the components in each construct and their respective sources. The list of measures is expressed via a questionnaire to evaluate and generate an in-depth view related to AI-teaching assistants. Notably, the measurement scale for the entire measurement would strictly adhere to the 7-Likert scale, which is an effective tool for comprehending the perception of the research [22]. As for the first aspect, attitudes toward new technologies (ATT) were measured through two items. For instance, "How comfortable would you be with new technologies (e.g., robots, AI) taking routine roles?" and "How comfortable would you be with new technologies (e.g., robots, AI) taking interpretive roles?" Responses for this aspect would

be obtained from the 7 Likert Scale (e.g., 1 = strongly disagree; 7 = strongly agree). The 7-Likert-type scale was applied to generate the results (e.g., 1 = strongly disagree; 7 = strongly agree). In the further step, Intention to adopt AI teaching assistant-based education (INT), the items were listed to establish the initial idea about adopting efficiently into AI products. Kim, J. et al. [23] listed it as "If an AI teaching assistant-based online class is available, I would consider taking the class" and "If an AI teaching assistant-based online class is available, I would be interested in taking the class." The 7-Likert-type scale also evaluates it. To evaluate the aspect of consumer innovativeness (INV), it is required to use the in-depth scale to review the perception of innovativeness that people need [43]. It lists six items to clarify users' sentiment toward innovativeness provided in the questionnaire. Furthermore, the novelty value provided beneath the five items begins with "Using AI-based technology (e.g., virtual agent, voice-based agent, robot) is ". It served as a tool to evaluate the newness of the teaching assistant. Also, the innovativeness was supported by the proposal of Interaction (ITR). It included statements like "I can easily..". It also assessed how users accessed the features and facilitated how users generate their own experiences. Generally, the measurement scale also examines the loyalty of users in the four items, including "I will use AI-based technology the next time I seek solutions,"; "I intend to keep using AI-based technology,"; "I am committed to AI-based technology"; and "I would be willing to pay a higher price for AI-based technology over other solutions." Subsequently, the function of the loyalty examination is to generate a survey about the trust and loyalty of users for following usage [7]. It will be concluded by the service quality with three supported items to probe the review of the user toward the AI-teaching assistant solution.

TABLE II
CORRELATION AND AVE VALUE

	Innovativeness	Novelty	Attitude	Interaction	Loyalty
Innovativeness	0.828				
Novelty	0.613	0.883			
Attitude	0.573	0.686	0.933		
Interaction	0.653	0.756	0.674	0.913	

TABLE III
SMART PLS RESULTS

Relationship	Coefficient	Standard Deviation	T Statistics	P Values	CI 2.5%	CI 97.5%	VIF
Innovativeness -> interaction	0.305	0.085	3.582	0	0.135	0.462	1.601
Novelty -> interaction	0.569	0.07	8.18	0	0.444	0.702	1.601
interaction -> loyalty	0.747	0.046	16.271	0	0.647	0.824	1
loyalty -> attitude	0.733	0.047	15.569	0	0.63	0.812	1

IV. DISCUSSION AND CONCLUSION

In conclusion, the current study investigated the variables that affect students' acceptance of novel AI-based educational solutions. It is thought that a key element in determining good views toward the AI teaching assistant model is the novelty value or innovativeness that an AI teaching assistant offers for students, which ultimately leads in behavioural loyalty. Future scientists are recommended to expand this area of focus by repeating it with various understudy populations and educators in light of the basic findings of the rise and growth analysis. Depending on their level of education, understudies may have different perspectives regarding an AI displaying partner (for instance, school versus secondary school). Additionally, AI guidance may provide an effective technique for providing essential instruction if the COVID-19 epidemic prevents face-to-face human interaction.

REFERENCES

- [1] Abdullah, F., & Ward, R. Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, 56, 238–256, 2016.
- [2] Bervell, B., Umar, I.N. and Kamilin, M.H. Towards a model for online learning satisfaction (MOLS): re-considering non-linear relationships among personal innovativeness and modes of online interaction. *Open Learning: The Journal of Open, Distance and e-Learning*, 35(3), pp.236–259, 2020.
- [3] Bloom, B. S.. *Taxonomy of educational objectives: The classification of educational goals*. New York: David McKay Company, 1956.
- [4] Burgoon, J. K., Bonito, J. A., Bengtsson, B., Cederberg, C., Lundberg, M., & Allspach, L. . Interactivity in human-computer interaction: A study of credibility, understanding, and influence. *Computers in Human Behavior*, 16(6), 553–574, 2000.
- [5] Carvalho, S.W. and de Oliveira Mota, M. The role of trust in creating value and student loyalty in relational exchanges between higher education institutions and their students. *Journal of marketing for higher education*, 20(1), pp.145–165, 2010.
- [6] Chandler, J., & Schwarz, N. (2010). Use does not wear ragged the fabric of friendship: Thinking of objects as alive makes people less willing to replace them. *Journal of Consumer Psychology*, 20(2), 138–145, 2010.
- [7] Cheng, Y. and Jiang, H., 2020. How do AI- driven chatbots impact user experience? Examining gratifications, perceived privacy risk, satisfaction, loyalty, and continued use. *Journal of Broadcasting & Electronic Media*, 64(4), pp.592–614, 2020.
- [8] Coeckelbergh, M. . Virtual moral agency, virtual moral responsibility: on the moral significance of the appearance, perception, and performance of artificial agents. *AI & society*, 24(2), 181–189, 2009.
- [9] Davis, F. D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340, 1989.
- [10] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982– 1003, 1989.
- [11] De Visser, E. J., Monfort, S. S., Goodyear, K., Lu, L., O'Hara, M., Lee, M. R., & Parasuraman, K.F. A little anthropomorphism goes a long way. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 59(1), 116–133, 2017.
- [12] Edwards, A., Edwards, C., Spence, P.R., Harris, C. and Gambino, A. Robots in the classroom: Differences in students' perceptions of credibility and learning between "teacher as robot" and "robot as teacher". *Computers in Human Behavior*, 65pp. 627–634, 2016.
- [13] Edwards, C., Edwards, A., Spence, P.R. and Lin, X. I, teacher: using artificial intelligence (AI) and social robots in communication and instruction. *Communication Education*, 67(4), pp.473–480, 2018.
- [14] Fischer, G. Communication requirements for cooperative problem solving systems. *Information Systems*, 15(1), 21–36, 1990.
- [15] Fogel, A. L., & Kvedar, J. C. Artificial intelligence powers digital medicine. *NPJ digital medicine*, 1(1), 1–4, 2008.
- [16] Garcia, R. and Calantone, . A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management: An international publication of the product development & management association*, 19(2), pp.110–132, 2002.
- [17] Goetz, J., & Kiesler, S. Cooperation with a robotic assistant [Paper presentation]. CHI02: Human Factors in Computing Systems. Minneapolis, Minnesota, 2002.
- [18] Gul, R. The relationship between reputation, customer satisfaction, trust, and loyalty. *Journal of Public Administration and Governance*, 4(3), pp.368–387, 2014.
- [19] Guthrie, S. E. Anthropomorphism: A definition and a theory. In R. W. Mitchell, 1997.
- [20] N. S. Thompson, & H. L. Miles (Eds.), *SUNY series in philosophy and biology. Anthropomorphism, anecdotes, and animals* (pp. 50–58). State University of New York Press.
- [21] Han, J.H., Jo, M.H., Jones, V. and Jo, J.H. . Comparative study on the educational use of home robots for children. *Journal of Information Processing Systems*, 4(4), pp.159–168, 2008.
- [22] Joshi, A., Kale, S., Chandel, S. and Pal, D.K. Likert scale: Explored and explained. *British journal of applied science & technology*, 7(4), p.396, 2015.
- [23] Kim, J., Merrill, K., Xu, K. and Sellnow, D.D. . My teacher is a machine: Understanding students' perceptions of AI teaching assistants in online education. *International Journal of Human-Computer Interaction*, 36(20), pp.1902–1911, 2020.
- [24] Kim, K.J. and Frick, T.W. Changes in student motivation during online learning. *Journal of Educational Computing Research*, 44(1), pp.1–23, 2021.
- [25] Kirienco, M., Sollini, M., Ninatti, G., Loiacono, D., Giacomello, E., Gozzi, N., Amigoni, F., Mainardi, L., Lanzi, P.L. and Chiti, A., 2021. Distributed learning: a reliable privacy-preserving strategy to change multicenter collaborations using AI. *European Journal of Nuclear Medicine and Molecular Imaging*, 48(12), pp.3791–3804.
- [26] Krishna Rao, M.R.K. . Infusing critical thinking skills into content of AI course. In *Proceedings of the 10th annual SIGCSE conference on Innovation and technology in computer science education* (pp. 173–177), 2005, June.
- [27] Landwehr, J. R., McGill, A. L., & Herrmann, A. It's got the look: The effect of friendly and aggressive "facial" expressions on product liking and sales. *Journal of Marketing*, 75(3), 132– 146, 2011. <https://doi.org/10.1509/jmkg.75.3.132>.
- [28] Li, J. The benefit of being physically present: A survey of experimental works comparing copresent robots, telepresence robots, and virtual agents. *International Journal of Human-computer Studies*, 77, 23–37, 2015.
- [29] Li, J., Kizilcec, R., Bailenson, J., & Ju, W. Social robots and virtual agents as lecturers for video instruction. *Computers in Human Behavior*, 55, 1222–1230, 2015.
- [30] Manheim, K., & Kaplan, L. Artificial intelligence: Risks to privacy and democracy. *Yale JL & Tech.*, 21, 106, 2019.
- [31] McClure, P.K. "You're fired," says the robot: The rise of automation in the workplace, technophobes, and fears of unemployment. *Social Science Computer Review*, 36(2), pp.139–156, 2018.
- [32] McKnight, D. H., & Chervany, N. L. What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *International journal of electronic commerce*, 6(2), 35–59, 2001.
- [33] McMullan, R. and Gilmore, A. The conceptual development of customer loyalty measurement: A proposed scale. *Journal of Targeting, Measurement and Analysis for Marketing*, 11(3), pp.230–243, 2003.
- [34] Midgley, D.F. and Dowling, G.R. Innovativeness: The concept and its measurement. *Journal of consumer research*, 4(4), pp.229–242, 1978.
- [35] Moreale, E., & Watt, S. An agent- based approach to mailing list knowledge management. In L. van Elst, V. Dignum, & A. Abecker (Eds.), *Agent-mediated knowledge management. AMKM 2003. Lecture notes in computer science* (Vol. 2926, pp. 118–129), 2004. Springer Berlin, Heidelberg.
- [36] Nind, M. and Hewett, D. Access to communication: Developing the basics of communication with people with severe learning difficulties through intensive interaction, 2012. David Fulton Publishers.
- [37] Park, E., Kim, K.J. and Pobil, A.P.D. The effects of a robot instructor's positive vs. negative feedbacks on attraction and acceptance towards the robot in classroom. In *International conference on social robotics* (pp. 135–141), 2011, November Springer. Berlin, Heidelberg.
- [38] Park, Y., & Chen, J. V. Acceptance and adoption of the innovative use of smartphone. *Industrial Management & Data Systems*, 107 (9), 1349–1365, 2007.
- [39] Petrock, V. US voice assistant users 2019: Who, what, when, where and why. eMarketer, 2019.
- [40] Pfeifer, R., & Scheier, C. Understanding intelligence. The MIT Press. Ramírez-Montoya, M. S., Mena, J., & Rodríguez-Arroyo, J. A. (2017).

- In-service teachers' self-perceptions of digital competence and OER use as determined by a xMOOC training course. *Computers in Human Behavior*, 77, 356–364.
- [41] Rampersad, G. Robot will take your job: Innovation for an era of artificial intelligence. *Journal of Business Research*, 116, pp.68-74, 2020.
- [42] Redish, E. F., & Smith, K. A. Looking beyond content: Skill development for engineers. *Journal of Engineering Education*, 97(3), 295-307, 2020.
- [43] Roehrich, G. Consumer innovativeness: Concepts and measurements. *Journal of business research*, 57(6), pp.671- 677, 2004.
- [44] Selwyn, N. Should robots replace teachers?: AI and the future of education. John Wiley & Sons, 2019.
- [45] Siau, K., & Wang, W. Building trust in artificial intelligence, machine learning, and robotics. *Cutter business technology journal*, 31(2), 47-53, 2018
- [46] Statista. (2019, February). Number of voice assistants in use worldwide 2019-2023. <https://www.statista.com/statistics/973815/worldwide-digital-voice-assistant-in-use/>
- [47] Täks, M., Tynjälä, P., Toding, M., Kukemelk, H., & Venesaar, U. Engineering students' experiences in studying entrepreneurship. *Journal of engineering education*, 103(4), 573-598, 2014.
- [48] Vasagar, J. How robots are teaching Singapore's kids. *Financial Times*, 2017.
- [49] Waytz, A., Morewedge, C. K., Epley, N., Monteleone, G., Gao, J. H., & Cacioppo, J. T . Making sense by making sentient: Effectance motivation increases anthropomorphism. *Journal of Personality and Social Psychology*, 99(3), 410–435. <https://doi.org/10.1037/a0020240>, 2010.
- [50] Winter, P. Coming into the world, uniqueness, and the beautiful risk of education: An interview with Gert Biesta. *Studies in Philosophy and Education*, 30(5), pp.537-542, 2011.
- [51] World Economic Forum. The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution. *Global Challenge Insight Report*, 2016.
- [52] Yuan, L. (Ivy), & Dennis, A. R. Acting likehumans? Anthropomorphism and consumer's willingness to pay in electronic commerce. *Journal of Management Information Systems*, 36(2), 450–47, 2019.

Sustainability Reporting in India: A Critical Assessment of Business Responsibility Reports of the Top 100 Companies

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Abstract—This paper aims to investigate environmental, social and governance reporting compliance by the top 100 companies in India. It presents and discusses companies' compliance, the nature of disclosures, and the issues and challenges in reporting. For this purpose, content analysis of the business responsibility reports of these companies published between 2016 and 2019 and an expert survey were conducted. The paper provides insights into sustainability reporting compliance amid the ongoing efforts to develop reporting regulations in India suited to the country's context and, simultaneously, at par with global standards.

Index Terms—sustainability, business responsibility, India, ESG, nonfinancial reporting

I. INTRODUCTION

The Union Government of India launched a new sustainability reporting requirement in May 2021 [1]. The format released by the Securities Exchange Board of India (SEBI), which regulates capital markets in the country, is known as the Business Responsibility and Sustainability Report (BRSR). SEBI has mandated the top 1000 companies, by market capitalisation, listed on the two Indian stock exchanges, i.e. the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE), to publish the BRSR starting from 2022-23. In this new format, these companies must report material ESG risks and opportunities, mitigation approaches, sustainability goals and targets, and environmental and social disclosures.

The BRSR is the most recent development in sustainability reporting regulations in India. The first reporting format, known as the business responsibility report (BRR), was launched in 2012, and the top 100 companies were mandated to publish BRR [2]. This mandate was extended to the top 500 companies in 2015 [3]. Before the BRR, the government had launched the corporate social responsibility (CSR) guidelines and the national voluntary guidelines (NVGs) in 2009 and 2011, respectively [4, 5]. The CSR guidelines were the first guidelines urging all kinds of companies in India to conduct business socially and environmentally responsibly. However, no framework or format was provided for disclosing information in this regard. The NVGs, following the CSR guidelines, were a set of nine principles to be incorporated by companies in their business models. These principles are related to customers, employees, the environment, ethics, human rights, etc. To date, these nine principles form the basis of sustainability reporting in India. The most recent BRSR format is also based on principle-wise disclosures. After 2015, in the following years, the government launched the national guidelines for responsible busi-

ness conduct in 2019, along with a revised BRR format [6]. This document was one of the comprehensive regulations on sustainability reporting for Indian companies. The format included material risks, stakeholder engagement, social and environmental disclosures in either essential or leadership categories. Before the BRR format came into the picture in 2012, many top companies in India, including the Mahindra Group, the Tata Group, Maruti Suzuki India Ltd., Ambuja Cements Ltd., ITC Ltd., Reliance Industries Ltd., were preparing sustainability reports using formats like the Global Reporting Initiative (GRI) and CDP (Carbon Disclosure Project) etc. The GRI standards are the most widely used for sustainability reporting [8]. The oldest report in the GRI database is the Tata Motors 2008 sustainability report [9].

All these developments show that the regulations for sustainability reporting in India evolved in the last decade. With every revision, the format became comprehensive. The number of disclosures increased in line with global frameworks like the Global Reporting Initiative (GRI) Standards. The accompanying guidance also became extensive [7]. Materiality analysis and stakeholder engagement are essential parts of the new format. The regulation is based on extensive stakeholder deliberations [1], and the number of companies covered under the mandate has increased from 100 to 1000 in ten years. A cross-country study [10] showed that mandatory sustainability regulations improve the quality and quantity of disclosures and firm value.

While financial gains or firm value can be rational reasons for companies to prepare sustainability reports, the stakeholders' expectations for transparency and accountability from the corporate sector are also increasing. The pressures from institutional investors, government, the community, and civil society organisations are intensifying [11]. As we move towards the 2030 agenda for sustainable development, the regulations are expected to become more stringent and compulsory rather than voluntary.

In the literature, the impact of sustainability on the performance of companies has been explored [12]. But very few studies assess compliance with sustainability regulations in India. One study [13] published in 2017 mapped the disclosures against the NVGs for the top 100 companies. In the same year, a consultancy firm also conducted a survey [14] on the response of the leading companies and reported the trends in BRR to provide insight into making the format mandatory for 500 companies. These studies were restricted to reports published before 2017. Post that period, a critical

assessment of the BRRs published by India's top 100 companies is missing in the literature.

Against this backdrop, this paper attempts to provide insight for future policy-making on sustainability reporting in India. The paper presents a critical review of the BRRs published between 2016 and 2019 of the top 100 (by market capitalisation in India) listed companies in India. It presents and discusses companies' compliance, the nature of disclosures, and the issues and challenges in BR reporting. Data extracted from the BRRs was analysed using descriptive analysis. Further, semi-structured interviews were conducted with experts to probe the difficulties companies face in preparing reports.

The remaining paper is divided into the following sections: literature review, methodology, results, discussion, and recommendations. The concluding section discusses limitations and future research directions.

II. REVIEW OF LITERATURE

A. The Indian Context

The keywords used to study the literature were - "sustainability" OR "ESG" OR "business responsibility" OR "CSR" AND "reporting" on the Web of Science platform. Through manual verification, papers relevant to the study's objectives were divided into the following themes: (a) Sustainability and BR Reporting, (b) CSR reporting, and (c) GRI and Environmental, Social, and Governance (ESG) reporting. A discussion emerging from the review follows.

B. Sustainability and BR Reporting

A recent study was conducted by Adler et al. (2021) [15] on waste disclosure by 30 companies in India. The authors used a waste disclosure index to analyse the data of these companies sourced from sustainability, annual, and BR reports. They reported that almost 85 per cent of companies disclosed limited information. Similarly, Singh et al. (2020) [16] developed a sustainability disclosure index for small and medium enterprises (SMEs) listed on the Bombay Stock exchange. They used content analysis to study the sustainability reporting practices of 29 SMEs. They found that these firms reported environmental and social impacts inadequately and recommended more robust policies and regulations. Some researchers focused only on one dimension of sustainability. For instance, Mathiyazhagan et al. (2020)

[17] prepared a model of the social sustainability practices of automotive manufacturing firms. They found customer management, information sharing, reporting and standardisation, and monitoring methods to be the most influential in driving the social sustainability of these firms.

Most of the work on sustainability reporting was found to be sectoral. Kumar et al. (2018) examined the reports of the top 10 Indian banks [18]. They found that the banks had a long way to go in sustainability reporting, specifically regarding adequacy and transparency. Stakeholder engagement was weak, and quantified data on metrics like remuneration, occupational health and safety, and customer privacy were missing. In another study, Raut et al. (2017) [19] analysed the sustainability reports of six banks. They developed an integrated model combining financial stability, cus-

tomers relationship management, internal business process and an environment-friendly management system. They found that an environment-friendly management system was given the least preference by companies.

Yadav and Sinha (2015) [20] conducted a study on public and private companies. They analysed sustainability reports and found no significant differences between the two types on the economic dimension, but reporting on environmental and social dimensions was quite different. Some authors undertook a cross-country analysis. Mishra et al. (2020) [21] evaluated the annual and sustainability reports of Indian, Chinese and USA companies from five highly polluting industries. They found that larger firms are more likely to report more disclosures than smaller firms.

C. CSR Reporting

The concept of CSR in the literature is different from sustainability. While sustainability combines economic, social and environmental dimensions, CSR usually comprises voluntary, charitable initiatives of the company.

One section of the literature was about the impact of CSR regulation in India, unique to the Indian context. A recent study was conducted by Jumde (2020) [22] on companies' compliance with the regulation in India. She found that the law seemed like a "tick-box exercise" for many companies, and the public sector invested in CSR as the government directed.

Some researchers created measurement models for understanding CSR performance. Debnath et al. (2018) [23] proposed a multi-criteria decision-making model based on five criteria and 17 indicators to measure CSR practices' compliance, accountability, and transparency. Some focused on particular sectors only. Pratihari and Uzma (2018) [24] conducted a content analysis of CSR reports in the banking sector. They found that public sector banks prioritise community-related initiatives while private banks accord customers the highest priority.

Plenty of literature explored the relationship between CSR and the company's financial performance. Although such topics do not fall under the scope of this study directly, these papers helped to understand the measurement of CSR in the literature. Singh and Chakraborty (2021) [25] developed a multidimensional CSR disclosure measuring six dimensions, i.e. employees, customers, investors, community, environment and others. Cherain et al. (2019) [26] identified five parameters from the literature, i.e. education, employee benefits expense, environment, community, customer, products and stock return. Muttakin and Subramaniam (2015) [27] designed a seventeen-item scale to measure CSR; the items were adapted from past literature.

Some researchers carried out analyses to identify CSR determinants. For instance, using panel data set for 2012-14, Jادیappa et al. (2021) [28] found that firms involved in high energy consumption or accounting manipulation have a higher probability of undertaking voluntary CSR. [29] Bansal et al. (2021) investigated if peer pressure affects CSR. They concluded that peer pressure was a significant determinant of CSR performance; however, the CSR mandate as per the Companies Act 2013 has diminished its significance. Adnan et al. (2018) [30] investigated the impact

of national culture and corporate governance on CSR reporting. They studied 403 reports and websites of companies based in China, Malaysia, India and the United States. They found that CSR reporting is more prevalent in individualistic societies with low power distance. Also, board committees and government ownership have an impact.

D. GRI and ESG Reporting

An emerging stream of research focused on ESG reporting. Chauhan and Sharma et al. (2020) [31] analysed the ESG performance of Indian companies listed on the Bombay Stock Exchange between 2013 and 2016 by analysing their annual and sustainability reports. They found that ESG disclosures had a significant positive effect on these companies' financial and market performance. Also, Chauhan and Kumar (2019) [32] investigated the impact of ESG reporting on foreign investments of Indian firms and found that foreign investors preferred firms that disclosed ESG information. Bhattacharya and Sharma (2019) [33] investigated the impact of ESG scores on credit ratings for a sample of 122 firms. The ESG scores and credit ratings were sourced from Bloomberg. They found the overall ESG performance and individual components to be significant predictors of creditworthiness. However, unlike ESG reporting, extensive literature was based on GRI Reporting.

Kumar and Das (2018) [34] evaluated GRI reports of BRIC nations. India scored the highest on all three dimensions - economic, environmental and social; Russia scored the least. IT industry in India was the most compliant. In another study in 2021 [35], they analysed reports of 200 firms in developed and emerging economies using text mining. They found that the adoption of GRI reporting expanded rapidly in the second half of the last decade compared to the first half. Canada was the best in disclosures, while India and China ranked the least. Another cross-country comparison was by Bae et al. (2018) [36] among India, Pakistan and Bangladesh firms. The authors found that corporate governance had a strong influence in reducing marketing asymmetry among the stakeholders. Also, Islam and Thomson (2016) [37] carried out research for the Asia-Pacific region by considering the six largest banks from each of the four countries, namely - Australia, Japan, China and India, from 2005-to 2012. They found that banks participating in the GRI are more responsive to disclosing more information; Australian banks emerged as the leaders.

Rodríguez et al. (2018) [38] conducted a study on a sample of 281 firms to determine if corporate governance defines sustainability reporting practices. They found that institutional mechanisms affect the reporting practices to the greatest extent of the institutional, group and firm-level mechanisms. Narula et al. (2021) [39] collected data from 132 industry leaders and policymakers to understand the importance of Industry 4.0 (14.0) technologies in adopting the GRI framework. It was found that 85% of environmental, 65% of economic, and 50% of societal standards were influenced by 14.0. Also, the social aspect was the most overlooked in the manufacturing industry.

E. The Global Context

Apart from the Indian context, studies conducted across the globe were also reviewed. This section presents an over-

view of the literature in the global context. Mura et al. (2018) [40] conducted a comprehensive review of the literature on sustainability measurement. They divided the literature into 12 subfields. Some have been expanding over the years, and others faded out. The three main problems in sustainability measurement identified by the authors are: (a) duplication of the effort by researchers, (b) poor framing of problem, and (c) proposed incomplete solutions. Fifka (2011) [41] carried out a comprehensive review of 186 studies conducted in different geographies. The author discussed that research on sustainability reporting originated in the Anglo-Saxon and Western European contexts in the 1970s. Still, it picked up pace in the emerging and developing economies in the 1990s. The researchers adopted different approaches, but differences in the impact of determining factors were not strong.

Most reviews and studies on sustainability reporting globally have been sector-based because the standards, conditions and challenges vary from sector to sector. Adres (2019) [42] surveyed 261 owners-managers of SMEs to understand their sustainability and good governance practices. Mariadoss et al. (2011) [43] used a case method to study the marketing practices and strategies for promoting sustainable consumption in business-to-business firms.

A significant section of the literature studied either determinants of sustainability reporting [44,45,46] (Cubilla-Montilla et al., 2019; Gerwanski et al., 2019; Farooq et al., 2021) or the relationship of reporting with corporate performance - financial as well as market-based [47,48,49] (Klassen and McLaughlin, 1996; Clarkson et al., 2008; Akisik and Gal, 2017). However, Milne and Gray (2013) [50] discussed that the triple bottom-line approach and GRI reporting were insufficient to sustain the environment; such frameworks and practices created business-as-usual scenarios.

F. Limitations of the Existing Literature

The literature was skewed and mainly emerged from the Western context, where sustainability reporting originated, and the laws progressed. The bodies proposing sustainability reporting standards are also western. Thus, research on Indian companies gives a contextual perspective. Most literature in the Indian context has either been review-based or sectoral. The mandate for business responsibility reporting in India was announced in 2012, and the regulations have been evolving. But very few studies, like Rana, 2017 [13], have studied BR reports. A critical assessment of BR reporting of the top companies in India and insight into the associated issues and challenges are missing in the literature. This study seeks to fill this gap.

III. METHOD

The study used secondary data. BRRs of three financial years, i.e. 2016-17, 2017-18, and 2018-19 for the top 100 companies in India were analysed. Three accounting periods were taken into account for inter/intra-company comparisons. The period between 2016 and 2019 is appropriate to study compliance as the format did not change during this time. The year 2019 was a turning point when significant revisions were made to the BRR format.

The BRRs were either published separately or as integrated or annual reports on the companies websites. The top 100 companies listed on the national stock exchange were chosen in the final sample based on their market capitalisation. The impact intensity of these large-scale global organisations on the socio-environmental context is very high. The data was manually collated and analysed using descriptive statistics. To determine the reasons for non-compliance and understand the issues and challenges for companies, an expert survey was conducted through semi-structured interviews with a purposive sample of ten experts (Table 1).

TABLE 1 PROFILE OF INTERVIEWEES

SN	Designation	Area/Sector	Experience (Yrs)	Gender	Highest Qualification
1	Assistant Manager	Consultancy	6	Female	MBA
2	Associate Director	Consultancy	12	Male	MBA
3	Manager	Export/Import	10	Male	MBA
4	Sustainability Manager	Beverages	10	Male	MBA
5	Senior Manager	Energy	12	Male	MBA
6	CEO	Consultancy	26	Male	MSc
7	Deputy Manager	Construction and Buildings	8	Male	MSc
8	CEO	Consultancy	25	Male	MSc
9	Senior Manager	FMCG	16	Female	PG (PR)
10	Senior Consultant	Consultancy	8	Female	MBA

The interviews were conducted online through Google Meet and recorded. The selected respondents were working in the sustainability/ESG/CSR reporting domain either in a consultancy firm or in a department/division in a public or private sector company responsible for such reporting. The designations and names of the departments/divisions varied, including CSR, corporate communications, public relations, sustainability, and human resource management. Interview data were coded using the web version of Atlas.ti according to thematic analysis adapted from Braun and Clarke, 2006 (Table 2). Descriptive analysis of the reports and themes emerging from the expert interviews follows.

TABLE 2: SIX-STEP METHOD FOR THEMATIC ANALYSIS

Step 1	Familiarisation with Data
Step 2	Initial Coding
Step 3	Generation of Themes
Step 4	Reviewing Themes
Step 5	Defining and Naming Themes
Step 6	Writing the Analysis

Source: Braun and Clarke, 2006

IV. RESULTS

This study had two objectives. One, to ascertain the nature of compliance, quality and quantity of disclosures by the companies in the BRRs between 2016 and 2019 and two, to identify critical issues and challenges emerging in preparing BRRs. This section presents the results in line with the two objectives.

A. Sample Description

The top 100 companies by market capitalisation, listed on the BSE comprised the sample. So, all the companies were large-cap. Almost 50 per cent of the companies across the select three financial years had a paid-up capital of up to 500 crores. Few companies, i.e. 13, 19 and 24 per cent respectively, had a paid-up capital of more than 1000 crores in the three years. Almost 20 per cent of the companies made a profit of up to 1000 crores, and 25, 27, and 34 companies made a profit of more than 1000 crores during the three years (Table 3).

Of the 100 companies, most of the companies were in Maharashtra and New Delhi, followed by a few in Gujarat, Karnataka and West Bengal (Table 4). Thus, majority of the companies were either in southwest or north India.

Most of the companies were required to spend 2 per cent of the last three years' average annual net profit on CSR activities as per Section 135 of the Companies Act, 2013. These companies disclosed that they spent either 1-2% or more than 2% of the profits as per CSR regulation (Table 5). Education and healthcare were the top two CSR activities. Women empowerment followed at the third position for 2016-17 and 2018-19, respectively, while environmental sustainability was the third most reported activity in 2017-18. Upon mapping these CSR activities with the sustainable development goals, most CSR activities lead towards Goals 3, 4, and 5 in all the years. These include good health and well being, quality education and gender equality (Table 6).

TABLE 3: PROFIT AFTER TAXES (PAT) AND PAID-UP CAPITAL

Paid-up capital *	Profit-After Tax*	Number of Companies		
		2016-17	2017-18	2018-19
0- 500	Upto 1000cr	27	25	22
	More than 1000 cr	25	27	34
500-1000	Upto 1000cr	0	4	2
	More than 1000 cr	6	8	6
>1000	Upto 1000cr	2	3	5
	More than 1000 cr	11	16	19

*All numbers are in crores

TABLE 4: GEOGRAPHICAL DISTRIBUTION OF COMPANIES

State	No of Companies		
	2016-17	2017-18	2018-19
Maharashtra	33	37	37
New Delhi	13	17	17
Gujarat	8	10	11
Karnataka	5	5	6
West Bengal	3	4	4
Rajasthan	2	2	2
Tamil Nadu	2	2	1
Telangana	2	2	3
Andhra Pradesh	1	0	0
Haryana	1	1	1
Hyderabad	1	1	1
Kerala	1	1	1
Madhya Pradesh	1	1	1
Punjab	1	1	1
Assam	0	0	1
Chennai	0	0	1
Haryana	0	0	1

TABLE 5: CSR EXPENDITURE

CSR Expenditure (%)	Number of Companies		
	2016-17	2017-18	2018-19
Less than 1%	7	10	5
1% - 2%	30	32	38
More than 2 %	31	36	40

TABLE 6:

YEAR-WISE TOP THREE CSR ACTIVITIES AND THEIR MAPPING WITH THE SDGs

Year	Top Three CSR Activities			SDGs
16-17	Education	Health care	Women empowerment	3,4, 5,10
17-18	Education	Health care	Environment and sustainability	3,4,6,7, 11,15,13,14
18-19	Education	Health care	Women Empowerment	3,4,5,10

B. Governance

As far as governance is concerned, the top five designations of the BR heads reported by companies were company secretary, whole-time director, chief financial officer, managing director and chief sustainability officer (Table 7). These were more or less consistent across the years. Other designations included associate vice-president, director-operations, director-legal and regulatory, head-corporate services, head-environment, health and safety, corporate head-safety, health, environment and sustainability, head corporate infrastructure & administrative services, head- BR and CSR, head- human resources, head- corporate communications, and independent director.

TABLE 7: DESIGNATION OF BR HEAD

Designation of BR Heads	No of Companies		
	16-17	17-18	18-19
Company Secretary	6	8	9
Whole-Time Director	4	6	8
Chief Financial Officer	3	6	4
Managing Director	3	14	14
Chief Sustainability Officer	2	1	1

For the three years, the majority of the companies, i.e. 30, 40, and 45, held BR meeting once in a year, i.e. annually (see Table 8). Most of the other companies held meetings once in 3-6 months. At least one company, each year, reported monthly meetings for the BRR. Only one company in 2016-17 reported weekly meetings. At least 16 companies each year did not disclose this data.

TABLE 8: FREQUENCY OF BR MEETING

Frequency	Number of companies		
	16-17	17-18	18-19
Annually	30	40	45
Bi- annually	3	2	3
3-6 months	13	19	22
Within 3 months	2	1	1
Monthly	1	1	2
Weekly	1	0	0
Data not available	23	21	16

C. Compliance and Principle-wise Disclosures

TABLE 9: DEGREE OF COMPLIANCE

Measure	Number of Companies		
	16-17	17-18	18-19
Prepared a BRR report	84	93	93
Used the prescribed BRR format	84	93	93
Prepared a Sustainability Report	37	41	40

Despite the compulsion, few companies did not prepare BRR (Table 9). BRR was mandated for the top 100 companies way back in 2012. Even if we consider the period required for a company to prepare and install mechanisms and systems to collect and report BR data, a few big companies were still not been able to deliver the reporting and transparency required even five years after the regulation; the reasons need exploration. The companies reported principles as per the prescribed NVGs and the BRR format. Almost 60 per cent of companies made all the nine principle-wise disclosures (Table 10).

The maximum number of companies disclosed ethics, transparency, and accountability policies in 2018-19. The least reported disclosure was the responsible engagement in public and regulatory policy across three years.

TABLE 10: PRINCIPLE-WISE DISCLOSURES(Y)

	Principle	Number of Companies		
		16-17	17-18	18-19
1	Ethics, Transparency and Accountability	77	88	87
2	Safe and sustainable goods and services	72	83	83
3	Employees Well-Being	77	88	87
4	Respect towards all stakeholders, especially the vulnerable/marginalised	75	86	85
5	Human rights	73	84	83
6	Respect and efforts to restore the environment	75	83	82
7	Responsible engagement in public and regulatory policy	51	61	59
8	Inclusive growth and equitable development	76	87	86
9	Value to the customers and consumers in a responsible manner	73	81	83

TABLE 11: TOP REASONS FOR NON-DISCLOSURE

Year	Top Three Reasons		
16-17	Not substantially relevant to the nature of its business	Yet to formulate public policy advocacy	Need for formal policy not felt
17-18	Not substantially relevant to the nature of its business	Company has other forums	Yet to be formulated
18-19	Company engages with industry associations and expert agencies	No specific policy for this principle	Not at a stage or in a position to formulate and implement policies on specified principles

As far as the reasons for non-disclosures related to the principles are concerned, the top reasons were (a) the principle was not of substantial interest to the nature of the business and (b) the company engaged with industry associations and expert agencies for the fulfilment of requirements under the principle. Other reasons included that the company was still not at a stage to implement the concerning principle or no specified policy related to that principle (Table 11).

D. Disclosures

The disclosures in the BRR were in five categories – social, environmental, community development and ethics, supply chain and stakeholder engagement.

TABLE 12A: SOCIAL DISCLOSURES – 1

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Disclosed total number of permanent employees	75	85	83
2	Disclosed number of permanent women employees	76	85	83
3	Disclosed number of permanent employees with disabilities	67	72	73
4	Existence of an employee association that is recognised by management	51	49	48
5	Disclosed number of complaints relating to child labour, forced labour, involuntary labour, sexual harassment	74	82	80
6	Disclosed percentage of mentioned employees given safety & skill up-gradation training in the last year	52	51	67
7	Disclosed total number of employees hired on temporary/contractual/casual basis	71	80	79

There was an increase in companies reporting social disclosures yearly (Table 12A, 12B). The maximum increase was in companies disclosing information about employees given safety and skill up-gradation training. Almost 80 companies reported the number of permanent employees, including women, in 2018-19. A total of 73 companies disclosed the number of permanent employees with disabilities. But some companies admitted to having zero permanent women employees. The minimum number of permanent employees was 18 in 2016-17 and 380 in 2018-19, showing that some companies have very few permanent employees. Some companies also disclosed '0' permanent employees with disabilities in all three years. However, on the contrary, a select few did not have any contractual employees.

Almost 70 per cent of companies disclosed information about strategies and initiatives to address global environmental issues like climate change and global warming. There was an increase of 8 per cent in this number from 2016-17 to 2018-19. However, very few companies disclosed information about any projects related to clean development – only around 20% for all three years (Table 13A, 13B).

TABLE 12B: SOCIAL DISCLOSURES – 1

SN	Measure	16-17		17-18		18-19	
		Min	Max	Min	Max	Min	Max
1	Permanent Employees	18	387223	25	394998	379	424285
2	Permanent Women Employees	0	134542	0	139487	0	152114
3	Permanent Women Employees as % Total Employees	0	43.75	0	43.38	0	43.54
4	Permanent Employees with Disabilities	0	1003	0	1775	0	1744
5	Permanent Employees with Disabilities as % of Total Employees	0	2.81	0	2.81	0	3.07
6	Number of complaints relating to child labour, forced labour, involuntary labour, sexual harassment	0	1470	0	1995	0	87
7	Percentage of mentioned employees given safety & skill up-gradation training in the last year	15	100	22.55	100	33.06	100
8	Total number of employees hired on temporary/contractual/casual basis	0	282311	0	264589	0	293662

The top products/services incorporating environmental concerns were online, recycling, and energy-efficient products. For three years, the top projects relate to alternative fuels, emission reduction, and biogas production. The maximum number of pending show cause notices from the Central Pollution Control Board (CPCB) was 6 in 16-17 and 17-18.

TABLE 13A: ENVIRONMENTAL DISCLOSURES – 1

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Top product or service incorporated social or environmental concerns, risks and/or opportunities	Online services	recycling	Energy efficient products
2	Maximum number of show cause/ legal notices received from CPCB/SPCB which are pending	6	6	3
3	Minimum number of show cause/ legal notices received from CPCB/SPCB which are pending	0	0	0
4	Top strategies to address environmental issues	Only Y/N	Only Y/N	Only Y/N
5	Top Projects to address environmental issues	Use of alternative fuel (biomass)	Emission reduction	Produce biogas

TABLE 13B: ENVIRONMENTAL DISCLOSURES – 2

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Has strategies/ initiatives to address global environmental issues such as climate change, global warming, etc	73	78	75
2	Identifies and assesses potential environmental risks	70	73	69
3	Has Project related to Clean Development Mechanism	22	24	24
4	Has undertaken other initiatives on –clean technology, energy efficiency, renewable energy, etc.	67	72	74
5	Reports Emissions/Waste generated by the company within the permissible limits given by CPCB/SPCB	73	76	68
6	Discloses number of show cause/ legal notices received from CPCB/SPCB which are pending	66	70	71
7	Has a mechanism to recycle products and waste	61	66	69

The number of companies disclosing information about policies for human rights across the supply chain increased from a mere 34 in 2016-17 to 55 in 2018-19. The numbers were almost similar for environmental protection policies. There was a gradual increase in companies reporting sustainable supply chain disclosures. However, the most significant number was any trade or association membership revelation. Overall, the numbers were less as compared to other categories of disclosures.

TABLE 14A: DISCLOSURES ABOUT COMMUNITY DEVELOPMENT AND ETHICS – 1

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Disclosed direct contribution to community development projects	65	65	66
2	Taken steps to ensure that this community development initiative is successfully adopted by the community	64	72	73
3	Disclosed percentage of customer complaints/consumer cases are pending as on the end of financial year	62	79	87
4	Displays product information on the product label, over and above what is mandated as per local laws	48	49	54
5	Disclosed any case filed by any stakeholder against the company regarding unfair trade practices, irresponsible advertising and/or anti-competitive behaviour during the last five years and pending as on end of financial year	66	70	74
6	Conducted any consumer survey/consumer satisfaction trends	58	69	70
7	Specified programmes/initiatives/projects in pursuit of the policy related to Principle 8	71	79	77

TABLE 14B: DISCLOSURES ABOUT COMMUNITY DEVELOPMENT AND ETHICS – 2

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Maximum direct contribution to community development projects	659 CRORE	745 CRORE	849 CRORE
2	Minimum direct contribution to community development projects	1.67 CRORE	1.9 CRORE	6.05 CRORE
3	Maximum percentage of customer complaints/consumer cases are pending as on the end of financial year	0	0	0
4	Minimum percentage of customer complaints/consumer cases are pending as on the end of financial year	46.47%	22%	89%

TABLE 15:
DISCLOSURES ABOUT STAKEHOLDER ENGAGEMENT AND IMPACT ASSESSMENT

SN	Measure	Number of Companies		
		16-17	17-18	18-19
1	Conducted any impact assessment	53	62	69
2	Internal Assessment (in-house team/own foundation etc.)	USE MIX	USE MIX	USE MIX
3	External Assessment (NGO/ Government / any other etc.)	USE MIX	USE MIX	USE MIX
4	Mapped internal and external stakeholders	59	69	75
5	Identified the disadvantaged, vulnerable & marginalised stakeholders	56	65	72
6	Taken special initiatives to engage with the disadvantaged, vulnerable and marginalised stakeholders	58	67	70
7	Disclosed stakeholder complaints have been received in the past financial year	67	70	73
8	Disclosed percent complaints satisfactorily resolved by the management	67	70	73
9	Resolved 100% complaints	26	25	31
10	Resolved less than 50% complaints	3	5	3

Almost 70 per cent of companies reported that they had conducted some impact assessment in 2018-19; most used a combination of internal and external evaluations. Total 75 companies disclosed having mapped internal and external stakeholders. This number increased from 59 in 2016-17. As far as stakeholder complaints are concerned, 73 companies reported such complaints in 2018-19. Of these, only 31 mentioned that they have been able to resolve 100 per cent of complaints. Only three companies disclosed that they had resolved less than 50 per cent (see Table 15).

V. DISCUSSION

A. Key Observations

- The reports of some companies in the top 100 list are not available, despite the compulsion to pub-

lish. The number of such companies decreased every year; still some BRRs were unavailable.

- Almost 30 companies spent more than 2 percent or more on socially responsible activities in terms of CSR. But the maximum budgets were allocated to health and education. Consequently, the impact is restricted to a few SDGs.
- As explained in global frameworks like the GRI, the foundation of sustainability reporting is stakeholder engagement. Only 75 companies mapped their stakeholders in 2018-19. Of these, only 72 focused on identifying the vulnerable, disadvantaged and marginalised stakeholders.
- Since the NVGs were introduced in 2009, the majority of companies disclosed policies to implement the NVGs. However, the policies varied from company to company and sector to sector, making inter-company and sectoral comparisons very difficult.
- Governance is the critical enabler for preparing a BR report. The bodies responsible for governance mostly meet annually; hardly any company conducts weekly meetings.
- The governance for sustainability reporting in these companies is primarily looked after by a director or employees like the company secretary or the chief financial officer. Only a few have hired specialised professionals like the chief sustainability officer.
- The compulsion to include different categories of disclosures has pressured the companies. This is evident from the increase in the number of companies for each disclosure year after year.
- However, looking at the top reasons for non-disclosure indicates that BRR is still an obligation for a few companies. There is scepticism about disclosing data on social and environmental impacts. They feel they are not at a stage where sustainability is of relevance or it doesn't align with the nature of their business. Thus, the whole narrative of corporate sustainability is alien to a few of them.
- There is maximum transparency in the case of social disclosures. These data help provide insights into the status of diversity and inclusion in companies.
- The numbers in the case of supply chain disclosures are not very promising but indicate a tendency to improve every year.
- In environmental disclosures, the top priorities are investing in online services, recycling, and energy efficiency. It shows a vast scope here to move beyond the basics.
- Almost 50 per cent of companies did not conduct any impact assessment in 2016-17. This number remained 31 in 2018-19.
- The range of contributions to community development was very vast. While one company spent approximately six crores, another spent almost 850 crores.
- The least number was found in the case of disclosure related to clean development.

- Further, only half of the companies revealed displaying information on product labels, beyond the requirement by law. This number is essential, keeping in view the expected focus on eco-labelling in the future. India launched an eco-labelling scheme in 1991 but failed to generate the desired impact.

B. Challenges (Expert survey coded data)

Based on the thematic analysis of the interviews, the following challenges were identified.

Human resources and expertise: To begin with, the workforce emerged as a significant challenge. Sustainability is an interdisciplinary as well as a transdisciplinary concept. Similar to the discipline of management, which derives its underpinning from various fields, sustainability requires an understanding of diverse areas, including psychology, sociology, environmental science, law and so on. According to the experts, there is a shortage of trained human resources to lead sustainability projects. Limited expertise is available to design strategies to implement sustainability and report such disclosures. In many cases, the tasks are outsourced to consultancy firms which may or may not have ownership.

Business Model: Organisations, not all, continue to consider preparing a BRR as a box-ticking exercise without any strategic planning or long-term orientation to drive business outcomes for social and environmental benefits. One of the primary reasons is that the company leaders do not see the direct alignment of the sustainability concept with the company's business model. As one of the experts expressed, *"Companies are still struggling to find reasons...they say if within the rule of law we operate, why do we need sustainability?"*

Stakeholder Support: Another major challenge was the lack of stakeholder support. While a sustainable organisation focuses on stakeholder wealth maximisation, stakeholders' interests are quite diverse. If each stakeholder is focused on their benefit, the larger purpose of driving business towards sustainable development gets defeated. One of the experts said, *"It is very challenging. Win-win is theory."* Thus, in the trade-off between the benefits and losses of reporting, some companies choose the latter.

Finance: Finance is the backbone of any organisation. Without adequate funds, firms cannot survive. Increasingly, some institutional investors seek ESG compliance; however, many investors still look for fair returns in the short run. In the absence of investors, companies choose to hide disclosures or report vague, ambiguous data.

Leadership: Sustainability can be achieved both through top-down and bottom-up approaches. However, a business organisation cannot work toward sustainability integration without leadership support. There is still a lack of leaders who adopt sustainability at the core of a business organisation. One of the experts cited the case of Danone in 2012 which ousted its climate-champion CEO Immanuel Faber for pursuing a purposeful strategy. Thus, leadership, not only at the CEO level, but at the board level is crucial for building an organisation that takes BR reporting seriously.

Covid-19: Although reports analysed were not of the pandemic years, Covid emerged as a theme as the interviews were completed during the pandemic. According to some

experts, the pandemic was a key challenge for organisations. But it also served as a case in point to align business operations for future goals. The uncertainties brought into light the strengths and weaknesses and gave a jolt to the stability of the organisations. It also brought into light the need to be prepared for the next major crisis i.e. climate change. In this light, it could serve as a motivator for organisations to adopt ESG compliance and prepare comprehensive BRRs because such reports then feed into the business strategy.

TABLE 16: CHALLENGES CODED FROM THE INTERVIEWS

SN	Themes	Frequency	Quotes
1	Business Model	23	“doesn’t align with business model” “an external exercise” “why and how to do” “struggling for evidence”
2	Human resources and Expertise	18	“employees are burdened” “lack of trained workforce” “everyone is an expert” “where to find the workforce” “need for capacity building”
3	Stakeholder Support	22	“consumers want the best at the least price” “everyone is competing; it is a mad game” “win-win is theory” “we need support from all the stakeholders”
4	Finance	33	“where is the money?” “long-run makes the management anxious” “need investors”
5	Leadership	12	“top-down works” “leader had to lead by example” “employees follow what the CEO envisions”
6	Covid-19	7	“pandemic is a good time to re-align” “resources are depleting; covid shook everyone” “the next big crisis”

VI. CONCLUSION, IMPLICATIONS AND FUTURE DIRECTIONS

This study provides insights into BR reporting in India based on an analysis of BR reports of the top 100 companies and an expert survey. Despite the mandate, it was observed that some leading companies still did not publish a BRR. The number of disclosures increased yearly – maximum transparency was observed in social disclosures. There is far more scope for disclosing supply chain and environmental impact data. The future reporting format must consider mechanisms for improving stakeholder engagement and materiality analysis disclosures, along with frameworks to establish accountability. Some critical research and policy-related questions arising from the study follow.

- If stakeholder engagement is the prerequisite, why are few companies not mapping and engaging with stakeholders?
- Globally, companies are preparing GRI-based reports, which are much more comprehensive. How can India transition toward the GRI framework?

- Should impact assessment be a part of the reporting?
- Should assurance be compulsory?
- What challenges do companies face that prevent them from disclosing all the items in the reports?
- How can this format be adapted to micro, small and medium enterprises?
- Is there a need to assess the penalties associated with non-compliance with BRR?
- Should there be more training programmes for officials engaged in making BRR?
- Has the government launched the framework without adequate guidance and support?
- Why is the impact limited to a few states and a few sectors?

Future research can explore the answers to these questions. Further, there are some limitations of this study. Only three years were taken into account to analyse data. The sample size was limited to the top companies. The expert survey was also based on ten interviews. Future studies may analyse recent data for larger sample sizes as per the new reporting format. Further, sector-wise and cross-country comparisons could be undertaken because sustainability challenges are contextual in nature. Primary data-based surveys to corroborate data available in the reports can also serve as potential future research directions.

REFERENCES

- [1] SEBI (2021), “Business responsibility and sustainability reporting by listed entities” available at: https://www.sebi.gov.in/legal/circulars/may-2021/business-responsibility-and-sustainability-reporting-by-listed-entities_50096.html (accessed 25 August 2022).
- [2] SEBI (2012), “Business responsibility reports” available at: https://www.sebi.gov.in/legal/circulars/aug-2012/business-responsibility-reports_23245.html (accessed 26 August 2022).
- [3] SEBI (2015), “Format for business responsibility report” available at: <https://www.sebi.gov.in/legal/circulars/nov-2015/format-for-business-responsibility-report-brr-30954.html> (accessed 25 August 2022).
- [4] MCA (2009), “CSR Voluntary Guidelines”, available at: https://www.mca.gov.in/Ministry/latestnews/CSR_Voluntary_Guidelines_24dec2009.pdf (accessed 28 August 2022).
- [5] MCA (2011), “Annual reports, Ministry of corporate affairs” available at: https://www.mca.gov.in/Ministry/latestnews/National_Voluntary_Guidelines_2011_12jul2011.pdf (accessed 30 August 2022).
- [6] MCA (2018), “National guidelines on responsible business conduct” available at: https://www.mca.gov.in/Ministry/pdf/NationalGuideline_15032019.pdf (accessed 26 August 2022).
- [7] SEBI (2022), available at: https://www.sebi.gov.in/sebi_data/condocs/may-2021/Business%20responsibility%20and%20sustainability%20reporting%20by%20listed%20entitiesAnnexure2_p.PDF (accessed 25 August 2022).
- [8] RBI (2011), “RBI BULLETIN”, available at: https://www.rbi.org.in/scripts/bs_viewbulletin.aspx?id=12339 (accessed 27 August 2022).
- [9] TerraGreen (2021), available at: https://terragreen.teriin.org/index.php?option=com_terragreen&task=detail§ion_id=4525&category_id=20&issueid=175 (accessed 27 August 2022).
- [10] I. Ioannou, G. Serafeim, “The consequence of mandatory corporate sustainability reporting,” Harvard Business School Working Paper, pp. 11- 100, 2017.
- [11] M. Rajan, R. Kumar, “Outlast: How ESG can benefit your Business?”, Harper Business, 2021.
- [12] K. K. Dalal and N. Thaker, “ESG and corporate financial performance: A panel study of Indian companies,” IUP Journal of Corporate Governance, Vol. 18, no. 1, pp. 44-59, 2019.
- [13] D. Rana, “Business responsibility reporting: A study of Indian companies,” Journal Of Commerce And Business Studies, 2013.

- [14] KPMG (2017), "Survey" available at: <https://assets.kpmg/content/dam/kpmg/in/pdf/2017/07/Business-Responsibility-Reporting.pdf> (accessed 25 August 2022).
- [15] R. Adler, M. Mansi, and R. Pandey, "Accounting for waste management: a study of the reporting practices of the top listed Indian companies," *Accounting & Finance*, Vol. 62, no. 2, pp. 2401-2437, 2022.
- [16] A. Singh and M. Chakraborty, "Does CSR disclosure influence financial performance of firms? Evidence from an emerging economy," *Sustainability Accounting, Management and Policy Journal*, Vol. 12, no. 4, pp. 788-810, 2021.
- [17] K. Mathiyazhagan, V. Mani, D. Mathivathanan, and S. Rajak, "Evaluation of antecedents to social sustainability practices in multi-tier Indian automotive manufacturing firms," *International Journal of Production Research*, pp. 1-22, 2021.
- [18] R. Kumar, N. Pande, and S. Afreen, "Developing a GRI-G4-based persuasive communication framework for sustainability reporting (SR): Examining top 10 Indian banks," *International Journal of Emerging Markets*, 2018.
- [19] R. Raut, N. Cheikhrouhou, and M. Kharat, "Sustainability in the banking industry: A strategic multi-criterion analysis," *Business Strategy and the Environment*, Vol. 26, no. 4, pp. 550-568, 2017.
- [20] R. N. Yadava and B. Sinha, "Scoring Sustainability Reports Using GRI 2011 Guidelines for Assessing Environmental, Economic, and Social Dimensions of Leading Public and Private Indian Companies," *Journal of Business Ethics*, Vol. 138, no. 3, pp. 549-558, 2016. available at: <https://philpapers.org/rec/YADSSR>
- [21] P. S. Mishra, A. Kumar, and N. Das, "Corporate Sustainability Practices in Polluting Industries: Evidence from India, China and USA," *Problemy Ekorozwoju*, Vol. 15, no. 1, 2020.
- [22] A. Jumde, "The law on CSR in India: An analysis of its compliance by companies through corporate disclosures," *Journal of Corporate Law Studies*, Vol. 21, no. 1, pp. 253-282, 2021.
- [23] A. Debnath, J. Roy, K. Chatterjee, and S. Kar, "Measuring corporate social responsibility based on fuzzy analytic networking process-based balance scorecard model," *International journal of information technology & decision making*, Vol. 17, no. 4, pp. 1203-1235, 2018.
- [24] S. K. Pratihari and S. H. Uzma, "Corporate social identity: an analysis of the Indian banking sector," *International Journal of Bank Marketing*, 2018.
- [25] A. Singh and M. Chakraborty, "Does CSR disclosure influence financial performance of firms? Evidence from an emerging economy," *Sustainability Accounting, Management and Policy Journal*, 2021.
- [26] J. Cherian, M. Umar, P. A. Thu, T. Nguyen-Trang, M. S. Sial, and N. V. Khuong, "Does corporate social responsibility affect the financial performance of the manufacturing sector? Evidence from an emerging economy," *Sustainability*, Vol. 11, no. 4, 2019.
- [27] M. B. Muttakin and N. Subramaniam, "Firm ownership and board characteristics: do they matter for corporate social responsibility disclosure of Indian companies?" *Sustainability Accounting, Management and Policy Journal*, 2015.
- [28] N. Jadyappa, B. Parikh, N. Saikia, A. Usman, "Social responsibility or smoke screening: evidence from India," *Sustainability Accounting, Management and Policy Journal*, Vol. 12, no. 4, pp. 767-787, 2021.
- [29] S. Bansal, M. Khanna, and J. Sydrowski, "Incentives for corporate social responsibility in India: Mandate, peer pressure and crowding-out effects," *Journal of Environmental Economics and Management*, Vol. 105, 2021.
- [30] A. M. Shayuti, D. Hay, and C. J. Van Staden, "The influence of culture and corporate governance on corporate social responsibility disclosure: A cross country analysis," *Journal of Cleaner Production*, Vol. 198, pp. 820-832, 2018.
- [31] M. Mittal, M. Pareek, S. Sharma, and J. Chohan, "A Sustainable environmental change and ESG initiatives by the manufacturing and others service Industries during COVID19 Pandemic," *IOP Conference Series Earth and Environmental Science*, 2021.
- [32] Y. Chauhan and S. B. Kumar, "The value relevance of nonfinancial disclosure: Evidence from foreign equity investment," *Journal of Multinational Financial Management*, Vol. 52, 2019.
- [33] D. Sharma, S. Bhattacharya, and S. Thukral, "Resource-based view on corporate sustainable financial reporting and firm performance: evidences from emerging Indian economy," *International Journal of Business Governance and Ethics*, Vol. 13, no. 4, pp. 323-344, 2019.
- [34] S. Bhattacharya and D. Sharma, "Do environment, social and governance performance impact credit ratings: a study from India," 2019.
- [35] A. Kumar and N. Das, "A Text-Mining Approach to the Evaluation of Sustainability Reporting Practices: Evidence from a Cross-Country Study," *Problemy Ekorozwoju*, Vol. 16, no. 1, 2021.
- [36] S. M. Bae, M. A. K. Masud, and J. D. Kim, "A cross-country investigation of corporate governance and corporate sustainability disclosure: A signaling theory perspective," *Sustainability*, Vol. 10, no. 8, 2018.
- [37] M. A. Islam, A. Jain, and D. Thomson, "Does the global reporting initiative influence sustainability disclosures in Asia-Pacific banks?," *Australasian Journal of Environmental Management*, Vol. 23, no. 3, pp. 298-313, 2016.
- [38] M. D. M. Miras-Rodriguez, D. Martinez-Martinez, and B. Escobar-Perez, "Which corporate governance mechanisms drive CSR disclosure practices in emerging countries?," *Sustainability*, Vol. 11, no. 1, 2018.
- [39] S. Nagula, H. Puppala, A. Kumar, G. F. Frederico, M. Dwivedy, S. Prakash, and V. Talwar, "Applicability of industry 4.0 technologies in the adoption of global reporting initiative standards for achieving sustainability," *Journal of Cleaner Production*, Vol. 305, 2021.
- [40] M. Matteo, M. Longo, P. Micheli, and D. Bolzani, "The evolution of sustainability measurement research," *International Journal of Management Reviews*, Vol. 20, no. 3, pp. 661-695, 2018.
- [41] M. Fifka, "The development and state of research on social and environmental reporting in global comparison," *Journal für Betriebswirtschaft*, Vol. 62, no. 1, pp. 45-84, 2012.
- [42] M. Oguz and C. Searcy, "A review of sustainable supply chain management practices in Canada," *Journal of Business Ethics*, Vol. 117, no. 3 pp. 635-658, 2013.
- [43] B. J. Mariadoss, P. S. Tansuhaj, and N. Mouri, "Marketing capabilities and innovation-based strategies for environmental sustainability: An exploratory investigation of B2B firms," *Industrial Marketing Management*, Vol. 40, no. 8, pp. 1305-1318, 2011.
- [44] M. Cubilla-Montilla, A. Neito-Librero, M. P. Galindo-Villardón, M. P. V. Galindo, and I. Gercia-Sanchez, "Are cultural values sufficient to improve stakeholder engagement human and labour rights issues?," *Corporate Social Responsibility and Environmental Management*, Vol. 26, no. 4, pp. 938-955, 2019.
- [45] J. Gerwanski, O. Kordsachia, and P. Velte, "Determinants of materiality disclosure quality in integrated reporting: Empirical evidence from an international setting," *Business Strategy and the Environment*, Vol. 28, no. 5, pp. 750-770, 2019.
- [46] F. Farooq, W. Ahmed, A. Akbar, F. Aslam, and R. Alyousef, "Predictive modeling for sustainable high-performance concrete from industrial wastes: A comparison and optimisation of models using ensemble learners," *Journal of Cleaner Production*, Vol. 292, 2021.
- [47] R. D. Klassen and C. P. McLaughlin, "The impact of environmental management on firm performance," *Management Science*, Vol. 42, no. 8, pp. 1199-1214, 1996.
- [48] P. M. Clarkson, Y. Li, G. D. Richardson, F. P. Vasvari, "Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis," *Accounting, organisations and society*, Vol. 33, no. 4, pp. 303-327, 2008.
- [49] O. Akisik and G. Gal, "The impact of corporate social responsibility and internal controls on stakeholders' view of the firm and financial performance," *Sustainability Accounting, Management and Policy Journal*, 2017.
- [50] M. J. Milne and R. Gray, "W(h)ither ecology? The triple bottom line, the global reporting initiative, and corporate sustainability reporting," *Journal of business ethics*, Vol. 118, no. 1, pp. 13-29, 2013.

Integration of Supply Chain Risk Management into the Enterprise Risk Management Program for the Department of Defense

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Abstract—This paper explores supply chain risk management (SCRM) integration into the enterprise risk management (ERM) program across the Department of Defense for three main reasons: responsibility, necessity, and visibility. Multiple laws, orders, policies, strategies, and standards hold Federal leaders responsible for their agencies' performance. The current global nature of the DoD's supply chain, its dependency on information technology, and the constant threats in the cyber realm make it necessary to integrate SCRM into the ERM program. Should DoD leadership lose sight of these threats, the impact on the enterprise could be catastrophic. As a result, DoD leaders must maintain the visibility of the supply chain as part of the ERM program. While many organizations have treated SCRM and ERM separately throughout the years, technology and the exponential growth of cyber threats have brought those days to a close. The importance of the supply chain to mission accomplishment, coupled with persistent threats in the cyber-realm, dictates the integration of SCRM and ERM as a requirement. This paper explains the issues above while giving multiple examples of why integration is imperative. Should the DoD make SCRM part of its ERM program, the chances of remaining a dominant global force will continue well into the future for Cybersecurity professionals working in U.S. organizations.

Index Terms—cybersecurity, supply chain risk management, DoD, policy, enterprise risk management.

I. INTRODUCTION

The Department of Defense (DoD) should integrate supply chain risk management (SCRM) into its enterprise risk management (ERM) program for three main reasons: responsibility, necessity, and visibility. Before analyzing these three prongs, it is necessary to gain a clear understanding of ERM and SCRM. This understanding makes the importance of integrating SCRM into the DoD's ERM program more apparent.

II. LITERATURE REVIEW

Enterprise Risk Management is a methodology used to identify, address, and control risks that affect the entire organization [1]. Instead of individually addressing risks based on organizational function or activity, ERM addresses interdependence and sheds light on the second and third-order effects across the enterprise should an incident occur in one of its functions, like the supply chain [1]. Figure 1 below is a depiction of the main elements of the ERM process. When starting the process, organizational leaders should consider various factors such as laws and policies, foreign relationships, resources, etc. [1]. The next step, the identification of

risks [2], is critical because, in the supply chain, the risk is not merely the prime contractor. Still, it may likely be the prime contractor's subcontractors and all of their suppliers. Therefore, leadership must clearly define and scope the problem. The issue here is if the risks and threats faced by functions like the supply chain are discussed in silos instead of upfront as part of the ERM program, then organizational leadership will always be in a reactive mode, addressing the problems after the damage.

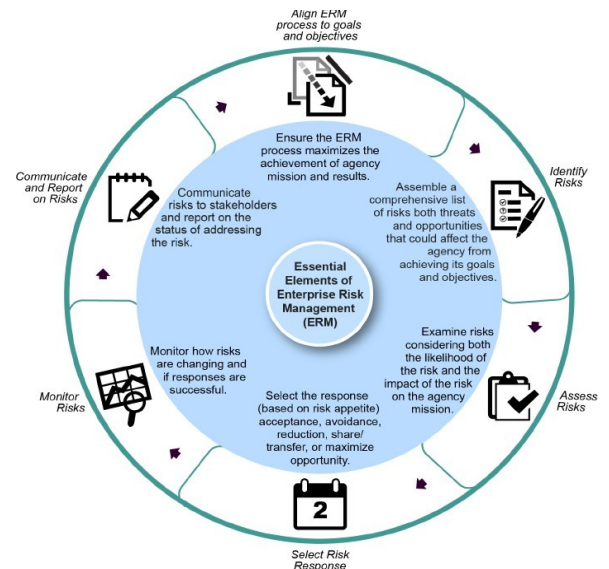
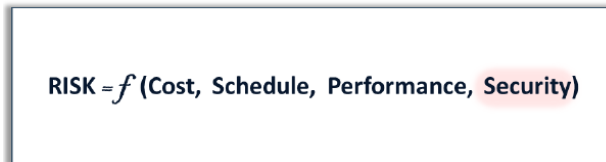


Figure 1. A graphic depicting the critical elements of enterprise risk management as provided by GAO for use by the Federal government. Retrieved from Enterprise Risk management: Selected Agencies' Experiences Illustrate Good Practices in Managing Risk, by the U.S. Government Accountability Office, December 2016, GAO-17-63, p. 8.

Understanding ERM enables an easier understanding of SCRM. One need only replace the word "enterprise" with "supply chain." While there are issues unique to the supply chain, the methodology and theory are the same. The supply chain is an integral part of the enterprise. To be clear, an enterprise cannot function properly without its supply chain. For the DoD in the continental United States (CONUS) or beyond, the enterprise relies heavily on its supply chain to deliver mission-critical goods and services. From the provision of information technology (IT) experts to support the day-to-day mission in the National Capital Region (NCR) and abroad, or delivery of equipment, weapons, material, or information and communications technology (ICT), the DoD supply chain is essential to mission accomplishment.

However, risk comes along with having a supply chain. Historically, leaders assessed supply chain risk as a function of cost, schedule, and performance (National Counterintelligence and Security Council, n.d.). As demonstrated by Figure 2 below, because of today's global environment populated that is constantly experiencing technological change joined by a growing population of harmful cyber-threats, a fourth element must be added to the equation, security. These risks, coupled with other factors such as organizational interdependencies, U.S. and international laws, policies, etc., must be considered when conducting SCRM.



$$\text{RISK} = f(\text{Cost, Schedule, Performance, Security})$$

Figure 2. A graphic depicting the equation used to express supply chain risk in the cyber-realm. Retrieved from Supply Chain Management: A Framework for Assessing risk, by the National Counterintelligence and Security Center, n.d., p. 1.

III. RESPONSIBILITY

The agency head is responsible for its performance. However, there are tools in place to help provide guidance. These tools come from federal laws, executive orders, presidential directives, DoD policies, and industry standards. Many of these artifacts require the agency head to engage in ERM. With that said, the DoD cannot adequately perform ERM without managing supply chain risk as part of the program. Arguably, the same holds for all other Federal government departments and agencies.

The Federal Managers' Financial Integrity Act (FMFIA) of 1982 requires all Federal managers to control their agency and its assets effectively. The supply chain is how DoD agencies receive and manage their assets. Therefore, agency heads cannot fulfill their responsibilities under the Act without considering how supply chain risks may affect the enterprise. Under the authority of the FMFIA, Office of Management and Budget (OMB) Circular A-123, first published in 1981, was issued to all elements of the DoD to strengthen internal controls [3]. According to a 2016 memorandum submitted by OMB's director to the heads of all Executive departments and agencies, ERM is an essential control function and must be appropriately conducted [3]. The proper conduct of ERM includes the assessment of all risks to the enterprise, including the supply chain. A 2019 survey issued to organizational leaders throughout the Federal government revealed that cybersecurity and compliance with OMB Circular A-123 were top concerns for all respondents [4]. Even though the survey also found that most of the respondents had an ERM program, there was no indication that SCRM was integrated into their ERM programs [4].

Four years after the issuance of OMB Circular A-123, OMB Circular A-130 was published. As revised in 2000, this circular directs agencies to manage information as a strategic resource [5]. The policy includes the security of information technology (IT) [5]. Information technology is used throughout the DoD supply chain. From how the DoD qualifies suppliers and acquires goods and services to manu-

facturing processes and system delivery, the DoD supply chain relies heavily on IT. This reliance is why IS throughout the supply chain is so important as an element of SCRM and serves as yet another reason why integration into the DoD ERM program is required.

After OMB Circulars A-123 and A-130, the Federal Acquisition Supply Chain Act (FASCA) of 2018, Title II of 2018 Strengthening and Enhancing Cyber-capabilities by Utilizing Risk Exposure (SECURE) Technology Act was passed. To help strengthen security within the Federal supply chain, FASCA 2018 modified Title 41 of the United States Code (public contracts). This modification caused Federal leaders, including those within the DoD, to take a more critical look into their supply chains, especially when dealing with IT procurement [6]. The requirement for a more in-depth look into supply chain risk represents a good reason to integrate SCRM into ERM. The DoD does not have to sacrifice supply chain security to maintain global competitiveness, nor do regulations and oversight have to burden operations.

In most cases, like the FASCA, rules are in place to help to ensure continued operations. In this case, the rules require DoD leaders to manage supply chain risk while accomplishing the mission. Accordingly, here is yet another reason Federal laws and policies require that the DoD ensure the security of its supply chain and any IT procured through it. Because IT is heavily used throughout the DoD supply chain, SCRM should be incorporated into the DoD ERM program.

Even the Executive Office has weighed in on supply chain security and its effect on the DoD enterprise. In 2009, the White House released The Comprehensive National Cybersecurity Initiative. In the initiative, President Obama directed the Executive Branch to work with all key players, including State and local governments, to promote the unity of effort when responding to future cyber-attacks [7]. The notice contains twelve specific initiatives. The eleventh initiative requires leadership to develop and incorporate a program to manage supply chain risk across the enterprise [7]. The President followed up in 2012 by issuing the National Strategy for Global Supply Chain Security. While a global supply chain reduces trade barriers and bolsters the American economy, security must be in place to protect the supply chain from internal and external threats [8]. Therefore, it stands to reason that to help ensure a more operable, secure, and resilient supply chain; DoD leaders should incorporate SCRM into their ERM program. To do otherwise would place too much distance between the DoD leadership and supply chain cyber threats that could bring organizational operations to a screeching halt.

To align with the Federal rules, the DoD has issued multiple policies. For instance, Department of Defense Instruction (DoDI) 4140.01, DoD Supply Chain Material Management, provides direction on how the DoD addresses the supply chain's cybersecurity risks, including subcontractor qualification requirements and software procurement [9] (2019). While DoDI 5200.44, Protection of Mission Critical Functions to Achieve Trusted Systems and Networks, sets the standard for SCRM across the DoD and briefly mentions ERM, it does not draw the connection between the two

(2012). However, DoDI 5000.02, Operation of the Defense Acquisition System, makes it clear that “[a] supply chain is at risk when an adversary may sabotage, maliciously introduce an unwanted function, or otherwise subvert the design, integrity, manufacturing, production, distribution, installation, operation, or maintenance of a system ...” (p. 167). If second and third-tier suppliers are not checked, if the origins of parts or algorithms are not closely scrutinized, the door will be open for bad actors to find their way into DoD through the supply chain. Unlike a kinetic attack that may disrupt operations in a specific location, cyber-attacks have no boundaries. It necessarily follows, therefore, that because of the interdependency between DoD IT systems, the effect of a cyber-attack on one DoD agency’s supply chain would not stop at the agency. Instead, the potential damage would likely spread enterprise-wide if not quickly detected and responded to following the risk management framework for supply chains [10]. This scenario is another reason SCRM should be incorporated into the DoD ERM program. Yes, SCRM is an excellent way to mitigate cybersecurity risks to the supply chain. However, as explained in volume 1 of DoD Manual (DoDM) 4140.01, a disrupted supply chain, regardless of DoD agency, poses critical risks to the DoD enterprise [11]. Thus, supply chain risk cannot be viewed in a bubble. Instead, the risk to the DoD supply chain must be incorporated into its ERM program.

IV. NECESSITY

Even if there were no Federal laws and policies governing supply chain management and information security, the cyber risks facing the DoD supply chain make it necessary to incorporate SCRM into the DoD ERM program. Such integration would equip leaders with the timely, relevant information necessary to make critical decisions for the enterprise. In a 2013 article in the American Journal of Industrial and Business Management, several authors joined to drive home the necessity of integrating SCRM into ERM [12]. The authors posit that not only can SCRM provide organizations with an advantage over others, but that advantage can be enhanced if SCRM is made part of ERM [12]. The authors suggest that ISO 31000 can serve as the guideline for integration [12].

In its special publication (SP) 800-161, the National Institute of Standards and Technology (NIST) suggests four elements of SCRM. As Figure 3 below depicts, security is one of those four elements. Information transmission and storage security become more significant as the DoD supply chain continues to increase reliance on IT. When the NIST speaks of information security, the concern is the information’s confidentiality, integrity, and availability [10]. Theft of the information is a concern for the DoD. Concurrently consider exploiting any of the SCRM elements, security, for example [10]. If bad actors could gain access to a DoD system and exercise any form of control, significant harm could result, ranging from loss of information to loss of life. Further, issues such as infected IT products and weak suppliers within the DoD supply chain can grant bad actors access to the DoD information network (DoDIN). Such critical threats make it necessary to integrate SCRM into the DoD ERM program.



Figure 3. A depiction of the four pillars of information and communications technology (ICT) SCRM as posed by the NIST. Retrieved from, Supply Chain Risk Management Practices for Federal Information Systems and Organizations, by J. Boyens, C. Paulsen, R. Moorthy, and N. Bartol, NIST SP 800-161, April 2015, p. 4.

In 2018, the GAO published a report highlighting the supply chain risks affecting Federal agencies related to procuring information and communications technology (ICT). Because of the nature of ICT, bad actors can infiltrate poorly managed global supply chains by introducing malware or malicious algorithms. At a minimum, the Act would disrupt the supply chain, and the worst-case scenario, supply chain failure across the enterprise resulting in mission failure and loss of life [14].

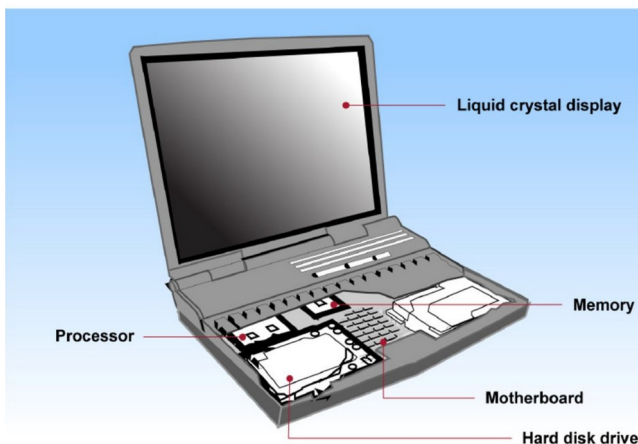
To further illustrate the threat communicated by GAO, consider the 2010 Defense Industrial Base (DIB) Sector-Specific Plan (SSP) published by the Department of Homeland Security (DHS). The DHS designated the DoD as the sector-specific agency (SSA) for the Defense Industrial Base Sector [15]. In the DIB sector-specific plan, the DoD articulates the value of its partnerships with hundreds of thousands of organizations in the private sector [15]. Each one of the partner organizations has relationships with multiple other entities that provide them with IT and various other products that ultimately reach DoD information systems or equipment. Thus, supply chain corruption may not only affect a local DoD system, but it could also cause a ripple of system failures across the enterprise. For example, the DoD procures thousands of laptops for use on DoDIN. As Figure 4 demonstrates, many of the items used to make these laptops could come from suppliers in multiple foreign countries. The systems used by the laptop parts suppliers may be open to hackers. As a result, once their parts are passed through to the DoD, so is the threat.

However, bad actor access does not have to be as intricate as corrupting parts used to manufacture a laptop. For example, certain DoD personnel can procure IT products with government purchase cards. Cimpanu reported how hackers infiltrated certain wireless USB dongles to access organizations’ information systems [11]. Many of these wireless

USB dongles were inserted into mice used with DoD laptops. Even though this issue was identified in 2016, and because these supply chain risks are not addressed as part of the ERM program, DoD agencies have continued to allow individuals to purchase and distribute these vulnerable mice. Hence, vulnerable equipment such as laptops and mice represent ways bad actors may access the DoD information network (DoDIN). For DoD leadership to effectively mitigate these risks, it is necessary to incorporate SCRM into the ERM program.

V. VISIBILITY

The final reason the DoD should integrate SCRM into its ERM program is supply chain visibility. To minimize risk to the enterprise, leaders must maintain consistent visibility of their supply chain, especially when the procurement of ICT is involved. As Figure 5 below illustrates, the further away supply chain operations get away from organizational leadership, the less visibility top leadership has, and the higher the risk to the enterprise. This model does not mean that top DoD leaders should know everything about the qualification process for each of the hundreds of thousands of first, second, and third-tier suppliers of each agency. Such an effort is unrealistic, time-consuming, and likely impossible. Figure 5 also demonstrates how visibility is reduced and risk increases as one moves further down the supply chain. With that said, if only one hacker infiltrates one sub-tier supplier, that could be enough to cause critical damage across the DoD enterprise. As a result, DoD leaders should include SCRM as they consider and manage risk to the enterprise.



Component	Location of facilities potentially used by suppliers
Liquid crystal display	China, Czech Republic, Japan, Poland, Singapore, Slovak Republic, South Korea, Taiwan
Memory	China, Israel, Italy, Japan, Malaysia, Philippines, Puerto Rico, Singapore, South Korea, Taiwan, United States
Processor	Canada, China, Costa Rica, Ireland, Israel, Malaysia, Singapore, United States, Vietnam
Motherboard	Taiwan
Hard disk drive	China, Ireland, Japan, Malaysia, Philippines, Singapore, Thailand, United States

Figure 4. A picture showing how the various parts used to create a laptop may be procured from multiple foreign countries. Retrieved from Supply Chain Risks Affecting Federal Agencies, by the U.S. Government Accountability Office, July 12, 2018, GAO-18-667T, p. 4.

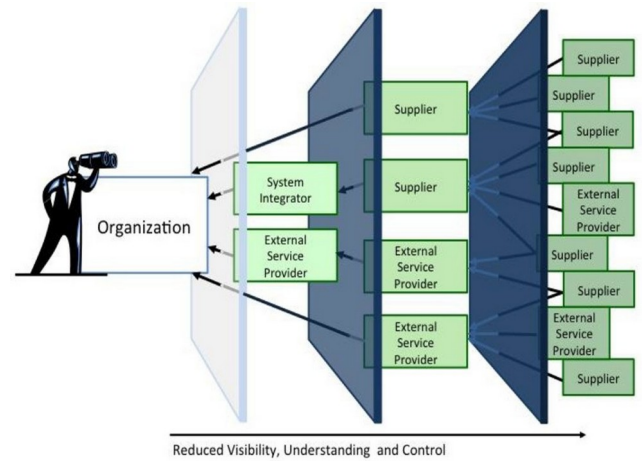


Figure 5. A depiction of how top leadership's visibility decreases the further one moves down the IT supply chain. Retrieved from Supply Chain Risk Management Practices for Federal Information Systems and Organizations, by J. Boyens, C. Paulsen, R. Moorthy, and N. Bartol, NIST SP 800-161, April 2015, p. 8.

To further illustrate the point made by NIST in Figure 5, the NCSC has demonstrated how security, one of the elements of supply chain risk, introduces additional, far-reaching risks to the enterprise (NCSC, n.d.). As demonstrated by the NCSC in Figure 6, to properly understand the security risk facing a supply chain, leadership must understand the "threat, vulnerabilities, and consequences" (NCSC, n.d., para. 3). When considering the threat, leadership should ask questions like, what does the bad actor want (NCSC, n.d., para. 3)? Vulnerabilities in supply chains procuring ICT are both internal and external (NSCS, n.d.). The question is whether a bad actor can reach the DoD through those vulnerabilities within the supply chain (NSCS, n.d.). Consequences range from those that can be addressed and recovered to those that will cripple the enterprise (NSCS, n.d.). DoD leadership must consider these risks throughout the lifecycle of any system it procures, concept through retirement (NSCS, n.d.). Typically, DoD leadership reviews procurement and fielding plans for any major system. However, recent events have shown that, because of the potential impact that an IT security breach may have on the enterprise, more attention should be paid to the procurement of smaller IT-enabled items like laptops and wireless mice. Therefore, it makes even more sense for leadership to integrate SCRM as part of the ERM program for visibility purposes.

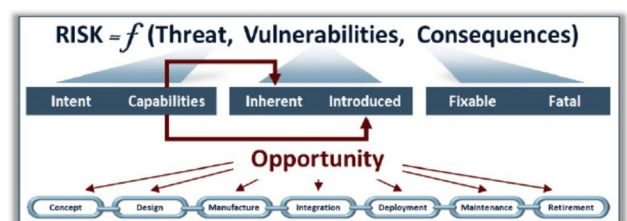


Figure 6. A depiction of threats and vulnerabilities can impact the organization throughout the supply chain by using the system lifecycle concept as an example. Retrieved from Supply Chain Management: A Framework for Assessing risk, by the National Counterintelligence and Security Center, n.d., p. 2.

VI. CONCLUSION

To satisfy responsibility, necessity, and visibility, it only makes sense for the DoD to include SCRM within its ERM program. Federal laws and policies make it clear that DoD leaders are responsible for the overall health of their supply chains, which includes information security. The forever changing and increasing threats to the DoD's IT-dependent supply chain make SCRM and ERM integration necessary. Because of these threats, DoD leadership must maintain visibility of the risks facing their supply chains. The results of the alternative are grave. On the whole, integration of SCRM into its ERM program will allow the DoD to remain a dominant power across the globe for years to come.

FIGURES

- **Figure 1.** A graphic depicting the critical elements of enterprise risk management as provided by GAO for use by the Federal government. Retrieved from: <https://www.gao.gov/assets/690/681342.pdf>
- **Figure 2.** A graphic depicting the equation used to express supply chain risk in the cyber-realm. Retrieved from: <https://www.dni.gov/files/NCSC/documents/supplychain/20190422-SCRM-Framework-for-Assessing-Risk.pdf>
- **Figure 3.** A depiction of the four pillars of information and communications technology (ICT) SCRM as posed by the NIST. Retrieved from; <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-161.pdf>
- **Figure 4.** A picture showing how the various parts used to create a laptop may be procured from multiple foreign countries. Retrieved from: <https://www.gao.gov/assets/700/693064.pdf>
- **Figure 5.** A depiction of how top leadership's visibility decreases the further one moves down the IT supply chain. Retrieved from <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-161.pdf>
- **Figure 6.** A depiction of threats and vulnerabilities can impact the organization throughout the supply chain by using the system lifecycle concept as an example. The National Counterintelligence and Security Center adapted this picture from the Defense Science Board Task Force Report, Resilient Military Systems, and the Advanced Cyber Threat. Retrieved from: <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB424/docs/Cyber-081.pdf>

REFERENCES

- [1] U.S. Chief Financial Officers Council (USCFOC), Playbook: enterprise risk management for the U.S. federal government, 2016
- [2] U.S. Government Accountability Office (GAO), Enterprise risk management: selected agencies' experiences illustrate practices in managing risk, 17-63. (2016).
- [3] Donovan, S., OMB circular no. A-123: management's responsibility for enterprise risk management and internal control, 2016
- [4] Association for Federal Enterprise Risk Management (AFERM), Federal enterprise risk management survey results, (2019).
- [5] Office of Management and Budget (OMB). Circular no. A-130: Management of federal information resources. 2000.
- [6] Federal Acquisition Supply Chain Act (FASCA) of 2018, Title II of the SECURE Technology Act (Strengthening and Enhancing Cybercapabilities by Utilizing Risk Exposure) (H.R. 7327, 41 USC Chap. 13 Subchap. III and Chap. 47, P.L. 115-390)
- [7] Obama, B. The comprehensive national cybersecurity initiative, 2009.
- [8] Obama, B. National strategy for global supply chain security, 2012.
- [9] Department of Defense Instruction (DoDI) 4140.01. DoD Supply Chain Material Management, 2019.
- [10] Boyens, J., Paulsen, C., Moorthy, R., & Bartol, N., Supply chain risk management practices for federal information systems and organizations. National Institute of Standards and Technology (NIST) Special Publication (SP) 800-161. 2015
- [11] Cimpanu, C., Logitech wireless USB dongles vulnerable to new hijacking flaws, 2019
- [12] Scannel, T., Curkovic, S., & Wagner, B. Integration of ISO 31000:2009 and supply chain risk management. American Journal of Industrial and Business Management, 3, 367-77., 2013.
- [13] Department of Defense Manual (DoDM) 4140.01, vol.1. DoD Supply Chain Material Management Procedures: Operational Requirements.
- [14] U.S. Government Accountability Office (GAO) 18- 667T, Information security: supply chain, 2018.
- [15] Department of Defense Instruction (DoDI) 5200.44, Protection of Mission Critical Functions to Achieve Trusted Systems and Networks., 2018
- [16] U. S. Department of Defense, Defense Science Board (DoDDSB), Task force report: resilient military systems and the advance cyber threat, 2013.
- [17] Department of Defense Instruction (DoDI) 5000.02, Operation of the Defense Acquisition System, (2019).

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Impact of leadership's perspective on the effectiveness of operational risk management at the Vietnamese commercial banks

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Abstract—The research investigates the impact of the leadership's perspective on the effectiveness of operational risk management (ORM) at commercial banks based on the Basel Committee on Banking Supervision (BCBS). A quantitative method is utilized through the scale's reliability analysis, External Factor Analysis and regression with a dataset of 300 observations from the survey in 2021. The survey sample was determined to be senior staff with at least three years of experience working in the risk management department of commercial banks. The research results imply the leader's opinion has a strong positive impact on the commercial bank's ORM. In addition, other factors such as organizational structure, implementation of the ORM process, IT system, training, communication, and contingency business plans have a profound influence on the effectiveness of ORM in the banking business. These findings play an important role in theoretical and practical aspects, demonstrating the decisive role of the leader in ORM. On that basis, the study makes some recommendations to enhance ORM in Vietnamese commercial banks.

Index Terms—Commercial bank; leadership's perspective; operational risk management; operational risk.

I. INTRODUCTION

The global financial crisis of 2007-2008 stemmed from weaknesses in the risk governance structures and bank's excessive risk-taking is considered a milestone marking a change in the financial institution's attitude toward risk as in [11], [16]. Risk and risk management become urgent issues for any commercial bank at any time. Instead of only considering financial losses, commercial banks also relatively quantify non-financial losses. Instead of considering risk types independently, the commercial bank assesses risk in its impact relationship with other risks. There is no clear boundary for all kinds of risks. A cause can lead to many risks, or a type of risk can result from many different reasons, and even entails another risk. The complexity of risk is focused, especially when studying operational risk that is pervasive, spread and interspersed with other types of risk. According to reference [9], operational risk is the risk of loss from inadequate or failed internal processes, people and systems or external events. Operational risk is one of the most serious potential risks and inherent in all activities of any commercial banks. Moreover, it arises from internal and external causes and goes beyond the risks that cause financial loss [19]. Then, ORM to adjust and mitigate operational risk is an inevitable step of modern banking

management. ORM is the entire process of identifying, evaluating, controlling, monitoring and reporting operational risk continuously to minimize losses and ensure business continuity of the commercial bank as in reference [9].

Sound ORM is the inevitable direction of today's Asian banking systems. Asian economies are characterized by weaker investor protection, poor regulatory enforcement, and government intervention as in [15] and [24]. Therefore, the distinct investigation of risk management issues in Asian countries is extremely urgent. Vietnam's commercial banking system is highly appreciated for its risk management system. However, it mainly focuses on managing traditional risks (liquidity risk, credit risk, etc). ORM still has many limitations as not giving an overall risk management strategy, not developing a comprehensive risk management framework, not giving a clear statement about risk appetite, etc. This event's financial losses have reached trillions of dong and have stemmed from processes, systems and external factors, especially serious frauds of bank staff. Therefore, for the Vietnamese commercial banking system, ORM is increasingly becoming an urgent issue and more focused than ever. The increased competition in the financial system, the technological revolution and international integration require the Vietnamese commercial banks to have a comprehensive risk management framework. Therefore, it is necessary to examine determinants of ORM.

Reference [14] argued that a leader is responsible for creating a vision and infusing it into the organization's activities to achieve its goals. Leaders play a fundamental role in strengthening risk management effectiveness because they shape the risk management culture as in [26], [36]. The risk management culture identity is one of the core competitive advantages to help commercial banks overcome the crisis and other competitors. Not only that, but the leader's perspective is evident in the development and implementation of the ORM framework. A suitable ORM framework with a strict management structure and regularly evaluated is the basis for ORM effectiveness. However, to the authors' knowledge, there is no empirical research examining the relationship between the leader's perspective and the ORM.

Overall, this study contributes to the existing literature in several ways. First, to the best of our knowledge, our study is one of the pioneer examinations of the application of the Basel international practice in the research framework to

study determinants of ORM. Based on the Basel international practice about operational risk, the authors built a model and scales of variables. The findings imply that the leadership's perspective strongly influences on ORM. In addition, other factors (organizational structure, implementation of process, IT system, training, communication, and contingency business plan) impact positively on ORM. The study plays an essential role in theoretical and practical contributions that demonstrates the decisive role of the leadership's perspective on the effectiveness of ORM. On that basis, the study makes some recommendations to enhance the ORM effectiveness in the Vietnamese commercial bank.

The remainder of this study consists of four parts as follows. After the introduction, the second session comprehensively reviews research related to ORM. Based on the second part, the third session proposes a methodology. The research results are shown in the fourth part, which is the base for making recommendations in the final session to enhance the ORM of Vietnamese commercial banks in particular and the Asian financial system in general.

II. LITERATURE REVIEW AND RESEARCH HYPOTHESES

Operational risk has been a topic of great interest to researchers in the past two decades. BCBS officially mentioned it in 2003 and developed it in 2011. References [9, 10] has been one of the fundamental theoretical bases for researchers on this topic. These studies were mainly carried out after the global financial crisis of 2007-2008. At that time, the commercial bank was well aware of the impact of operational risk and the importance of ORM for operating business. As shown in Fig.1, an ORM framework for commercial banks of any size and scope of operations was provided in [9].



Fig. 1 Factors affecting ORM at the commercial bank.
Source: BCBS (2003)

A. Leadership's perspective on ORM

Risk governance mechanisms expressed by the leadership's structure and perspective significantly reduce bank risk-taking [1]. The leader plays a fundamental role in strengthening risk management effectiveness because they shape the risk management culture that has a strategic position that contributes to ORM as in [26], [36]. Not only that, *the leader's perspective* is evident in the development and implementation of the ORM framework.

Reference [9] pointed out that operational risk should be considered a distinct risk type to be able to manage and periodically review in the ORM framework which articulates

risk appetite and risk tolerance. It becomes a needle of the Vietnamese commercial bank's all departments in all operations. Furthermore, the board of directors was also responsible for developing ORM policies, processes and procedures. Reference [4] pointed out that leadership's point of view hugely impacts on ORM in Australian commercial banks. Therefore, the authors expect that it is a positive relationship and hypothesize:

H1. The leadership's perspective has a positive relationship with the commercial bank's ORM.

B. The internal operational risk culture

As in [9], The internal operational risk culture was the set of values, attitudes, capabilities and behaviours of individuals/organizations that define the organization's commitment and style of risk management. The better the commercial bank's *training and communication* is, the stronger the internal operational risk culture [4] [25].

In ORM, training plays an urgent role. Reference [5] argued that risk management is deeply related to the organization's mission and vision. However, there is a clear gap between the board of directors and staff regarding roles and responsibilities. Training is considered an opportunity to exchange ideas between employees, managers and senior management. Moreover, ORM is a new issue for commercial banks in a developing economy like Vietnam. Therefore, the authors expect a positive relationship between training and ORM.

An organization cannot function effectively when poor communication, especially risk communication [28]. Risk communication is the exchange of information between individuals, groups about risks based on continuous forecasting and calculation of the damage possible in the future as in Ref. [22]. Communicating information to the Board of Directors is essential to making timely decisions to help limit operational risk.

C. The internal adjustment culture

According to reference [9], the internal adjustment culture was clarity about the responsibilities and duties of bank staff in the ORM process. It is shown clearly in *employee engagement and empowerment*.

Ref. [31] defined empowerment as giving more authority to employees. Ref. [20] believed that empowerment is an act of building, developing and increasing the power of employees to increase the staff's authority and autonomy. It impacts an organization's performance in both positive and negative ways.

According to Ref.[13], employees must be empowered and encouraged to solve problems they face within their capabilities. In a fast-paced business environment, transferring decision-making power to lower-level employees who directly face and understand the problems will help find solutions quickly. Employees will feel respected and that they contribute directly to the organization's success, which motivating employees in increasing responsibility, as in [4] and [38].

In contrast, reference [32] argued that empowerment negatively affects risk management. Empowering means that employees work with less supervision while lacking experience, which leads to an increase in risk. Another issue is se-

curity. Empowering employees also means sharing organizational information. Confidential data can be leaked to parties that do not have access to that information, which increases operational risk.

The Vietnamese commercial banks are still inexperienced in ORM. Therefore, the authors expect that it is an inverse relationship and hypothesize:

H2. Employee engagement and empowerment has an inverse relationship in the commercial bank's ORM.

D. Information disclosure

Reference [9] suggested that **information disclosure** allows market participants to assess the bank's ORM. Proactive disclosure supports the bank to be more prudent in its operations to reduce risks to attract prospective investors. The timely and regular disclosure tightens market discipline, which enhancing ORM as in references [8], [9], [10] and [29]. Information disclosure has not been implemented synchronously and is likely to affect the ORM's effectiveness. Therefore, a positive relationship between disclosure and ORM is expected by the authors.

H3. Information disclosure and the commercial bank's ORM have a positive relationship.

E. Contingency business plan

Building a business plan for continuous operation is necessary for any bank, as in [9], [10] and [21]. For reasons that may be beyond the control of the commercial bank, an event could result in the bank being unable to carry out its business activities. It leads to financial and non-financial losses as well as an interruption of the financial system. Therefore, the bank needs to establish **contingency business plans** that are considered in many different situations [10], especially for Vietnamese commercial banks inexperienced in ORM. Thus, the authors expect a positive relationship between the contingency business plan and ORM and hypothesize:

H4. The contingency business plan impacts positively on the commercial bank's ORM.

Ref. [10] enhanced the ORM framework with 11 principles emphasizing the role of establishing a depth risk management culture. Commercial banks with a strong risk management culture often have had less operational risk because staff clearly understand the activities allowed and not allowed, their responsibility and authority for risk.

Ref. [10] pointed out that an effective organizational structure plays a fundamental role in ORM. Organizational structure is how the corporate's activity is divided, conducted and coordinated, as in [3]. It is clearly shown in an organizational chart in two aspects: the work department and the communication mechanism as in [34]. Moreover, it contributes to risk-taking behaviours [33] because it makes differences in dividing work and coordinating between positions. Furthermore, inter-position relationships serve as a channel for communication between levels. The organizational structure determines the control system's effectiveness and the risk exposure of commercial banks as in [12] and [25]. Therefore, the authors expect a positive relationship between organizational structure and ORM.

Moreover, it was essential for the commercial bank to build **an effective ORM process and process management**

as in [10]. Instead of mainly relying on internal control systems and audit activities for risk management, they have transformed ORM framework into a suitable procedure [9], which is essential for contributing to ORM [6]. Therefore, the authors expect it is a positive relationship. In addition, reference [4] showed that the ORM process implementation played a core role in enhancing ORM. The implementation of the ORM process is to ensure that the work is in a certain order. Not only contributes to increasing operational efficiency, but a uniform ORM process also serves as a control tool to control operational risk [9]. Therefore, the authors expect that the ORM process execution strengthens ORM.

Reference [9] asserted the impact of **information technology** (IT) on ORM. It can be undeniable that modern IT offers many advantages to businesses, specifically operational speed, stability, and compatibility in generating data [25]. As in [7], it drove organizational efficiency, improved productivity and controlled internal processes. According to Ref. [37], IT was one of the strategies leading to success in risk management effectiveness based on data. Therefore, the authors expect that the IT system plays a core role in ORM.

Reference [2] and [10] emphasized the role of the supervisor who controls the group/individual to ensure the proper operation of their role. Ref. [23] assumed that a large supervisor team lead to poor information communication and fragmented and suboptimal decision making. In contrast, resource dependency theory suggests that large risk committees improve ORM because of the diversity of opinion, expertise, and robust decision-making process as in [27]. Furthermore, they supported limiting operational risk by clarifying the difference between acceptable and unacceptable behaviour [2]. Due to the lack of experience and synchronization in ORM, the supervisor's role is one of the core factors in reducing operational risk at Vietnamese commercial banks. The authors expect a positive relationship between the supervisor's role and ORM and hypothesize:

H5. The role of the supervisor positively impacts the commercial bank's ORM.

Other studies as in [17], [35] examined the impact of financial ratio on ORM. According to Ref. [35], bank size has a negative relationship with the amount of capital requirement for ORM. The larger bank has had an effective risk management system and more experience in ORM, so they hold less capital. Reference [17] demonstrated that ORM and financial performance has a positive relationship. The study proposed that risk management is of importance in the banking business.

Operational risk has been studied in recent years, especially after the 2008 global financial crisis. Reference [4] and [6] examined the impact of factors on the commercial banks' ORM. However, these papers only used a qualitative research method based on operating practice at commercial banks in Australia and Ghana. References [17], [35] used a quantitative research method but only considered the relationship between financial ratios with ORM. By running a regression model, Ref. [25] examined the qualitative factors affecting ORM. However, this research did not base on references [9] [10] to build the model and the variables' scale. Not only that, Ref. [25] only

studied ten commercial banks required to apply Basel II. This study has been expanding the research scope which is all the Vietnamese commercial banks. Especially, based on reference [9], [10] and in-depth interviews with experts, the authors found that some variables likely to impact ORM had not been studied. Therefore, this study has examined the relationship between these qualitative factors on ORM by both quantitative and qualitative research methods. This is one of the selling points of this research. This study will add more theoretical evidence on risk management in general and ORM in particular.

III. METHODOLOGY

A. The research model

To examine the model's appropriateness, the qualitative research method is used through a semi-structured interview with experts. The interviewees are selected based on three criteria namely relevance to research subjects, diversification of research contexts and accessibility [30]. Ten experts divided into two groups are chosen. The interviewees mainly work in the sales department, risk management department and internal audit department for more than five years with extensive experience in ORM.

The authors identify 11 factors shown in Fig.2 that are likely to affect ORM. Four new variables are included in the research (leader's perspective, employee engagement and empowerment, the role of supervisor, information disclosure activities and contingency business plan).

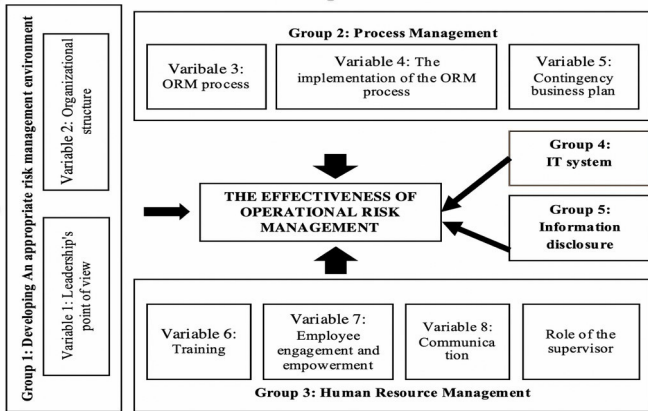


Fig.2 Proposed research model.

Based on references [9] [10], the authors have built the scale for the variables. The five-level Likert scale is chosen. After that, the questionnaire has been sent to 20 experts and used in in-depth interviews. The variables' scale is shown in Appendix - Table A1.

B. Research Sample

The sampling method is the non-probability convenience sampling method. The research sample was determined to be staff with at least three years of experience working in the risk management department of commercial banks. The sample size is 300 observations. The data collection process has been implemented in two ways: face-to-face and online. The number of online questionnaires collected is 253, and the number of usable questionnaires is 214. About the face-to-face survey, the number of sheets issued is 150, the num-

ber of votes collected is 113, and the number of usable votes is 86. The total number of valid sheets for analysis is 300. According to Ref. [18], the minimum sample size is five times the total number of observed variables. With 43 observations variables, the sample size includes 300 observations to meet the analysis requirements. The data collection period is from April 2021 to September 2021.

C. Data Processing

After data collection and cleaning, the research paper used the quantitative method to process the data set through the SPSS program. First, Cronbach's Alpha value is used to **evaluate the scale's reliability**. That the Cronbach's Alpha value is higher than 0.6 confirms that the variables' scale is enough coherence to synthesize into independent variables. The authors remove inappropriate items after considering their meaning to increase the scale's reliability.

The exploratory factor analysis (EFA) is utilized to group variables closely related to each other to form new factors by determining the scale's converging value. Besides, the EFA support separating variables whose scales are less relevant by examining the scale's distinguishing value. The EFA has proceeded through the five following steps.

Firstly, the authors consider the data's appropriateness by examining the sample size, the relationship between sample size and the number of observed variables and between variables through the correlation matrix, the KMO coefficient and the Bartlett test.

Secondly, the analysis of the principal components is utilized to determine the factors formed from the set of observed variables. It is the most viral method in recent years.

Thirdly, based on the Eigenvalue value, the authors have kept the factors having the Eigenvalue value greater than 1 as in [39].

Next, the authors conduct factor rotation by the Varimax method. Groups of variables must satisfy "convergence value" (observed variables converge on the same factor) and "discriminatory value" (observed variables belonging to this factor are distinguished from other variables).

Finally, the authors decide on the number of observed variables of each factor through Factor loading which must be greater than or equal to 0.5 (Nguyen et al 2015).

The authors run **a multivariable regression model** to evaluate the impact of factors on the Vietnamese commercial banks' ORM. The Evview software is utilized to run the model, examine and overcome diagnostics to meet Best Linear Unbiased Estimator (BLUE).

IV. RESULTS AND DISCUSSIONS

A. Testing the reliability of the scale

As shown in Table I, the corrected item-total correlation coefficient is higher than 0.3, ensuring the coherence between the variables. Cronbach's Alpha coefficient of all scales is higher than 0.6, showing that the scales have enough reliability to synthesize into independent variables.

The Cronbach's Alpha coefficient if Item deleted of the variable PLA3 is 0.760, higher than the Cronbach's Alpha coefficient of PLA (0.740). However, the authors have considered that the meaning of PLA3 plays an essential role in

the scale and the Cronbach's Alpha coefficient of the PLA variable is higher than 0.7. Therefore, the authors have not removed PLA3. All other variables have The Cronbach's Alpha coefficient if the Item deleted is lower than the Cronbach's Alpha coefficient of the scale. The result testing the scale's reliability showed that the correlation coefficient of the total variable > 0.3 and the Cronbach's alpha coefficient > 0.6 , so it has concluded that all 43 observed variables have enough reliability and coherence to be able to form 11 independent variables and a dependent variable.

TABLE I.
TESTING THE RELIABILITY OF THE SCALE

Variables	Cronbach's Alpha coefficient
PER	0.872
STR	0.721
PRO	0.704
IMP	0.781
PLA	0.740
TRA	0.666
EMP	0.800
COM	0.847
SUP	0.702
IT	0.701
DIS	0.860
ORM	0.668

B. Exploratory Factor Analysis

1) EFA for the independent variable

With independent variables, the EFA is carried out three times. The test results in Table II have shown that the factor loading coefficients are all higher than 0.5, which demonstrated the appropriate correlation between the variables (indicators) and selected variables in the model. However, in the first analysis, due to not guaranteeing the "discriminatory value", IT1, STR4, SUP1, SUP2 are removed.

The second exploratory factor analysis points out that SUP3 has appeared in two columns, does not guarantee "discriminatory value", so SUP3 is removed. SUP4 to be used to measure the independent variable "Role of supervisor" is likely to combine with the items PLA1, PLA2, PLA3 to form a new factor. When considering the meaning of the content of SUP4, it has a certain similarity with PLA1, PLA2, PLA3 expected to be used to measure the independent variable "Contingency business plan". Therefore, these four items can form a new factor named PLA, according to the name of the original variable.

Thus, the items form 10 variables (PER, COM, IMP, DIS, EMP, PRO, PLA, IT, TRA, STR) which are likely to impact the dependent variable. All variables have ensured "convergent value" and "discriminatory value" with Factor loading coefficients higher than 0.3. The KMO coefficient = 0.720 (> 0.5) and Barlett's test have statistical significance (Sig. = 0.000 < 0.05), which shows that there are enough observed variables to form factors and correlated with each other. All variables' Eigenvalue values are higher than 1. It can be explained 66.005% of the variability of all variables.

TABLE II.
THE EFA TEST'S RESULT FOR INDEPENDENT VARIABLES

EF A test	KMO coefficient	Sig value	Extracted variance	Eigenvalue of factors	Factor loading factor	Conclusion
1 st	0.737	0.000	68.755	> 1	All > 0.5	Remove IT1, STR4, SUP1, SUP2
2 nd	0.711	0.000	67.612	> 1	All > 0.5	Remove SUP3
3 rd	0.720	0.000	66.005	> 1	All > 0.5	Ensure requirements

2) EFA for the dependent variable

KMO coefficient = 0.627 (> 0.5) and the Barlett test has statistical significance (Sig. = 0.000 < 0.05) means that there are enough observed variables to form a variable and are interrelated. 60.879% of the dependent variable is explained by the variability of the data. Eigenvalue = 1.826 > 1 . Therefore, the scale of the dependent variable is accepted. Thus, it can be concluded that ORM represents the dependent variable, which ensures reliability for regression analysis.

After conducting the reliability and EFA, the model consists of ten independent variables and a dependent variable ensuring the scale's reliability, convergence and distinguish value.

C. The regression model

1) Descriptive Statistical Analysis

The result of the dataset's descriptive statistics is shown in Table III. The maximum value of the independent variables reaches the highest level with the "very good" meaning. The variable TRA has the highest mean of all variables, reaching 3.8456. In other words, training activity is evaluated highly by staff banks who have at least three years of experience in risk management. The difference between the independent variables' mean is low, which shows that all activities have been focused on by commercial banks and are likely to affect ORM.

TABLE III.
DESCRIPTIVE STATISTICS

Variables	Mean	Median	Max	Min	S.D
PER	3.7017	3.7500	5.000	2.000	0.7190
COM	3.6817	3.7500	5.000	2.250	0.7173
IMP	3.8160	3.8000	5.000	2.000	0.5383
DIS	3.6778	3.6667	5.000	2.000	0.7430
PRO	3.8067	3.7500	5.000	2.500	0.5722
EMP	3.6867	3.6667	5.000	2.000	0.7127
PLA	3.7617	3.7500	5.000	2.000	0.6102
IT	3.8078	3.6667	5.000	2.333	0.6197
TRA	3.8456	3.6667	5.000	2.333	0.5855
STR	3.7311	3.6667	5.000	2.000	0.5969
ORM	3.8056	3.6667	5.000	2.333	0.5442

The correlation coefficient represents the degree of linear dependence between the variables. Table IV shows that the correlation coefficients of the variables are in the range (0.008 – 0.4). The variables are not strongly correlated with

each other. Therefore, there is no non-separation phenomenon which influences the model result.

TABLE IV.
CORRELATION BETWEEN THE MAIN VARIABLES

	PER	COM	IMP	DIS	PRO	EMP	PLA	IT	TRA	STR
PER	1.0000									
COM	0.0390	1.0000								
IMP	0.2072	0.0375	1.0000							
DIS	-0.0308	0.0040	-0.0618	1.0000						
PRO	0.3451	-0.0476	0.3195	-0.0533	1.0000					
EMP	0.0487	0.2186	0.1921	0.0838	-0.0342	1.0000				
PLA	0.1781	0.0271	0.2514	0.0255	0.2771	0.0610	1.0000			
IT	0.2499	-0.0159	0.2519	-0.0075	0.3374	-0.0367	0.2639	1.0000		
TRA	0.2589	0.0451	0.3085	-0.0857	0.3531	0.0083	0.1938	0.2528	1.0000	
STR	0.3249	-0.0059	0.2501	-0.0896	0.1704	0.0197	0.1242	0.0678	0.2370	1.0000

The regression model results in Table V show that Prob (F-Statistic) = 0.0000 < 0.05, which means that the model's results are significant. Adjusted R² = 0.3505 shows that the model can explain 35.05% of the change of the dependent variable.

The model has seven independent variables that positively impact the dependent variable with 95% confidence. Specif-

TABLE V.
THE RESULT OF THE REGRESSION MODEL

Dependent variable: ORM	Coefficient	VIF
C	-0.0062 (0.3443)	
PER	0.1059*** (0.04001)	1.286
COM	0.0847** (0.0364)	1.059
IMP	0.1087** (0.0540)	1.315
DIS	0.0354 (0.0346)	1.026
PRO	0.0578 (0.0524)	1.396
EMP	0.0062 (0.0376)	1.118
PLA	0.1181*** (0.0448)	1.163
IT	0.2422*** (0.0455)	1.237
TRA	0.1305*** (0.0488)	1.269
STR	0.1210*** (0.0465)	1.197
R-squared	0.3723	
Adjusted R squared	0.3505	
Prob (F-statistic)	0.0000	
Durbin-Watson	1.7402	
Observations	300	

Note: Statistically significant at ** 5%, *** 1%.

ically, PER, PLA, IT, TRA, and STR affect ORM at a 1% significance level; COM and IMP impact ORM at a 5% significance level. However, these variables (C, DIS, PRO, EMP) are not statistically significant because the P-value > 0.05. Using Wald Test, the test result shows that Pro (F-Statistic) = 0.5915 > 0.05, so the variables C, DIS, PRO, and EMP are removed without affecting model results.

Testing for the model's diagnostics

Test for multicollinearity: Variance Inflation Factors (VIF) are lower than 2, which implies that multicollinearity is not an issue of this model.

Test for heteroskedasticity: The White test's result finds out the model has no heteroskedasticity problem due to P-value = 0.8993 > 0.05.

Test for autocorrelation: The Serial Correlation LM test result finds out that the model has an autocorrelation defect because Prob (F-statistic) = 0.0278 < 0.05. The authors use AR(p) to overcome this problem and have the model results in Table VI.

TABLE VI.
THE RESULT OF THE REGRESSION MODEL AFTER OVERCOMING THE AUTOCORRELATION PROBLEM

Dependent variable: ORM	Coefficient
PER	0.1093*** (0.0378)
COM	0.0799** (0.0303)
IMP	0.1354*** (0.0459)
PLA	0.1424*** (0.0431)
IT	0.2586*** (0.0385)
TRA	0.1478*** (0.0449)
STR	0.1336*** (0.0452)
R-squared	0.3770
Adjusted R squared	0.3599
Prob (F-statistic)	0.0000
Durbin-Watson	1.9909
Observations	300

Note: Statistically significant at ** 5%, *** 1%

The regression model has statistical significance (P-value = 0.0000 < 0.05) and the model explains 35.99% of the change of the dependent variable (Adjusted R squared = 0.3599). For the explanatory model, the fit of this model is acceptable.

After overcoming the defects of the regression model, the paper has pointed out seven independent variables that impact on ORM of Vietnamese commercial banks as follows.

Firstly, IT (information technology system) has a strongest impact on the Vietnamese commercial bank's ORM at a 1% significance level, which is consistent with references [7], [25] and [37]. When IT increase (decrease) by 1%, the ORM will increase (decrease) by 0.2586%. The research result is suitable for practice in Vietnam. The Vietnamese commercial banks' IT system has been invested in and centrally managed. However, to meet the calculation requirements by the advanced methods such as Advanced Measurement Approach, the Vietnamese commercial banks have many limitations in terms of data as well as investment in IT systems. It is the main reason why the Vietnamese commer-

cial banks have not yet calculated the expected and unexpected losses, which limits ORM's effectiveness.

Secondly, TRA (training) has a positive relationship with ORM at a 1% significance level, which is compatible with reference [4], [25]. When TRA rises (declines) by 1%, the ORM efficiency will climb (falls) by 0.1478%. Because ORM is complex for Vietnamese commercial banks, training is extremely crucial. Most training courses in Vietnamese commercial banks focused on general risk management activities or traditional risks (credit and liquidity risk), not many in-depth training courses on operational risk. Moreover, in the current context, there are more and more occurred operational risk events stemming from the bank staff's support. Therefore, the ethical issue of bank staff in Vietnamese commercial banks becomes an urgent topic. For the above reasons, training is one of the necessary solutions to minimize operational risk.

Thirdly, PLA (contingency business plan) and ORM have a positive relationship at a 1% significance level. H4 is accepted, which is one of the selling points of this study. Specifically, when PLA increases by 1%, the ORM efficiency will witness a rise of 0.1424% and vice versa. All interviewed experts implied that operational risk is inevitable. Therefore, it is necessary to develop a contingency business plan to maintain business continuity. However, some Vietnamese commercial banks have not yet issued regulations on business continuity plans. When an operational risk occurs, they only build temporary contingency plans, which makes them passive in responding to operational risk.

Fourthly, IMP (the implementation of the ORM process) impacts positively ORM at the 5% significance level, which has the same opinion as references [4] and [9]. A drop of 0.1354% will be seen in the ORM efficiency when IMP fall by 1% and vice versa. Some Vietnamese commercial banks that manage operational risk well as BIDV, Vietcombank, Vietinbank, etc have developed an ORM process under the guidance of references [9] [10] and uniformly implemented the process. Meanwhile, some Vietnamese commercial banks such as Agribank have just issued a framework with a risk management process applied to all types of risks, including operational risk. Therefore, ORM is performed sporadically, without coordination between departments, which leads to low ORM effectiveness. In other words, the ORM process of the Vietnamese commercial banks has not been implemented synchronously.

Fifthly, STR (organizational structure) impacts positively on the Vietnamese commercial bank's ORM at a 1% significance level, which is consistent with references [10] [12] and [25]. Specifically, ORM will increase (decrease) by 0.1336% when STR rises (drops) by 1%. Currently, most Vietnamese commercial banks have built an organizational structure with three layers of defence according to references [10] but has not been implemented effectively. The defence lines overlap functions and tasks, especially in the first line and the second line, which reduces the ORM effectiveness at the Vietnamese commercial banks.

Sixthly, PER (the leadership's perspective) has a positive strong relationship with the dependent variable ORM at a 1% significance level. The hypothesis H1 is accepted, which is compatible with references [4], [26] and [36]. In specific,

when PER increases by 1%, ORM will see growth by 0.1093% and vice versa. However, other commercial banks have not yet enacted a separate ORM policy. Risk appetite and risk tolerance are integrated into the general policy on risk management or in the business strategy of commercial banks, which reduces the Vietnamese commercial bank's ORM effectiveness.

Finally, COM (communication) has positively impacted the ORM. A drop of 0.0799% is witnessed in the ORM efficiency when COM falls by 1% and vice versa. The Vietnamese commercial bank does not have much experience in ORM. Therefore, through communication, the leadership has transmitted information to employees to improve staff's awareness and understanding of ORM. Moreover, timely communication about the operational risk will help make timely decisions, thereby minimizing the loss.

The remaining variables as EMP (employee engagement and empowerment), SUP (role of supervisor), DIS (information disclosure activities), and PRO (ORM process) are not statistically significant. The hypotheses H2, H3 and H5 are refused, which is contrary to the authors' expectations. However, it is consistent with the reality in Vietnam. Survey subjects are bank staff with at least three years of experience. Therefore, the characteristics of the ORM process and the controller's activities have not been approached directly by bank officials. The difference in the degree of empowerment for employees working at positions in the Vietnamese commercial banks leads to inconsistent levels of impact on ORM. Therefore, the research results do not have enough basis to confirm that employee engagement and empowerment impact ORM. Besides, the information disclosure on operational risk at the Vietnamese commercial banks is still very poor. The Vietnamese commercial banks have only published general overviews of ORM. No commercial banks have yet to build a database on operational risk loss. Therefore, no evidence shows the impact of the information disclosure on ORM.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the application of BCBS's principles in the research framework, the paper aims to test the impact of leadership's perspective on ORM at the Vietnamese commercial bank. The research's result is concluded as follows:

Firstly, the finding of this study has demonstrated the decisive role of the leader's viewpoint, which is one of highlights of this study. The board of directors develops policies, sets goals as well as shapes the ORM culture. Building a suitable ORM framework plays an essential role in minimizing operational risk. At the same time, the review of the ORM framework also aims to re-evaluate the suitability of policies for activities, systems and processes to support commercial banks capture operational risk.

Secondly, a strictly organizational structure contributes to improving the ORM effectiveness. It contributes to departments dividing duties and responsibilities and acts as a communication channel for policy and information between levels. Therefore, the organizational structure also affects the ability to capture, process and communication between departments. It concluded that the organizational structure affects directly the internal control system's effectiveness, es-

pecially for the type of risk existing in all operations like operational risk.

Thirdly, the better the ORM process's steps are implemented, the higher the ORM is. The ORM process implementation is consistent with prescribed steps, principles, tools and methods. It contributes as a control tool for managers, ensuring the commercial bank's business continuity.

Fourthly, the commercial bank's specific contingency business plan plays a core role in enhancing the ORM system. This is one of the selling points of this study. Operational risk is pervasive, inevitable and interspersed in all activities. When operational risks occur, this solution is an urgent measure to help minimize operational risk.

Fifthly, training plays an urgent role in improving ORM. It not only helps staff enrich their knowledge, but also provides an opportunity to exchange ideas between employees and senior managers. In recent times, when ethical issues of bank staff is a "hot" topic, training is a necessary measure to minimize operational risk.

Sixthly, communication contributes to improve ORM in Vietnamese commercial banks. An effective communication channel help make timely decisions. In addition, through the communication channels, the commercial bank's leadership transmits information to employees to raise staff's awareness of ORM.

Last but not least, it is undeniable that the IT system plays a crucial role in improving ORM. The modern IT system promotes ORM activities mainly based on data. Because of the characteristics of the banking industry, the IT system needs to be improved regularly, especially in the context of digitalization of the banking system in Vietnam nowadays.

Based on the research results, the authors have proposed some recommendations to enhance the ORM effectiveness in Vietnamese commercial banks.

First, the Vietnamese commercial banks need to build and develop an ORM culture in line with their business strategy. A strong ORM culture plays an essential in encouraging sharing of knowledge and a deep commitment to ethical and responsible business. At a higher level, risk management culture defines how risk is managed when occurring. It can be said that the culture creates stability and competitive advantages for commercial banks.

Second, the Vietnamese commercial banks need to build an organizational structure according to the model of three lines of defence, synchronizing with risk management of the whole line. Some banks have already done that. However, this model still overlaps tasks across departments, especially in the first and second lines of defence.

Third, the Vietnamese commercial banks should implement the ORM process following references [9] [10]. The ORM process's steps are set up depending on the operation of commercial banks. The commercial bank system needs to strengthen the synchronous implementation in utilizing risk management tools.

Moreover, the Vietnamese commercial banks should develop a transparent and clear policy regarding the contingency business plan. Commercial banks should aim to transform the digital banking model partially or completely to service the contingency business plan.

Fifth, the Vietnamese commercial banks should improve understanding of ORM for all staff. They need to build a communication flow following the established organizational structure. It is essential to diversify content and forms of communication and training suitable for each conveyed object.

Finally, the Vietnamese commercial banks need to promote IT separate applications for ORM to integrate data. ORM software needs to automatically integrate with the data source of the business software system.

Some research hypotheses testing the impact of the supervisor's role, employee engagement and empowerment, and information disclosure on ORM have not met the authors' expectations. However, the study results do not mean that this factor does not affect ORM. The evidence of this impact is concluded only for this survey sample. The researcher can study the survey object as the board of directors, and staff in the risk management department to test the impact of these factors on ORM.

REFERENCES

- [1] A. Abid, A.G. Ammar, N. Hussain, and D.K. Nguyen, "Risk governance and bank risk-taking behavior: evidence from Asian banks", *Journal of International Financial Markets, Institutions & Money*, vol. 75, pp.101466, 2021.
- [2] J. Agnew, *A Supervisor's Guide to Safety Leadership*, Performance Management Publications, 2016.
- [3] G. A. Ahmadya, M. Mehrpourb, and A. Nikooravesh, "Organizational Structure", *Procedia - Social and Behavioral Sciences*, vol. 230, pp. 455–462, 2016.
- [4] H. Akpolat, and T. Pitinanondha, "A Framework for Systematic Management of Operational Risks", *The Asian Journal on Quality*, vol. 10, no. 2, pp. 1-17, 2009.
- [5] F. Al-Khatib, *Training and education for developing risk management capabilities*. Retrieved from: <http://www.care-web.co.uk/blog/training-education-developing-risk-management-capabilities/>, 2014.
- [6] P. Arhenful, A. K. Yeboah, and B. A. Tackie, "Evaluation of Operational Risk Management of Commercial Banks in Ghana", *Advances in Management & Applied Economics*, vol. 4, no. 9, pp. 25-40.
- [7] F. Azmaa, M.A. Mostafapourb, and H. Rezaei, "The application of information technology and its relationship with organizational intelligence", *Procedia Technology*, vol. 1 pp. 94 – 97, 2012.
- [8] A. Barakat, and K. Hussainey, "Bank governance, regulation, supervision, and risk reporting: Evidence from operational risk disclosures in European banks", *International Review of Financial Analysis*, vol. 30, pp. 254-270, 2013.
- [9] Basel Committee on Banking Supervision, *Sound practices for the management and supervision of operational risk*. Report, February, Bank for International Settlements., 2003.
- [10] Basel Committee on Banking Supervision, *Sound practices for the management and supervision of operational risk*. Report, June, Bank for International Settlements, 2011.
- [11] F. Battaglia, and A. Gallo, "Risk governance and Asian bank performance: An empirical investigation over the financial crisis", *Emerging Markets Review*, vol. 25, pp. 53–68, 2015.
- [12] P. Bolton, and M. Dewatripont, "The Firm as a Communication Network", *The Quarterly Journal of Economics*, vol. 109, no. 4, pp. 809-839, 1994.
- [13] W. E. Deming, *Out of Crisis*. Massachusetts Institute of Technology. Center for Advanced Engineering Study, USA, 1986.
- [14] H. Dincer, and U. Hacıoglu, *Risk management, strategic thinking and leadership in the financial services industry: a proactive approach to strategic thinking*, Springer International Publishing AG, New York, 2017.
- [15] Y. Dong, C. Meng, M. Firth, and W. Hou, "Ownership structure and risk-taking: Comparative evidence from private and state-controlled banks in China", *International Review of Financial Analysis*, vol. 36, pp. 120–130, 2014.
- [16] D. H. Erkens, M. Hung, and P. Matos, "Corporate governance in the 2007–2008 financial crisis: evidence from financial institutions world-

wide", *Journal of Corporate Finance*, vol. 18, no. 2, pp. 389–411, 2012.

- [17] O. S. Fadun, and D. Oye, "Impacts of Operational Risk Management on Financial Performance: a case of commercial banks in Nigeria", *International Journal of Finance & Banking Studies*, vol. 9, no. 1, pp. 22-35, 2020.
- [18] J. F. Hair, R. E. Anderson, R. L. Tatham, and W. C. Black, *Multivariate Data Analysis*, 5th ed, Prentice Hall College Div, USA, 1998.
- [19] D. Homolya, "The impact of the capital requirements for operational risk in the Hungarian banking system", *Magyar Nemzeti Bank (Central Bank of Hungary)*, vol. 4, no. 2, pp. 6-13, 2009.
- [20] L. Honold, "A Review of The Literature on Employee Empowerment", *Empowerment in Organizations*, vol. 5, no. 4, pp. 202-212, 1997.
- [21] Ian Storkey, *Operational risk management and Business Continuity Planning for Modern State Treasuries*, Technical Notes and Manuals, International Monetary Fund. Retrieved from: <https://www.imf.org/external/pubs/ft/tnm/2011/tnm1105.pdf>, 2011.
- [22] J. Infanti, et al, *A literature review on effective risk communication for the prevention and control of communicable diseases in Europe*, Stockholm: ECDC, 2013.
- [23] M. C. Jensen, "The modern industrial revolution, exit, and the failure of internal control systems", *The Journal of Finance*, vol. 48, no. 3, pp. 831–880, 1993.
- [24] R. La Porta, F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, "Investor protection and corporate governance", *Journal of Financial Economics*, vol 58, no.1-2, pp. 3–27, 2000.
- [25] T.V.K. Le, *Operational risk management system at the Vietnamese commercial bank*, Doctoral Thesis, National Economics University, Vietnam, 2016.
- [26] F.C. Lunenburg, "Leadership versus management: a key distinction-at least in theory", *International Journal of Management, Business and Administration*, vol. 1, no. 14, 2011.
- [27] M. F. Malik, J. Nowland, and S. Buckby, "Voluntary adoption of board risk committees and financial constraints risk", *International Review of Financial Analysis*, vol. 73, p.101611, 2021.
- [28] M. R. Markovic and A. Salamzadeh, *The Importance of Communication in Business Management*, The 7th International Scientific Conference on Employment, Education and Entrepreneurship, Belgrade, Serbia, 2018.
- [29] H. Nobanee, and N. Ellili, "Does Operational Risk Disclosure Quality Increase Operating Cash Flows?", *Brazilian Administration Review*, vol. 14, no. 1, pp. 2-13, 2017.
- [30] M. Q. Patton, *Qualitative Evaluation and Research Methods*, SAGE Publications Limited, United Kingdom, 1990.
- [31] C. A. L. Pearson, and S. R. Chatterjee, "Implementing Empowerment Through Subunit Clusters: A Western Australian case study", *Empowerment in Organizations*, vol. 4, no. 3, pp. 16-25, 1996.
- [32] T. Robertson, *Negative Effects of Employee Empowerment*. Retrieved from: <https://smallbusiness.chron.com/negative-effects-employee-empowerment-18691.html>, 2019.
- [33] A. Roy, "Organization structure and risk taking in bankin", *Risk management*, vol. 10, no. 2, pp. 122-134, 2008.
- [34] J. E. Shahriari, J. Maleki, P. Koolivand, and M. Meyvand, "The study of the relationship between organizational structure and psychological empowerment among the staffs in Ministry of Economic Affairs and Finance", *European Online Journal of Natural and Social Sciences*, vol. 2, no. 3, pp. 330-338, 2013.
- [35] S. Sharifi, A. Haldar, and N. Rao, "Relationship between operational risk management, size, and ownership of Indian banks", *Managerial Finance*, vol. 42, no. 10, pp. 930-942, 2016.
- [36] R. Tannenbaum, and W. H. Schmidt, "How to choose a leadership pattern", *Harvard Business Review*, vol. 36, pp. 162-180, 1973.
- [37] M. Teymouria, and M. Ashoorib, "The impact of information technology on risk management", *Procedia Computer Science*, vol. 3, pp. 1602-1608, 2011.
- [38] B. Williams, *The pros and cons of employee empowerment*. Retrieved from: <https://www.forwardfocusinc.com/inspire-leaders/the-pros-and-cons-of-employee-empowerment/>, 2011.
- [39] B. Williams, T. Brown, and A. Onsmann, "Exploratory factor analysis: a five-step guide for novices", *Australasian Journal of Paramedicine*, vol. 8, no. 3, pp. 1-13, 2010.

APPENDIX

TABLE A1.
THE VARIABLES' SCALE IN THE REGRESSION MODEL

N o	Variable s	The scale meaning	
1	PER	PER1	ORM framework construction
		PER2	ORM framework content
		PER3	Structure establishment
		PER4	Regular monitoring
2	STR	STR1	Execution
		STR2	Capacity and experience
		STR3	Communication
3	PRO	PRO1	Clear process
		PRO2	The specific assignment
		PRO3	The independence degree
		PRO4	Regular reporting
4	IMP	IMP1	Implementation of identification
		IMP2	Implementation of assessment
		IMP3	Implementation of monitoring
		IMP4	Implementation of internal control
		IMP5	Implementation of tools
5	PLA	PLA1	Set up
		PLA2	Meplacement mechanism
		PLA3	Periodically review
6	TRA	TRA1	Periodic organization
		TRA2	Content
		TRA3	Forms
7	EMP	EMP1	Being empowered
		EMP2	Regularly participate
		EMP3	Consider seriously
8	COM	COM1	Information update
		COM2	Information exchange
		COM3	Content
		COM4	Form
9	SUP	SUP1	Independence of control
		SUP2	Information exchange
		SUP3	Contribution for planning
		SUP4	Contribution for overcoming
10	IT	IT1	Upgrades
		IT2	Completeness
		IT3	Synchronization
		IT4	Timeliness
11	DIS	DIS1	Fully
		DIS2	Timely
		DIS3	Content
12	ORM	ORM1	Losses
		ORM2	Disruption
		ORM3	Concordance between ORM and business objectives

Digital Forensic Readiness of Cybercrime Investigating Institutions in Nigeria: A Case Study of the Economic and Financial Crimes Commission (EFCC) and the Nigeria Police Force

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Abstract—This case study investigates Nigeria's cybercrime agencies' digital forensic readiness and forensic capability and how this affects the cybercrime caseloads and prosecution. The Routine Activity Theory (RAT) and the Technology, Organization, and Environment (TOE) theories were applied. This study used the TOE framework to examine the digital forensic technology adoption and forensic readiness of cybercrime investigators in Nigeria and relates this with the RAT framework and the effectiveness of law enforcement agencies as capable guardians. The research population of this study was the Nigerian Internet fraud investigative agencies – the Economic and Financial Crimes Commission (EFCC) and the Nigeria Police Force (NPF). Eighteen participants from the two organizations were interviewed. The paper concluded that the cybercrime investigators in Nigeria are not forensically ready given the established lack of digital forensic resources (technological gap, human resources gap, skills gap, funding gap), particularly when juxtaposed with the high cybercrime caseloads in the country.

Index Terms—cybercrime, internet fraud, digital forensics, routine activity theory, Nigeria

I. INTRODUCTION

Nigeria is one of the hotbeds of cybercrime in the world. The scale and magnitude have been quite disturbing, not just to Nigeria but also to the international community, given the limitless boundaries of cybercrime [15][34]. The Nigerian Deposit Insurance Company [32] report shows Nigeria lost 15.15 billion Naira (approximately \$43 million in 2019) to fraud in the banking sector alone in 2018. This amount represented an increase of 539% from the 2.37 billion Naira recorded in 2017. Cybercrime accounts for most of these. Their victims cut across the financial sector to other institutions and individuals across different jurisdictions. Internet fraud is driven mainly by financial gains [14]. Internet fraud originated from Advance Fee fraud. This fraudulent scheme is said to have a history in West Africa [26]. Globally, this scheme is mainly associated with Nigeria, which has influenced its naming – "419" and "Yahoo Yahoo" - with the "419" code being Nigeria's criminal code for fraud [3][4]. Besides averaging the highest loss per victim, Nigerian "419" scams are the second most reported cybercrime [12]. Symantec Corporation and African Union [38] reported that out of a large pool of email addresses used by online scammers, 46% were Nigerian Internet Protocol (IP) addresses. Unless otherwise determined by the Secretary of Defense (SecDef) or the President of the United States (POTUS), cy-

ber-attacks on the election infrastructure are the first issues of homeland security [22][36]. As a result, the States and local governments should act as first responders to the cyber-attack before directly requesting support from the Cybersecurity and Infrastructure Security Agency (CISA).

II. LITERATURE REVIEW

Nigerian Internet fraudsters have increased in sophistication over the years. They have metamorphosed from sending bulk emails to unsuspecting victims to carrying out spear-phishing attacks and sophisticated Business Email Compromise (BEC) schemes that compromise their corporate email accounts. For instance, Nigerian cybercriminals reportedly caused a breach involving the confidential health records of over 750,000 persons in Los Angeles [7][8]. They now use sophisticated malware tools such as Zeus, Darknet, Predator pain, ISpySoftware, and other malware [24]. This increased sophistication has incentivized more attacks and perhaps explains the high numbers. Such a high prevalence is of significant concern to the country.

Nigeria has responded to these increasing caseloads by implementing reforms and setting up structures to combat Internet fraud. The Economic and Financial Crimes Commission (EFCC) [21] is the primary investigating agency for Internet fraud. Set up by the Economic and Financial Crimes Commission (EFCC) Act 2004 [20], the commission's mandate extends beyond Internet fraud to other financial crimes, both in the online and terrestrial world [33][42]. The commission investigated 15,124 petitions, securing only 568 convictions between 2010 and 2015 [25]. However, other agencies often play overlapping roles in this regard. For instance, the Nigerian Police Force has a dedicated cybercrime unit with a mandate to crack down on cybercrime [30]. This unit investigates and prosecutes Internet fraud [43]. Also, the National Security Adviser (NSA) plays a central role in cybercrime investigation as host to Nigeria's Computer Emergency Response Team [38]. They coordinate the nation's corporate response to cyber-attacks.

A. Routine Activity Theory (RAT)

Cybercrime has grown in popularity in the last two decades and is now an established research area in criminology [27][43]. Routine Activity Theory is a renowned situational theory of crime developed by Cohen and Felson [13].

The theory states that for crime to occur, three conditions must occur. The conditions are a motivated offender, a suitable target, and the absence of a capable guardian. This study is rooted in the third element: the absence of a "capable guardian."

There have been debates about the suitability of this theory in other areas beyond the terrestrial world. Specifically, there are varying perspectives and arguments regarding RAT's suitability to analyze the causation of cybercrime and Internet fraud. For instance, Yar [43] states that RAT cannot reliably explain the causation of Internet crime, given the spatiotemporal nature of cyberspace and the ecological nature of the RAT. Grabosky [23] believes the three conditions applicable in the terrestrial world also apply in the cyber world. Leukfeldt and Yar [27] also agreed that RAT is suitable for cybercrime due to the similarities between cyberspace and the terrestrial world.

The Capable Guardian. This study investigated the lack of digital forensic resources among the financial crime agencies in Nigeria. Looking at the three elements of RAT – motivated offender, a suitable target, and the absence of a capable guardian – the lack of forensic resources amongst law enforcement agencies fits the context of the capable guardian. Tseloni et al. [40] define guardianship as the capability of persons and objects to prevent crime. The concept of capable guardianship may be applied rather widely. Yar [43] suggests this could be the property owner, custodian, law enforcement, Computer Emergency Response Teams, banks, or any other, whose presence may discourage the occurrence of the crime in question. Bello and Griffiths [10] posited that the awareness of the existence of a capable guardian is a demotivating factor to the criminal.

B. Technology-Organization-Environment (TOE) Framework

Adoption refers to an individual's decisions to accept, diffuse and mainstream innovation in an integrated manner [48]. As organizations invest large sums in new technologies, it is essential to study technology adoption. Such investments may not yield positive results, except if the right adoption strategies are implemented (Ahmed, 2020). The rapidly evolving and emerging technological landscape has necessitated studying innovation adoption. Researchers have applied several technology adoption models to explore emerging technologies over the last few years (Leung et al., 2015). For instance, the Theory of Reasoned Action (TRA) [10], the theory of Planned Behaviors [9], the Technology Acceptance Model (TAM) [18], and the Unified Theory of Acceptance and Use of Technology (UTAUT) [54] have all contributed to perspectives in technology adoption.

However, Oliveira and Martins [42] observed that the above models focused more on the individual and suggested that the Technology-Organization-Environment (TOE) framework offers a better explanation of technology adoption at the firm level. Oliveira and Martins [42] noted that an essential feature of the TOE framework is incorporating environmental factors, which help explain technology adoption. As can be seen from the name, the TOE framework considers the three critical elements of adoption: technology, organization, and environment. Technological context includes all relevant technologies in the firm. This context

comprises existing related tools and emerging technologies [35].

C. Digital Forensic Readiness

Although a relatively new term, digital forensic readiness has received much attention recently. Used first by Tan [39], the concept has two primary objectives: to maximize the usefulness of the evidence collected; and to minimize the cost of investigations. Carrier and Spafford [11] further divided forensic readiness into operational and infrastructural readiness, with the former being concerned with adequate training and equipment and the latter with efficient data preservation. There are different ways to view digital forensic readiness, such as time, cost, training, and technology [19]. To be adequately empowered to investigate Nigeria's growing Internet fraud cases, the country's financial crime agencies must attain considerable forensic readiness. This capacity can be measured using any of the digital forensic readiness frameworks.

D. Digital Forensics Readiness Models

Different researchers have come up with many frameworks for Digital Forensic Readiness. For instance, Ngoben et al. [31] developed a conceptual model for wireless networks. Makutsoane and Leonard [28] developed a forensic readiness model for a cloud service provider. Alenezi et al. [5] developed a framework for measuring an organization's forensic readiness for cloud services. Almarzooqi and Jones' [7] framework for digital forensic readiness narrowed their model to assessing the core capabilities of a Digital Forensic Organization. Garba and Bade [22] proposed a Digital Forensic Readiness model for Nigerian banks. This improved previous research work with Zenith Bank, Nigeria, as a case study [21]. Englbrecht et al. [20] proposed a capability model for digital forensic readiness. Poee and Labuschagne [36] identified five critical components of the digital forensic readiness model: people, process, policy, technology, and data. There is literature on existing digital forensics models, leaving the forensic expert with many choice models.

E. Digital Forensic Readiness of the Nigerian Financial Crimes Agency

Nigerian investigative agencies must attain considerable forensic readiness to investigate Internet fraud and online financial crimes efficiently. In Nigeria, the primary law enforcement agency for cybercrimes is the EFCC and a complementary role by the Cybercrime division of the Nigerian Police [1] [2]. It is noteworthy that some agencies play a critical role in combatting cybercrime. For instance, the Office of the National Security Adviser plays a central role in cybercrime investigation as host to Nigeria's Computer Emergency Response Team [10] [38]. They coordinate the nation's corporate response to cyber-attacks. The scope of this research is limited to the investigative agencies – the EFCC and the Nigerian Police.

F. Processing and Thematic qualitative Analysis

The researcher used a digital audio recorder for the interviews, with the consent of the participants. The researcher used the qualitative software NVivo to analyze the transcrip-

tion of recorded interviews. This tool codifies themes from the interview transcripts. This study used inductive thematic analysis for the categorization of interview data. A thematic analysis could come in three forms: inductive analysis, theoretical analysis, and that which comes with constant comparison [45]. This study adopted the inductive thematic analysis. This method ensured the analysis of interviews without any pre-existing categories. The data collected was analyzed to look out for repeating patterns and themes. The study was structured to follow the analytic procedure Marshall and Rossman [33] recommended. The procedure adopted in this research is summarized below as:

1. Interview transcripts were studied, organized, and loaded into NVIVO.
2. Interview transcripts were further analyzed, read, and re-read.
3. The researcher generated categories and themes using NVivo
4. The researcher used NVivo to code data.
5. The research interpreted data analyzed by NVivo.
6. Searched for alternative understandings
7. The researcher presented research findings.

III. RESEARCH DESIGN AND METHODOLOGY

This study examined the digital forensic readiness of law enforcement agencies in Nigeria. This research used the qualitative case study method to investigate the digital forensic readiness of Nigeria's two primary cybercrime and financial crime prevention and prosecution agencies – the EFCC and the Nigerian Police Force. A qualitative study is suitable when investigating a relatively unknown phenomenon or subject of interest, and the resources available will allow for interviews and reviews of related documents [6]. It is exploratory and, therefore, more suitable in the context of this study.

Specifically, the research adopted the case study approach, a qualitative paradigm. Yin [44] gave four scenarios suitable for qualitative case studies. The four scenarios are:

1. When answers to the "how" and "why" questions are critical to research.
2. When it is impossible to manipulate research participants.
3. When the contextual conditions are relevant to the study; and
4. There is an unclear boundary between the phenomenon of interest and the prevailing contexts.

This research used the steps outlined by Baxter and Jack [9]. An essential first step in a case study is determining the case. Miles and Huberman [29] define a "case" as a phenomenon occurring in a bounded context. It is the unit of analysis. This research established the lack of digital forensic resources in Nigeria's financial crime agencies, as the case. The definition of the boundary followed once the "case" was determined [37] [44]. Defining the boundaries will keep the research focused. This research is limited to the law enforcement agencies in Nigeria responsible for combatting internet fraud - EFCC and the Nigeria Police Force.

This study was structured to investigate Nigeria's digital forensic readiness of cybercrime agencies. To this end, the research sample consisted of officers of the two principal agencies responsible for fighting financial crimes and inter-

net fraud. They are the Economic and Financial Crimes, set up by the EFCC Act 2004 [16], and the Nigerian Police Force [33] [41]. The sample consisted of personnel from only departments directly involved or impacted by the use of or the lack of digital forensic technology in financial crimes prosecution to keep this study focused.

The sample consisted of five persons from the Cybercrime department of the Nigerian Police and thirteen officers of the EFCC, drawn from four related (forensic-dependent) departments within the organization – Digital Forensic department, Cybercrime Department, Advance Fee Fraud Department, and Legal (Cybercrime Prosecution) Department. This diversity was necessary to ensure broad perspectives. Participants had varying years of experience, ranging from four to over 20 years. Participants had the requisite work experience to discuss the subject, with fourteen out of the eighteen with more than ten years of experience.

While semi-structured interviews were used for this study, guiding questions ensured a focused and organized discussion. The five critical components of the Digital Forensic Readiness model identified by Poee and Labuschagne [36] shaped the interview questions. The five components are people, Processes, Policy, Technology, and data. The researcher grouped the primary interview questions under the components identified by Poee and Labuschagne [36]. This grouping helped to keep things focused and organized. The researcher also created a general theme for generic questions.

IV. RESULTS

The qualitative analysis tool was used to generate a word cloud, shown in Figure 1. The thematic analysis produced five themes and nine subthemes. The main themes are personnel, digital forensic technology, digital forensic training, processes, and policy. The personnel theme had subthemes for personnel adequacy and personnel capability. The digital forensic technology theme had the following subthemes: tool availability and the impact of the lack of digital forensic technology. The digital forensic training theme had one subtheme: structured training. The process theme had the fol-

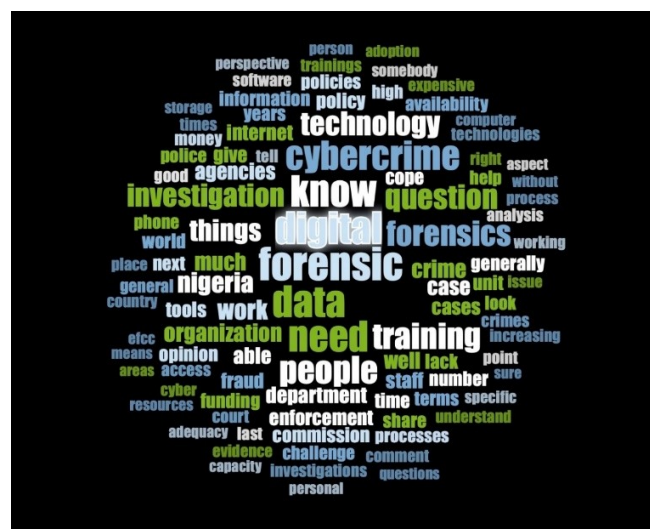


Fig 1 - Word Cloud Generated from Interview Files. *Note.* This figure shows frequently used words by participants as generated by NVivo.

lowing subthemes: defined processes and structured process reviews. The policy theme had two subthemes: policy framework and the roadmap for digital forensic readiness. The themes reveal the perspectives shared by participants drawn from the two agencies. The researcher analyzed the research questions within the context of these themes.

V. CONCLUSION

Seven themes emerged from participants' responses. The result was discussed by analyzing each theme against existing scholarly literature. The seven themes are personnel adequacy, capability, tools availability, tool licensing challenge, defined processes, structured process review, and policy framework. The study investigated the lack of digital forensic resources and the digital forensic readiness of Nigeria's cybercrime agencies using these themes in the digital forensic readiness framework. These themes fit into Poee and Labuschagne's [36] five critical components of a Digital Forensic Readiness model of people, process, policy, technology, and data.

This study shows that the cybercrime investigating agencies in Nigeria lack digital forensic resources. The findings suggest they are not forensically ready and fall short of the expected capability maturity needed to perform efficiently and optimally in investigating cybercrime. This result which harvested views from the practitioners' point of view (Law Enforcement Agencies), is consistent with other scholarly works. Odumesi [41] submitted that the law enforcement agencies in Nigeria, particularly the Nigerian Police, lack the computer forensic laboratories to investigate and analyze cybercrime effectively.

Odumesi [41] further posited that beyond having enabling laws, law enforcement agencies need to acquire more tools and more training for their personnel if they wish to be effective. Oraegbunam [35] also echoed this position by submitting that there was a need to upscale the digital forensic capabilities of law enforcement agencies across the various formations and not just restricted to an elite law enforcement squad. Ehimen and Bola [18] asserted that the Nigerian Police are not technologically savvy and lack the computer forensic skills needed for investigating cybercrimes.

A. Limitations of the Study

While the two agencies chosen as the population for this study are principally responsible for prosecuting financial crimes in Nigeria, in reality, there are also overlapping roles by other related agencies. For instance, the Office of the National Security Adviser plays a central role in cybercrime investigation, as host to Nigeria's Computer Emergency Response Team (Symantec Corporation and African Union, 2016). They coordinate the nation's corporate response to cyberattacks and therefore play a role in the fight against Internet fraud. However, because they are not frontline agencies in financial crime investigation, this study did not capture them.

B. Implications for Practice

This study was limited to the EFCC and the Nigeria Police Force. The research was delimited to sample of the staff of the digital forensics unit of the EFCC and the Cyber

crime unit of the Nigeria Police Force. Expectedly, these are elite units of small teams. For instance, the EFCC digital forensics unit at the agency's head office has an 8-man team (Okolorie, 2020). Extending the sample far beyond this might affect the focus of the study.

The sample for the Police was also limited to staff of the unit at the Force Headquarters. It is noteworthy to mention that the 36 states in Nigeria all have fraud units in the states. Therefore, limiting the study to just the force headquarters may not be representative of the entire opinion of the rank and file of the Police. Further studies could benefit from the outcome of this study to extend the study to all the 36 states and beyond just the cybercrime unit.

C. Summary

In summary, this research was conducted to identify themes for reference to be taken into consideration that could potentially shape policy formulation in both organizations and, by extension, in law enforcement agencies in Nigeria. It established the lack of digital forensic resources and made specific findings. The research made novel contributions by identifying themes needed by Nigeria's cybercrime agencies. The study sought to investigate the digital forensic readiness of Nigeria's financial crime agencies. Previous studies highlighted the gaps in forensic resources of law enforcement agencies as a significant impediment to the fight against cybercrime. For instance, Odumesi [41], Oraegbunam [35], and Bello and Griffiths [10] all pointed to this lack of forensic capabilities of law enforcement agencies. These studies only pointed to the lack without drilling into the specifics. Therefore, this study investigated the specifics of this lack – technology, human resources, capabilities, and others – both from the insider's perspective and available literature and documents.

The finding of this research establishing the digital forensic readiness and the extent of lack of digital forensic resources is an essential first step to developing a practical roadmap to forensic readiness for both organizations. This research outcome could help strengthen the cybercrime investigation capability of the Nigerian Police Force and the Economic and Financial Crimes Commission in Nigeria by inserting the identified themes that this study produced.

REFERENCES

- [1] O. S. Adesina, "Cybercrime and poverty in Nigeria", 2017. Canadian social science, 13(4), 19-29.
- [2] R. Ajetunmobi, C. Uwadia, and F. Oladeji, Computer forensic guideline: A Requirement for fighting cyber crime in Nigeria now?, 2016. UNILAG research conference 2016, Nigeria. <https://ir.unilag.edu.ng/handle/123456789/5833>
- [3] O. Akanle, J. Adesina, and P. Akarah, "Towards human dignity and the Internet: The cybercrime (yahoo yahoo) phenomenon in Nigeria" 2016. African Journal of Science, Technology, Innovation and Development, 8(2), 213-220.
- [4] O. Akanle and B. Shadare, Yahoo-plus in Ibadan: Meaning, characterization, and strategies, 2019. International Journal of Cyber Criminology, 13(2).
- [5] A. Alenezi, R. Hussein, R. Walters, and D. Wills, A framework for cloud forensic readiness in organizations. 2017 5th IEEE International Conference on Mobile Cloud Computing, Services, and Engineering (MobileCloud), 199–204. <https://doi.org/10.1109/MobileCloud.2017.12>
- [6] B. Algozzine, and D. Hancock, Doing case study research: A practical guide for beginning researchers. Teachers College Press, 2017.

- [7] A. Almarzooqi and A. Jones, A framework for assessing the core capabilities of a digital forensic organization. In IFIP international conference on digital forensics (pp. 47-65). Springer, Cham 2016.
- [8] Associated Press, "Nigerian man charged with hacking Los Angeles County emails", 2016. Guardian newspaper. <https://www.theguardian.com/us-news/2016/dec/18/los-angeles-county-email-hack-kelvin-onaghinor>
- [9] I. Ajzen, The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211, 1991.
- [10] I. Ajzen and M. Fishbein, *Understanding attitudes and predicting social behavior*. Prentice-Hall Englewood Cliffs, 1980.
- [11] T. Barboza, "LA County targeted in phishing cyberattack; Private information of 750,000 people compromised", 2016. Los Angeles times. <https://www.latimes.com/local/lanow/la-me-ln-county-cyberattack-20161217-story.html>.
- [12] P. Baxter and S. Jack, Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), 544-559, 2008.
- [13] M. Bello and M. Griffiths, Routine activity theory and cybercrime investigation in Nigeria: How capable are law enforcement agencies? In *Rethinking Cybercrime* (pp. 213-235), 2021. Palgrave Macmillan, Cham.
- [14] B. Carrier and E. Spafford, An event-based digital forensic investigation framework, 2004. *Digital Investigation*. https://dfrws.org/wp-content/uploads/2019/06/2004_USA_paper-an_event-based_digital_forensic_investigation_framework.pdf
- [15] K. Choi, C. Lee, and E. Louderback, Historical evolutions of cybercrime: From computer crime to cybercrime. *The Palgrave Handbook of International Cybercrime and Cyberdeviance*, 27-43, 2020.
- [16] L. Cohen and M. Felson, Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 588-608, 1979.
- [17] C. Cross, Victims' motivations for reporting to the 'fraud justice network.' *Police Practice and Research*, 19(6), 550-564, 2018.
- [18] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" 1989. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- [19] F. E. Eboibi, A review of the legal and regulatory frameworks of the Nigerian Cybercrimes Act 2015. *Computer Law & Security Review*, 33(5), 700-717, 2017.
- [20] Economic and Financial Crimes Commission, UK government donates forensic equipment to EFCC, 2013. <https://efccnigeria.org/efcc/news/576-uk-government-donates-forensic-equipment-to-efcc>
- [21] Economic and Financial Crimes Commission, UK to support EFCC's anti-corruption fight with digital forensic technology, 2018. <https://efccnigeria.org/efcc/news/3328-uk-to-support-efcc-s-anti-corruption-fight-with-digital-forensic-technology>
- [22] O. Ehimen and A. Bola, Cybercrime in Nigeria. *Business Intelligence Journal*, 3(1), 93-98, 2010.
- [23] M. Elyas, S.B. Maynard, A. Ahmad, and A. Lonie, Towards a systemic framework for digital forensic readiness. *Journal of Computer Information Systems*, 54(3), 97-105, 2014.
- [24] L. Englbrecht, S. Meier, and G. Pernul, "Towards a capability maturity model for digital forensic readiness". *Wireless Networks*, 1-13, 2019.
- [25] A. Garba and M. Siraj, A holistic-based digital forensic readiness framework for Zenith Bank, Nigeria. *International Conference on Computational and Social Sciences*, 551-560, 2015.
- [26] A. Garba and A. Bade, A recommended digital forensics readiness framework for Nigerian banks. *International Journal of Development Research*, 9(08), 2019.
- [27] P. Grabosky, Virtual criminality: Old wine in new bottles? *Social & Legal Studies*, 10(2), 243-249, 2001.
- [28] A. Hinchliffe, "A Nigerian prince to kings of malware: The next evolution in Nigerian cybercrime". *Computer Fraud & Security*, 2017(5), 5-9, 2017.
- [29] I. Jamo, Economic and Financial Crimes Commission (EFCC) and Anti-Corruption Crusade in Nigeria: Success and Challenges. *Gusau International Journal of Management and Social Sciences*, 4(2), 13-13, 2021.
- [30] A. Kigerl, Spam-Based Scams. In Holt T. & Bossler A. (Eds.), *The palgrave handbook of international cybercrime and cyber deviance*, 2020. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-78440-3_42
- [31] E. Leukfeldt and M. Yar, Applying routine activity theory to cybercrime: A theoretical and empirical analysis. *Deviant Behavior*, 37(3), 263-280, 2016.
- [32] M. Makutsone, and A. Leonard, A conceptual framework to determine the digital forensic readiness of a cloud service provider, July 2014. In *Proceedings of PICMET'14 Conference: Portland International Center for Management of Engineering and Technology; Infrastructure and Service Integration* (pp. 3313-3321).
- [33] C. Marshall and G. Rossman, *Designing qualitative research*, 2014. Sage publications.
- [34] M. Miles and A. Huberman, *Qualitative data analysis: An expanded sourcebook*, 1994. Sage.
- [35] S. R. Muller and D. N. Burrell, "Social Cybersecurity and Human Behavior. *International Journal of Hyperconnectivity and the Internet of Things (IJHIoT)*", 6(1), 1-13, 2022.
- [36] S. R. Muller and M.L. Lind, "Factors in information assurance professionals' intentions to adhere to information security policies". *International Journal of Systems and Software Security and Protection (IJSSSP)*, 11(1), 17-32, 2020.
- [37] News Agency of Nigeria, "Police to create a special unit to tackle cybercrime", 2016. Guardian Newspaper. <https://guardian.ng/news/police-to-create-special-unit-to-tackle-cybercrime/>
- [38] S. Ngobeni, H. Venter, and I. Burke, "A forensic readiness model for wireless networks". In K.-P. Chow & S. Sheno (Eds.), *Advances in Digital Forensics VI* (Vol. 337, pp. 107–117), 2010. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-15506-2_8
- [39] Nigerian Deposit Insurance Company, NDIC annual report 2018, 2019. <https://ndic.gov.ng/wp-content/uploads/2019/09/NDIC-2018-ANNUAL-REPORT.pdf>
- [40] E. Obuah, Combatting corruption in Nigeria: The Nigerian economic and financial crimes (EFCC). *African Studies Quarterly*, 12(1), 2010.
- [41] J. O. Odumesi, A socio-technological analysis of cybercrime and cyber security in Nigeria. *International Journal of Sociology and Anthropology*, 6(3), 116-125, 2014.
- [42] T. Oliveira and M. Martins, Literature review of information technology adoption models at firm level. *Electronic Journal of Information Systems Evaluation*, 14(1), pp110-121, 2011.
- [43] B. Omodunbi, P. Odiase, O. Olaniyan and O. Esan, Cybercrimes in Nigeria: Analysis, detection, and prevention. *Journal of Engineering and Technology*, 1(1), 37-42, 2016.
- [44] I. Oraegbunam, "The Nigerian police and problems of cybercrime investigation: Need for adequate training". *Nigerian Law Journal*, 18(1), 1-28, 2015.
- [45] W. Percy, K. Kostere and S. Kostere, Generic qualitative research in psychology. *The qualitative report*, 20(2), 76-85, 2015.
- [46] A. Poore and L. Labuschagne, A conceptual model for digital forensic readiness, August 2012. In *2012 Information Security for South Africa* (pp. 1-8). IEEE.
- [47] R. Stake, *The art of case study research*. Sage, 1995.
- [48] E. Straub, Understanding technology adoption: Theory and future directions for informal learning. *Review of educational research*, 79(2), 625-649, 2009.
- [49] Symantec Corporation and African Union, Cybercrime & cybersecurity trends in Africa, 2016. www.thehaguesecuritydelta.com/media/com_hsd/report/135/document/Cyber-security-trends-report-Africa-en.pdf
- [50] J. Tan, *Forensic readiness*. Cambridge, MA: @ Stake, 1-23, 2001.
- [51] A. Tseloni, K. Wittebrood, G. Farrell, and K. Pease, Burglary victimization in England and Wales, the United States and the Netherlands: A cross-national comparative test of routine activities and lifestyle theories. *British Journal of Criminology*, 44(1), 66-91, 2004.
- [52] I. Umar, R. Samsudin, and M. Mohamed, Understanding the successes and challenges of Anti-Corruption Agency (ACA) in Nigeria: A case of Economic and Financial Crimes Commission (EFCC). *Asian Journal of Multidisciplinary Studies*, 4(5), 27-33, 2016.
- [53] V. Venkatesh, M. Morris, G. Davis, and D. Davis, User Acceptance of Information Technology: Toward a Unified View, 2003). *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>

The impact of online sales promotion on consumers' online impulsive buying decisions, suggestion for AI recommendation systems

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Abstract—Impulse buying is making a purchase that you did not originally intend to. This could be stimulated by the external shopping environment, your internal thought-processing course, or both simultaneously. Marketers, in their own way, try to make the most of this behavior to boost sales. Online shopping has always been developing at a remarkable pace, however, with the outbreak of the COVID-19 pandemic at the beginning of 2020, recent years have seen even more significant increases in terms of online sales revenue. Combining the two notions of “impulse buying”, “online shopping”, and the marketing technique of sales promotion, this paper aims to analyze how online sales promotions affect consumers' online impulsive buying decisions. Based on a previously proposed research model as a theoretical basis, the researcher simplified to make it more fitting and feasible due to the short period of the total research process. Primary research was carried out among people living in the city of Hanoi, Vietnam who do their shopping online daily. A structured questionnaire was used to collect relevant data from respondents of a sample size of 295. The results show that online promotions indeed affect consumers' online impulsive buying decisions, the two opposite directions of anticipated regret have contrasting impacts on those decisions, and consumers' inherent trait of impulsiveness does not moderate the relationship between the anticipated regret they experience and their impulsive purchase decisions.

Index Terms—AI, impulsive buying decision, online consumer behavior, sales promotions.

I. INTRODUCTION

We are living in the digital age, the traditional way of life that we are all accustomed to is changing in every way. And one of the biggest, or most obvious, changes is how things are bought and sold. Online purchasing has become the go-to option for stock replenishment ever since the pandemic outbreak in early 2020, as unnecessary travel was avoided during lockdowns, and everything had to be delivered using the no-touch system.

The sellers must adjust their marketing plans appropriately as the number of online consumers rises to better suit the needs of the modern consumer. If used on a digital platform, something that was formerly profitable in a brick-and-mortar store might no longer be as effective, suggesting the need for adjustment. Even while online sales are on the rise, the epidemic had a negative impact on people's money and, as a result, on the profits of online retailers. For retailers to increase sales, it is essential to understand what is going through their consumers' minds when they search online for

the products they want. Consumers can also understand their own psychology when purchasing and base decisions on it.

As sales promotion is rather common nowadays as an instrument for online merchants to make their shops more appealing to the eyes of the customers, it is vital to analyze precisely how sales promotion is affecting customers' impulsive buying decisions to generate more profit. Since promotions usually comes with constraints, they naturally prompt consumer to purchase right at the time they are on sale without prior planning. Such action is called impulse buying. On the sellers' side, to increase sales and maximize profit, they must grasp the psychology behind their consumers' behavior and strategically formulate effective marketing plans. And for buyers, understanding the principles behind the causation of impulsive purchase decisions could help them identify the temptation and manage their desires while doing their shopping, thus making better purchase choices.

II. LITERATURE REVIEW

A. B2C E-commerce

E-commerce is the short form of electronic commerce. E-commerce can be explained as “commercial transactions involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products and services” (Laudon & Laudon, 2022). There are two main types of E-commerce including business-to-business (B2B) and business-to-consumer (B2C).

B2C refers to the direct selling of products and services between businesses and their consumers. Business-to-consumer (B2C) only involves two parties: the businesses offering products and services and the consumers who directly purchase and use those products and services without the interference of any middle person. Combining this definition of B2C with the previous explanation of e-commerce, B2C e-commerce, refers to online retailers that sell directly to consumers over the internet. The online platform on which these retailers are offering their products and services could be their home websites, mobile applications, etc. In the modern world, there are merchants who entirely moved their marketplace online, whereas some maintain both online and offline presence to keep up with the new shopping trends.

This leaves those solely selling at brick-and-mortar stores gradually experiencing a decrease in demand, popularity, and number.

B. Stimulus-Organism-Response Model

The figure below demonstrates the most basic structure of a stimulus-organism-response model.

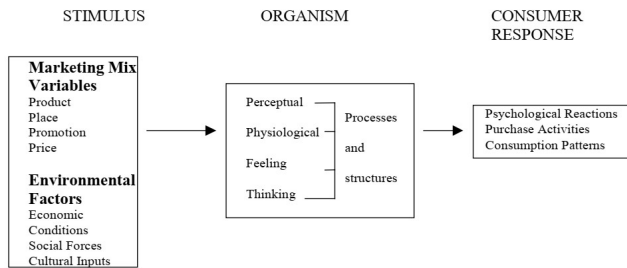


Fig 1. Stimulus-organism-response model [2]

External stimulus affects organisms, or consumers' internal emotional reactions, which eventually prompt them to act accordingly. Consumers' response, in this case, would be exactly what marketers want them to do when originally setting up those stimuli. Marketers gather information about consumers beforehand to be able to predict their next move. By doing so, they could strategically apply this model efficiently to increase consumers' consumption and at the end of the day, gain more profit, which is the goal of every business owner.

The stimulus-organism-reaction model is very commonly used in research on marketing strategy in general (Luo, et al., 2021). Furthermore, most of the studies that have been made to investigate consumer impulse buying behavior are made on the stimulus-organism-response theoretical basis. Thus, this paper will also adopt the stimulus-organism-response framework to build the research model.

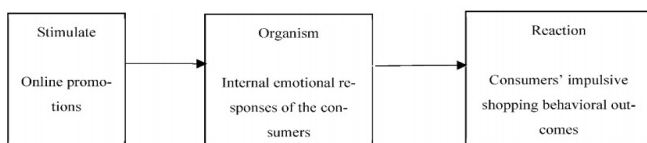


Fig 2. The basic theoretical framework of the paper [3]

In this paper, stimulus is the online promotion methods in general. The organism represents consumers' emotional reaction after experiencing the stimulus and, in this case, it is the anticipated regret. We would be discussing both directions of anticipated regret: upward and downward. Finally, the response refers to consumers' behavioral results, or in other words, how they act under the influence of the psychological process caused by the stimulus. The impulsive buying decision in this study represents behavioral outcomes of consumers as a reaction to online sales promotions (the external stimulus).

C. Sales promotion

Sales promotion is defined as "short-term incentives to encourage the purchase or sales of a product or service" [4]. Whereas advertising offers reasons to buy a product or service, sales promotion offers reasons to buy now. Therefore,

sales promotion is now being recognized as an important marketing technique, especially in tight market competition.

Additionally, one of the most important and commonly practiced marketing models is the 4P theory, which consists of product, price, place, and promotion [5]. Since then, the definition of the word "promotion" as well as the marketing tactic of using promotions to boost sales has become widely known.

By making use of modern technology, specifically advanced communication tools, sellers can now deliver promotion information much more appealingly so they could excite consumers and eventually evoke their desire to buy. The two most common ways of promotion are: quantity-limited and time-limited promotions. The reason why these two are commonly used is that the limited nature of these promotions gives consumers a sense of urgency, which would result in them buying impulsively since they do not want to miss this once-in-a-lifetime deal, as advertised by many retailers. In practice, both promotions can grasp consumers' attention, attract them with a favorable price, then prompt them to immediately make an impulsive purchase since they are under the impression that they have to race against time and also against other consumers to be able to secure the product.

D. Anticipated regret

Regret occurs when an individual feels sad and wishes that he or she had made a different decision in the past because the result of his or her actual choice was unfavorable and did not offer as much benefit as the other choice could have brought about. Anticipated regret refers to the anxiety caused by the individual worrying about possible loss before deciding. This could lead to hesitation and doubt before making purchase decisions. Based on the directions of counterfactual thoughts, it is easy to differentiate between the other possible courses of action and the actual outcome [6]. "When starting from the perspective of downward counterfactual thinking, people tend to compare the result of a decision with the result of a worse plan" [3]. This is called downward anticipated regret. When consumers have this direction of anticipated regret, they think that if they make this decision is not beneficial to them and it would only bring about regret in the future, thus they would choose not to perform such action to averse any risk that may occur. On the other hand, consumers with downward expectations regret, they believe that by making that decision, their benefits will increase, thus increasing the possibility of them doing so.

In short, "the upward anticipated regret commonly inhibits the individual's desire to act, while the downward anticipated regret stimulates the individual's desire to act" [3]. Therefore, this paper aims to study both directions of anticipated regret and investigates how they are related to online promotional activities as well as consumers' online impulsive buying decisions.

E. Impulsive buying

Impulsive buying, by definition, is the act of buying on a whim without prior planning. This could be stimulated by the external shopping environment. Marketers intentionally design the shopping environment to be appealing and attractive to motivate consumers to buy products that they did not

originally mean to. When put into such an environment that has been strategically mapped out to allure them to purchase, it is usually very hard for consumers to act against those temptations. This behavior of buying impulsively is “often accompanied by happiness and passion” [3]. However, as previously explained, impulsive buying is making a purchase that one did not intend to, thus it is natural that this action is usually performed with a lack of thoughtful trade-offs. This would eventually leave consumers with regret post purchase. In short, buying impulsiveness is explained by the act when a consumer plans to buy “spontaneously, unreflectively, immediately, and kinetically” [7].

With the development of modern technology and consequently the widespread growth of e-commerce, impulsive buying behavior on digital platforms, or in other words, online impulsive buying behavior has been the main focus of many scholars. As consumers today are on their phones most of the time, it is predictable that they are surrounded by sales information all day long, which could trigger them to make impulsive purchases. Online promotion is much more appealing to consumers due to its “diversified and eye-catching forms of product presentation” [3]. Thanks to this attractive nature of online promotion, it is now considered an effective marketing tool by businesses and marketers. The purpose of this paper, as previously stated, is to investigate the link between online promotion and consumers' online impulsive buying decisions.

F. AI recommendations system

Artificial intelligence (AI), which was a curiosity for generations, is rapidly developing into a major applied technology with many applications in a variety of fields [8]. The rise of Big Data databases produced by the Internet, e-commerce, the Internet of Things, and social media are the main factors propelling the quick development of AI. The sharp decline in computer processing costs and the increase in processor power are considered secondary causes [1]. Customer experiences are changed because of AI technologies. The employment of talking bots is a significant example. Bots (like Alexa) can offer information about goods and businesses as well as suggestions and direction. Gangwani [8] provides the following suggestions for enhancing customer experiences:

1. Employ NLP to create user documentation. The conversation between customers and machines is also enhanced by this feature.
2. Classify photos visually (for examples, use IBM's Visual Recognition and Clarifai)
3. By examining consumer data, offer customized and segmented services. This encompasses enhancing the shopping experience and CRM.

Salesforce's Einstein is a prominent illustration of AI in CRM. Marketing professionals are also concerned with a consumer's psychological profile in addition to their classification of lifestyle [1]. An individual's needs, impulses, motivations, perceptions, and learned behaviors, including attitudes and beliefs, make up their psychological profile. Through product design, product positioning, and marketing communications, marketers try to appeal to various psychological profiles. For instance, a lot of health e-commerce

websites highlight that by giving customers knowledge about illnesses and treatments, they enable them to feel in charge of their health's course. This message is a potent appeal to the need for self-control and command over what may be a challenging, life-threatening circumstance among a rich, educated, professional, and technologically sophisticated group of web users.

III. MODEL AND HYPOTHESES

Promotions are limited-time offers or special pricing on products. The online promotion also shares the same meaning, the only difference is that promotion activities are now presented on digitalized platforms. Due to its “diverse and vivid expressions” [3], online promotion has been able to appeal itself to a wide range of merchants and has gradually become an inevitable method for marketing to many businesses. Promotions, in general, get people excited and eager enough to make a purchase immediately because there is a sense of urgency, and it is of human's nature not to pass on something that seems like a bargain.

Online merchants offer promotions on a wide variety of goods that you probably don't need right away or even have never purchased before, but if there is a chance to get them at a very reasonable price, then you might stock up on them immediately before the offer is over. This impulsive response is exactly what the sellers and marketers expect consumers to have when planning promotions.

Personalities and traits are innate and thus, very hard to be changed. This paper will be specifically discussing impulsive traits, which are described as inherent characteristics of an individual and rather challenging to be changed, as previously stated. “The level of impulsive traits is commonly manifested in individual impulsive willingness or differences in behavior” [3] which has been quite commonly discussed in consumer behavior study.

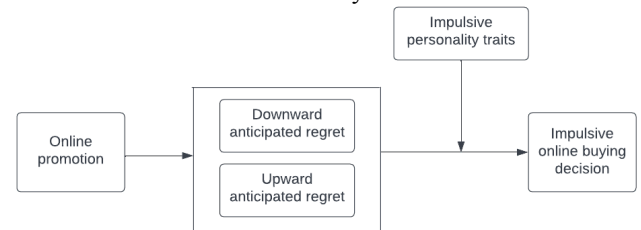


Fig 3. The researchers's proposed research model

Due to the many limitations of the economic model and the stimulus-response that have been previously stated, these two models would not be used in this paper. Instead, this paper will use the stimulus-organism-response (SOR) model as the theoretical basis of the research model by virtue of its many advantages and highly analytical nature. In the research model, online promotions will be acting as an independent variable, with both directions of anticipated regret (upward anticipated regret and downward anticipated regret) as an intermediate indicator, and lastly consumers' online impulsive buying decision as the dependent variable. In addition, the factor of consumers' impulsive traits will also be used as the moderator of the relationship between anticipated regret and impulsive online buying decision.

This model was adapted from a previously proposed research model by Luo [3]. The original research model is as follows:

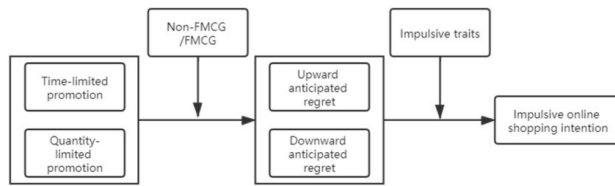


Fig 4. The original proposed model by Luo, et al. (2021) [3]

Although the research model proposed is tremendously logical and extremely well-developed, I, unfortunately, had to make certain simplifications due to the time-constraint of this paper and my limited knowledge. After some alterations, the research model has become less complicated and thus, much more manageable for me.

As mentioned above, there are a total of two directions of anticipated regret: downward and upward. Downward anticipated regret prompts the individual to act whereas upward anticipated regret inhibits their desire to do so. Online promotional activities could stimulate both these anticipations of regret, and consumers' behavioral response would be different according to each type. However, promotion usually comes in the form of limited time or quantity, which would more likely encourage consumers to make purchases rather than holding them back. The reason behind this is that restrictive conditions make consumers feel a sense of urgency and competition, thus they would choose to act and fall into this so-called trap that marketers set up. On this basis, I would propose the following hypothesis:

Hypothesis 1 (H1): Online promotions have a more significant impact on downward anticipated regret than on upward anticipated regret.

It's natural that consumers want to maximize their utility while shopping for goods. To do so, they would have to weigh their decisions carefully prior to the actual purchase. There are two types when it comes to consumers' anticipation of regret: downward and upward. Among these two, upward anticipated regret is referred to as the action effect, and downward anticipated regret is referred to as the inaction effect. If consumers think that they can buy the exact same product later at a lower price, they will regret if they buy it now and thus reduce the possibility of making an impulsive decision; if consumers think they will no longer be able to buy the product at such a bargain after promotion, they will think that not buying this immediately could cause regret in the future. Based on the above statement, I propose the following two hypotheses:

Hypothesis 2 (H2): Upward anticipated regret negatively affects consumers' online impulsive buying decisions.

Hypothesis 3 (H3): Downward anticipated regret positively affects consumers' online impulsive buying decisions.

Individual impulsive traits are inherent and are the personality characteristics of consumers. Impulsivity in traits could translate to impulsivity in purchases. Consumers with a high level of impulsivity would more easily fall into the trap of promotion and make buying decisions immediately upon those offers. On the other hand, those with less impul-

sivity would weigh the consequences of available options more carefully, thus less likely to make impulsive decisions. Based on these statements, we can hypothesize:

Hypothesis 4 (H4): Impulsive personality traits moderates the relationship between consumers' anticipated regret and online impulsive buying decisions

IV. MATERIALS AND METHODS

This paper aims to study the impact of online promotional activities on consumers' impulsive buying decisions and consumers' impulsive personality traits are chosen as the moderating variables, based on the proposed research model. Some successful findings and experiences in earlier research were used as references for measurement indicators.

This paper collects primary data by using questionnaires. The questionnaire is divided into four parts: part one collects people's personal information to gain demographic insights, part two presents a scenario for people to make decisions upon to test which direction of anticipated regret they lean more towards, part three examines the impulsivity level in their personalities and finally, part four rates their online impulsive buying decisions. As mentioned, there is a specific scenario in part two, which serves the aim of putting respondents into a situation as realistic as possible, thus they could better visualize and immerse themselves in the situation. By doing so, the authenticity of answers can be improved drastically compared to questionnaires with no specific promotion scenes.

The scenario is as follows: You intend to buy a t-shirt on an e-commerce platform. While browsing the website to choose which design to purchase, you happen to see a pair of shoes that suit your style, and it has also received pretty good reviews from previous buyers. You can absolutely afford to buy these shoes at their original price. However, this product is currently being discounted by 20% and this promotion will expire within the next 3 days.

Table 4.1 shows the items used to measure the four variables in the questionnaire: upward anticipated regret, downward anticipated regret, impulsive personality traits, and impulsive online purchase decisions.

The questionnaire was released digitally on Google Form and all participants were given the same scenario as explained above. A total of 295 questionnaires were collected, and they were all valid. All valid questionnaire data were collected and analyzed by the statistical software, SPSS20.0.

In order to test Hypotheses H1 (online promotions have a more significant impact on downward anticipated regret than on upward anticipated regret), I used the paired-sample t-test for verification. The reason is that in this case, it is of the researcher's interest to investigate the difference between two variables (upward anticipated regret and downward anticipated regret) for the same subject (online promotions).

This paper uses the regression analysis to test H2 (upward anticipated regret negatively affects consumers' online impulsive buying decisions), H3 (downward anticipated regret positively affects consumers' online impulsive buying decisions), and H4 (impulsive personality traits moderates the

TABLE I
RESEARCH VARIABLES MEASUREMENT INDICATORS AND
MEASUREMENT ITEMS

Research Variables	Measurement Indicators	Measurement Items	Reference Scale
<i>Upward anticipated regret</i>	UR1	There's a chance that this product will be discounted at a lower price in the future. If I buy it now, I will regret it.	Hettis, et al. (2000)
	UR2	I could find the same product at a lower price in other stores in the future. If I buy it now, I will regret it.	
	UR3	I need more time to consider buying this product. I could still afford it if it wasn't on sale anyways. If I buy it now, I will regret it.	
	UR4	Buying will cost more than not buying at all. If I buy it now, I will regret it.	
<i>Downward anticipated regret</i>	DR1	Once the product is sold out, it might be out of production for good. If I don't buy it now, I will regret it.	
	DR2	The product will be restored to its original price once the promotion period is over. If I don't buy it now, I will regret it.	
	DR3	I might not be able to buy the same product for a better price in other stores in the future. If I don't buy it now, I will regret it.	
	DR4	Being able to buy the product I want for a good price makes me feel like I'm a conscious/smart consumer. If I don't buy it now, I will regret it.	
<i>Impulsive personality traits</i>	IT1	I act on the spur of the moment.	Patton, et al. (1995)
	IT2	I often say things without thinking much.	
	IT3	I often do things without thinking much.	
	IT4	I get bored easily when solving thought problems.	
	IT5	I make up my mind quickly.	
	IT6	My self-control level is rather low.	
<i>Impulsive online buying decision</i>	ID1	When shopping online, I usually buy what I like instead of what I really need.	Jones, et al. (2003)
	ID2	When shopping online, I usually buy things that are not on my shopping list.	
	ID3	Upon seeing a promotional item, I will want to buy it although it is outside of my shopping plan.	

relationship between consumers' anticipated regret and on-line impulsive buying decisions).

V. RESULTS

A. Reliability Analysis

The reliability analysis of the research is shown in KMO value and Bartlett's sphericity test results of anticipated regret show that each variable has a Cronbach's Alpha coefficient greater than 0.6, indicating that all the items used to study a variable have relatively high internal consistency and the reliability of the whole questionnaire is at an acceptable level. KMO value of the mediator: anticipated regret is 0.808, $p < 0.001$, which indicates that the data collected through the questionnaire are well-fitted for factor analysis.

The result in KMO value and Bartlett's sphericity test of impulsive traits shows that the KMO value of the moderator: impulsive traits is 0.798, $p < 0.001$, which indicates that the data collected through the questionnaire are well-fitted for factor analysis. The result in KMO value and Bartlett's sphericity test results of impulsive buying decision shows that the KMO value of the dependent variable: impulsive buying decision is 0.715, $p < 0.001$, which indicates that the data collected through the questionnaire are well-fitted for factor analysis.

TABLE II
EXPLORATORY FACTOR ANALYSIS RESULTS OF ANTICIPATED REGRET

	Component	
	1	2
UR1	0.665	0.509
UR2	0.688	0.498
UR3	0.669	0.440
UR4	0.641	0.407
DR1	-0.621	0.387
DR2	-0.554	0.598
DR3	-0.702	0.506
DR4	-0.724	0.428

The results of exploratory factor analysis are shown for the mediator - anticipated regret, for the moderator - impulsive traits, and for the dependent variable - impulsive buying decision. The load value of each index is larger than 0.5, all variables are valid for further analysis.

B. Hypothetical Test

In the test of H1, the researcher will be using the method of paired sample t-test since in this specific hypothesis, we are interested in the difference between two variables for the same subject. The analysis results in Table 5.8 shows that the significance level $p = 0.049$ (< 0.05), which means promotions indeed affect consumers' anticipated regret in general. In the next step, it is also clear that upon facing an online promotion, overall, consumers would have an average upward anticipated satisfaction of 3.2070. This figure is lower than that of the downward anticipated regret, with an average of 3.3773. Based on this, we can conclude from this analysis result that between the two directions of anticipated regret, online promotions have a more significant impact on downward anticipated regret (because $3.3773 > 3.2070$). Hypothesis H1 is proved.

TABLE III
IMPACT OF PROMOTIONS ON ANTICIPATED REGRET

Variable	Average	Standard Deviation	Significance (two-tailed)
Upward anticipated regret	3.2070	1.02775	0.049
Downward anticipated regret	3.3773	1.02924	

The test results of H1 prove that online promotional activities have a more profound influence on consumers' downward anticipated regret than they do on the opposite direction of regret. This is straightforward and easy to comprehend. This result is also consistent with the previous findings. Consumers find an item being on sale at a favorable price, then it is natural that they choose to make a purchase so as not to miss out on the opportunity. When offered a great deal, consumers would fear the opportunity loss, which is also known as the inaction regret, or downward anticipated regret.

In the test of H2 and H3, the significance level $p = 0.000$ (<0.05). This means that anticipated regret indeed affects consumers' online impulsive buying decisions. There is a significant linear relationship between anticipated regret and impulsive online purchase decision, and the regression equation can be made to test the hypotheses.

TABLE IV
REGRESSION COEFFICIENT^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	1.718	0.316		5.430	0.000
UR	-0.092	0.058	-0.089	-1.578	0.016
DR	0.459	0.058	0.445	7.897	0.000

^aDependent variable: impulsive online buying decision

According to the analysis results in Table 5.9, the coefficient of the influence of the upward anticipated regret on impulsive online shopping decision is -0.092 (<0), $p = 0.016$ (<0.05), meaning that there is a significant relation between the two and that relationship is an inverse one. It can be concluded that upward anticipated regret affects consumers' impulsive online purchase decision negatively. H2 is proved.

The coefficient of the influence of downward anticipated regret on impulsive online shopping decision is 0.459 (>0), $p = 0.000$ (<0.05), meaning there is a positive relationship between the two variables. Or in other words, downward anticipated regret has a positive effect on consumers' online impulsive buying decision. H3 is proved. The test results of H2 and H3 are also in line with the definitions of two directions of anticipated regret in the works of other scholars and researchers. Downward expectation of regret positively affects consumers' impulsive purchase decisions whereas the upward expectation of regret also affect consumers' impulsive purchase decision but in a opposite direction.

In the test of H4, the analysis results are shown in two tables: Table 5.10 and Table 5.11 below, with the p values of each interaction item of anticipated regret and impulsive traits greater than 0.05, indicating there does not exist a rela-

tionship between anticipated regret and impulsive traits. Impulsive traits do not act as a moderator in the relationship of consumers' anticipated regret and their online impulsive buying decisions. This finding contrasts the previous findings of Luo [3]. Hypothesis H4 is not proved.

TABLE V
INTERACTION OF UPWARD ANTICIPATED REGRET AND IMPULSIVE TRAITS

	Co-efficient	Standard Deviation	t	Significance
constant	1.0340	0.5071	2.0389	0.0424
upward anticipated regret	-0.1699	0.1369	-1.2413	0.2156
impulsive traits	0.8606	0.1792	4.8031	0.0000
upward anticipated regret – impulsive traits	-0.0007	0.0495	-0.0143	0.9886

TABLE VI
INTERACTION OF DOWNWARD ANTICIPATED REGRET AND IMPULSIVE TRAITS

	Co-efficient	Standard Deviation	t	Significance
constant	-0.7076	0.4610	-1.5350	0.1260
downward anticipated regret	0.4586	0.1410	3.2530	0.0013
impulsive traits	1.0166	0.1786	5.6925	0.0000
downward anticipated regret – impulsive traits	-0.0799	0.0507	-1.5755	0.1163

The results of all the proposed hypothesis are summarized in the table.

TABLE VII
HYPOTHESIS TEST RESULTS SUMMARY

Hypothesis	Result
H1: Online promotions have a more significant impact on downward anticipated regret than on upward anticipated regret	Support
H2: Upward anticipated regret negatively affects consumers' online impulsive buying decisions.	Support
H3: Downward anticipated regret positively affects consumers' online impulsive buying decisions.	Support
H4: Impulsive personality traits moderates the relationship between consumers' anticipated regret and online impulsive buying decisions.	No support

In conclusion, after the quantitative analysis of all the proposed hypotheses, the research objectives of this research have been fulfilled and the research questions have also been answered with solid numerical evidence. Firstly, online promotions affect both directions of anticipated regret, with the impact on the downward direction more significantly than the upward one. Secondly, the relationship between upward anticipated regret and consumers' impulsive buying decisions as well as the relationship between downward anticipated regret and consumers' impulsive buying decision was proved to be in line with the research of previous scholars and the definition of both types of regret. Lastly, an individual's impulsive traits do not act as the moderator in the anticipated regret – online impulsive buying decision relationship.

VI. DISCUSSION

Through the above analysis, we can draw the following discussions:

A. The effect of online promotional activities on consumers' anticipated regret

Online promotional activities with constraints (e.g., time-restricted, quantity-limited promotions) will bring psychological pressure to consumers, prompting them to have different emotional responses, which would eventually lead to different levels of willingness. These levels have profound and direct impact to how consumers shop and make their purchases. Consequently, consumers would easily be swayed to make the purchase decision rather than stray from them. This is because we learned from the analysis that online promotions affect downward anticipated regret more significantly than they are to upward anticipated regret.

Through the paired sample t-test, we compare the impact that online promotions have on both directions of anticipated regret. Under the psychological oppression caused by promotions' constraints, consumers would be more concern about the opportunity that might be loss from not taking actions immediately, which enhances downward anticipated regret. Aside from the significant impact that online promotions have on downward anticipated regret, they also affect the opposite direction of regret, just not as much. Contrary to consumers whose expectation of regret move downwards upon seeing promotions, there are still those who consider for even a longer amount of time before buying if there are online promotions. This type of consumers could see discount programs as risks and try to averse from it, which enhances upward anticipated regret.

B. The impact of consumers' anticipated regret on their online impulsive purchase decisions

Before choosing to purchase, it is common for consumers to anticipate the consequences of those decisions. As stated in the previous chapters, anticipated regret is divided into two types, or two opposite directions: downward anticipated regret and upward anticipated regret. Downward anticipated regret is also known as inaction regret, whereas upward anticipated regret is commonly called action regret. In the context of this research, consumers having the downward anticipation of regret think that they will regret if they do not make the purchase now. While on the contrary, consumers with upward expectation of regret think that buying now equals loss and that they will regret having made that decision. Using counterfactual thinking, consumers will carefully evaluate and assess all alternatives available then make a decision that can minimize their regret, which is the best option they think they could make in a particular situation.

Through regression analysis, upward anticipated regret has a negative effect on consumers' online impulsive buying decisions, whereas downward anticipated regret affect their impulsive purchase decisions positively. This is perfectly in line with the definitions of the two types of regrets: regret in the upward direction inhibits actions, and regret in the downward direction stimulate their desires to act.

Under the effect of downward anticipated regret, it is almost impossible not to buy since those have this direction of

anticipated regret, they think their benefits will increase after the purchase and buying is the best options among all. On the other hand, consumers with downward anticipated regret would not choose to purchase goods simply because they are on discount. When being offered such a bargain, they would take a lot of things into consideration and after carefully analyzing all alternatives, they would choose to averse from risk.

C. The moderating effect of impulsive traits on the relationship between consumers' anticipated regret and their impulsive purchase decisions

Impulsive traits are inherent characteristics of an individual, thus very difficult to change. When put under the pressure of having to choose to risk the loss of a seemingly favorable opportunity, impulsive traits would be the deciding factor and directly affect consumers' physical reactions. However, through the analysis, it is found that impulsive traits do not act as a moderator in this relationship. This contradicts the previous findings of Luo [3].

Luo [3] found out through their research that when consumers encounter online promotions, they will generate expected emotions based on their inherent traits. And when this happens, these traits will affect their decision to act. The higher the impulse characteristics of consumers, the more likely they are to make impulsive buying decisions.

However, this contradictory finding could be attributed to the lack of questionnaire data and the sample size is not ideal enough to represent all online shoppers living in Hanoi, Vietnam. Therefore, in the recommendations of this research, the researcher would still give suggestions for online merchants to deal with consumers of impulsive traits since the results and analysis of Luo [3] is, without a doubt, more professionally tampered with. Furthermore, prevention is always better than cure, merchants should always be prepared in any situation, thus it is best to still act upon the tendencies of those who are highly impulsive in nature to obtain more profits.

VII. RECOMMENDATIONS

According to the above quantitative analysis, I have put forward several suggestions for online merchants and consumers with a view to providing valuable tips for merchants to maximize their profits and guiding consumers to shop smarter.

A. Sellers should use online promotions reasonably and strategically to avoid counter-effectiveness

Online merchants should make reasonable use of promotions for them to take maximum effect. Rather than being used alone, online promotions are commonly paired with some constraints to increase attractiveness and effectiveness. The restrictive conditions of promotions could be one of the two following: time-limited promotion and quantity-limited promotion.

Both the length of the promotion period and the number of products being sold at a discount should be taken into careful consideration. If the time-limited promotions are being dragged on for a long period of time, this would consequently tremendously decrease the sense of urgency, making

merchants lose many of their buyers since buyers would think they can buy the product at any other time, thus thinking that there is no need to hurry and buy this right now. The same situation applies with the large quantity of goods being put on discount. Too many products on discount means that they can no longer bring a sense of competition to consumers to prompt them to buy impulsively anymore. In both situations, the psychological suppression that restrictive online promotions bring about in consumers to urge them to make impulsive purchases would no longer take effect. The marketing technique of using promotions could be considered counter-effective in this circumstance.

At the same time, even with the appropriate length of promotion or adequate number of products being put on discount, overusing the marketing technique of promotion is not suggested. However great results the promotions may bring, too much frequency would lessen the products' perceived value in the eyes of consumers. It could even raise doubts about the quality of the products being on sale.

B. Sellers should also cater for consumers with impulsive characteristics and applying AI recommendations systems

Merchants should come up with suitable promotion strategies for consumers with impulsive characteristics [9]. As previously mentioned, merchants should always be prepared in any situation, even when it is dealing with impulsive consumers to maximize their profits. When working on their promotion plans, merchants should carefully consider beforehand how consumers with different impulsive characteristics might react. According to this paper, a consumer's upward anticipated regret inhibits the chance of a purchase, whereas anticipated regret in the downward direction enhances the likelihood of a purchase [10]. As a result, online merchants must manage to boost consumer's downward trend while decreasing regret in the opposite direction. Slogans like "The lowest prices ever", "Don't miss out", "The only chance this year" might be used as examples.

Recommendations in order to provide tailored suggestions that fit each customer's tastes and preferences across all of the retailer's touchpoints, AI draws on that experience and expertise in machine learning. Convenience and individualized experiences will be the primary differentiators for customers by 2025. An intelligent recommendation system looks at the available data to build a detailed, individual portrait of each customer and make predictions about their preferences and behavior, especially their propensity to make purchases. When a customer is comparison shopping or simply looking, retailers adopt a different engagement strategy than when the customer is ready to make a purchase straight away. In order to apply a strategy that encourages a sale without unnecessarily reducing margins, retailers must be able to distinguish between serious shoppers and window shoppers using data from a variety of sources, such as propensity modelling. For instance, merchants may provide a discount to entice comparison shopping, but a buyer with a high propensity to purchase may be more interested in features and upgrades than discounts. Retail businesses will be able to reach new levels of personalisation by utilizing AI-powered data to better serve their customers. One of the best tools a store or brand can use to deliver a tailored experience

and, ultimately, deepen the consumer relationship is a recommendation engine [11]. The use of recommendation engines boosts crucial e-commerce KPIs including gross merchandise volume, sales conversion rates, website traffic, and click-through rates, which increases revenue. The Artificial Intelligent Recommender System improves its quality in the first iteration by adapting iteratively to the customer and acquiring relevance based on customer feedback. Through learning from consumer behavioural patterns as well as customer and profile information, these systems give things and/or content to customers that they may like to buy or engage with impulsive buying.

C. Consumers should make decisions more carefully

On the consumers' side, they should learn to control their impulsiveness while doing their shopping online to avoid excessive unnecessary purchases. To become a smarter shopper and make better, more necessary purchases, consumers should firstly think more carefully not to be ensnared in the trap that marketers have set up. Consumers should give themselves much time to mull over a purchase decision to consider if they need to buy it, and keep in mind that there is no need to rush since there are still plenty of occasions to buy items for a good price. Consumers should only buy when the promotional item is in their demand, or the item's functionality and applicability is good for the price offered.

Lastly, if consumers find it hard to resist themselves and make a careful decision, it might be of help to recall their own previous unsatisfactory impulsive purchases. Being offered products at attractive prices, it is natural for consumers to be swayed and buy them impulsively. However, if you have previously had bad experience with purchases made on impulse, it is highly possible that you will be more guarded with similar situations and carefully weigh the pros and cons of promoted items to make better purchase decisions.

VIII. CONCLUSION

The successful research and development of new recommendation architectures and algorithms has strongly stimulated the growth of the sector and helped the responsive retailers to maintain the profit margin, even though there is still a long way to go before the technology is industrialized to the point of general absorption by retailers. In the interim, the recommender can be enhanced through the use of AI technologies that make use of multi-modal information, such as images. To make it simpler for customers to find the products they want, there will be app-specific models in addition to the recommendation engine that produce trending, personalized, and random content. From a technical perspective, retailers should make investments now to be well-prepared and outfitted with the skills and knowledge to successfully leverage technologies to succeed in business and overcome new industry challenges. This is especially true in light of impulsive buying and artificial intelligence recommendation systems.

REFERENCES

- [1] K. C. Laudon, & J. P. Laudon, Management Information Systems: Managing the Digital Firm. Pearson Education Limited, 2022, pp. 108.
- [2] L. H. Teunter, "Analysis of Sales Promotion Effects on Household Purchase Behavior". ERIM Ph.D. Series Research in Management, 2022, pp. 10.
- [3] H. Luo, et al., Research on the Impact of Online Promotions on Consumers' Impulsive Online Shopping Intentions. Theoretical and Applied Electronic Commerce Research, Volume 16, 2021, pp. 2386-2404.
- [4] P. Kotler, G. Armstrong, J. Saunders, & V. Wong, Principles of Marketing. 8th ed., Prentice Hall, 1999, pp.22.
- [5] E. J. McCarthy, Basic Marketing: A Managerial Approach. Illinois: Richard D. Irwin, Inc, 1960, pp. 120.
- [6] B. Li, M. Hu, X. Chen, & Y. Lei, "The Moderating Role of Anticipated Regret and Product Involvement on Online Impulsive Buying Behavior", Frontiers in Psychology, 2021, pp. 11.
- [7] D. W. Rook & R. J. Fisher, "Normative Influences on Impulsive Buying Behavior", Journal of Consumer Research, 22(3), 1995, p. 305–313.
- [8] T. Gangwani, "3 Ways to Improve Customer Experience Using A.I." CIO Contributor Network, October 12, 2016.
- [9] J. J. Hetts, et al., "The influence of anticipated counterfactual regret on behavior", Psychology & Marketing, 17(4), pp. 345-368, 2000.
- [10] M. A. Jones, K. E. Reynolds, , S. Weun, & S. E. Beatty, "The product-specific nature of impulse buying tendency". Journal of Business Research, 56(7), 2003, pp. 505-511.
- [11] J. H. Patton & M. S. Stanford, "Factor structure of the Barratt impulsiveness scale". Journal of Clinical Psychology, 51(6), 1995, pp. 768-774.

APENDIX

Table A1. Sample statistical characteristics

Statistical Features		Number of people	Percentage
Gender	Female	233	77.4%
	Male	62	20.6%
Age group	Under 18	67	22.3%
	18-25 years old	196	65.1%
	25-40 years old	31	10.3%
	Above 40	1	0.3%
Education	Highschool	79	26.2%
	College degree	7	2.3%
	Undergraduate	197	65.4%
	Master's degree or above	12	4%
Profession	Full-time student	200	66.4%
	Employed	85	28.2%
	Unemployed	10	3.3%
	Retired	0	0%
Monthly income	Under VND 5 million/month	196	65.1%
	VND 5-10 mil/month	57	18.9%
	VND 10-20 mil/month	30	10%
	Above VND 20 mil/month	12	4%
Preferred online purchase platform	Social media (e.g., Facebook, Instagram, etc.)	60	19.9%
	E-commerce sites (e.g., Shopee, Lazada, Tiki, etc.)	231	76.7%
	Brands' official website (e.g., Locknlock.vn, Uniqlo.com, etc.)	4	1.3%

Between app efficiency and user wellbeing: a cluster analysis on consumer types and continuance usage of food delivery app

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Abstract—The introduction of food delivery apps, facilitated by the global pandemic, has created a significant disruption in the hospitality industry. However, how consumers use mobile applications in the context of daily choices and food consumption has not been fully explored. Using data collected through an online questionnaire comprising 165 food delivery app subscribers, k-mean cluster analysis was performed to classify users based on their internal motivations. The results reveal three distinct groups: Health-conscious Eaters, Food Enthusiasts, and Lifetime Diners. Practically, the present exploratory study assists FDA providers to better identify customers, so potentially optimizing marketing initiatives, and maximizing profitability.

Index Terms—Cluster analysis, Food delivery app, Customer segmentation.

I. INTRODUCTION

Customers can currently access a wide range of services anytime and anywhere with their smartphones and the internet [1]. The growing use of online food delivery apps (FDA), facilitated by the global pandemic, has significantly transformed the food sector [2,3]. FDA is defined as a mobile-based application utilized to contact restaurants, search and order food for delivery, and pay for the bills without physical interaction with restaurant personnel [4]. The worldwide market of FDAs was estimated to achieve turnover of US\$ 5,400 million in 2022 and is forecast to increase at a Compound Annual Growth Rate (CAGR) of 12.54% to reach approximately US\$ 9.772 million in 2027 [5]. The increasing usage is mainly though due to an adaptation to the “new normal” in consumer lifestyles, such as social distancing, contactless delivery, and hectic work schedules [6].

While the FDA witnessed explosive growth during 2020-2021, they are encountering its slowest growth in years in the post-pandemic commencing 2022. The fall in app usage can be explained by the relaxation of stay-at-home restrictions and consumers returning to restaurants to enjoy in-person dining [7]. Equally, the competitive landscape in the market is getting more intense. The major players in the market - Delivery Hero, Just Eat, and Uber Eats – compete intensively to acquire users [8]. Moreover, FDA’s consumers nowadays are becoming less loyal to a single service provider [9]. With an increasing number of FDAs, customers tend to hop between apps to find their best options. Therefore, it is imperative for the providers to understand users’ demands to obtain a sustainable sales performance.

Discovering consumer behaviors offers a better insight into consumer profiles that ultimately provide a solid back-

ground for deploying marketing strategies [10]. Consequently, classifications of e-commerce customers are more common. For instance, Chawla and Joshi (2017) divided mobile banking users into three groups based on demographic and behavioral factors [11]. Ariguzo and White (2011) classified mobile commerce users by three variables: gross domestic product per capita, mobile cell phone use, internet use [12]. Neunhoffer and Teubner (2018) utilized consumer motives to segment consumers in peer-to-peer sharing platforms [13]. Despite the prevalence of FDA, no studies have yet examined consumer segmentation with respect to their behavioral factors in this emerging domain.

Customers can be distinguished according to a general attitude, internal motivations, personal concerns, and demographic elements [13]. In this paper, we identify the primary motivational constructs of FDA users from a sample of 165 survey respondents using items based on perceived ease of app usage and socio-demographic data. The differences between FDAs are thought to be app efficiency, user benefits, and continued behavior. Regarding practical implications, the present study assists FDA providers in better managing customer investments, optimizing marketing initiatives and maximizing profitability.

II. LITERATURE REVIEW

A. Food delivery application

FDA is defined as a mobile-based application utilized to contact restaurants, search and order foods for delivery, and pay for the bills without physical interaction with restaurant staff [4]. Moreover, the app can save consumer information such as recent orders, food preferences, or payment methods to facilitate the next purchase [14]. By using these apps, customers can access and order their meals from various independent restaurants at anytime and anywhere. According to Chen et al. (2020), the FDA is an example of online-to-offline commerce (O2O) that has triggered one significant disruptions in the hospitality sector [14].

FDA can be divided into two classifications [15]. On the one hand, catering services can offer their own FDA, such as Domino’s, Pizza Hut, and KFC. Alternatively, intermediary providers create multi-restaurant platforms, such as Uber Eats in the US, and Meituan Dianping in China. The popularity of FDA has shifted the way people order and consume food on a global scale [16]. It not only helps to facilitate convenient and swift food delivery to the customers’ front door with a few taps of a smartphone screen [6] but also sat-

ified consumers' demands for personal safety and health concerns [17] during the global pandemic.

B. IT-related motives

The technology, especially the mobile applications, plays a vital role in the food delivery process. Accordingly, information and system qualities are the critical components for IS success that subsequently affect actual usage of IT [18]. Thus, our study employed information quality and system quality as the significant IT-related dimensions that motivate a user to adopt a system. From the user's perspective, information quality is an overall level of assessment that the system is helpful for accomplishing a specific outcome [18]. In the context of e-commerce, DeLone and McLean (2003) indicated that information quality was evaluated based on accuracy, timeliness, completeness, relevance, and consistency [19]. The FDA provides consumers with more comprehensive, up-to-date, and accurate information about restaurants, menus, food descriptions, etc. Accompanying this information is the ability of the FDA to display real-time information for the customer to see their order progress and shipper locations [20].

Moreover, system quality encompasses the characteristics such as ease of use, functionality, reliability, flexibility, portability, and integration [19]. Customers prefer to use a system that can offer the maximum technical efficiency and expected accuracy [21]. Similar to other mobile apps, FDA should provide easy-to-use navigation control that allows users to go to the desired pages easily and quickly within the app. In addition, it also has filter functions for the consumer to sort out foods according to their interest with minimal effort [22]. If the users experience better system performance, it will result in higher usage.

C. User wellbeing and benefit motives

Subjective wellbeing refers to "experiencing happiness, including life satisfaction and positive affect" [23]. Diener, Suh, Lucas, and Smith (1999) indicated that subjective wellbeing is a broad category of phenomena consisting of individuals' emotional responses, domain satisfactions, and global judgments of life satisfaction [24]. Subjective wellbeing is an essential element of positive wellbeing and health [25]. People with a low degree of subjective wellbeing can employ technology to enhance their subjective wellbeing [26]. For example, mobile mindfulness applications, such as Headspace and Calm, support mental health and wellbeing [27]. Apple, Facebook, and Google have introduced a time tracker for their apps so users can see when and how long they spend time on apps and devices [28].

Past studies have concentrated on behavioural factors to classify users into discrete segments in the context of IS [11,13]. On the other hand, other beneficial elements could be significant in the context of food consumption, such as users' overall wellbeing, which has not yet been investigated in the literature in this discipline. In fact, the FDA gets food delivered to customers' front door with a few taps of a smartphone screen [6]; that not only makes people's lives more convenient but also enhances their quality of life [29]. Thus, these benefits permit users gain a higher level of perceived wellbeing through using the app.

III. METHODOLOGY

IV. Data collection

Prior to the official data collection, the survey instrument was piloted with 6 FDA users to ensure its clarity and relevance. The pilot study indicated that the respondents clearly understood the questions and items. For the final data collection, the study employed an online questionnaire using Google Forms, and data was gathered via the Prolific platform.

As the study targets consumers who are using FDA, we utilized the Prolific advanced feature to recruit FDA subscribers from over the world. We double-checked the respondents by asking filter questions "Do you currently use any food delivery app?" and the follow-up question "Please name the food delivery app that you use most frequently". Participants were initially informed the purpose of this research and the protocol in the first section of the survey in compliance with ethics requirements. A total of 165 valid responses were selected for further analysis.

A. Measurement

All the questionnaire items in this study were adapted from studies of information systems, and revised for the research context of the FDA. The app-related factors, including system quality and information quality, were adapted from [30, 31]. Subjective wellbeing was measured by four items by [32, 33]. Continued usage was developed based on [4, 31]. All items were measured by seven-point Likert scales, ranging from strongly disagree (1) to strongly agree (7). The third section contained demographic questions (age, gender, education) and FDA usage behaviors (usage frequency, usage experience, and frequently ordered items on FDA). Table 1 describes the nature of the sample.

TABLE I. DESCRIPTIVE ANALYSIS

Variable	Category	Frequency	Percent (%)
Usage Experience	Under 1 year	30	18.2
	From 1 to 3 years	92	55.8
	From 3 to 5 years	34	20.6
	Over 5 years	9	5.5
Usage Frequency	1-5 times	118	71.5
	6-10 times	39	23.6
	11-20 times	7	4.2
	More than 20 times	1	0.6
Gender	Male	77	46.7
	Female	88	53.3
Age	Under 20 years old	4	2.4
	From 20 to 30 years old	121	73.3
	From 31 to 40 years old	24	14.5
	41 years and older	16	9.7
Education	High school or equivalent	26	15.8
	Vocational/technical school	1	0.6
	Some College	40	24.2
	Bachelor's Degree	71	43
	Master or Higher Degree	27	16.4

TABLE II. FREQUENTLY-ORDERING ITEMS ON FDA

Classification	Count	% of respondents
Fast foods	159	96%
Speciality foods	47	28%
Diet foods	5	3%
Drinks	35	21%
Desserts	14	8%

B. Data analysis

1) Factor analysis and reliability test

The collected data were analyzed using SPSS 25.0 version. In the first step, we utilized exploratory factor analysis (EFA) for 16 items of total variables. Table 3 shows the results of varimax rotation with a reduced set of 13 items. Three factors were obtained with factor loadings above a critical value of 0.5. It is important to note that items “Using this app met your overall need for wellbeing”, “Assuming you want to order meals, you intend to use this app” and “If you have an opportunity, you will order meals through this app,” reported cross-loadings between factors and were then removed. As presented in Table 1, three factors were labeled based on the item characteristics. Factor 1, “App Efficiency,” was based on the app functions and benefits, with factor loadings greater than 0.723. Factor 2, “User Wellbeing”, was related to the usage purposes and consequences, with factor loadings greater than 0.836. Factor 3, “Continued Behavior,” indicated the usage behavior, with factor loadings greater than 0.834. The reliability Alpha values for “App Efficiency”, “User Wellbeing” and “Continued Behavior” were 0.921, 0.88, and 0.718, respectively.

TABLE III. FACTOR ANALYSIS AND RELIABILITY ANALYSIS

Construct	Items	Factor Loading	CA
App Efficiency	This app is user friendly	0.855	0.921
	This app is easy to use	0.818	
	This app provides you with sufficient information	0.805	
	The information content meets your needs	0.796	
	This app provides precise information you need	0.793	
	This app has high efficiency	0.793	
	This app has high reliability without errors	0.745	
	This app provides up-to-date information	0.723	
User Wellbeing	Your life is excellent when you use this app.	0.906	0.88
	You are satisfied with your life when you are using this app	0.896	
	Using this app played an important role in enhancing your quality of life	0.836	
Continued Behavior	You will keep ordering food through this app rather than to use any alternatives in the future	0.866	0.718
	You will continue to use this app in the future	0.834	

2) Cluster analysis

Next, a K-means nonhierarchical cluster analysis was used to segment users into groups. This method minimizes within-cluster distances and maximizes between-cluster distances until a point till final cluster centers are identified [11]. Initially, we determined the exact number of clusters

(k) by using a k-mean clustering validation for k=2,3,4. The iteration data revealed that the final cluster centers with the maximum absolute coordinate change for any centers is .000 at the current iteration 8 for k=2 and k=3 (see Table 4). However, due to the lower exploratory power of k=2 [13] and for the nature of this exploratory study, we selected k=3 for final number of cases for further analysis.

TABLE IV. ITERATION HISTORY (K=3)

Iteration	Change in Cluster Centers		
	1	2	3
1	2.431	3.259	3.422
2	0.681	0.156	0.488
3	0.326	0.118	0.208
4	0.000	0.098	0.175
5	0.000	0.092	0.139
6	0.000	0.116	0.147
7	0.000	0.060	0.077
8	0.000	0.000	0.000

The one-way ANOVA results in Table 5 reveal that all the variables of Usage Experience ($F=20.913$, $p=0.000$), Usage Frequency ($F=20.743$, $p=0.000$), App Efficiency ($F=115.835$, $p=0.000$), User Wellbeing ($F=40.788$, $p=0.000$), and Continued Behavior ($F=37.012$, $p=0.000$) are significantly in forming the cluster. This indicates that among the three clusters created, there are significant differences in the above dimensions. Moreover, cluster 1 consists of 6 respondents, cluster 2 consists of 90 respondents, and cluster 3 has 69 respondents as presented in Table 6.

TABLE V. ONE WAY ANOVA RESULTS

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Z-score: Usage Experience	16.827	2	0.805	162	20.913	0.000
Z-score: Usage Frequency	16.718	2	0.806	162	20.743	0.000
Z-score: App Efficiency	48.256	2	0.417	162	115.835	0.000
Z-score: User Wellbeing	27.462	2	0.673	162	40.788	0.000
Z-score: Continued Behavior	25.717	2	0.695	162	37.012	0.000

TABLE VI. THE NUMBER OF CASES IN EACH CLUSTER

Cluster	Number of Cases in each Cluster	Percentage
1	6	3%
2	90	55%
3	69	42%
Total	165	100%

3) Cluster description

In the following, we describe each cluster and name them according to their characteristics. Table 7 presents the mean

comparison of each construct among segmentation. Figure 1 illustrates the comparison of different dimensions among clusters.

Cluster 1: Health-conscious Eaters

The number of members in this cluster is the smallest ($n=6$). Users in this cluster care more about their subjective wellbeing while using FDA ($M=4.722$). However, this group had the lowest mean scores for other elements, including App Efficiency ($M=2.8542$), and Continued Behavior ($M=4.6667$). Members of this group have an average experience of using FDA ($M=2.17$) and are potentially regular customers ($M=1.17$). Thus, these consumers are named “Health-conscious Eaters”, who take their wellbeing into consideration when ordering meals via FDA.

Cluster 2: Food Enthusiasts

The number of members of this cluster is the largest of all clusters (90 people out of 165). Users included in this segment was characterized by a high expectation for app efficiency ($M=5.6736$) and high continuance usage ($M=5.2722$). They are also less concerned with their wellbeing ($M=4.0556$). Consumers in this group show the lowest scores regarding both usage experience ($M=1.82$) and usage rates of FDA ($M=1.11$). Due to participants seemingly value the effectiveness and efficiency of FDA service, users in cluster 2 are labeled “Food Enthusiasts”.

Cluster 3: Lifetime Diners

Cluster 3 contained 42 percent of participants ($n=69$). Compared to the other two clusters, consumers in this cluster have the highest score for all dimensions. They have the highest interest in app efficiency ($M=6.3134$). They tend to care extra about their wellbeing when ordering meals via FDA ($M=5.5556$) and are more likely to continue using FDA ($M=6.3116$). Consumers in this group order more frequently ($M=1.65$) and have extensive experience with FDA ($M=2.54$). We name this cluster “Lifetime Diners”, who are demanding and probably high-value customers for FDA in the long term.

TABLE VII. MEAN COMPARISON AMONG CLUSTERS

	Cluster 1 ($n=6$)		Cluster 2 ($n=90$)		Cluster 3 ($n=69$)	
	Mean	SD	Mean	SD	Mean	SD
App Efficiency	2.8542	1.3215	5.6736	0.54137	6.3134	0.47192
User Wellbeing	4.7222	0.68041	4.0556	1.16036	5.5556	0.87758
Continued Behavior	4.6667	1.25167	5.2722	0.89053	6.3116	0.64227
Usage Experience	2.17	0.753	1.82	0.68	2.54	0.698
Usage Frequency	1.17	0.408	1.11	0.35	1.65	0.703

In addition, the chi-square test was performed to examine whether the demographic variables were statistically significant across the three proposed clusters (see Table 8). Neither gender nor age were discriminating variables. On the other hand, the chi-square statistical test of the univariate multinomial model suggests a significant relationship between education level and the group (Wald = 34.093, d.f. 8; $p<0.001$). We are more likely to find those having a bachelor's degree

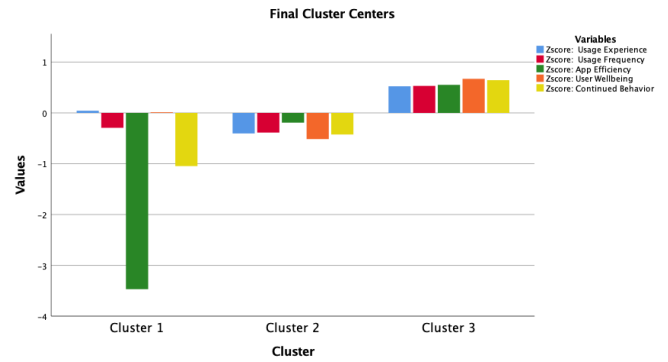


Fig. 1 Comparison among cluster

in cluster 2 (27% of total respondents), although a higher percentage of consumers having both a bachelor and higher degrees are found in cluster 3 (30% of total respondents).

TABLE VIII. DISTRIBUTION OF RESPONDENTS PER CLUSTER ACCORDING TO DEMOGRAPHIC VARIABLES

Demographic characteristic of clusters			Cluster 1	Cluster 2	Cluster 3	Chi-square test
Gender	Male	Count	3	45	29	Chi-square (2)=1.025, $p=0.599$
		%	1.80%	27.30%	17.60%	
	Female	Count	3	45	40	
		%	1.80%	27.30%	24.20%	
Age	Under 20 years old	Count	0	1	3	Chi-square (6)=3.474, $p=0.747$
		%	0.00%	0.60%	1.80%	
	From 20 to 30 years old	Count	4	70	47	
		%	2.40%	42.40%	28.50%	
	From 31-40 year old	Count	1	12	11	
		%	0.60%	7.30%	6.70%	
	41 years and older	Count	1	7	8	
		%	0.60%	4.20%	4.80%	
Education	High school or equivalent	Count	1	16	9	Chi-square (8)=34.093, $p=0.000$
		%	0.60%	9.70%	5.50%	
	Vocational/technical school	Count	1	0	0	
		%	0.60%	0.00%	0.00%	
	Some College	Count	1	28	11	
		%	0.60%	17.00%	6.70%	
	Bachelor's Degree	Count	2	32	37	
		%	1.20%	19.40%	22.40%	
	Master or Higher Degree	Count	1	14	12	
		%	0.60%	8.50%	7.30%	

4) Validation of clusters: multiple discriminant analysis

To further validate the clusters, we conducted a multiple discriminant analysis. The results are illustrated in Table 9. Firstly, there are two discriminant dimensions, both of which were statistically significant by the chi-square test ($p<0.001$). The canonical correlations for functions 1 and 2 are 0.848 and 0.635, respectively, which suggested a relatively high level of relationship between the discriminant scores and the groups. Table 9 also indicated that besides

app efficiency, function 1 imputes importance to other usage behavioral factors, whereas function 2 emphasizes user wellbeing. Moreover, 98.2% of the participants were accurately allocated to the cluster grouping. Figure 2 shows canonical discriminant functions that visualize the differences among clusters.

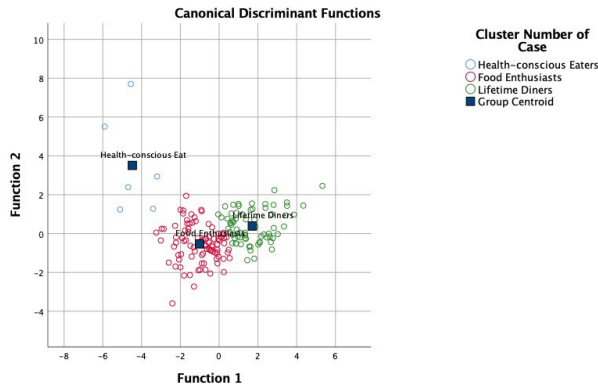


Fig. 2 Canonical discriminant functions

TABLE IX. SUMMARY OF MULTIPLE DISCRIMINANT ANALYSIS

Testing Significance of Three Clusters

Function	Canonical Correlation	Wilks' Lambda	Chi-square	Sig.
1	0.848	0.168	285.79	0.000
2	0.635	0.596	82.723	0.000

Standardized Canonical Discriminant Function Coefficients

	Function 1	Function 2
Zscore: Usage Experience	0.435	0.384
Zscore: Usage Frequency	0.415	0.195
Zscore: App Efficiency	0.711	-0.704
Zscore: User Wellbeing	0.326	0.616
Zscore: Continued Behavior	0.436	0.191

Classification Results

Cluster Number of Case			Predicted Group Membership			Total
			Health-conscious Eaters	Food Enthusiasts	Lifetime Diners	
Original	Count (%)	Health-conscious Eaters	5 (83.3%)	1	0	6
		Food Enthusiasts	0	9	0	90
		Lifetime Diners	0	2	67 (97.1 %)	69

Note: 98.2% of original grouped cases correctly classified.

V. DISCUSSION

The aim of this research is to define and demonstrate segments of users who are using the FDA in their daily lives. Though consumers' motivational factors, namely app efficiency, user wellbeing, and continuance intention, this study grouped users into four unique segments: Health-conscious Eaters, Food Enthusiasts, and Lifetime Diners.

A large number of users – Food Enthusiasts - were characterized as having an interest in app-related features that provide them with functional values, such as easy-to-use navigation control and accurate information. This group of users has slightly favorable motivations toward their wellbeing state. They also rarely utilized FDA for ordering meals (around one to five times per month). However, these individuals showed a high stickiness toward the use of the FDA. Therefore, to increase the retention of this segment, FDA should provide practical or price value to help them save time or money.

The study also reported a small potential group fond of healthy food to enhance their subjective wellbeing – Health-conscious Eaters. Remarkably, the low continuous intention was reported in these users despite their moderate purchase frequency. We propose the app should add more healthy food options, nutrition descriptions, or wellbeing-oriented activities within the app (e.g., counting food calories, mindful eating exercises) to encourage the continuance usage of this emerging group.

Our findings suggested the highly profitable consumer segment for FDA: Lifetime Diners. These participants were described as highly-favorable motivations toward app efficiency and their subjective wellbeing. They may perceive FDA as being easy to use, functionality, portability, and wellbeing assistance. This segment is ideal for FDA providers to interweave technological-related values with health-focused features that help them achieve a state of wellbeing.

With regard to theoretical contributions, this paper is among the first in the academic literature to examine the customer segmentation of the FDA. We shed light on possible consumer classifications and the differences in behaviors among these segments on the FDA. Our findings enrich the knowledge of consumer characteristics in the use of information systems in general and the online delivery platform in particular. From a practical perspective, this paper suggested the three distinguished customer segments for FDA providers: Food Enthusiasts, Health-conscious Eaters, and Lifetime Diners. Thus, marketing strategies (including feature development and target promotion) should deal with the variety of needs and motives of consumers, depending on specific segment, to target consumer more effectively, which ultimately increases consumer purchase intention.

VI. CONCLUSIONS AND FUTURE RESEARCH

Food delivery service has become increasingly an integral part of everyday lives. Despite the rapid rise of this technology, little remains known in terms of user typologies and their related motivational factors. This study has revealed that FDA users are not homogenous but rather heterogenous in their using motives. The first group, Health-conscious Eaters as we name them, are those who use apps to support their wellbeing goals. The second group, Food Enthusiasts, includes individuals who show a high engagement with app technology. Finally, the third group, Lifetime Diners, who strongly demand for both utilitarian and hedonic value of the app. For practical implications, the results from this study may assist FDA providers in better managing customer in-

vestments and optimizing retention strategies for sustainable profitability.

Further research is also required to enrich our understanding of the segments, especially niche markets. Finch (2019) indicated that the K-mean algorithm tends to allocate most members of the sample into the group related to the largest cluster, which may result in a concern in practice when the small group represents a rare but significant subgroup [34]. Indeed, our results revealed a small number of users classified in a Health-conscious Eaters segment. It also aligns with our findings in Table 2 that 96% of respondents ordered fast foods while only 3% mentioned ordering diet foods on the FDA. The demand for mindful eating is obvious [35]. Therefore, further exploration should examine with a larger sample size to analyze this potential subgroup.

REFERENCES

- [1] Zhang, S., Pauwels, K., & Peng, C. (2019). The impact of adding on-line-to-offline service platform channels on firms' offline and total sales and profits. *Journal of Interactive Marketing*, 47, 115-128.
- [2] Chotigo, J., & Kadono, Y. (2021). Comparative analysis of key factors encouraging food delivery app adoption before and during the COVID-19 pandemic in Thailand. *Sustainability*, 13(8), 4088
- [3] Kumar, S., Jain, A., & Hsieh, J.-K. (2021). Impact of apps aesthetics on revisit intentions of food delivery apps: The mediating role of pleasure and arousal. *Journal of Retailing and Consumer Services*, 63, 102686.
- [4] Al Amin, M., Arefin, M. S., Alam, M. R., Ahammad, T., & Hoque, M. R. (2021). Using mobile food delivery applications during COVID-19 pandemic: an extended model of planned behavior. *Journal of Food Products Marketing*, 27(2), 105-126.
- [5] Coppola, D. (2022). Estimated online food delivery market size worldwide from 2022 to 2027. Retrieved from <https://www.statista.com/statistics/1170631/online-food-delivery-market-size-worldwide/>
- [6] Tandon, A., Kaur, P., Bhatt, Y., Mäntymäki, M., & Dhir, A. (2021). Why do people purchase from food delivery apps? A consumer value perspective. *Journal of Retailing and Consumer Services*, 63, 102667.
- [7] Rana, P. (2022). Uber Eats, DoorDash Offer New Deals to Court Customers as Growth Cools. Retrieved from <https://www.wsj.com/articles/growth-cools-at-once-hot-food-delivery-apps-uber-eats-and-door-dash-11658340167>
- [8] Curry, D. (2022). Food Delivery App Revenue and Usage Statistics (2022). Retrieved from <https://www.businessofapps.com/data/food-delivery-app-market/>
- [9] Perri, J. (2022). Which company is winning the restaurant food delivery war? Retrieved from <https://secondmeasure.com/datapoints/food-delivery-services-grubhub-uber-eats-door-dash-postmates/>
- [10] Rong-Da Liang, A., & Lim, W. M. (2011). Exploring the online buying behavior of specialty food shoppers. *International Journal of Hospitality Management*, 30(4), 855-865.
- [11] Chawla, D., & Joshi, H. (2017). Consumer perspectives about mobile banking adoption in India—a cluster analysis. *International Journal of Bank Marketing*.
- [12] Ariguzo, G., & White, D. S. (2011). Africa's Mobile Commerce Segments: A Model-Based Cluster Analysis. *Review of Business Research*, 11(4), 38-44.
- [13] Neunhoffer, F., & Teubner, T. (2018). Between enthusiasm and refusal: A cluster analysis on consumer types and attitudes towards peer-to-peer sharing. *Journal of Consumer Behaviour*, 17(2), 221-236.
- [14] Chen, H.-S., Liang, C.-H., Liao, S.-Y., & Kuo, H.-Y. (2020). Consumer attitudes and purchase intentions toward food delivery platform services. *Sustainability*, 12(23), 10177.
- [15] Ray, A., Dhir, A., Bala, P. K., & Kaur, P. (2019). Why do people use food delivery apps (FDA)? A uses and gratification theory perspective. *Journal of Retailing and Consumer Services*, 51, 221-230.
- [16] Kumar, S., & Shah, A. (2021). Revisiting food delivery apps during COVID-19 pandemic? Investigating the role of emotions. *Journal of Retailing and Consumer Services*, 62, 102595.
- [17] Zhao, Y., & Bacao, F. (2020). What factors determining customer continually using food delivery apps during 2019 novel coronavirus pandemic period? *International Journal of Hospitality Management*, 91, 102683.
- [18] Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: an empirical examination within the context of data warehousing. *Journal of management information systems*, 21(4), 199-235.
- [19] DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems*, 19(4), 9-30.
- [20] Alalwan, A. A. (2020). Mobile food ordering apps: An empirical study of the factors affecting customer e-satisfaction and continued intention to reuse. *International Journal of Information Management*, 50, 28-44.
- [21] Peters, T., Işık, Ö., Tona, O., & Popović, A. (2016). How system quality influences mobile BI use: The mediating role of engagement. *International Journal of Information Management*, 36(5), 773-783.
- [22] Kapoor, A. P., & Vij, M. (2018). Technology at the dinner table: Ordering food online through mobile apps. *Journal of Retailing and Consumer Services*, 43, 342-351.
- [23] Diener, E. (2009). Subjective well-being. *The science of well-being*, 11-58.
- [24] Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological bulletin*, 125(2), 276.
- [25] Diener, E., Sapyta, J. J., & Suh, E. (1998). Subjective well-being is essential to well-being. *Psychological inquiry*, 9(1), 33-37.
- [26] Kim, M. J., Lee, C. K., & Preis, M. W. (2020). The impact of innovation and gratification on authentic experience, subjective well-being, and behavioral intention in tourism virtual reality: The moderating role of technology readiness. *Telematics and Informatics*, 49, 101349.
- [27] Stankov, U., Filimonau, V., Gretzel, U., & Vujičić, M. D. (2020). E-mindfulness—the growing importance of facilitating tourists' connections to the present moment. *Journal of Tourism Futures*, 6(3), 239-245.
- [28] Cecchinato, M. E., Rooksby, J., Hiniker, A., Munson, S., Lukoff, K., Ciolfi, L., . . . Harrison, D. (2019). Designing for digital wellbeing: A research & practice agenda. Paper presented at the Extended abstracts of the 2019 CHI conference on human factors in computing systems.
- [29] Gaggioli, A., Riva, G., Peters, D., & Calvo, R. A. (2017). Positive technology, computing, and design: shaping a future in which technology promotes psychological well-being. In *Emotions and affect in human factors and human-computer interaction* (pp. 477-502): Elsevier.
- [30] Wang, Y.-S., Tseng, T. H., Wang, W.-T., Shih, Y.-W., & Chan, P.-Y. (2019). Developing and validating a mobile catering app success model. *International Journal of Hospitality Management*, 77, 19-30.
- [31] Wang, Y. S. (2008). Assessing e-commerce systems success: a respecification and validation of the DeLone and McLean model of IS success. *Information Systems Journal*, 18(5), 529-557.
- [32] Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of personality assessment*, 49(1), 71-75.
- [33] Kim, J. J., Nam, M., & Kim, I. (2019). The effect of trust on value on travel websites: Enhancing well-being and word-of-mouth among the elderly. *Journal of Travel & Tourism Marketing*, 36(1), 76-89.
- [34] Finch, W. H. (2019). A Comparison of Clustering Methods when Group Sizes are Unequal, Outliers are Present, and in the Presence of Noise Variables. *General Linear Model Journal*, 45(1), 13.
- [35] Nelson, A. (2020). Reaching the new healthy consumer. Retrieved from <https://www.foodbusinessnews.net/articles/16376-reaching-the-new-healthy-consumer>

Creating awareness and implementing Blooms Taxonomy in teaching pedagogy—with special reference to Higher Education

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Abstract—The main objective of this study is to design a questionnaire which helps to measure the constructive alignment of Blooms taxonomy as per the six level of cognition. To achieve the objective, questionnaire was designed. This questionnaire will be helpful in ascertaining the present level of respondent as per the blooms taxonomy so that corrective actions could be taken to optimize learning outcomes. In Indian higher education, especially in Tier 2 and Tier 3 colleges are more heavily biased towards lower order thinking skills. With this questionnaire, current standing of the respondent can be measured and progression to higher order thinking skills can be facilitated at the end of the trainer/educator, hence bridging the gap between academia and industry.

Index Terms—Blooms taxonomy, Higher Education, Learning, Constructive Alignment.

I. INTRODUCTION

The future of any individual, society and country is solely depends on the level of education. The level of education does not mean to have higher and higher degrees but in current scenario, the actual meaning of education is to “know how to apply the existing knowledge to solve and create an innovative solution”.

As learning progresses it becomes more complex. A mere understanding of any concept becomes increasingly insufficient with the progression in learning complexity. Several models have been proposed to measure the level of cognition of the learner. One such widely accepted and acclaimed model is Blooms Taxonomy.

Although named after Bloom, the taxonomy is based on series of conferences from 1949-53 which were designed to improve existing curricula. It has three domains namely: Cognitive, Affective and Psycho motor which is shown in figure 1.

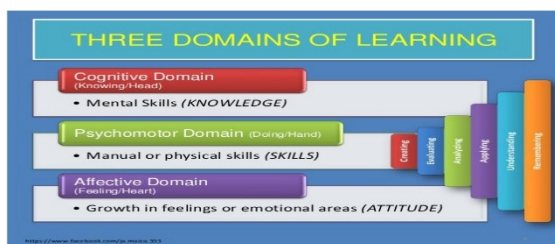


Figure 1: Three Domains of Learning

II. NEED OF STUDY

The present Proposal is based on the most widely used domain, i.e. the cognitive domain. The main reason behind

the choice is, at the level of higher education, a student predominately uses this domain. There is no doubt that Bloom's Taxonomy of Educational Objectives for the cognitive domain [3] has had a considerable impact on educational thought and practice all over the world [5]. The original taxonomy is a six-level classification system that uses observed student behavior to infer the level of cognitive achievement. These are: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation were shown in Figure 2.

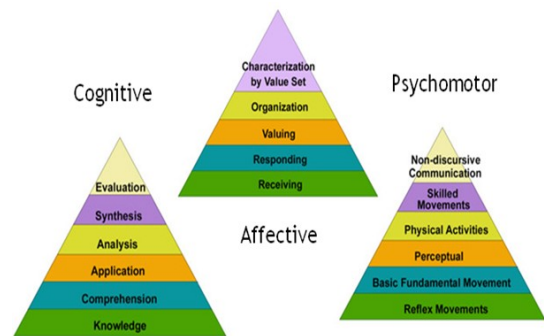


Figure 2: Six Levels of Cognitive Domains

A. Research Motive

These six levels can be categorized into two thinking orders according to the cognitive thinking required at each level. These two thinking orders are Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS) which is represented in Figure 3.

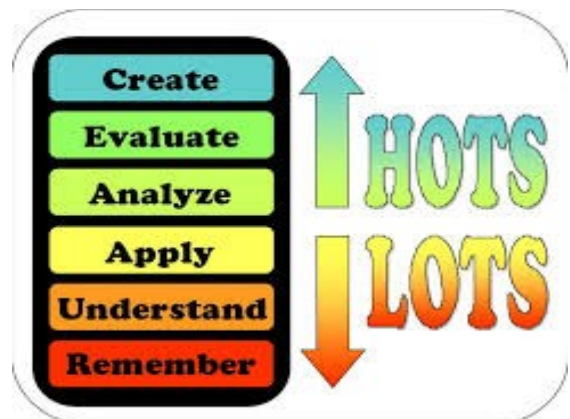


Figure 3: Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS)

The affective domain is generally shaped during the formative years of the life of the student and family and early schooling has a major impact on expression of this domain.

Psycho motor domain caters to hand-eye coordination and hands on training. Higher education is more inclined towards classroom learning and control experiments rather than giving hands on experiences. So, as far as the scope of the present proposal goes, we are limiting ourselves to only **cognitive domain**.

B. Research Gaps

Research study [6] mentioned that huge gap has existed in education system. Moreover, the level of understanding, knowing and creating new solutions in the minds of students is also missing [7] which can be fulfilled with the help of blooms taxanomy.

III. METHODS

A. Sample

The current study works on measuring the level of awareness of implementing blooms taxonomy in teaching pedagogy in higher education. Data were collected through a questionnaire designed by the investigators and pilot testing was done to validate the questionnaire designed after extensive literature review. The items of questionnaire were generated based on guiding theoretical principles that each level of bloom taxonomy. The study was conducted on a sample of 190 educators (21 Professors, 39 Associate Professors, 130 Assistant Professors responded) working in different academic organizations in NCR region, India. Convenient purposive sampling procedures were used to collect data from educators/trainers. The questionnaire also sought personal information such as name, age, gender, educational qualification, occupation, marital status, designation, and work experience. Descriptive statistics of the demographic variables (gender and marital status, educational qualification, and work experience) were shown in Table 1.

Demographic n = 190		No. of respondents	Percentage (%)
Age (in years)	Young (27-37)	120	63.15
	Middle age (38-47)	50	26.31
	Old Age(48-57)	20	10.52
Gender	Male	90	47.36
	Female	100	52.64
Education	Post-Graduation	107	56.31
	PhD	83	43.69
Designation	Assistant Professor	130	68.42
	Associate Professor	39	20.53
	Professor	21	11.05
	Professor	21	11.05

B. Objectives and Relevance of the Study

The main objective of this study is to design a questionnaire which helps to measure the constructive alignment of Blooms taxonomy as per the six level of cognition. To achieve the objective, questionnaire was designed. This questionnaire will be helpful in ascertaining the present level of respondent as per the blooms taxonomy so that corrective actions could be taken to optimize learning outcomes. In Indian higher education, especially in Tier 2 and Tier 3 colleges are more heavily biased towards lower order thinking skills. With this questionnaire, current standing of the respondent can be measured and progression to higher order thinking skills can be facilitated at the end of the trainer/educator, hence bridging the gap between academia and industry.

IV. DISCUSSION

The findings of the data were represented in the form of bar graph and pie charts for easily understanding to the large number of audiences. To check the awareness of blooms taxonomy in higher education, question was asked that “Are you aware of educational learning objective models called Bloom's Taxonomy?”. The **first finding** of the result was shown in figure 4. A majority of 73.8% (140) respondents confirm that they are aware of educational learning objective models called Bloom's Taxonomy and the remaining 26.2% (50) respondents do not know (not aware) about educational learning objective models called Bloom's Taxonomy.

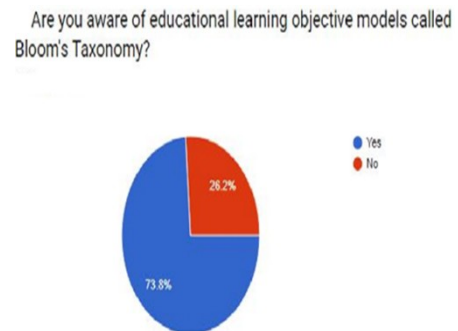


Figure 4: Awareness about Bloom's Taxonomy

Second finding represented in figure 5. Out of 140 respondents, 52.8% have applied it in their classroom teaching methodology and the remaining 47.2% have not yet applied in their classroom teaching methodology

If yes, then do you apply it in your classroom teaching methodology?

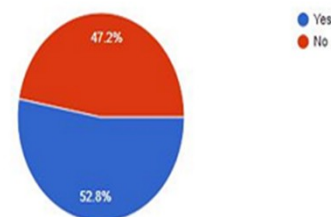


Figure 5: Classroom teaching methodology

Do you think if given appropriate training, you would be able to incorporate the taxonomy model in your classroom teaching

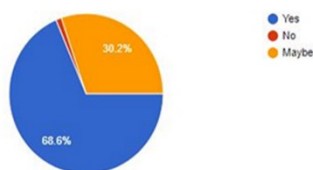


Figure 6: Applied taxonomy model in their lassroom teaching if appropriate training would be given

Third finding represented in figure 6. Out of 190 respondents, 68.6 % respondents can incorporate the taxonomy model in their classroom teaching if appropriate training would be given. 30.2% respondents mentioned that they may incorporate the taxonomy model in their classroom teaching if appropriate training would be given. For a surprise of the researchers, 1.2% (2) respondents were not able to incorporate the taxonomy model in their classroom teaching if appropriate training would be given.

Fourth finding represented in figure 7. Out of 190 respondents, 73.7 % respondents can incorporate any innovative teaching methodology in the classroom. 26.3% respondents cannot incorporate any innovative teaching methodology in the classroom.

Have you incorporated any innovative teaching methodology in the classroom?

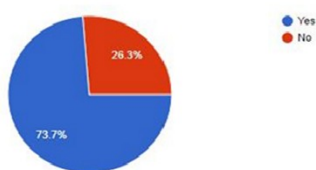


Figure 7. Able to incorporate any innovative teaching methodology in the classroom

Fifth finding represented in figure 8. Out of 190 respondents, 52.6% (102) respondents using most of the techniques in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 35.6% (69) respondents using all the techniques in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 11.3% (22) respondents using some of the techniques in some time in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 0.5% (1) respondents using all or some of these techniques very rarely in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations.

Sixth finding represented in figure 9. Out of 190 respondents, 51% (99) respondents using most of the techniques in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class. 41.2% (80) respondents using all the techniques in the classroom viz, Quiz, conceptual assignments, asking students questions

Consider the following aids of classroom teaching: Giving notes to students , using charts/models/diagrams to teach concepts or theories, video lectures, animations.

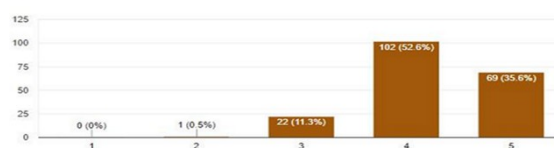


Figure 8: Cognition Level 1- Remembering

based on the concept taught in the previous class, reinforcement by reiteration in the next class. 7.2% (14) respondents using some of the techniques in some time in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class. 0.5% (1) respondents using all or some of these techniques very rarely in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class.

Seventh finding represented in figure 10. Out of 190 respondents, 55.2% (107) respondents using most of the techniques in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 11.9% (23) respondents using all the techniques in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 28.9% (56) respondents using some of the techniques in some time in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 4.1% (8) respondents using all or some of these techniques very rarely in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts.

Eighth finding represented in figure 11. Out of 190 respondents, 45.9% (89) respondents using most of the techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 24.2% (47) respondents using all the

Consider the following aids of classroom teaching: Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class.

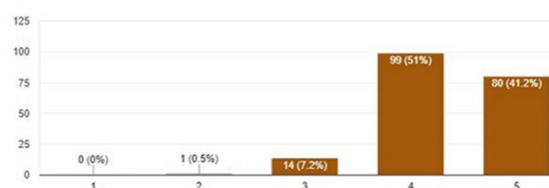


Figure 9: Cognition Level 2- Understanding

Consider the following aids of classroom teaching: Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts

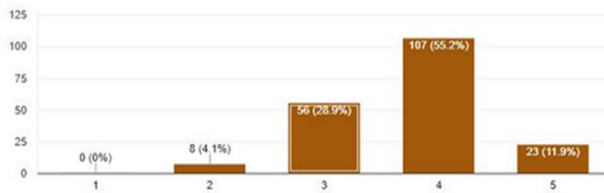


Figure 10: Cognition Level 3- Applying

techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 24.7% (48) respondents using some of the techniques in some time in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 4.6% (9) respondents using all or some of these techniques very rarely in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 0.5% (1) respondents do not use any of the above techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays.

Consider the following aids of classroom teaching: Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays

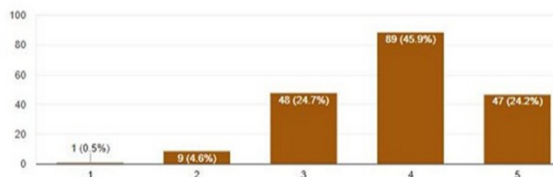


Figure 11: Cognition Level 4- Analyzing

Ninth finding represented in figure 12. Out of 190 respondents, 39.2% (76) respondents using most of the techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 41.2% (80) respondents using all the techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 18% (35) respondents using some of the techniques in some time in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 1% (2) respondents using all or some of these techniques very rarely in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 0.5% (1) respondents don't use any of the above techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject.

Consider the following aids of classroom teaching: Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject.

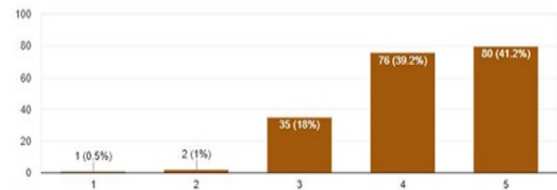


Figure 12: Cognition Level 5- Evaluating

using all or some of these techniques very rarely in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 0.5% (1) respondents don't use any of the above techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject.

Ninth finding represented in figure 13. Out of 190 respondents, 43% (83) respondents using most of the techniques in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 39.4% (76) respondents using all the techniques in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 18% (35) respondents using some of the techniques in some time in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 1% (2) respondents using all or some of these techniques very rarely in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 0.5% (1) respondents don't use any of the above techniques in the classroom viz, give assignment/

Consider the following : Do you give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects.

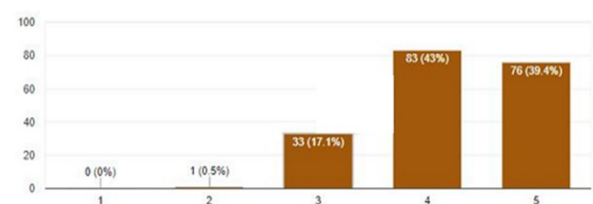


Figure 13: Cognition Level 6- Creating

projects to students which promote learning by doing, encourage students to take up unique/novel projects.

V. CONCLUSION

The present study reports that majority of faculty members made extensive use of LOTS techniques. An average of 77.6% faculty members used at least one of the HOTS techniques in their classroom. 73.8% faculty members mentioned that they are aware of Bloom's Taxonomy. Surprisingly, only 52.8% admitted to making its use in classroom teaching, **indicating a state of being unconsciously unaware**. These ~42% faculty members do not know that they do not know the concept of Bloom's Taxonomy. The **unconsciously unaware** state can be rectified with proper training and workshops. So, the academicians are suggested to incorporate the blooms taxonomy model in their classroom teachings for the better results and learning among students.

VI. RECOMMENDATION AND IMPLICATIONS

To make sure that students in management and education can apply what they learn, teachers are recommended to implement the following:

- Provide opportunities for the student to use ideas, theories, or problem-solving techniques and apply them to new situations.
- Review the student's work to ensure that he/she is using problem-solving techniques independently.

- Provide questions that require the student to define and solve problems.
- Ensure that assignments given cater to HOTS
- Question papers should be an optimum mix of LOTS and HOTS.
- An ongoing project/assignment/group task that gradually increases in complexity can be implemented
- This mix should gradually move towards achieving higher ratio of HOTS questions during the semester

REFERENCES

- [1] Anderson, L., & Krathwohl, D. A. (2001). Taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.
- [2] Armstrong, P. (n.d.). Bloom's Taxonomy. Center for Teaching, Vanderbilt University.
- [3] Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York: David McKay Company.
- [4] Harrow, A. J. (1972). A taxonomy of the psychomotor domain. New York: David McKay Co.
- [5] Seddon, G. M. (1978). The properties of Bloom's taxonomy of educational objectives for the cognitive domain. Review of educational research, 48(2), 303-323.
- [6] Aheisibwe, I., Kobusigye, L., & Tayebwa, J. (2021). Bridging Education Gap in Higher Institutions of Learning Using Bloom's Taxonomy of Educational Objectives. African Educational Research Journal, 9(1), 69-74.
- [7] Kroft, K., Lange, F., Notowidigdo, M. J., and Katz, L. F. (2016). Longterm unemployment and the great recession: the role of composition, duration dependence, and nonparticipation. Journal of Labor Economics, 34(S1): S7-S54
- [8] Iwuchukwu, M. O. (2015). Literature Review and Use of Benjamin Bloom's Taxonomy1. International Journal, 2(3).

Allocation of Village Funds for *BUMDES* and its contribution to Village Own-Source Revenue with the Management Process as a Moderating Variable

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Abstract—Law No. 6 of 2014 concerning villages confirms that the Government of Indonesia fully encourages the development of village social and economic independence. The COVID-19 pandemic that has occurred since 2020 has had a very significant impact on the village economy. Therefore, in 2022, the Minister of Villages, Development of Disadvantaged Regions and Transmigration issued Regulation (*Permendesa*) Number 7 of 2021 concerning the priority use of village funds in 2022 (<https://nasional.kompas.com> 14/11/2021) which consists of three main points, one of which is: national economic recovery in accordance with village authority. Opportunities to use village funds to develop Village Owned Enterprises (*BUMDES*) are intended to improve village own-source revenue. This study aims to test whether the amount of village fund allocation for *BUMDES* influences the increase village own source revenue with the moderating variable of village fund management. The results of the study revealed that the total allocation of village funds did not have a direct contribution to the increase in village own-source revenue. However, with moderated *BUMDES* management, the total allocation of village funds has a positive contribution to the increase village own-source revenue.

Index Terms—allocation of village fund, management process, village own-source revenue

I. BACKGROUND

Law Number 6 of 2014 concerning villages confirms that the Government of Indonesia fully encourages the development of village social and economic independence. The Government of Indonesia's support is strengthened by the allocation of State Budget/*APBN* and Regional Revenue and Expenditure Budget/*APBD* for village development (<http://www.djpk.kemenkeu.go.id>). The COVID-19 pandemic that has occurred since 2020 has had a very significant impact on the village economy. Therefore, the Minister of Villages, Development of Disadvantaged Regions and Transmigration issued Regulation (*Permendesa*) Number 7 of 2021 concerning the priority use of village funds in 2022 (<https://nasional.kompas.com> 14/11/2021) which consists of three main points: national economic recovery in accordance with village authority, national priority programs in accordance with village authority and mitigation, and dealing natural and non-natural disasters in accordance with village authority. In the context of village economic growth, village funds may be used for the establishment of *BUMDES* (Village Owned Enterprises). The use of village funds for the development of *BUMDES* is intended to encourage the economy of the community in the village. According to <https://nasional.kontan.co.id>, September 15, 2021), only about 68% of villages in Indonesia use village funds to establish Village-

Owned Enterprises. In addition to the COVID-19 pandemic, several studies note that non-optimal management affects the development of *BUMDES*. (<https://ejournal.bappeda-jatengprov.go.id/>).

This study aims to find out what portion of village funds are allocated for the establishment of *BUMDES* in the Special Region of Yogyakarta, how it is managed, and the contribution of *BUMDES* to the village's own-source revenue. This study is expected to provide an overview of how the influence of village ownership of *BUMDES* in contributing to Village Own-source Revenue.

II. LITERATURE REVIEW

A. Village Owned Enterprises (*BUMDES*)

According to Law No. 11 of 2021 concerning Village-Owned Enterprises (*BUMDES*), *BUMDES* is a legal entity established by villages to manage businesses, utilize assets, develop investments, or provide services with the aim of improving village welfare. *BUMDES* must be run based on the spirit of kinship and mutual cooperation with the principles of: (a) professional; (b) open and responsible; (c) participatory; (d) by prioritizing local resources that are (d) sustainable (Law no. 11 of 2021 on *BUMDES*). Many researches on *BUMDES* have been carried out, however in general the research conducted is descriptive research on the management of *BUMDES* in an area, such as that conducted by Filya, who conducted a description of the optimization of *BUMDES* management in Sukorejo village, Bojonegoro sub-district (Filya, Journal of Economics and Public Finance, Vol. 4 No. 2 Dec, 2017). Nur Aeni's research which describes the performance of *BUMDES* management in Pati Regency suggests that the performance of *BUMDES* in Pati Regency is not yet optimal (<https://ejournal.bappeda.jatengprov.go.id/>). Research conducted by Aprilia, Cahyono and Nastiti (Journal of Accounting and Applied Business vol 1 no 1, 2021) reveals that one of the success factors for *BUMDES* is an accounting information system and good organizational management.

Lukmawati, Puspaningtyas and Rachim (2020, p.65) state that the establishment of *BUMDES* has the intention of growing the village economy, increasing Village Own-source revenue (*PADES*), providing public benefits in the form of providing services for the purpose of living for rural communities and as a pioneer for economic business activities in the village.

BUMDES is a pillar of economic activity in the village that functions as a social institution and commercial institution. *BUMDES* as a social institution sided with the interests of the community through its contribution to the provision of social services, while as a commercial institution it aims to make profits through offering local resources (goods and services) to the market. (Nugrahaningsih, Falikhatus and Winarna, 2016, 39). Mutolib, et.all (2019, 12) stated that the development and progress of *BUMDES* cannot be separated from the support of the village government as the owner of *BUMDES*.

In achieving the objectives, *BUMDES* must be managed properly in accordance with the principles of *BUMDES* management. Filya (2019, 22) Dwiningwarni and Amrulloh (2020, 6) stated that there are 6 (six) principles in managing *BUMDES*, namely: (1) Cooperative; (2) Participatory; (3) Emancipation; (4) Transparent; (5) Accountable and (6) Sustainable. Cooperative means that all components involved in the management of *BUMDES* must work together and have good coordination for the smooth running of *BUMDES* activities. Participation is shown by the involvement of all components within the *BUMDES*, who must be willing to voluntarily provide support and contributions that can encourage the progress of *BUMDES* efforts. Equality means that there are equal opportunities for all components involved in the management of *BUMDES*, regardless of gender, class, ethnicity and religion. The principle of transparency is shown by the existence of activities that affect the interests of the general public which can be known by all levels of society easily and openly. The principle of accountability is the principle that all business activities must be accountable both technically and administratively. The last principle is sustainable, which is defined as the sustainability of *BUMDES* activities. To be able to survive in business competition, *BUMDES* are required to always be able to innovate and maintain the quality of their products which are supported by all components of *BUMDES*.

III. RESEARCH METHOD

This study has 3 variables, namely the portion of village funds for *BUMDES* as the dependent variable, the increase of village own-source revenue as an independent variable and *BUMDES* management as a moderating variable. Questionnaires and interviews with *BUMDES* managers were used as data collection instruments in this study. Village fund allocations are grouped into 3, namely low village fund allocations, medium village fund allocations and high village fund allocations. The variable of village fund management is measured through management principles consisting of participation, coordination, accountability, transparency, and sustainability. Data collection was carried out by means of questionnaires and interviews.

The research model is described in the following equation:

$$Y = a + b_1X + b_2W + b_3X*W$$

Y is the contribution of *BUMDES* to the village own-source revenue, X1 is the allocation of village funds and W is the management of *BUMDES*. X*W reflects the interaction between village fund and *BUMDES* management.

BUMDES management is a moderating variable that affects the relationship between allocated village fund and village own-source revenue. Before being processed, the classical assumption test was carried out on the data obtained. Hypothesis testing is done with the help of software Spss.20.

IV. RESEARCH RESULT

Many *BUMDES* in DIY and Central Java are inactive. The pandemic caused *BUMDES* to no longer be able to survive. Only 63 *BUMDES* are still operational during the time of study. Of that amount, 31 *BUMDES* are used as the sample. The response rate is 42. However, only 17 data are eligible to be processed. This means the final response rate is 27%. Classical assumption tests were performed for normality and heteroscedasticity tests. From the normality test using the Kolmogorov-Smirnov method, the Asymp value was obtained. Sig. (0.050) is above the maximum error limit, which is 0.05, then the data above is normally distributed. Heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residual of one observation to another observation. If the residual variance from one observation to another observation remains, it is called homoscedasticity. To test the presence or absence of heteroscedasticity, it is done by correlating each independent variable with the absolute value of the residual using Spearman Rank correlation. With the help of SPSS 20 software, the results show that there is no heteroscedasticity in this test.

A. Hypothesis testing

The Effect of Village Fund Allocation on *BUMDES* on The Increase of Regional Own-source revenue Moderated by *BUMDES* Management.

To see the effect of Village Fund Allocation on The Increase Regional Own-source revenue Moderated by *BUMDES* Management, linear regression analysis is used with the following equation:

$$Y = a + b_1X + b_2W + b_3X*W$$

In which:

Y = The Increase Regional Own-source revenue

X = Village fund allocation

W = *BUMDES* management

a = constant

b = Regression Coefficient

The results of processing on SPSS 26 software for multiple regression analysis are presented in the following table:

REGRESSION ANALYSIS TABLE

Coefficients ^a					
Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	3.431	2.356		1.456	.169
X	.286	.080	.723	3.571	.003
W	.072	.049	.341	1.465	.167
X*W	-.003	.002	-.481	-1.972	.070

a. Dependent Variable: Y

Source : Primary Data Processing Results, 2022

Based on the results of the calculations in the table above, the form of the linear regression equation is obtained as follows:

$$Y = 3,431 + 0,286X + 0,072W - 0,003X*W$$

The value of the regression coefficient on the independent variables illustrates that if it is estimated that the independent variable increases by one unit and the value of the other independent variables is estimated to be constant or equal to zero, then the value of the dependent variable is estimated to increase or decrease according to the sign of the regression coefficient of the independent variable.

From the linear regression equation above, the constant value is 3.431. That is, if the variable of the Increase of Regional Own-source revenue is not influenced by the independent variables, namely Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated by *BUMDES* Management, the average amount of Regional Own-source revenue Increase will be 3,431.

The sign of the regression coefficient of the independent variable shows the direction of the relationship of the variable concerned with the Increase of Regional Own-source revenue. The regression coefficient for the independent variable *X* is positive, indicating a unidirectional relationship between the allocation of village funds and the increase of Regional

Own-source revenue. The regression coefficient of the *X* variable of 0.287 means that for every increase in the allocation of village funds by one unit, it will cause an increase in Regional Own-source revenue by 0.287.

The regression coefficient for the independent variable *W* is positive, indicating that there is a unidirectional relationship between the management of *BUMDES* and the increase of Regional Own-source revenue. The regression coefficient for the variable *W* of 0.072 means that for every increase in *BUMDES* management by one unit, it will cause an increase in Regional Own-source revenue by 0.072.

The regression coefficient for the independent variable *X* moderated *W* is positive. This shows that there is a unidirectional relationship between the allocation of village funds moderated by the management of *BUMDES* and the increase in Regional Own-source revenue. The regression coefficient for the variable *X* moderated by *W* is 0.003 which means that for every increase in the allocation of village funds moderated by *BUMDES* management by one unit, it will cause a decrease in the increase in Regional Own-source revenue by 0.003.

B. Testing the Significance of the Regression Coefficient Overall Hypothesis Testing (F Test)

The government allocates village funds to *BUMDES* to accelerate *BUMDES*' operational activities. As the *BUMDES* operational activities increase and sustain, the village own-resource will also increase. A good *BUMDES* management will make the operational activities better and sustainable. The combination of the amount of village fund along with good management will increase village-own resource. Thus, the hypothesis in this research is

Ho: There is no effect of village fund allocation, *BUMDES* management, and village fund allocation moderated by *BUMDES* management on the increase of Regional Own-source revenue.

Ha : There is a significant effect of village fund allocation, *BUMDES* management, and village fund allocation

moderated by *BUMDES* management on the increase of Regional Own-source revenue.

To determine whether the influence of the independent variables on a dependent variable is significant simultaneously, the F test is used.

$$\alpha = 5\%$$

Statistical test:

$$F = \frac{R^2(n-k-1)}{k(1-R^2)}$$

Testing criteria: Ho is accepted if F calculate < F table

$$F \text{ table} = F_{\alpha; (df1, df2)} ; df1 = k, df2 = n-k-1 \quad (17-3-1)=13 = 3,411.$$

The results of the F test based on SPSS processing are presented in the following table:

OVERALL HYPOTHESIS TESTING TABLE (TEST F)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.587	3	4.196	4.985	.016 ^b
	Residual	10.942	13	.842		
	Total	23.529	16			

ANOVA^a

a. Dependent Variable: Y

b. Predictors: (Constant), *X*W*, *X*, *W*

Source: Primary Data Processing Results, 2022

From the table above, the F calculate value is 4.985. Because the F calculate value (4.985) > F table (3.411), Ho is rejected. Thus, it can be concluded that simultaneously there is a significant effect of Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated by *BUMDES* Management on the increase of Regional Own-source revenue.

C. Hypothesis testing

To determine the significant effect of the independent variable on a dependent variable, the t test was used.

Hypothesis:

Ho₁ : $\beta_1 = 0$ Village Funds Allocation has no significant effect on the increase of Regional Own-source revenue.

Ha₁ : $\beta_1 \neq 0$ Village Funds Allocation has a significant effect on the increase of Regional Own-source revenue.

Ho₂ : $\beta_2 = 0$ The management of *BUMDES* has no significant effect on The Increase of Regional Own-source revenue.

Ha₂ : $\beta_2 \neq 0$ *BUMDES* management has a significant effect on The Increase of Regional Own-source revenue..

Ho₃ : $\beta_3 = 0$ Village Fund Allocation moderated by *BUMDES* Management has no significant effect on The Increase of Regional Own-source revenue.

Ha₃ : $\beta_3 \neq 0$ Moderated Village Fund Allocation The management of *BUMDES* has a significant effect on The Increase of Regional Own-source revenue.

$$\alpha = 5\%$$

Statistical Test :

$$T_{cal} = \frac{b}{Se(b)}$$

Testing criteria : 1. Ho is rejected if the value of Sig ≤ 0.05 .

The results of the t-test based on SPSS processing are presented in the following table:

TABLE OF PARTIAL HYPOTHESIS TESTING (t-TEST)

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.431	2.356		1.456	.169
	X	.286	.080	.723	3.571	.003
	W	.072	.049	.341	1.465	.167
	X*W	-.003	.002	-.481	-1.972	.070

a. Dependent Variable: Y

Source: Primary Data Processing Results, 2022

The following results can be concluded:

1. Based on the table above, it can be seen that Variable X has a sig value less than 0.05. Because the value of sig (0.003) < 0.05, Ho is rejected. Therefore, it can be concluded that there is a significant effect of the allocation of village funds on the increase of regional own-source revenue.
2. Based on the table above, it can be seen that variable W has a sig value more than 0.05. Because the value of sig (0.167) > 0.05, Ho is accepted. Therefore, it can be concluded that there is no significant effect of *BUMDES* Management on the increase of Regional Own-source revenue.
3. Based on the table above, it can be seen that variable X moderated by W has a sig value greater than 0.05. Because the value of sig (0.070) > 0.05, Ho is accepted. Therefore, it can be concluded that there is no significant effect of village fund allocation moderated by *BUMDES* management on the increase of Regional Own-source revenue.

D. Correlation Analysis

To find out the simultaneous relationship between Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated by *BUMDES* Management on the increase of Regional Own-source revenue, multiple correlation analysis (R) was used.

CORRELATION ANALYSIS TABLE

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731 ^a	.535	.428	.91744

a. Predictors: (Constant), X*W, X, W

Source: Primary Data Processing Results, 2022

Based on the results of the SPSS software output above, the correlation coefficient (R) is 0.731. This shows that there is a sufficient relationship between Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated by *BUMDES* Management on the Increase of Regional Own-source revenue.

E. Coefficient of Determination

The magnitude of the influence of Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated by *BUMDES* Management on the increase of Regional Own-source revenue can be shown by the coefficient of determination with the following formula:

$$KD = R^2 \times 100\%$$

$$= (0,731)^2 \times 100\% \\ = 53,5\%.$$

This means that the variables of Village Fund Allocation, *BUMDES* Management and Village Fund Allocation which are moderated by *BUMDES* Management have an influence of 53.5% on the increase of Regional Own-source revenue. While the remaining 46.5% is the contribution of other variables besides Village Fund Allocation, *BUMDES* Management and Village Fund Allocation moderated *BUMDES* Management.

V. CONCLUSION

From the results of research and data testing, the following conclusions were obtained:

1. Village funds allocated to *BUMDES* vary widely, depending on the Village Government, however, some of the average village fund allocations for *BUMDES* are in the low category
2. Good management greatly affects the sustainability and performance of Village Owned Enterprises
3. From the statistical test results, the allocation of village funds is not directly correlated with the increase in village own-source revenue, but the allocation of village funds has a positive correlation with the increase in village own-source revenue if moderated by good management.

Limitations of Research and Suggestions for further research: This study only uses sample data in three areas, namely the Special Region of Yogyakarta, the District of Mungkid and the District of Klaten. Thus, the conclusions in the study only apply to these three areas. Further research can be carried out in different areas so that a clearer picture can be obtained of the relationship between the three variables studied. The number of samples is also small because many *BUMDES* are no longer operating during the PPKM period.

REFERENCES

- [1] Aprilia, Cahyono dan Nastiti, "Systematic Literature Review, Keberhasilan dan Kegagalan kinerja *BUMDES*, Jurnal Akuntansi Terapan dan Bisnis, vol 1, no 1, 2021 pp 35-44). ISSN :2807-243X
- [2] Bougie, Roger and Uma Sekaran: "Business Research Method: A Skill Building Approach". Enhanced e-text. 8th edition, Wiley
- [3] Datar, S.M., and Rajan, M.R. (2018). *Cost Accounting: A Managerial Emphasis*. 16 edition. Pearson Higher Education.
- [4] Dwiningwarni, Sayekti Suindah dan Amrulloh, Ahmad Zuhdi. Perneran Pengelolaan Dana Desa Untuk Meningkatkan Pendapatan Masyarakat di Jombang Jawa Timur. (2020). *Ekuitas: Jurnal Ekonomi dan Keuangan*. Vol.4.NO.1.Maret 2020; hal.1-20
- [5] Filya, Afifa Rachmanda, "Optimisasi Pengelolaan *BUMDES* dalam Meningkatkan PADES di Kecamatan Bojonegoro, di Kabupaten Bojonegoro Provinsi Jawa Timur Jurnal Ekonomi dan Keuangan Publik vol 5, no 1, Juni 2018 pp 19-39.
- [6] Hanson, D. R., & Mowen, M. (2007). *Managerial Accounting*. Ohio, USA: Thomson South Western Learning.
- [7] Hilton, Ronald W. & Platt, E. David. (2020). *Managerial Accounting: creating Value in a Dynamic Business Environment* (12th edition). Singapore: Mc Graw Hill.
- [8] Lanen. William., Anderson. Shannon and Hamer. Michael. (2020) *Fundamentals of Cost Accounting*. 6th edition. McGraw Hill.
- [9] Lukmawati, Andriana, Anggraini Puspaningtyas. "Strategi Badan Usaha Milik Desa (*BUMDES*) dalam Meningkatkan Pendapatan Asli Desa". Jurnal Universitas Tujuh Belas Agustus 1945, Semarang, 2020.

- [10] Mowen, M. M., Hansen, D. R., & L., H. D. (2012). *Cornerstone of Managerial Accounting* (4 ed.). Mason, Ohio, USA: South Western Cengage Learning.
- [11] Nugrahaningsih, Putri. Falikhatun, Winarna, Jaka.(2016). Optimalisasi Dana Desa dengan Pengembangan Badan Usaha Milik Desa Menuju Desa mandiri. *Jurnal Akuntansi dan Bisnis.Vol.* 16.No.1. Februari 2016: Hal 37-45
- [12] Nurul Aeni, “*Gambaran Kinerja BUMDES di Kabupaten Pati*” <https://ejournal.bappeda.jatengprov.go.id> Suparji “*Pedoman Tata Kelola BUMDES*” UIJ Press, 2019
- [13] Peraturan Menteri Desa, Pembangunan Daerah Tertinggal dan Transmigrasi Republik Indonesia Nomor & tahun 2021 Tentang Prioritas Penggunaan Dana Desa tahun 2022. (2021)
- [14] Peraturan Pemerintah Republik Indonesia no 11 tahun 2021 tentang *BUMDES*
- [15] <https://www.kppod.org/berita/view?id=51>
- [16] <http://www.djpk.kemenkeu.go.id>
- [17] (<https://nasional.kompas.com>)
- [18] <https://djpb.kemenkeu.go.id/kppn/bukittinggi/id/data-publikasi/artikel/>

Innovative Teaching, Delivering Materials and the Student's Satisfaction in Online Learning: Evidence from a Sharp Shift due to Covid-19 Pandemic in Vietnam

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Abstract—Online learning is one of the trend in modern education today. In the context of the complicated Covid-19 epidemic, the role of online learning in teaching and research activities is even more critical. Innovative teaching methodologies and providing materials are two decisive factors in online education, so improving those two factors will help increase the quality of online learning. The research explores the influence of innovative teaching approach and the effectiveness of delivery materials on student satisfaction at higher education institutions in Vietnam. The research collected data through survey questionnaires with 527 responses. The study tested the measurement quality and examined hypotheses through multivariate regression analysis. The findings confirmed a positive effect of innovative teaching approaches and the effectiveness of delivering materials on student satisfaction in online courses. Based on the findings, the research proposed some recommendations to improve innovative teaching methodologies and provide materials in e-learning to enhance the quality of online learning.

Index Terms—Innovative teaching approach, delivery materials, online learning, student satisfaction.

I. INTRODUCTION

Online learning (e-learning) is controversial, with many different concepts receiving more attention from researchers and practitioners (Oblinger & Hawkins, 2005). Zemsky and Massy (2004) suggest three different understandings of e-learning: a method of distance education, learning management software to support network communication activities, and learning through electronic means. Due to the impact of the Covid-19 pandemic, e-learning has become a common and normal activity around the world (Elshami et al., 2021). E-learning contributes to the innovation of Vietnamese education. Higher education institutions (HEIs) in Vietnam have quickly switched to online learning or blended learning as of 2020, particularly in light of the complex evolution of the Covid-19 outbreak. Higher self-study competency is needed for online learning to replace face-to-face instruction, which implies students need self-efficacy to self-regulate their behavior in online courses. Students with low self-efficacy cause the procrastination and isolation in online learning (Klassen, Krawchuk, & Rajani, 2008). It is crucial to employ an innovative teaching approach and deliver materials effectively in online courses that engage students in the on-

line environment and satisfy them (Giap, Vu, Tran, & Nguyen, 2022).

Many authors and prestigious universities in the global have studies that bring great value to education. Student satisfaction is one of the most popular criteria to evaluate the program quality and investigate factors influencing student satisfaction pay attention from researchers. Student satisfaction has a positive correlation with the quality of learning outcomes (Palmer & Holt, 2009). Improving learner satisfaction can lead to a higher quality of learning outcomes for students. Innovative teaching attracts the student's attention, stimulates their interest in the subject, and helps them easily grasp the concepts (Baskaran & Rajarathinam, 2018), so teachers' innovative teaching approaches or behaviors can increase learner satisfaction. While providing materials contributes a vital part to the success of education that makes a difference in learner satisfaction between online learning and traditional learning (McFarland & Hamilton, 2005). However, the previous studies pay less attention to delivering materials in online learning and its effect on learner satisfaction. Some of the earlier studies had a limitation in sample size that was relatively small (Cao, Shang, & Meng, 2020) or focused on graduate students. From 2020 to 2021, the HEIs in Vietnam switched to online learning due to the impact of the Covid-19 pandemic and the social distancing policies of the Vietnamese Government, there are few domestic studies on the effect of innovative teaching and delivering materials in online courses on student satisfaction.

This study aims to answer the following questions: (1) The reality of student satisfaction at HEIs during the sharp transition to online learning due to the Covid-19 pandemic? (2) How do an innovative teaching approach and delivering materials in online learning influence student satisfaction? The study significantly contributes to research and practice by identifying key elements to boost student satisfaction with online learning. The findings also have theoretical contributions to research models, and implications for HEIs to implement innovative teaching methodologies to meet the user needs in the context of the fourth industrial revolution as well as widely implement e-learning and blended learning after the Covid-19 pandemic.

II. CONCEPTUAL FRAMEWORK

Online learning or e-learning is a common and familiar term used to refer to the transmission of learning or training activities based on information technology software and social networking sites such as websites and the internet. Online learning is known as distance learning or virtual learning (Holsapple & Lee-Post, 2006). Online learning is a method of distance learning based on modern electronic platforms and devices such as desktop computers, laptops, tablets, and smartphones via an internet connection (Urdan, Weggen, & Cornelia, 2000). From the perspective of learners, e-learning is defined as learning supported by information and communication technology (ICT), and e-learning is not only limited to digital literacy but also combines many forms and methods (CEDEFOP, 2001). Learning materials and lectures are updated on the learning management system (LMS) and other information technology devices. However, there is a lack of interactions between teachers and students, resulting in isolation in online classes (Bolliger & Martin, 2018).

One of the key elements HEIs believe determines the quality of online learning is student satisfaction. Satisfaction is an emotion or attitude formed based on comparing what they expect with what they receive from a particular product or service. Satisfaction is defined as a mindset when people achieve a goal (Plouffe, Vandenbosch, & Hulland, 2001) that shows people's psychological comfort and emotional state. Various levels of management consider proper feedback as the key to user satisfaction. Some researchers show that quality has an effect on satisfaction, while others argue that better service gives consumers a comfortable consumption experience (Lee, Lin, & Kang, 2016). Student satisfaction with learning is the subjective feelings of students about the evaluation of teaching and learning support services provided by the school based on knowledge and experience from using the training service (Harvey, Parahoo, & Santally, 2017).

Innovative behavior refers to the intentional development, introduction, and implementation of new ideas inside a work role, group, or organization to enhance the performance of the role, the group, or the organization (Janssen, 2000). Innovative teaching approach as comparative advantage and learning satisfaction as satisfaction from Technology Acceptance Model (Lee et al., 2016). The level of innovative teaching behavior or innovative teaching approach positively affects learner satisfaction (Baskaran & Rajarathinam, 2018; Lee et al., 2016). Based on the above literature, this research proposes the following hypothesis:

Hypothesis H1: Innovative teaching approach has a positive effect on student satisfaction in online learning.

Online learning has distinct characteristics from face-to-face teaching, which emphasizes the openness of learning resources (Hu & Li, 2017). Delivering materials in online learning is not simply providing lessons and learning materials, but it is related to the strategy of building infrastructure, learning platforms, the connection between applications, and curriculum to be able to bring about the effectiveness of providing materials and effective use of learning materials in student learning (Schmidt & Winterhalter, 2004). In the connectivism theory, Siemens (2004) highlighted how changes

in access to information in the digital age affect learning and the development of online learning connections. In particular, the element of learning resources needs to be provided and distributed through multiple channels and must be adequate to optimize for learners (Ally, 2004; Ally, Lin, McGreal, Woo, & Li, 2005). There is a difference in student satisfaction and performance between traditional and online course delivery (McFarland & Hamilton, 2005). New educational delivery methods like online learning are diverse resources for students, and delivering materials in these courses is a critical factor in student satisfaction (AlHamad, Al Qawasmi, & AlHamad, 2014). The research postulates the following hypothesis:

Hypothesis H2: The effectiveness of delivering materials has a positive effect on student satisfaction in online learning.

III. METHODOLOGY

A. Instruments measurement

The research adopted measures from previous studies to reduce the common method variance phenomenon (Chang, Van Witteloostuijn, & Eden, 2010). Student satisfaction and innovative teaching approach were adopted from Lee et al. (2016) with seven and six indicators, respectively. The study adopted the scale of the effectiveness of delivering materials developed by the Center for Innovation in Teaching & Learning with seven items. In the pretest phase, the interview result with a professor revealed that the item “do not invite elderly local people to have a lecture as a formal curriculum” was not common in the training programs in Vietnam. Thus, this item was eliminated from the original scale of the innovative teaching approach. The study used a 5-point Likert scale to assess student satisfaction in online learning courses on an increasing scale from (1) Totally disagree to (5) Totally agree. The summary of the measures is presented in Table 1.

B. Data gathering and analysis

This research focused on undergraduate students at the HEIs. The questionnaire included two parts: part I focused on the demographic of the respondent, and part II evaluated the level of three variables. The minimum sample was determined to align with exploratory factor analysis (EFA) (Nguyễn Đình Thọ, 2013). With 20 items measuring vari-

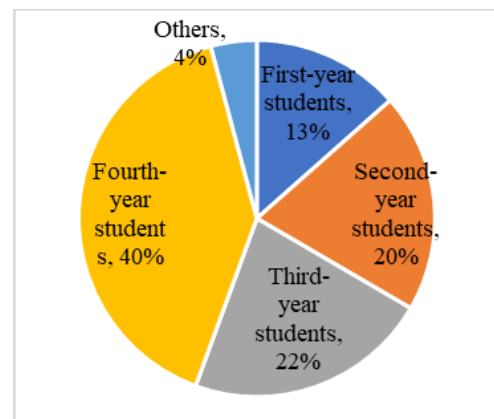


Fig. 1 Demographic of respondents

ables, the minimum sample is 100. The survey link was sent via the online student groups and through lecturers at the HEIS to transfer to the Zalo group of online courses.

The demographic of respondents in the survey is shown in Fig. 1. The total number of valid responses was 527. The respondents came from diverse HEIs in Vietnam, i.e., National Economics University, Hanoi University of Industry, Academy of Finance, Hanoi University, Thuongmai University, Hanoi University of Science and Technology, Hanoi University of Civil Engineering, etc. Regarding the major, 87% of respondents came from economic and social major, and the rest, 13% of respondents, was technical and natural major. The respondents covered all the academic years; however, the fourth-year student accounted for the highest percentage, with 40%.

IV. RESULTS AND DISCUSSION

A. Measurement model test results

The descriptive results are presented in Table 1, which shows the mean value of variable measures. The 5-point scale is used to evaluate the agreement to items of the measures. The results reveal that all items, except ITA2- *Editing local culture material is a new teaching method*, are greater than 4. Students at HEIs highly appreciate the innovative teaching approach, the effectiveness of delivering materials, and satisfaction with online courses.

The research test constructs reliability and validity. The reliability estimator is examined by using Cronbach Alpha. Cronbach Alpha coefficient greater than 0.6 ensures the scale's reliability (Hair, Black, Babin, & Anderson, 2014; Nguyen, 2013; Nunnally & Bernstein, 1994). The results of the reliability analysis are summarized in Table 1. The results of Cronbach Alpha coefficients are greater than 0.6, showing that all constructs for the variables ensure reliability.

Then, the research tests the validity of constructs by employing exploratory factor analysis (EFA) for dependent and independent variables, respectively, with principal component analysis and Varimax rotation. The criteria for EFA include KMO being greater than 0.5 with 95% confidence. The items will be removed if the difference between the factor loading coefficient on the variable groups is less than 0.3 (Kaiser, 1974; Tabachnick & Fidell, 2007). The KMO value of dependent variable is 0.909 (sig. = 0.000) and the KMO value of independent variables is 0.921 (sig. = 0.000). These results show that the data are completely consistent with the proposed model. For the dependent variable, all items load a single group of factors, which are computed and named SAT. For the independent variables, the total variance extracted is 57.993% > 50%, and the varimax rotation loads up two groups of factors. Factor 1- Effectiveness of delivering materials (EDM) includes seven items: EDM5, EDM1, EDM4, EDM7, EDM2, EDM3, and EDM6. Factor 2 - Inno-

TABLE 1
SUMMARY OF MEASUREMENT TEST RESULTS

	Items	Mean	Corrected Item-Total Correlation	Cronbach Alpha if Item Deleted
<i>Innovative teaching approach (Lee et al., 2016)</i> Cronbach alpha = 0.789				
ITA1	Using mobile technology is a new teaching method	4.45	0.476	0.771
ITA2	Editing local cultural material is a new teaching method	3.98	0.590	0.745
ITA3	Inviting experts to share their experiences	4.21	0.585	0.746
ITA4	Using QR-CODE as a teaching aid is a new teaching method	4.50	0.446	0.778
ITA5	Field trip is a new teaching method	4.21	0.604	0.740
ITA6	Video lecturing is a new teaching method	4.40	0.550	0.757
<i>Effectiveness of delivering materials (Center for Innovation in Teaching & Learning)</i> Cronbach alpha = 0.904				
EDM1	The lectures are organized logically	4.48	0.734	0.888
EDM2	The lecturers make the content engaging by intertwining interesting anecdotes, videos, and examples into the lectures.	4.30	0.713	0.890
EDM3	The content in materials is delivered consistently.	4.42	0.667	0.895
EDM4	The delivered materials are concise	4.46	0.766	0.884
EDM5	The delivered materials stay focused.	4.47	0.751	0.886
EDM6	The delivered materials are brief.	4.21	0.656	0.898
EDM7	The content of course materials is presented visually whenever possible.	4.44	0.745	0.886
<i>E-learning satisfaction (Lee et al., 2016)</i> Cronbach alpha = 0.925				
SAT1	Online learning makes learning become much more interesting	4.32	0.737	0.916
SAT2	Online learning gives me the ability to observation	4.21	0.768	0.913
SAT3	Online learning makes my thoughts sharp	4.18	0.768	0.913
SAT4	I like the online courses	4.13	0.789	0.911
SAT5	I hope online learning can promote other subjects	4.34	0.800	0.910
SAT6	I hope I still have opportunities to learn in the online courses	4.31	0.764	0.913
SAT7	I will recommend the online courses to other classmates	4.27	0.722	0.918

vative teaching approach (ITA) includes six items: ITA3, ITA5, ITA2, ITA1, ITA4, and ITA6.

B. Hypotheses test results

The results of the correlation analysis of three variables are presented in Table 2. The results of correlation analysis from 2-tailed shows a close correlation between the independent and dependent variables if the correlation is greater than 0.05 with 95% confidence. The results in Table 2 show that the independent variables (ITA and EDM) and dependent variables (SAT) are significantly correlated with each other.

TABLE 2
CORRELATION ANALYSIS RESULTS

Correlations		ITA	EDM	SAT
ITA	Pearson Correlation	1	.667**	.609**
	Sig. (2-tailed)		.000	.000
	N	527	527	527
EDM	Pearson Correlation	.667**	1	.690**
	Sig. (2-tailed)	.000		.000
	N	527	527	527
SAT	Pearson Correlation	.609**	.690**	1
	Sig. (2-tailed)	.000	.000	
	N	527	527	527

** . Correlation is significant at the 0.01 level (2-tailed).

The regression analysis results are summarized in Table 3.

TABLE 3
SUMMARY OF REGRESSION RESULTS

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.377	.166		2.280	.023		
	ITA	.294	.045	.268	6.559	.000	.555	1.802
	EDM	.593	.047	.512	12.547	.000	.555	1.802
a. Dependent Variable: SAT								
R Square	.516	Adjusted R Square	.514	F	279.481	Sig.		.000 ^b

The regression results show that the R-square value is 0.514, which indicates two independent variables, the innovative teaching approach and the effectiveness of delivering materials, explaining 51.4% of the variance of the dependent variable, online student satisfaction. When the independent variables change, it will explain more than 51.4% of the dependent variable (adjusted R-square = 0.514). The ANOVA analysis results using the F test to examine the proposed model have a significance value of 0.000. Thus, the proposed model is completely suitable for analysis and generalization.

The model regression results are presented in the Coefficients table. The innovative teaching approach and the effectiveness of delivering materials have a significance value of 0.000. For a 95% confidence level, these two variables influence student satisfaction in online learning. The B value shows that these two variables positively affect student satisfaction. These results indicate that both hypothesis H1 and hypothesis H2 are accepted.

C. Discussion

From the regression model, the results accept both research hypotheses and confirm the positive influence of the innovative teaching approach and the effectiveness of delivering materials on student satisfaction in online learning courses. The beta (β) value indicates the degree of influence of the independent variables on the dependent variable. The value of β_{EDM} is 0.512, indicating the most significant effect of the effectiveness of delivering materials on the dependent variable, satisfaction. And the value of β_{ITA} is 0.268, which shows a positive effect of the innovative teaching approach on student satisfaction in online courses. The VIF value is less than 2 showing no multicollinearity in the research model.

The findings show that the effectiveness of delivering materials during online learning has a great influence on student satisfaction. Providing materials such as documents, lecturer notes, and videos through supporting software can help students reduce the cost of printing documents, which are easy to manage and easy to find. Giving students the materials before class will enable them to prepare for class by studying the topic beforehand, which may boost their self-discipline and confidence. Additionally, providing materials after the lessons is also very important because it helps students consolidate their knowledge after class and serves as a basis for students to research when practicing and applying knowledge to reality. The research findings reveal that the innovative teaching approach positively affects student satisfaction. Students will feel more satisfied when teachers use various teaching methods, combining traditional learning with discussion topics, working in groups, and studying through specialized platforms and websites. For online learning, teachers employ quiz sections or games in the lessons, which will stimulate students. Moreover, using innovative teaching will engage students in learning activities in the class and enable them to reduce pressure.

The results also show that students at HEIs are quite satisfied with the innovative teaching and delivery of materials in online learning. This finding also brings positivity to schools and teachers because this new teaching method is likely to be widely used in the future when information technology is more and more developed and better supported for online learning. However, there are still some troubles that cause ineffective online learning. For example, the low quality of the internet results in a lag in accessing sources of materials and online classes. Other troubles come from the software, which has not been fully designed, or the security is not good. For example, there is some disorder in participating in online classes. In addition, lecturers and students are not proficient in using online teaching software, causing time-consuming and interruptions in the class.

V. CONCLUSION AND RECOMMENDATIONS

E-learning is a trend for all levels of education worldwide. The developed nations have a lot of advantages to e-learning, while the developing nations require more attention for investing in infrastructure, training teachers, and integrating elements of e-learning. This research investigates and states the positive influence of innovative teaching ap-

proaches and the effectiveness of delivering materials on student satisfaction in e-learning.

Based on the findings, the research recommends implementing an innovative teaching approach and delivering materials effectively in online learning courses. The online learning courses include students, lecturers and instructors, and support departments that ensure the online learning process. Therefore, recommendations are made based on stakeholders.

For teachers and instructors: The innovative teaching methods teachers use affect students' satisfaction. Proficient use of information technology and teaching aids help teachers interact with students most naturally and effectively and manage the best students, bringing high efficiency to teaching. Teachers must be knowledgeable in contemporary technology, including computers, online teaching software, and auxiliary equipment like webcams, video recorders, headphones, noise-canceling microphones, etc. Teachers need to pay more attention to grasping the lessons of students because, in reality, it is difficult to assess the student's follow-up like in a live class. Therefore, students must build initiative, positivity, and self-discipline in order to get the best learning effect. The teacher must convey the material as plainly as possible. Because students who occasionally pay more attention to the "hearing" than the "seeing" in online lectures may find that body language is no longer useful. Furthermore, teachers need to prepare in advance the necessary teaching materials, including PDF, word or document images, etc. Providing effective materials to help students enjoy online learning. Homework can be sent to the online chat group, and students can do their exercises.

For higher education institutions: HEIs should provide a manual to help lecturers and students use technology for online instruction. Because of the sudden transition to online schooling brought on by the Covid-19 epidemic, many lecturers will likely have trouble adjusting to new technology, especially those who are seasoned and inept with it. However, if instructors are given enough time to plan and assistance to show them how to use online teaching technologies, this scenario may be readily resolved. As a result, it is imperative that the school arrange classes for instructors to learn how to use online teaching resources. Providing guidance is not only necessary due to the transition under the impact of the Covid-19 pandemic but also necessary when HEIs actively implement blended learning or distance learning programs. In online learning, there is much-specialized software for meetings and online learning, but the problem is choosing suitable software that helps lecturers and instructors provide course materials effectively and fulfill innovative teaching activities. Free software like Moodle or Google Classroom can be challenging to use and requires some attention. These days, Zoom, Webinar, and Webex are the most widely used commercial software solutions. They are often inexpensive, simple to use, and require careful technical support from software license distributors.

For students, students should balance their own study time, improve their self-study competence, and enhance time management skills. Students should engage in online courses more actively.

REFERENCES

- [1] AlHamad, A. Q., Al Qawasm, K. I., & AlHamad, A. Q. (2014). Key Factors in Determining Students' Satisfaction in Online Learning Based on Web Programming/course within Zarqa University. *International Journal of Global Business*, 7(1), 7-14.
- [2] Ally, M. (2004). Foundations of educational theory for online learning. *Theory and practice of online learning*, 2, 15-44.
- [3] Ally, M., Lin, F. O., McGreal, R., Woo, B., & Li, Q. (2005). An intelligent agent for adapting and delivering electronic course materials to mobile learners.
- [4] Baskaran, K., & Rajarathinam, M. (2018). Innovative teaching practices in educational institutions (ITPEI). *International Journal of Educational Sciences*, 20, 72-76. doi:10.1080/09751122.2017.1420599
- [5] Bolliger, D. U., & Martin, F. (2018). Instructor and student perceptions of online student engagement strategies. *Distance Education*, 39(4), 568-583. doi:https://doi.org/10.1080/01587919.2018.1520041
- [6] Cao, C., Shang, L., & Meng, Q. (2020). Applying the job demands-resources model to exploring predictors of innovative teaching among university teachers. *Teaching and Teacher Education*, 89, 103009. doi:https://doi.org/10.1016/j.tate.2019.103009
- [7] CEDEFOP. (2001). *2001 Annual Report*. Retrieved from http://aei.pitt.edu/42113/1/2001_CEDEFOP.pdf
- [8] Center for Innovation in Teaching & Learning. DELIVERING CONTENT ONLINE. *Online course-in-a-box*. Retrieved from <https://citl.illinois.edu/citl-101/online-strategy-development/develop-or-revise-an-online-course/online-course-in-a-box/building-your-course/delivering-content/delivering-content-online>
- [9] Chang, S. J., Van Witteloostuijn, A., & Eden, L. (2010). From the Editors: Common method variance in international business research. *Journal of International Business Studies*, 41(2), 178-184. doi:doi:10.1057/jibs.2009.88
- [10] Elshami, W., Taha, M. H., Abuzaid, M., Saravanan, C., Al Kawas, S., & Abdalla, M. E. (2021). Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. *Medical Education Online*, 26(1), 1920090. doi:https://doi.org/10.1080/10872981.2021.1920090
- [11] Giap, H. T., Vu, B. T. T., Tran, Q. T., & Nguyen, H. H. (2022). Learners' Perceived Self-Efficacy, Engagement, and Satisfaction in Online Learning of Accounting and Auditing University Students. *Vietnam Journal of Education*, 6(2), 179-186. doi:https://doi.org/10.52296/vje.2022.200
- [12] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis: 7th Edition*. Essex: Pearson Education Limited.
- [13] Harvey, H. L., Parahoo, S., & Santally, M. (2017). Should gender differences be considered when assessing student satisfaction in the online learning environment for millennials? *Higher Education Quarterly*, 71(2), 141-158.
- [14] Holsapple, C. W., & Lee-Post, A. (2006). Defining, assessing, and promoting e-learning success: An information systems perspective. *Decision sciences journal of innovative education*, 4(1), 67-85. doi:https://doi.org/10.1111/j.1540-4609.2006.00102.x
- [15] Hu, M., & Li, H. (2017). *Student engagement in online learning: A review*. Paper presented at the 2017 International Symposium on Educational Technology (ISET).
- [16] Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and organizational psychology*, 73(3), 287-302. doi:https://doi.org/10.1348/096317900167038
- [17] Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.
- [18] Klassen, R. M., Krawchuk, L. L., & Rajani, S. (2008). Academic procrastination of undergraduates: Low self-efficacy to self-regulate predicts higher levels of procrastination. *Contemporary Educational Psychology*, 33(4), 915-931.
- [19] Lee, P.-C., Lin, C.-T., & Kang, H.-H. (2016). The influence of open innovative teaching approach toward student satisfaction: a case of Si-Men Primary School. *Qual Quant*, 50, 491-507. doi:https://doi.org/10.1007/s11135-015-0160-x
- [20] McFarland, D., & Hamilton, D. (2005). Factors affecting student performance and satisfaction: Online versus traditional course delivery. *Journal of Computer Information Systems*, 46(2), 25-32. doi:10.1080/08874417.2006.11645880

- [21] Nguyễn Đình Thọ. (2013). *Giáo trình phương pháp nghiên cứu khoa học trong kinh doanh*. Trường Đại học Kinh tế TP. Hồ Chí Minh: Nhà xuất bản Tài chính.
- [22] Nguyen, D. T. (2013). *Giáo trình phương pháp nghiên cứu khoa học trong kinh doanh [Research method in business]*. Trường Đại học Kinh tế TP. Hồ Chí Minh: Nhà xuất bản Tài chính.
- [23] Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory (3rd ed.)*. New York: McGraw-Hill.
- [24] Oblinger, D. G., & Hawkins, B. L. (2005). IT Myths The Myth about E-Learning. *Educause review*, 40(4), 14.
- [25] Palmer, S. R., & Holt, D. M. (2009). Examining student satisfaction with wholly online learning. *Journal of computer assisted learning*, 25(2), 101-113. doi:<https://doi.org/10.1111/j.1365-2729.2008.00294.x>
- [26] Plouffe, C. R., Vandenbosch, M., & Hulland, J. (2001). Intermediating technologies and multi-group adoption: a comparison of consumer and merchant adoption intentions toward a new electronic payment system. *Journal of Product Innovation Management: An International Publication of The Product Development & Management Association*, 18(2), 65-81.
- [27] Schmidt, A., & Winterhalter, C. (2004). User context aware delivery of e-learning material: Approach and architecture. *J. Univers. Comput. Sci.*, 10(1), 28-36.
- [28] Siemens, G. (2004). Connectivism: A Learning Theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning*, 2(1).
- [29] Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*. Boston, MA: Pearson Education. Inc.
- [30] Urdan, T., Weggen, C., & Cornelia, C. (2000). Corporate e-Learning: Exploring a New Frontier, March 2000. *A Research Paper from WR*.
- [31] Zemsky, R., & Massy, W. F. (2004). *Thwarted innovation: What happened to e-learning and why*. Retrieved from Pennsylvania:

Stop the lip service and stalling on faculty diversity: What a genuine commitment to hiring African-American faculty requires at top universities

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Abstract—There is a significant shortage of minority faculty at U.S. Colleges and Universities (Davis & Fry, 2019). Black, Hispanic, Native American, and multi-racial faculty members are underrepresented in the faculty ranks, compared to not only their share of the U.S. population (Gasman, 2022; Davis & Fry, 2019). The U.K. is even worse than the U.S., where just 160 out of 22,855 professors in 2020/21 are Black, essentially less than 1% (White, 2022). Minority students with educators of the same race or ethnicity are more likely to see those teachers as role models and report more significant effort in school and higher college goals (Davis & Fry, 2019). This paper explores the best practices to recruit more minority faculty in 2022 and beyond.

I. INTRODUCTION

Recently as students across the country protested incidents of racism and discrimination on and off campus, they called attention to the small numbers of Black, Latinx, and Native American professors on their campuses, and faculty diversity has consistently appeared on activists' lists of demands (Chessman & Wayt, 2016; Flaherty, 2015).

There is a significant shortage of minority faculty at U.S. Colleges and Universities (Davis & Fry, 2019). Black, Hispanic, Native American, and multi-racial faculty members are underrepresented in the faculty ranks, compared to not only their share of the U.S. population but also to the student bodies of colleges and universities at the highest-ranked universities in America (Gasman, 2022; Davis & Fry, 2019).

The numbers warrant more attention and focus on the university faculty diversity issue. For example, in the fall of 2017, only 5% of faculty members were Hispanic, compared with 20% of undergraduates (Davis & Fry, 2019). Black faculty were also underrepresented compared with the black undergraduate population (faculty 6% vs. students 14%) (Davis & Fry, 2019). On the other hand, Asian professors made up a slightly larger proportion of their peers than Asian students did (12% of faculty compared to 7% of students) (Davis & Fry, 2019). At the same time, students of color make up nearly half of the total enrollment in undergraduate programs (Centeno, 2021). Between the fall of 1997 and the fall of 2017, the share of nonwhite assistant professors grew by ten percentage points, compared with 8 points for professors (Davis & Fry, 2019). In 2013, underrepresented minority faculty made up approximately 11 percent of tenure-track or tenured faculty. As of 2019, the percentage of underrepresented minority faculty on tenure-track or tenured faculty has increased to just 12 percent (Gasman, 2022). Even worse than the United States is the situation in

the United Kingdom, where only 160 out of 22,855 professors in 2020/21 are black, which is less than 1% of the total (White, 2022).

Students who come from underrepresented groups and have teachers who are of the same race or ethnicity as them are more likely to see their teachers as role models. These students also report putting in significantly more effort in school and having higher aspirations for college if they have teachers who are of the same race or ethnicity as them (Davis & Fry, 2019). If professors were more representative of the students they taught, the academic achievement gap between students of different races and ethnicities could be reduced by as much as fifty percent (Davis & Fry, 2019). According to the findings of recent studies, there is a significant and robust positive association that exists between improvements in the diversity of the faculty and the graduation, transfer, and drop-out rates of minority students. This association has been found to be significant and robust (Cross & Carman, 2022). When they are instructed by a more diverse faculty, students from underrepresented groups see significant improvements in their academic performance (Cross & Carman, 2022).

II. METHOD

This paper uses two focus groups of African-American faculty from research one universities (5 males & 5 females) that have also served in diversity and inclusion roles in their careers. One key research question was: What are the best practices for recruiting and searching African-American faculty?

III. CONTEXTS FROM THE LITERATURE

According to Rutherford (2021), change theory recommends making adjustments to the organizational system, which, in many cases, is structured in such a way as to disadvantage one group in order to advantage another. The problem of implicit bias can be alleviated by making adjustments to the way the system works. The theory of change can be defined as a theory of how and why an initiative works, which can be empirically tested by measuring indicators for every expected step on the hypothesized causal pathway to impact, according to Gilissen et al. The theory of change can be defined as a theory of how and why an initiative works (Gilissen et al., 2018). This definition places an emphasis on the necessity of taking conscious steps toward ensuring inclusivity as well as a diversity of cultures.

The concept of change, on the other hand, is defined by Rutherford as latching onto a plausible and transparent distribution of intensities purposed to liberate human beings from constraints such as race, ethnicity, gender, sexual orientation, and gender identity that enslave them from enacting and achieving solutions (Rutherford, 2021). In order to address the issue of diversity within the teaching staff, educational institutions need to break free of the behaviors, actions, and decision making that perpetuate racism and favoritism. In order to accomplish this goal, places of higher education need to address the entire system. According to Espinosa et al. (2019), an authentic commitment to diversity conveys the message that the success of people of color should not be solely dependent on a predetermined number of people of color at the top or a percentage of people of color at the table. In the given circumstances, the fact that the rest of the staff members are white despite the fact that the department head is African American is insufficient because it does not provide exceptional representation. The importance of maintaining a sense of equilibrium throughout the entire institution.

The curriculum, as well as the discussions that take place on committees and in faculty meetings, benefit from an increase in richness when there is more diversity of thought among the faculty members (Gasman, 2022; Gasman, 2016). Additionally, the university is held accountable by a diverse faculty in ways that uplift people of color and center issues important to the large and growing communities of color across the nation (Gasman, 2022; Gasman, 2016). Higher education is rapidly approaching a tipping point where increasing the diversity of faculty members is not only an absolute necessity but also essential to the future of our country (Gasman, 2022; Gasman, 2016).

People of color who are otherwise qualified for faculty positions are frequently disregarded as candidates through the use of the word "quality" (Gasman, 2022; Gasman, 2016). Even those people on search committees who appear to be dedicated to access and equity will cite "quality" or lack of "quality" as a reason for not interviewing or hiring a person of color. This is true even if the people on the search committee are committed to access and equity (Gasman, 2022; Gasman, 2016).

In most cases, quality indicates that the minority applicant did not earn their Ph.D. from an establishment that is regarded as being of the highest caliber or that they did not receive guidance from a renowned expert in the field. (Gasman 2022; Gasman, 2016). It has been found that being able to attend and graduate from elite institutions as well as being mentored by prominent people is linked to social capital and relationships. However, people of color are not typically able to experience these things to their full potential (Gasman, 2022; Gasman, 2016). The argument that there are not enough people of color in the faculty pipeline is a typical justification (Gasman, 2022; Gasman, 2016; Smith, 2020; Griffin, 2019; Gavino, 2021).

IV. THEORIES THAT PROVIDE MORE CONTEXT

There are a variety of social and psychological motivations that can explain the interactions that take place during the faculty recruiting, interviewing, and hiring process, and

modern theories of intergroup bias function as a means to explain intergroup bias in terms of these various motivations around practices, behaviors, and interactions. Several different theories offer contexts for the difficulties posed by evolving systems and processes, which act to limit diversity. For example, sociocentrism is the tendency to judge one's own group as superior to other groups across various domains (American Psychological Association, 2022B). This theory could manifest itself when a White person on a search committee, a graduate from a predominantly White university, assumes that a Black applicant who went to a Historically Black College (HBCU) might have gotten an inferior level of education.

Another theory that provides an additional context to barriers to diversifying college faculty is ethnocentrism (American Psychological Association, 2022A). Ethnocentrism is the tendency, often unintentional, to base perceptions and understandings of other groups or cultures on one's own. A person functioning from a framework of ethnocentrism would practice regarding one's own ethnic, racial, or social group as the center of all things (American Psychological Association, 2022A). In behavior on a faculty search committee, this could mean that they might need to consider how the journeys, experiences, and perspectives of others could be so dramatically different from their own.

According to one of the central tenets of terror management theory, individuals are presupposed to hold favorable opinions of members of their own in-group because they believe that individuals who share similar perspectives are more likely to validate and support their own cultural worldview. However, they have a negative view of members of out-groups because they believe that people who are different from them pose a threat to their worldview (Hewstone, Rubin, & Willis, 2002). This theory provides some context for what could limit the viability of an African-American applicant when the search committee does not have any representation from other minority groups.

Intergroup bias is the final theory that helps provide additional context to the obstacles that prevent the diversification of college faculty. In general, this theory refers to the systematic tendency to evaluate one's own membership group (also known as the in-group) or the members of that group more favorably than one would evaluate a non-membership group (also known as the out-group) or the members of that group (Hewstone, Rubin, & Willis, 2002). Bias can refer to actions (such as discrimination), attitudes (such as prejudice), or cognitive processes (such as stereotyping) (Wilder & Simon, 2001; Hewstone, Rubin, & Willis, 2002). This tendency toward serving one's own group can benefit the in-group while hurting the out-group (Hewstone, Rubin, & Willis, 2002). The concept of "bias" requires one to make an interpretive decision. Because it goes beyond the objective requirements or evidence of the situation, this judgment is unfair, illegitimate, or unjustifiable. All three of these descriptors are accurate (Hewstone, Rubin, & Willis, 2002). This means that minority applicants might not be considered part of the in-group or group of choice. As a result, the applications of those in the in-group would be more favored, valued, and coveted.

Research shows that schemas affect evaluation and performance (Kang et al., 2016). The study uncovered those job applicants with African-American-sounding names needed to send significantly more resumes than applicants with White-sounding names to get contacted for an interview (Kang et al., 2016). "Resume whitening" refers to a practice in which candidates alter any information on their resume that indicates their ethnicity or race. This process could even include changing foreign-sounding or ethnic-sounding names to something American-sounding or a nickname that might seem more Caucasian-sounding (Kang et al., 2016). The clashing forces of assimilation and diversity have long fought for preeminence in the American experience, most intensely among African-Americans (Luo, 2009). The Whitening strategy is often viewed as a way to eliminate one more potential obstacle that might keep applicants from at least getting the chance to make it to an interview so they could present their case in person (Luo, 2009).

Nevertheless, the strategy of hiding race, changing names, and adopting nicknames can be demoralizing (Luo, 2009). Black job seekers said the purpose of hiding racial markers extended beyond simply getting in the door for an interview. It was also part of making sure they appeared palatable to hiring managers once their race was observed in the interview. In some ways, it is viewed as denying who and what they are or attempting to make it easier to be accepted and embraced by having a nickname it is easier to pronounce or by having a name that might sound like those conducting the interviews (Luo, 2009). Ultimately feeling pushed to a state of desperation to be hired that they attempt to tone down their identity in a way be more tolerated instead of celebrated. In a study, the researchers sent out 1,600 fabricated resumes, based on real candidates, to employers in 16 different metropolitan areas in the U.S. Some resumes were left as is.

Others, on the other hand, were made "whiter" (Kang et al., 2016). According to the findings of the study, while 25.5% of resumes received callbacks when the names of African American candidates were "whitened," only 10% of resumes received a call back when the candidate left both their name and their experience unchanged. Applicants of Asian descent had a response rate of 21% if they "whitened" their resumes, while only 11.5% of candidates received a response if their resumes were not "whitened" (Kang et al., 2016).

V. FACULTY SEARCH COMMITTEES

When reviewing applicants' resumes and deciding who will be invited for an interview, the hiring committee often poses a significant challenge to diversity efforts in the faculty. These search committees for faculty positions are a contributing factor to the issue (Gasman, 2022; Fraser & Hunt, 2011). They have a need for training in recruitment, their makeup is rarely diverse, and they are frequently more interested in hiring people who are similar to themselves than expanding the diversity of their department (Gasman, 2022; Fraser & Hunt, 2011). They rely on the recommendations of people they know as well as advertisements in national publications (Gasman, 2022). The efforts that are put into recruiting still contain biases, which limit the inclusion

of diverse candidates for interviews due to differences in the way their education or schools are perceived by the recruiters (Gasman, 2022). There are still biases present in recruiting efforts, which prevent a diverse pool of candidates from being considered.

Search committees that are lacking in diversity are more likely to engage in the manifestation of unconscious schemas or hypotheses. Our judgments of others, regardless of which group we belong to, are colored by schemas, which are expectations or stereotypes (Nosek, Banaji, & Greenwald, 2002). Every schema has an impact on the members of the group and the expectations they have regarding how they will be evaluated (Nosek, Banaji, & Greenwald 2002). Schemas frequently make their presence known through the occurrences of the following types of events:

- The quick processing of information, despite the fact that it is sometimes inaccurate.
- Frequently come into conflict with attitudes that are consciously held or "explicit."
- Evolve as a result of one's experiences and exposures.

The result is that the whole person is not considered for their full background and work experiences beyond the perceived pedigree of where they went to school (Gasman, 2022).

There are concerning trends where many selection committees are biasedly over-focused on international applicants or assume that everyone that goes to an Ivy League university must be the best in ways that dismissively leapfrog over highly qualified American minority applicants to focus diversity efforts exclusively on applicants from outside the U.S. with international backgrounds. Repeatedly search committees and administrators from predominately White institutions (PWI) superficial perception that only scholars from certain schools as automatically a better fit, instinctively more worthy, or more beneficial to the organization or its reputation or impact (Gasman, 2022; Smith, 2020; Griffin, 2019; Gavino, 2021).

Frequently, search committees make assumptions that people of color chose the university they attended because it was the only university they could get into, not understanding that often people of color have different variables and approaches to school choice (Gasman, 2022). The reality is that universities are not selecting a diploma. They are selecting a person. Inclusion requires that hiring committees consider more than where someone went to school without taking the time to find out about an applicant's full story or even the long and complex journey that someone took to get to where they are today (Gasman, 2022). The zig-zagged paths of diverse applicants often need to be fully valued, appreciated, and even understood (Gasman, 2022). An authentic commitment to diversity usually does not manifest itself by only interviewing a limited assortment of cookie-cut look-alike applicants regarding the same kind of backgrounds, degrees from the same types of universities, and linear career trajectories (Gasman, 2022; Smith, 2020; Griffin, 2019; Gavino, 2021).

VI. FOCUS GROUP RESULTS AND RECOMMENDATIONS

The following were outlined as best practices to diversify faculty that came from the focus group interviews.

They include 16 recommendations:

1. Build an effective search committee- Make sure that there is a significant representation of diverse members on the committee. Include people openly committed to diversity and excellence. When faculty members of color are low in a department, add minority graduate students or alumni as part of the search committee.

Train the search committee- Ensuring there is training on unconscious bias, diversity, and inclusion. One participant stated, "To be on a search committee at my university, we require that members read the following books as part of our training: "The Sum of Us" by Heather McGee, "Nice Racism," by Robin DiAngelo, Doing the Right Thing: How Colleges and Universities Can Undo Systemic Racism in Faculty Hiring by Marybeth Gasman and "Everyday Bias," by Howard Ross. We require the books to be read, and we have a facilitator debrief them and talk about how they might apply to the faculty search and hiring process."

2. Widen the pool from which the university recruits: actively pursue candidates thriving at less well-ranked institutions.

3. Partner with minority-serving institutions and institutions that are effective at graduating African-Americans from a variety of academic disciplines.

4. Include a diversity advocate- This is someone outside the school or academic department who is an expert on diversity and inclusion. This role supports the search committee by helping them see activities, approaches, and interactions that might need to be more inclusive or could recommend approaches that promote inclusion. This role could also be an externally hired consultant.

5. Engage in Active Recruiting- Relationship building and recruiting begins before there is an open position. Network directly with young scholars, including your own students. Invite them to speak. Foster connections with other institutions to identify and track promising candidates.

6. Encourage high-quality applications- Provide explicit directions for applicants. Be clear about the audience for applications. Provide a checklist with clear instructions.

7. Include a diversity statement for all applicants- This statement should state an applicant's commitment to diversity by providing examples of when they promoted diversity, functioned as an ally, or even championed a diversity initiative.

8. Thoughtfully Evaluate Candidates - Discuss and define evaluation criteria in advance. One participant stated, "We have had searches where we remove names of candidates and the universities during our first review of whom we want to interview. We have done this to remove bias or favoritism of universities or colleges that the search committee members might have an inequitable affinity for to such a level that they may develop tunnel vision about candidates."

9. Use a Candidate Evaluation Tool at Multiple Stages- Having rating and ranking sheets for all interviews.

10. Try to interview more than one female/minority candidate because of critical mass effects.

11. Treat all applicants as valuable scholars and educators, not representatives of a minority class or group.

12. Provide information well ahead of the visit regarding schedule, expectations, and audience.

13. Ask the candidate who s/he would like to meet that are current faculty listed on the faculty webpage.

14. Identify a host or key logistics person that can set the tone and schedules for all interview visits.

15. Establish interview questions that are asked of all those being interviewed- Interviews should only evaluate qualifications that are relevant to a faculty position – questions about matters that are not job relevant (i.e., family status) are not appropriate.

16. Grow your own faculty African-American through specialized funded doctoral programs and post-doctoral programs that could have a criterion of selection in the program of being an HBCU graduate. These are universities that anyone of any race or background could attend but the most likely attendees would be African-Americans.

REFERENCES

- [1] American Psychological Association (2022A) Ethnocentrism. American Psychological Association. Retrieved from: <https://dictionary.apa.org/ethnocentrism>
- [2] American Psychological Association (2022B) sociocentrism. American Psychological Association. Retrieved from: <https://dictionary.apa.org/sociocentrism>
- [3] Boyatzis, R. E. (2006). An overview of intentional change from a complexity perspective. *Journal of management development*.
- [4] Britton, T., Rall, R. M., & Commodore, F. (2022). The Keys to Endurance: An Investigation of the Institutional Factors Relating to the Persistence of Historically Black Colleges and Universities. *The Journal of Higher Education*, pp. 1–23.
- [5] Broady, K. E., Perry, A. M., & Romer, C. (2021, August 4). *Underfunding HBCUs leads to an underrepresentation of Black faculty*. Brookings. <https://www.brookings.edu/blog/the-avenue/2021/08/04/underfunding-hbcus-leads-to-an-underrepresentation-of-black-faculty/>
- [6] Centeno, J. (2021, May 12). Why We Need More Faculty Of Color In Higher Education. *Forbes*
- [7] Chessman, H, Wayt, L. (2016, January 13). What Are Students Demanding?" *Higher Education Today*. American Council on Education. Retrieved from: <https://www.higheredtoday.org/2016/01/13/what-are-students-demanding>.
- [8] Cross, J. D., Carman, C. (2022). The Relationship between Faculty Diversity and Student Success in Public Community Colleges, *Community College Journal of Research and Practice*, 46:12, 855–868, DOI: 10.1080/10668926.2021.1910595
- [9] Davis, L., Fry, R. (2019). College faculty have become more racially and ethnically diverse but remain far less so than students. *Pew Research Center*. Retrieved from: <https://www.pewresearch.org/fact-tank/2019/07/31/us-college-faculty-student-diversity/>
- [10] Elliott, S. (2021, July 6). *TSU looks to recoup millions in missing funding*. Nashville Scene. https://www.nashvillescene.com/news/citylimits/tsu-looks-to-recoup-millions-in-missing-funding/article_8ae60614-db7e-11eb-ba1f-0384b96522aa.html
- [11] Espinosa, L. L., Turk, J. M., Taylor, M., & Chessman, H. M. (2019). Race and ethnicity in higher education: A status report.
- [12] Flaherty, C. (2015, November 30). Demanding 10 Percent: Student protesters on a number of campuses want to see many more black faculty members. But how realistic are some of their goals? *Inside Higher Education*. Retrieved from: <https://www.insidehighered.com/news/2015/11/30/student-activists-want-more-black-faculty-members-how-realistic-are-some-their-goals>
- [13] Fraser, G. J., & Hunt, D. E. (2011). Faculty diversity and search committee training: Learning from a critical incident. *Journal of Diversity in Higher Education*, 4(3), 185.
- [14] Gasman, M. (2016, September). An Ivy League professor on why colleges don't hire more faculty of color: 'We don't want them.' *The Washington Post*.
- [15] Gasman, M. (2022). *Doing the Right Thing: How Colleges and Universities Can Undo Systemic Racism in Faculty Hiring*. Princeton, New Jersey: Princeton University Press.
- [16] Gavino, M. C. (2021). Moving beyond the rhetoric on faculty diversity in higher education: an interview with diversity expert Dr. Bailey Jackson. *Equality, Diversity, and Inclusion: An International Journal*.

- [17] Gilissen, J., Pivodic, L., Gastmans, C., Vander Stichele, R., Deliens, L., Breuer, E., & Van den Block, L. (2018). How to achieve the desired outcomes of advance care planning in nursing homes: a theory of change. *BMC geriatrics*, 18(1), 1-14.
- [18] Griffin, K. A. (2019). Redoubling our efforts: How institutions can affect faculty diversity. *Redoubling our efforts: How institutions can affect faculty diversity. Race and ethnicity in higher education: A status report*.
- [19] Hewstone M, Rubin M, Willis H. (2002). Intergroup bias. *Annu Rev Psychol.* ;53:575-604. doi: 10.1146/annurev.psych.53.100901.135109. PMID: 11752497
- [20] Kayes, P. E. (2006). New Paradigms for Diversifying Faculty and Staff in Higher Education: Uncovering Cultural Biases in the Search and Hiring Process. *Multicultural Education*, 14(2), 65-69.
- [21] Kang, S. K., DeCelles, K. A., Tilcsik, A., & Jun, S. (2016). Whiteness Résumé: Race and Self-Presentation in the Labor Market. *Administrative Science Quarterly*, 61(3), 469-502. <https://doi.org/10.1177/0001839216639577>
- [22] Kershaw, C., Rast III, D. E., Hogg, M. A., & van Knippenberg, D. (2021). Battling in-group bias with effective intergroup leadership. *British Journal of Social Psychology*, 60(3), 765-785.
- [23] Lovett, D. (2022). Rhetorical Twitter Tactics: Nikole Hannah-Jones and Digital Resistance on Twitter.
- [24] Lou, M. (2009, December 5). 'Whitening' the Résumé. *The New York Times*.
- [25] McBride, L. (2017, May 24). *Changing the narrative for men of color in higher education*. INSIGHT Into Diversity. <https://www.insightintodiversity.com/changing-the-narrative-for-men-of-color-in-higher-education/>
- [26] Moultry, A. M. (2021). The Evolving Role of Historically Black Pharmacy Schools in a Changing Environment. *American Journal of Pharmaceutical Education*, 85(9).
- [27] Nosek, Banaji, & Greenwald (2002). *Group Dynamics: Theory, Research, and Practice*, 6(1), 101-115.
- [28] Patt C, Eppig A, and Richards MA (2022) Postdocs as Key to Faculty Diversity: A Structured and Collaborative Approach for Research Universities. *Front. Psychol.* 12:759263. doi: 10.3389/fpsyg.2021.759263
- [29] Prestiadi, D., Zulkarnain, W., & Sumarsono, R. B. (2019, December). Visionary leadership in total quality management: efforts to improve the quality of education in the industrial revolution 4.0. In *The 4th International Conference on Education and Management (COEMA 2019)* (pp. 202-206). Atlantis Press.
- [30] Rutherford, M. (2021, May 12). Diversity & inclusion's theory of change (ToC). Diversity Professional. <https://diversityprofessional.com/diversity-inclusions-theory-of-change-toc/>
- [31] Sekaquaptewa, D., Takahashi, K., Malley, J., Herzog, K., & Bliss, S. (2019). An evidence-based faculty recruitment workshop influences departmental hiring practice perceptions among university faculty. *Equality, Diversity, and Inclusion: An International Journal*.
- [32] Smith, D. G. (2020). *Diversity's promise for higher education: Making it work*. JHU Press.
- [33] Strauss, V. (2019, February 26). Debunking 3 myths about black students — using data and logic. *Washington Post (Washington, D.C.: 1974)*. <https://www.washingtonpost.com/education/2019/02/26/debunking-myths-about-black-students-using-data-logic/>
- [34] Taylor, S. N. (2006). Why the real self is fundamental to intentional change. *Journal of Management Development*.
- [35] The Annie E. Casey Foundation. (2022). *Adult population by race and ethnicity*. Kidscount.org. <https://datacenter.kidscount.org/data/tables/6539-adult-population-by-race-and-ethnicity#detailed/1/any/false/2048,574,1729,37,871,870,573,869,36,868/68,69,67,12,70,66,71,2800/13517,13518>
- [36] White, N. (2022, February 1). Just 1% of U.K. professors are Black, new figures reveal. *The Independent*.
- [37] Wilder D, Simon AF. (2001). Affect as a cause of intergroup bias. See Brown & Gaertner 2001, pp. 153-72

Towards an insight into the adoption of Open Innovation by SMEs in Vietnam

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Abstract—This study aims to identify the influential factors of OI adoption by SMEs in Vietnam, in order to provide useful theoretical and practical recommendations for SMEs to adopt OI effectively. Based on a survey of 56 Vietnamese SMEs, this study identified two drivers including improving capability and expanding network orientation, and four main barriers, including knowledge, collaboration, organisation, and financial strategy. Notably, the study found that collaboration barriers and network expansion orientation are factors that vastly impact the adoption of OI.

Index Terms—Open Innovation, hindering factors, driving factors, SMEs, Vietnam.

I. INTRODUCTION

The adoption of Open Innovation (OI) has been an emerging topic in the past decades. While there is a wealth of studies on the model of OI practices adoption in large multinational firms, little research focuses on small and medium-sized enterprises (SMEs) and developing countries. In the current scenario of globalisation and digitalization, Vietnam's SMEs ecosystem has developed dynamically in terms of technology and open innovation (OI). Along with the birth of small and medium enterprises, Vietnam's economy shows extremely stable development. Recent research showed that SMEs in Vietnam have a high potential for innovation [1]. Companies and organisations are encouraged to innovate, and many have started to open their boundaries and rely on external knowledge. However, not all SMEs can grasp the opportunities and challenges that OI poses. In particular, SMEs still face both theoretical and practical difficulties in adopting OI.

In Vietnam, research about different aspects of open innovation for MSMEs and SMEs is poor. Furthermore, open innovation is still young and fragmented in the Vietnam context while R&D departments have only been invested and focused on by large companies. In the world of the wide dimension of knowledge, short product life cycles, and high worker mobility, the ability to adopt innovation faster is vital for any enterprise to achieve a sustainable competitive advantage.

In addition, SMEs should open up to OI due to its strength in flexibility, and high adapting to market change, despite some challenges about finance and resources [2].

Last but not least, OI provides benefits for each segment of the national innovation system. Precisely, for the government, it will increase enterprises' productivity, facilitate

technology development. For companies, it will provide solutions for their pressing problems as well as chances for partnership. For SMEs and startup companies, it will help them to overcome the entry barriers, collaborate with potential stakeholders, customers, and experts [3]. Therefore, this study aims at investigating the influential hindering factors and driving factors for the adoption of open innovation by SMEs in Vietnam. The generated findings will be particularly useful for managers of SMEs in Vietnam to manage innovation more effectively.

II. THEORETICAL BACKGROUND

A. Literature Review

1) Open Innovation

Open innovation (OI) was first defined by Chesbrough in 2003 as: "Value ideas can come from outside or inside the company and can go to market from inside to outside the company as well" [4]. In other words, OI is the process in which ideas can flow both from internal and external environments, and then become new offerings or new ideas for businesses. According to Manual (2005), OI contains four different types of innovation that can encompass large changes in firms' activities: product innovation, process innovation, organisational innovation, and marketing innovation [5, 6]. Furthermore, there are three pathways for OI to occur: Outside in process (Inbound); Inside out process (Outbound) and coupled process.

OI has increasingly been investigated by research in a variety of contexts and areas. The adoption of OI has been proven to bring numerous advantages to small and large enterprises. OI is deemed as a tool to explore ideas for enterprises to contribute a significant impact on customer satisfaction and efficiency. In addition, the lack of using OI might lead to irreparable losses, which are usually preferred to restriction in a new market and loss of competitive advantage in domestic and international markets [7].

Small and medium enterprises play a fundamental role in world economics, as most economic structures are composed of SMEs. Due to the increase in competitors, new technologies and customers' needs, it is vital for SMEs to achieve sustainable competitiveness. However, SMEs around the world have to deal with challenges when applying OI because they lack internal finance, human, and organisational resources [8].

In the Vietnam context, in recent years, the Vietnam government has paid more attention to OI. There are new policies and recommendations for enterprises to enhance the quality of products, competitive advantage and provide opportunities for domestic firms to take part in the value global chain [9].

The World Bank and OCDE suggest that Vietnam administrators should improve public administration for the innovation system and strengthen human resources for OI, enhancing the innovation system in enterprises and placing business in the heart of OI [8]. Especially, Covid 19 crisis can be a stimulating factor for enterprises and SMEs to transform and boost a competitive advantage against rivals [9]. As a result, in the new era, the speed of technology is changing day by day and investing in technology is increasingly expensive. The adoption of OI is a crucial factor for SMEs to compete with competitive tension in the market.

2) *Open innovation by small and medium enterprises from various contexts*

In a foreign context, a study by Robert Stanisławski [10] has shown determinant factors that encourage enterprises to have greater openness. The research attended to both external and internal determinants. By and large, it identified market determinants as one of the most crucial factors affecting the use of OI in SMEs, and the external determinants are more important for SMEs than for large companies. Additionally, the earlier researches by Santoro et al. [6]; Bigliardi and Galati (2016) [11] both illustrate factors that limit the implementation of OI for SMEs, and suggest the process for managers to increase openness in their business.

In the Vietnam context, recently there is one standout report of BambuUp illustrating the information about the OI landscape in Vietnam in 2021. This report provides an innovation startup ecosystem map (Innovation) which is comprehensive, and multi-dimensional with an emphasis on 11 outstanding areas: FMCG, Retail, Education, Finance, Healthcare, Martech & Salestech, Logistics & Supply Chain,... The report is one of the first benchmarks to provide a database and assessment in a wide range of sectors for enterprises in Vietnam [9]. While we have some significant articles in the Vietnam context investigating distinct aspects of OI, there is no research that has been found to empirically examine factors that drive or prevent open innovation for SMEs. Most of the research and articles pay attention to large companies with strong R&D departments and resources, instead of SMEs with reluctant internal finance and human assets.

B. *Previous models of the adoption of OI*

Over eighteen years, researchers have examined the factors that affect SME adoption of OI. In 2003, Chesbrough [13] introduced his innovative model of open innovation. From there, while there are several studies on the model of OI practices adoption in major multinational corporations, SMEs received little attention. According to Van de Vrande et al.'s [14] research, the resource and motivational environments of SMEs have distinctive characteristics. Following a systematic review by Usman, Roijakkers, Vanhaverbeke, and Frattini [15], among all articles on OI in SMEs, the topic of OI adoption accounted for fourteen percent, and Van de Vrande et al.'s article is the most cited, providing a foundation of motivations and challenges in OI adoption for

future research. Other studies have revisited this issue, including Savitskaya, Salmi, and Torkkeli (2010), Teirlinck and Spithoven (2013), and Verbano, Crema, and Venturini (2015) [16-18]. Regarding the predecessors, Bigliardi and Galati's research in 2016 [11] offered a model for conceptualizing the hindering variables, which included a synthesis of seventeen components from prior studies. Despite the fact that the list of OI practices is narrow, this is the first empirical study to analyze the barriers to OI adoption.

Moreover, a study [19] by Novandari, Suliyanto, and Kartawan analyzed the four factors motivating the adoption of OI by SMEs in Indonesia. The criteria were developed based on Parida (2012) and Van de Vrande et al.'s research (2009) [20], [14]. This research uncovered four characteristics that motivate SMEs to collaborate with external parties: market insight orientation, capability improvement orientation, network expansion orientation, and idea generation orientation. In addition, Stanisławski's [10] research centered on internal and external drivers in order to investigate the factors influencing the adoption of OI among SMEs. According to the findings, both determinants have a significant impact on OI implementation. Overall, it appears that the research model based on previously tested research is highly applicable. However, it is evident that little study and model testing has been conducted in Vietnam. The table below presents Novandari, Suliyanto, and Kartawan's concept [19] of four drivers of SME adoption of OI.

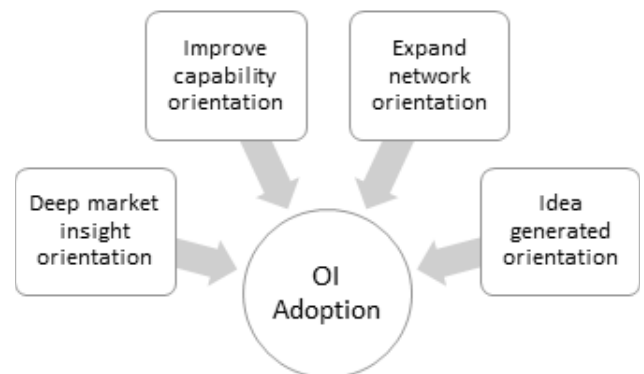


Fig. 1. Novandari, Suliyanto, and Kartawan's model of driving factors of OI adoption in SMEs.

C. *Hypothesis development and research model*

Based on prior research findings, a combination of both motivating and hindering factors is developed, aiming to have an exclusive research model to evaluate Vietnam SMEs' open innovation adoption.

One of the advantages that companies can acquire by implementing open innovation practices is accumulating knowledge, which can assist them in their innovation development [14]. However, lacking compatibility in parties' knowledge of OI projects or inefficiency in IP protection can cause adverse outcomes on OI projects [11], [17], [21]. Therefore:

Hypothesis 1: Knowledge barriers negatively impact the adoption of OI.

Collaboration is significant for the OI adoption process, as it is the foundation for exchanging information between stakeholders (universities, companies, research centres)

leading to innovation openly [13]. However, there are some hindrances in collaboration aspects negatively affecting the OI adoption process such as business culture differences, opportunistic partners' behaviours, miscommunication between parties; and collaborators incompatibility [17], [18], [22]. Hence:

Hypothesis 2: Collaboration barriers negatively affect OI adoption.

Internal environment and operation can adversely influence the OI adoption process. For example, inept management affects the internal flow of knowledge and information, causing inefficiency in knowledge sharing and unproductive working performance [17]. Additionally, resistance to innovation and organizational complexity cause difficulties influencing business's efforts in developing effective joint-innovation projects [18], [23]. Therefore:

Hypothesis 3: Organisational barriers negatively affect the adoption of OI.

For open innovation, strategic alignment and financial resources are two significant aspects [24]. Compatible business objectives with working styles and sufficient financial resources can assist OI stakeholders to develop effective joint-innovation projects [25]. Therefore, being unable to bear the R&D cost and IP protection expense cause financial barriers in SMEs' OI adoption process [14], [17], [18], [23]. Additionally, loss of know-how, IP uncertainty and opportunistic behaviors lead to strategic barriers in SMEs' OI adoption [26]. Therefore:

Hypothesis 4: Financial and Strategic barriers negatively influence the adoption of OI.

The fundamental premise of the open innovation concept is to effectively unite the internal and external flow of information and knowledge, therefore accumulating market understandings for business expansion [27]. Market understanding is one of the driving forces for OI adoption in SMEs, as it enables stakeholders to share knowledge and acquire up-to-date market insights, therefore accelerating novel ideas and innovative technologies development [28], [29], [30]. Thus:

Hypothesis 5: Market insight orientation positively affects the adoption of open innovation.

Innovation capabilities represent to what extent a business can unite internal and external flow of knowledge, identify compatible novel ideas, continuously innovate and implement it successfully in product and service development [29], [31], [32], [34]. SMEs tend to encounter insufficient financial resources, unsuitable operation tactics and low business performance affecting their ability to innovate therefore, by taking part in joint-innovation projects can enhance innovation capabilities [29], [30], [33]. Hence:

Hypothesis 6: Innovation capabilities orientation positively affects open innovation adoption.

Network is considered as the premise for business to implement and adopt the open innovation model, therefore increasing the success rate of joint-innovation projects [27], [35]. By expanding the network, businesses can access external resources, gain more market opportunities, and improve innovation capabilities [20], [29], [35], [36], [41]. Therefore:

Hypothesis 7: Network orientations positively affect the adoption of open innovation.

Developing ideas based on current market insights, then incorporating those ideas and knowledge into the creation of new goods and services in innovation projects is one of the fundamental premises of implementing an open innovation model into organizations [20], [35]. Additionally, prior research [37], [38] have indicated a positive correlation between idea creation and company front-end performance [41]. This performance refers to what extent SMEs can use their knowledge and idea creation to acquire a competitive advantage and succeed in innovation initiatives [35], [37], [40]. Therefore:

Hypothesis 8: Idea orientation positively influences the adoption of open innovation.

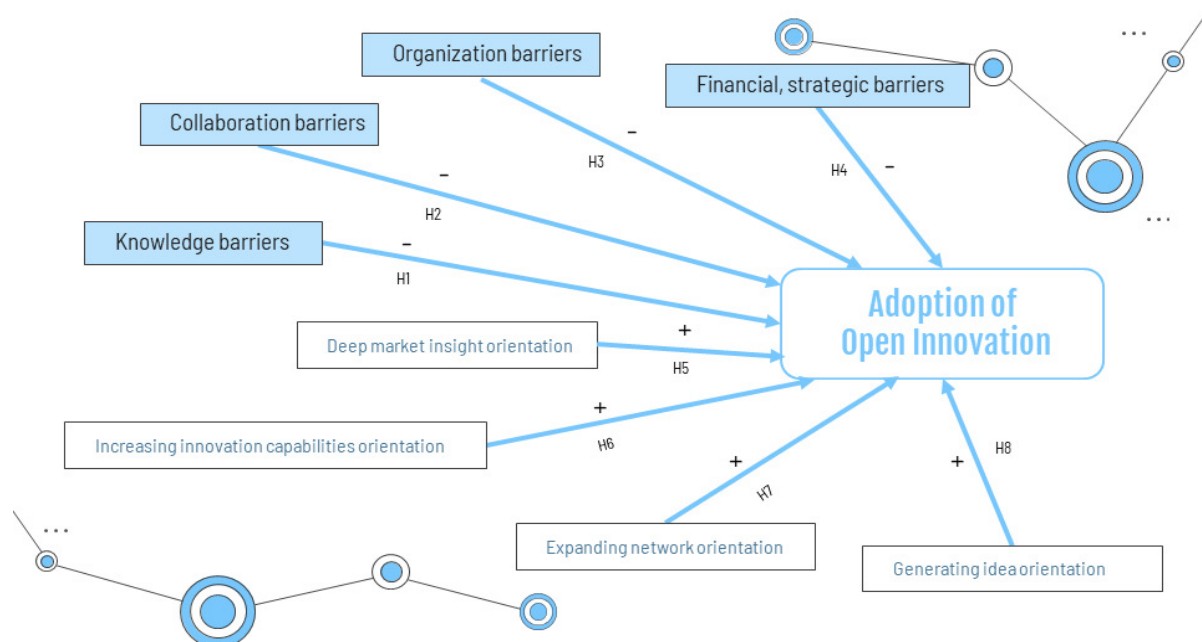


Fig. 2 Research Model

III. RESEARCHING METHOD

A. Sample design and data collection

The study was conducted with the participation of overall 56 respondents who are the representatives of enterprises in Vietnam. Due to the context of this study which is focusing on researching the open innovation in Vietnam's SMEs, so, after the cleaning data process, 8 of 56 collected answers have been cleared out because the enterprises' sizes were over the range. Therefore, the sample size of this study was 48. Most of the samples came from Hanoi counted for 75%. The majority of the sample was enterprises with total capital lower than 3 billion VND accounting for 43%, coming up is the enterprise with total capital from 3 to 20 billion VND counted for 32%. The two most popular forms of business among these samples are limited liability companies and joint-stock companies counted for 41% and 39%, respectively.

The questionnaire was originally created in English by adopting various scales from multiple experts in global with 3 main sections. During the data collecting process, the questionnaire has been translated into Vietnamese to enhance the understandability. All of the data collecting process was conducted online through the link created on Google form: "https://docs.google.com/forms/d/1hi_pWcHxcYDKSrdvZS6xTL8FGDgTwtwqi-LERd_RSNA/edit?ts=61719327". The link is then shared on various SMEs groups on social platforms, Vietnam business associations and directly through email.

B. Measure

To measure the adaptation of OI in SMEs, six composite indicators measuring the distinguished components of OI in SMEs initiated by Aineias Gkikas in 2018 were adopted [39]. Knowledge and technology outsourcing activities is a sample item of this scale. Developed by Bigliardi and Galati in 2016, seventeen items measuring the impacts of 4 elements that are considered as the barrier factors of OI implementation in SMEs were adopted. A sample item of this scale can be mentioned is economic/financial issues [11]. To

measure the level impacts of separated driven factors on adopting OI in SMEs, ten different motives to implement OI developed by Van de Grande, Jeroen P.J, and Vanhaverbek in 2009 were taken. To keep up with current market developments, customers, increase growth and/or market share is an example item of this scale. Cronbach's Alpha and Composite Reliability have been used as the indicators to assess the scale used in this study. All the scales having the value of Cronbach's Alpha higher than 0.6 has indicated the reliability of the scale used in this study. Moreover, the value of composite reliability for all the scales are higher than 0.5 have also proved for the high level of reliability of this study's scale.

IV. RESULTS

A. Reliability and validity

For measuring the reliability and validity of study's scale and the data set capturing from survey collecting process, Cronbach's Alpha and the Composite Reliability has been used. The value of Cronbach's Alpha showed that all the variables tested in this study have a Cronbach's Alpha value greater than 0.6, as demonstrated by the outcome. These findings indicate sufficient reliability for all variables measured in the study.

Composite reliability was calculated as part of this study, and the result indicated that all variables have composite reliability values greater than 0.5. These data have demonstrated that the measurements used in the study are adequately valid. In short, the study's variables' measures are all sufficiently reliable and valid.

Correlational values were determined among variables, and the results of correlation tests are as follows: All the variables, with the exception of financial strategic barriers (FSB) and collaboration barriers (CB), have been shown to have a significant correlation when taken as a whole.

B. Hypothesis Testing

Single regression has been used in this study for hypothesis testing. The results of regression analysis are presented in

TABLE I
THE CORRELATION OF VARIABLES

Variables	1	2	3	4	5	6	7	8	9
1.AOI									
2.KB	.309*								
3.CB	.128	.109							
4.OB	.339*	.654**	.354*						
5.FSB	.270	.726**	.194	.819**					
6.DMIO	.323*	.237	.296*	.243	.238				
7.IICO	.369**	.419**	.478**	.473**	.441**	.604**			
8.ENO	.216*	.234	.403**	.288*	.255	.751**	.688**		
9.GIO	.339*	.285*	.224	.342*	.296*	.630**	.493**	.718**	

Note. AOI: Adopting open innovation; KB: Knowledge barriers; CB: Collaboration barriers; OB: Organisation barriers; FSB: Financial strategic barriers; DMIO: Deep market insight orientation; IICO: Increasing innovation capabilities orientation; ENO: Expanding network orientation; GIO: Generating idea orientation

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed).

the table below in which most of the proposed hypotheses are supported.

Based on the data in Table III, the adoption of OI by SMEs is significantly and negatively impacted by each of the four types of barriers: knowledge barriers (KB), collaboration barriers (CB), organizational barriers (OB), and financial strategic barriers (FSB). With Sig = .010, CB has the greatest negative impact on OI adoption of the four factors. Also, the adoption of OI by SMEs is significantly influenced by the motivating factors of deep market insight orientation (DMIO) and expanding network orientation (ENO) in which ENO has a greater impact on OI adoption. In contrast, the adoption of OI is not significantly correlated with the two factors of increasing innovation capabilities orientation (IICO) or generating idea orientation (GIO) with Sig > 0.05. The findings of SMEs in the Vietnam context have provided numerous ways and suggestions for SMEs in Vietnam. This will be elaborated on in the below parts.

V. DISCUSSION AND CONCLUSION

The objective of this study was to shed new light on the adoption of OI by SMEs in Vietnam, with an emphasis on identifying motivating and inhibiting factors. Using quantitative data from surveys of managers of SMEs in Vietnam, the study uncovered intriguing findings regarding the adoption of OI by SMEs in the commercial setting of Vietnam. Four major hurdles, including knowledge, cooperation, organization, and financial strategy, as well as two drivers, including enhancing capability and extending network orientation, were shown to be strongly associated with the adoption of open innovation by SMEs. Notably, among the hurdles, cooperation barriers exhibit the most detrimental effects, although network development direction and market insight orientation are equally influential variables in the adoption of OI. The results of the four key impediments to the adoption of OI are similar to those discovered by Bigliardi and Galati (2016) concerning SMEs in Italy [11]. The conclusion that just two driving variables, network development orientation and market insight orientation, are associated with the adoption of OI by SMEs in Vietnam contradicts

Novandari et al. (2018)'s study that all four driving elements are favorable to the adoption of OI [12].

This study has two main theoretical contributions. First, the study advanced the extant literature on open innovation with the addition of a framework with both hindering and motivating factors for the adoption of open innovation. The present study's framework is more comprehensive in comparison with the prior studies, which examined the influences of the factors separately. Previous studies relating to open innovation in Vietnam are OI applications in Vietnam SMEs [42], and the implementation of the OI model in knowledge sharing in universities [43]. These studies have proposed a starting point in presenting the crucial role of open innovation in business operations as well as the university's flow of knowledge. However, their findings have not identified the barriers and the drivers of open innovation adoption in Vietnam, leading to businesses not accumulating understanding regarding this aspect, thus being unable to develop adequate policies and implementations of the open innovation model in organizational structure and operations. Therefore, findings in this study have theoretical contributions relating to hindrances and motivators in open innovation adoption in Vietnam SMEs, thus assisting companies in developing policies and making implementations in the operations. Second, the study extended the database of OI adoption in literature with empirical evidence of SMEs in the Vietnam context - an under-researched Asian developing economy for the study of open innovation. To be specific, research results indicate that SMEs in Vietnam find it challenging to implement OI in their enterprises due to knowledge hurdles, organizational barriers, and financial strategic constraints. In contrast, orientation toward skill enhancement and orientation toward idea development are two criteria that do not influence the adoption of OI by SMEs. SMEs in Vietnam view developing network orientation as the primary driver driving them to OI, followed by market insight orientation.

In line with the hypothesis, this study presents practical recommendations. First, SME managers must identify the factors that influence the adoption of open innovation (OI) and create high-conscious strategies to expand their network

TABLE II
HYPOTHESES TESTING

<i>Direct effects</i>	<i>Coefficients</i>	<i>T - values</i>	<i>Sig.</i>	<i>Outcomes</i>
KB → Adopting OI (H1)	0.323	2.314	.025	Supported
CB → Adopting OI (H2)	0.369	2.692	.010	Supported
OB → Adopting OI (H3)	0.316	2.260	.029	Supported
FSB → Adopting OI (H4)	0.339	2.446	.018	Supported
DMIO → Adopting OI (H5)	0.309	2.200	.033	Supported
IICO → Adopting OI (H6)	0.128	0.878	.385	Unsupported
ENO → Adopting OI (H7)	0.339	2.442	.019	Supported
GIO → Adopting OI (H8)	0.270	1.905	.063	Unsupported

of partners. In specific, managers should promote strategic plans and risk management towards the four significant barriers hindering OI adoption, including managing organizational knowledge, preventing collaboration, financial and strategic barriers, and organizational barriers. For instance, transparency in Intellectual Property–Rights during inbound and outbound practices can prevent unclear or ambiguous actions between partners. Second, expanding networks and market insights, and involving all members of the organization, particularly managerial staff, is essential. This awareness can be raised and effectively applied if enterprises exhibit proper attention through meetings and a suitable reward system. Further, research by the R&D department can provide profound insights into potential opportunities and challenges in the existing ecosystem. Although adopting OI provides vast opportunities to gain competitive advantages, policy development remains a challenge. Thus, the model hopes to assist SMEs in building effective collaboration platforms based on incentives related to financial and mutual knowledge, and policymakers in enacting transparent policies, thereby consolidating SMEs' propensity to implement OI practices in Vietnam.

However, this study has certain limitations. Importantly, the data collection method was conducted online during the Covid-19 outbreak, and there were challenges in collecting responses from SMEs to the quantitative survey; hence, the generalizability of the study's findings is limited. Future studies should presumably collect data on a wider size and scale. To increase the generalizability of the findings, researchers may reevaluate the model using a larger number of SMEs. Finally, research may re-evaluate the model in different circumstances, such as in other industries or countries.

REFERENCES

- [1] OECD, "Report on SME and Entrepreneurship Policy in Viet Nam", OECD Studies on SMEs and Entrepreneurship, 2021. DOI: <https://doi.org/10.1787/20780990>.
- [2] S. Bresciani and A. Ferraris, "Innovation-receiving subsidiaries and dual embeddedness: impact on business performance", Innovation-receiving subsidiaries and dual embeddedness: impact on business performance. ResearchGate, 2016.
- [3] V. Parida, M. Westerberg and J. Frishammar, "Inbound OI Activities in High-Tech SMEs: The Impact on Innovation Performance", *Journal of Small Business Management*, vol. 50, no. 2, pp. 283-309, 2012. Available 10.1111/j.1540-627x.2012.00354.x
- [4] J. West, A. Salter, W. Vanhaverbeke and H. Chesbrough, "Open Innovation: The Next Decade", *Research policy*, vol. 43, no. 5, p. 2, 2014. Available: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3121497. [Accessed 11 November 2021].
- [5] Publishing and Organisation for Economic Co-operation and Development, Oslo manual. Paris: Organisation for Economic Co-operation and Development, 2005, p. 46.
- [6] G. Santoro, A. Ferraris, E. Giacosa and G. Giovando, "How SMEs Engage in Open Innovation: A Survey", *Journal of the Knowledge Economy*, vol. 9, no. 2, pp. 561-574, 2016. Available: <https://link.springer.com/article/10.1007/s13132-015-0350-8>. [Accessed 12 November 2021].
- [7] D. Nguyen and N. Manh Cuong, "Đổi mới sáng tạo và cơ hội áp dụng tại Việt Nam", *Đổi mới sáng tạo và cơ hội áp dụng tại Việt Nam*. JSTP, 2015.
- [8] World Bank and OECD, "Đánh giá Khoa học, Công nghệ và Đổi mới sáng tạo ở Việt Nam Tóm tắt báo cáo", World Bank and OECD, 2014.
- [9] BambuUp and NSSC, "Báo cáo toàn cảnh đổi mới sáng tạo mở Việt Nam", BambuUp, 2021.
- [10] R. Stanisławski, "Open Innovation as a Value Chain for Small and Medium-Sized Enterprises: Determinants of the Use of Open Innovation", *Sustainability*, vol. 12, no. 8, p. 3290, 2020. DOI: 10.3390/su12083290.
- [11] B. Bigliardi and F. Galati, "Which factors hinder the adoption of open innovation in SMEs?", *Technology Analysis & Strategic Management*. ResearchGate, 2016.
- [12] W. Novandari, P. Suliyanto and M. Kartawan, "Driving factors of open innovation adoption on MSMEs in Indonesia", *Driving factors of open innovation adoption on MSMEs in Indonesia*. ResearchGate, 2021.
- [13] H. Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, MA: Harvard Business School Press, 2003.
- [14] V. Van de Vrande, P. De Jong, W. Vanhaverbeke, and M. De Rochemont, "Open innovation in SMEs: trends, motives and management challenges", *Technovation*, vol. 29, no. 6, pp. 423-437, 2009.
- [15] M. Usman, N. Roijakkers, W. Vanhaverbeke, and F. Frattini, "A Systematic Review of the Literature on Open Innovation in SMEs", pp. 3-35, 2018.
- [16] I. Savitskaya, P. Salmi, and M. Torkkeli, "Barriers to Open Innovation: Case China", *Journal of Technology Management & Innovation*, vol. 5, no. 4, pp. 10-21, 2010.
- [17] P. Teirlinck and A. Spithoven, "Research Collaboration and R&D Outsourcing: Different R&D Personnel Requirements in SMEs.", *Technovation*, vol. 33, no. 4, pp. 142-153, 2013.
- [18] C. Verbano, M. Crema, and K. Venturini, "The Identification and Characterization of Open Innovation Profiles in Italian Small and Medium-sized Enterprises.", *Journal of Small Business Management*. vol. 53, no. 4, pp. 1052-1075, 2015.
- [19] W. Novandari, P. Suliyanto, M. Kartawan, "Driving factors of open innovation adoption on MSMEs in Indonesia", *Opción*, no. 14, 2018.
- [20] V. Parida, M. Westerberg, and J. Frishammar, "Inbound Open Innovation Activities in High-Tech MSMEs: The Impact on Innovation Performance", *Journal of Small Business Management*, vol. 50, no. 2, pp. 283-309, 2012.
- [21] A. Drechsler, "Design Science as Design of Social Systems—Implications for Information Systems Research", *Journal of Information Technology Theory and Application*, vol. 14, no. 4, pp. 5-26, 2013.
- [22] T. Holzmann, K. Sailer, and B. Katzy, "Matchmaking as multi-sided market for open innovation", *Technology Analysis & Strategic Management*, vol. 26, no. 6, pp. 601-615, 2014. DOI: 10.1080/09537325.2014.913786.
- [23] M. Praest Knudsen and T. Bøtger Mortensen, "Some immediate – but negative – effects of openness on product development performance", *Technovation*, vol. 31, no. 1, pp. 54-64, 2011. DOI: 10.1016/j.technovation.2010.07.002.
- [24] M. Schilling, *Strategic management of technological innovation*, 4th edn. New York University, New York, 2013.
- [25] H. Chesbrough and A. Crowther, "Beyond high tech: early adopters of open innovation in other industries", *R and D Management*, vol. 36, no. 3, pp. 229-236, 2006. DOI: 10.1111/j.1467-9310.2006.00428.x.
- [26] L. Mortara, J. J. Napp, I. Slacik and T. Minshall, "How to Implement Open Innovation: lessons from studying large multinational companies", *Unilever and the Cambridge Integrated Knowledge Centre*. Cambridge, U.K, 2009.
- [27] H. W. Chesbrough, *Open Business Models: How to Thrive in The New Innovation Landscape*. Harvard Business Press, 2006.
- [28] C. Cheng and E. Shiu, "The inconvenient truth of the relationship between open innovation activities and innovation performance", *Management Decision*, vol. 53, no. 3, pp. 625-647, 2015. DOI: 10.1108/md-03-2014-0163.
- [29] V. Scuotto, M. Del Giudice, S. Bresciani, and D. Meissner, "Knowledge-driven preferences in informal inbound open innovation modes. An explorative view on small to medium enterprises", *Journal of Knowledge Management*, vol. 21, no. 3, pp. 640-655, 2017. DOI: 10.1108/jkm-10-2016-0465.
- [30] P. Skarzynski, R. Gibson, *Innovation to the Core: A Blueprint for Transforming the Way Your Company Innovates*. Harvard Business Press, 2008.
- [31] I. Barreto, "Dynamic Capabilities: A Review of Past Research and an Agenda for the Future", *Journal of Management*, vol. 36, no. 1, pp. 256-280, 2009. DOI: 10.1177/0149206309350776.
- [32] B. Lawson and D. Samson, DEVELOPING INNOVATION CAPABILITY IN ORGANISATIONS: A DYNAMIC CAPABILITIES APPROACH, *International Journal of Innovation Management*, vol. 05, no. 03, pp. 377-400, 2001. DOI: 10.1142/S1363919601000427.
- [33] M. Saunila and J. Ukko, "A conceptual framework for the measurement of innovation capability and its effects", *Baltic Journal of Management*, vol. 7, no. 4, pp. 355-375, 2012. DOI: 10.1108/17465261211272139.
- [34] M. Grimaldi, I. Quinto and P. Rippa, "Enabling Open Innovation in Small and Medium Enterprises: A Dynamic Capabilities Approach",

- Knowledge and Process Management*, vol. 20, no. 4, pp. 199-210, 2013. DOI: 10.1002/kpm.1423.
- [35] U. Westergren and J. Holmström, "Exploring preconditions for open innovation: Value networks in industrial firms", *Information and Organization*, vol. 22, no. 4, pp. 209-226, 2012. DOI: 10.1016/j.infoandorg.2012.05.001
- [36] S. Lee, G. Park, B. Yoon and J. Park, "Open innovation in SMEs—An intermediated network model", *Research Policy*, vol. 39, no. 2, pp. 290-300, 2010. DOI: 10.1016/j.respol.2009.12.009.
- [37] P. Koen, H. Bertels & E. Kleinschmidt, "Managing the Front End of Innovation—Part II: Results from a Three-Year Study", *Research-TechnologyManagement*, vol. 57, no. 3, pp. 25-35, 2014. DOI: 10.5437/08956308X5703199.
- [38] G. Perkins, J. Lean and R. Newbery, "The Role of Organizational Vision in Guiding Idea Generation within SME Contexts", *Creativity and Innovation Management*, vol. 26, no. 1, pp. 75-90, 2017. DOI: 10.1111/caim.12206.
- [39] D. Jones-Evans, A. Gkikas, M. Rhisiart and N. MacKenzie, "Chapter 13: Measuring Open Innovation in SMEs", *Researching Open Innovation in SMEs*, pp. 399-427, 2018. DOI: 10.1142/9789813230972_0013.
- [40] P. Soh, "The role of networking alliances in information acquisition and its implications for new product performance", *Journal of Business Venturing*, vol. 18, no. 6, pp. 727-744, 2003. DOI: 10.1016/S0883-9026(03)00026-0.
- [41] J. Christiansen and M. Gasparin, "Managing Controversies in the Fuzzy Front End", *Creativity and Innovation Management*, vol. 25, no. 4, pp. 500-514, 2016. DOI: 10.1111/caim.12174.
- [42] T. D. Au, "A PRIMARY RESEARCH ON OPEN INNOVATION ACTIVITIES OF SMEs", *Journal of Science and Technology*, vol. 12, no. 109, 2016.
- [43] T. D. Au, "Using open innovation model to enhance knowledge-sharing in Vietnam University", *Journal of Administrative and Business Studies*, vol. 2, no. 5, pp. 241-247, 2016.

Impact of knowledge absorption on Vietnamese commercial bank's product innovation

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Abstract—This paper explores the impact of knowledge absorption on the production innovation in Vietnamese commercial bank base on determining factors that influence bank's product innovation in Vietnam. The framework is proposed base on inheriting and adjusting from previous study. Data were collected from 234 employee in Vietnamese commercial bank through a questionnaire survey from May to August 2022 and processed by SPSS. The empirical results from analysis of data collected point out that knowledge absorption has significant effects on Vietnamese commercial bank's product innovation through two factors which are scanning and communications. The study's results are expected to help bank managers use direct efforts and resources in the most effective and efficient way to encourage bank's product innovation to improve their business in the long run.

Index Terms—product innovation, knowledge Absorption.

I. INTRODUCTION

In the current quickly changing business environment, many businesses have started to look to innovation as a significant differentiator for competitive advantage. Innovation is considered as a key driver for long-term success of an organization, especially in dynamic and competitive markets [1]. Innovation capacity helps businesses cope with the storms, changes and complexity in the external business environment. Businesses with innovation capabilities will then be able to respond to challenges faster, produce rapidly improved products, and exploit business opportunities more effectively than those without innovation [2].

Innovation is understood as a new or improved product or process (or a combination of both) that is significantly different from the organization's previous product or process, and is made available to potential users (when as a product) or applied within an organization (as a process)[3]. Innovation means broader than ideas, implementation on demand, not necessarily based on R&D activities, needs to be new and goal-oriented, but does not guarantee success. As a result, knowledge is a crucial tool for establishing core competencies, safeguarding priceless heritage, learning new skills, and launching novel circumstances.

The firm's capacity for absorption is said to have a considerable impact on its capacity for innovation, according to a number of earlier studies of innovation [4, 5]. For instance, Quinn et al. [6] claim that a company's competitive advantage is built upon its ability to exploit its capacity for absorption to create distinctive competitive abilities. They offer no advice on how to do this, though. Furthermore, other similar studies give little insight into how to create or en-

hance absorptive capacity. In this study, we define absorptive capacity as the employees' aptitude and desire to acquire outside information and their readiness to apply this information to the firm's innovation capability. The ability to acquire knowledge and the quantity of work required to put it into use are highlighted by absorptive capacity.

Additionally, due to the fact that services are less standardized, frequently not product-focused, and significantly fragmented than in other industrial industries, innovation in the banking sector has garnered less attention and research. It is more challenging to examine the innovation capability of banks due to the emphasis on client engagement and the intangible aspects of banking services [7]. Innovation in the banking sector necessitates prerequisites and an awareness of the operational characteristics of the banking sector because invention in banking is not necessarily a comprehensive innovation.

However, several previous studies on the impact factor models studying the factors that directly or indirectly affect the creativity of banks. These factors can have a positive (facilitating) or negative (reducing) influence on the innovation of a bank. Currency trading, providing banking services is one of the business areas in which the creation of completely new products is very difficult due to the specific and standardized nature of the products [8]. However, competition in the banking industry is very strong at the moment [9]. Therefore, commercial banks need to regularly introduce innovations to improve competitiveness. In that condition, it is very necessary to identify the factors that can affect the innovation capacity of commercial banks.

So that, this study is expected to help bank managers In Vietnam's banking industries use direct efforts and resources in the most effective and efficient way to encourage bank's product innovation to improve their business in the long run. The paper explores the impact of knowledge absorption on the production innovation base on analyzing data collected from 234 bank's employee. The rest of the paper as follow. The literature is reviewed, and the study framework and hypotheses are suggested in Section II. The research technique is described in Section III of this article. The results of the data analysis are described in Section IV. Section V discusses managerial implications and a brief conclusion.

II. THEORETICAL BACKGROUND AND HYPOTHESIS

A. Knowledge absorptive capacity

Knowledge absorptive capacity is understood as "the organizational mechanisms that help identify, communicate, and assimilate relevant external and internal knowledge". Refers to an organization's ability to identify, absorb, and use knowledge sources to develop newer knowledge that is new to the organization. Absorptive capabilities are tools that let a business find, share, and incorporate knowledge that is present in its internal or external environment. According to this perspective, "the firm's existing knowledge base, the effectiveness of systems that scan the environment, and the efficacy of the firm's communication operations are regarded to be the elements of absorptive capability." [10].

The capacity to absorb knowledge is expressed in five aspects, namely, the knowledge capacity of employees, managers, information systems, communication environment and exploitable knowledge sources [10]. The capacity of good employees is favorable in exploiting and using existing and new knowledge. A strong information network makes it easier to access new sources of knowledge and promotes the sharing of knowledge. An environment of open communication can enhance an organization's ability to innovate by encouraging both teamwork and open communication [11].

Knowledge absorption capacity can be considered as a system that enables businesses to locate and acquire pertinent internal and external knowledge sources, which can increase their capacity for innovation [10]. The scale of knowledge absorption capacity, inherited from the research of Najafi-Tavani [12], is a multi-level silver scale with 5 main components: knowledge absorption capacity of bank employees, capacity managers' resources, information systems, communication environments, and knowledge sources.

B. Product innovation

The OECD defines a product innovation as a new or significantly improved product/service compared to other products/services of the organization, including an improvement of one or more characteristics or features. such as quality, technique, friendliness [3]. Product innovation give a provision of new or significantly improved goods or services compared to the existing goods and services that the organization is providing, includes changing the characteristics of goods and services, software applications, or changing the way that customers can access to use goods and products in order to meet the maximum needs of customers compared to other products and services[13].

Product innovation is a difficult process driven by advanced technologies, changing customer needs, shortening product life cycles and increasing global competitiveness [14]. For successful product innovation, a strong interaction between organizations and customers and suppliers is required [15]. The scale of a bank's product innovation includes a significant change in product characteristics, creating new product service or an improved service or product, introducing and bringing a new product to market, or improving an existing product in terms of functionality, quality or appearance [11].

Therefore, the bank's product innovation capacity, based on the inheritance of existing studies Liao et al [16] and Lin et al [14] is measured on five dimensions : improve product quality; reduce the cost of products; develop new features; added new features; and add new products

C. The relationship between Absorptive capacity and bank's product innovation

The ability to absorb knowledge is known to be very important for an organization's innovation capacity [12]. While the linking system factor is concerned with external knowledge, knowledge absorption capacity focuses on internal knowledge acquisition to create new knowledge [10]. Previous studies have suggested learning orientation as an essential prerequisite for organizational innovation [17]. Then recent studies have emphasized the concept of knowledge absorption capacity to clarify the learning process in organizations [12].

The model proposed by Najafi-Tavani considers the factors affecting the innovation capacity of the organization based on the theory of learning capacity and organization [12]. The innovation capacity of the organization depends on two main groups: the capacity to absorb knowledge to exploit the organization's internal resources and the ability to cooperate and link external partners. However, the degree of cooperation with external parties such as customers, suppliers, competitors and research institutions to enhance innovation capacity depends on the ability of that organization to absorb knowledge. If the organization has a good ability to absorb knowledge, it will more effectively exploit external resources and thereby innovate better.

High levels of manager and employee knowledge put a company in a better position to absorb and use new information sources, which makes it more capable of creating new knowledge. While the communications climate refers to the environment within the firm that decides, the communication network refers to the size and strength of structural relationships. A strong communication network not only makes it easier for the company to acquire new knowledge sources, but it also makes it easier for knowledge—especially highly tacit knowledge—to be shared. Through fostering teamwork and an open exchange of information, an open communication environment can improve the firm's capacity for innovation [18]. Finally, knowledge scanning can be seen as a method that enables organizations to locate pertinent internal and external information sources, which can improve their capacity for innovation.

According to Cohen and Levinthal [4], one of the key factors affecting an organization's capacity for innovation is how well it uses the external knowledge it has amassed. In their analysis of earlier research on absorptive capacity, Zahra and George [19] discover a substantial positive association between absorptive capacity and innovation because both elements combine to create the organization's competitive edge. According to Knudsen and Roman's empirical study [5], absorptive capacity has a significant role in forecasting an organization's capacity for innovation.

Base on this prior research, our study propose that the bank with higher knowledge absorption capacity would have

a higher product's innovation capability. Therefore, the following is hypothesized:

Hypotheses: Knowledge absorption capacity has a positive impact on bank's product innovation

The research framework is shown in Figure 1.

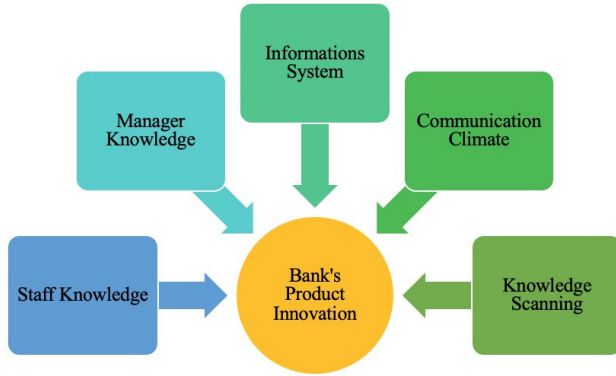


Fig.1 Research model

III. METHODOLOGY

A. Measurement

The constructs were measured using a five-point Likert scale (1 being totally disagree to 5 being completely in agreement). The research framework used here, bank's product innovation is dependent variable that is described as is the creation and distribution of a new product to market or the change of a current product's features, consistency of quality, or presentation. This study employs the concepts of Liao et al [16]. Therefore, the bank's product innovation capacity, based on the inheritance of existing studies Liao et al [16]; Lin et al [14] is measured on five dimensions. There are 5 items (SP1 – SP5) relating to these constructs: improve product quality; reduce the cost of products, develop new characteristics; added new features; and add new products.

On the other hand, knowledge absorption capacity refers to bank's ability to identify, acquire, and use knowledge sources to develop newer knowledge that is new to the bank. The capacity to absorb knowledge is expressed in five aspects, namely, the knowledge capacity of employees, managers, information systems, communication environment and exploitable knowledge sources according to Tu et al [14]. Thus, this study employs constructs the scale of knowledge absorption capacity, inherited from the research of Najafi-Tavani et al [20] and Tu et al [14] which is a multi-level silver scale with 5 main components as five independent variable as follow: knowledge absorption capacity of bank employees (items ACS1-ACS3), capacity managers' knowledge (items ACM1-ACM4), information systems (items ACN1 – ACN5), communication environments (items ACC1- ACC6), and knowledge scanning (items ACK2-ACK7).

B. Sample and procedure

Banks were selected to be included in the study based on their representativeness by ownership, size and transparency of information. The research has selected 18 satisfactory commercial banks. Conduct a survey through a questionnaire distributed to the respondents who are employees of

commercial banks selected in the research sample to collect opinions and evaluations on the Bank's Knowledge absorptive capacity and product innovation. The questionnaire was built on Likert scale. The data was collected in 2021. Collected data was aggregated, cleaned and analyzed. EFA exploratory factor analysis method to identify factors affecting the bank's product innovation. A regression analysis was then performed to evaluate the impact of Knowledge absorptive capacity on Bank's product innovation. All data analysis was performed on SPSS ver 20 software.

TABLE 1: SAMPLE

Characteristics of respondents	N	%
Bank's size	234	100
Small	50	21.4
Medium	71	30.3
Large	113	48.3
Position	234	100
Staff	159	67.9
Manager of branch	57	24.4
Manager of department	12	5.1
Manager at head office	6	2.6
Experience	234	100
Less than 3 years	70	29.9
From 3 years to less than 6 years	34	14.5
From 6 years to less than 10 years	49	20.9
From 10 years or more	81	34.6

Statistical of 234 observations in the research show that the most respondents belonging to the group of large banks (accounting for 48.3%), followed by medium-sized banks (accounting for 30.3%) and the group of medium-sized banks (accounting for 30.3%), the small-scale have 21.4%; Most of the respondents were employees (67.9%), followed by branch managers 24.4%, then senior managers at departments and headquarters with 7.7%. The survey results have good value and high reliability because most of the respondents have a lot of work experience. According to the sample structure, 34.62% are members who have worked for more than 10 years with the bank, 20.9% of the members have worked for 6 to 10 years at the bank and 14.5% of the research sample is members who have worked for 3 to 5 years at the bank, and only 70 people have worked at the bank for less than 3 years (accounting for 29.9%). Thus, most of the survey participants were engaged and devoted as well as understood the bank's organization and operation and business results. Therefore, the quality of the data obtained from the survey was high by their contribution to the survey.

C. The reliability of the scale

The reliability of the scale is assessed using the Cronbach Alpha reliability coefficient. When the standard has an alpha confidence of 0.60 or more, the scale is chosen. Variables with a total correlation coefficient less than 0.30 will be removed from the scale. The following table displays the findings of the scales' Cronbach's alpha study.

IV. RESULTS

A. Exploratory Factor Analysis (EFA)

The exploratory factor analysis (EFA) method was used to identify the factors that affect the product innovation capacity of Vietnamese commercial banks. Variables with a weight less than 0.50 in the EFA will be discarded. The fac-

TABLE 2: RESULTS CRONBACH'S ALPHA OF THE MEASUREMENT

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Scale Staff Knowledge Cronbach's Alpha 0.920					
AC S1	11.49	4.903	.846	.728	.886
AC S2	11.72	4.607	.805	.667	.902
AC S3	11.52	4.894	.817	.671	.895
AC S4	11.40	5.057	.802	.675	.901
Scale Manager Knowledge Cronbach's Alpha là 0.928					
AC M1	11.84	5.802	.840	.728	.905
AC M2	11.93	5.510	.852	.734	.899
AC M3	11.86	5.406	.834	.714	.905
AC M4	12.08	5.264	.810	.675	.915
Scale Information System Cronbach's Alpha 0.944					
AC N1	11.81	5.753	.861	.747	.928
AC N2	11.85	5.599	.895	.810	.917
AC N3	11.81	5.641	.875	.777	.923
AC N4	11.90	5.844	.831	.691	.937
AC N5	11.81	5.753	.861	.747	.928
Scale Communications Climate Cronbach's Alpha 0.937					
AC C1	19.70	13.835	.832	.726	.924
AC C2	19.57	14.460	.849	.752	.922
AC C3	19.53	14.722	.825	.713	.925
AC C4	19.56	14.840	.803	.674	.927
AC C5	19.73	13.899	.809	.695	.927
AC C6	19.61	14.505	.778	.658	.930
Scale Knowledge Scanning Cronbach's Alpha: 0.948					
ACK2	19.94	14.189	.805	.685	.942
ACK3	19.87	14.172	.822	.710	.940
ACK4	19.94	13.945	.834	.717	.938
ACK5	20.03	13.960	.839	.732	.938
ACK6	20.00	13.785	.866	.769	.934
ACK7	19.97	14.145	.871	.790	.934
Scale Bank's Product Innovation Cronbach's Alpha: 0.923					
SP1	15.77	9.612	.814	.694	.904
SP2	16.06	9.571	.696	.525	.928
SP3	15.76	9.573	.810	.708	.904
SP4	15.78	9.278	.842	.748	.898
SP5	15.85	9.112	.854	.757	.895

tor analysis method used is principal components with varimax rotation and breakpoint when extracting eigenvalue=1 factors. The scale is accepted when the total variance extracted is equal to or greater than 50% and the factor weight is 0.50 or more. The KMO and Bartlett's Test results get the KMO coefficient of $0.862 > 0.05$; Barlett test results have $\text{sig} = 0.000 < 0.5$, showing that factor analysis is appropriate with research data.

TABLE 3: TWO FACTORS ATTRACTED FROM EFA

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.285	67.855	67.855	9.219	38.411	38.411
2	1.053	4.389	72.245	8.120	33.834	72.245
3	.953	3.969	76.214			
4	.674	2.808	79.021			
5	.626	2.607	81.629			
6	.567	2.362	83.990			
7	.460	1.915	85.906			
8	.356	1.482	87.388			
9	.318	1.326	88.714			
10	.297	1.238	89.952			
11	.270	1.124	91.075			
12	.255	1.064	92.140			
13	.230	.960	93.100			
14	.221	.921	94.021			
15	.206	.859	94.880			
16	.199	.828	95.708			
17	.180	.750	96.458			
18	.157	.653	97.111			
19	.149	.620	97.731			
20	.129	.537	98.268			
21	.117	.487	98.754			
22	.110	.457	99.211			
23	.102	.427	99.638			
24	.087	.362	100.000			

Extraction Method: Principal Component Analysis.

After meta-analysis of EFA in the correlation between all 24 analyzed variables, 2 factors representing 24 variables were extracted. Two factors extracted include: Knowledge Scanning, and Communication system (Networks and Climate). These factors are further used in regression analysis to determine the impact level of each factor.

B. Regression

The linear regression model used is suitable because the results of the model test through the F test and in the ANOVA test show that sig and ANOVA are 0, so there is enough evidence to reject the hypothesis H0 and conclude that the regression model is statistically significant. The results also show that the model has a satisfactory fit ($R^2 = 0.551$), the model explains 55% of the variation of the bank's product innovation capacity. The results of the regression are as follows (Table 4).

Table 5 indicates the overall fit of the model ($F=143.900$, $\text{Sig} = 0.000$). Based on the regression model, it shows that the bank's ability to innovate products is affected by two factors: Knowledge Scanning, and Communication system (Networks and Climate). In which, knowledge Scanning is the most influential factor (FAC1-1) ($b_1 = 0.562$), followed by Information system (Networks and Climate) (FAC2_1). ($b_2 = 0.490$). Therefore, hypotheses are supported with a significance level of 1%. Other components of knowledge absorption capacity, such as employee's capacity, manager's capacity, have no impact on the bank's ability to innovate products.

V. DISCUSSION AND CONCLUSION

At commercial banks in Vietnam, product innovation is reflected in many different aspects. Through the survey results on product innovation in the past 3 years conducted at the bank from employees and managers at the bank, the overall assessment shows that banks have performed very well in this activity. The bank's product innovation activities are reflected in the two most appreciated criteria: improving the quality of products and adding more functions to the

TABLE 4: THE MULTIPLE REGRESSION OUTPUT

Coefficientsa									
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics
	B	Std. Error				Zero-order	Partial	Part	
(Constant)	-2.123E-016	.044		.000	1.000				
1 FAC1_1	.562	.044	.562	12.809	.000	.562	.644	.562	1.000
FAC2_1	.490	.044	.490	11.187	.000	.490	.593	.490	1.000

- a. Dependent Variable: FAC1_2
 b. Independent variable: Fac 1_1:
 Knowledge Scanning; FAC 2_1:
 Information System

		FAC1_2	FAC1_1	FAC2_1
Pearson Correlation	FAC1_2	1.000	.562	.490
	FAC1_1	.562	1.000	.000
	FAC2_1	.490	.000	1.000
	FAC1_2		.000	.000
Sig. (1-tailed)	FAC1_1	.000		.500
	FAC2_1	.000	.500	
	FAC1_2	.234	.234	.234
N	FAC1_1	234	234	234
	FAC2_1	234	234	234

products, which are common practice in most banks. However, the cost reduction and completely new product design compared to other product innovation activities are not being carried out. So, this activities can be noted to increase the bank's initiative in innovation.

Research results showed that knowledge absorption had a positive effect on bank's product innovation in the Vietnamese context. The Vietnamese commercial bank's product innovation will be increase if banks do the following:

First, The Bank needs to strengthen its capacity to absorb knowledge from the outside through: testing new technologies; execute new business opportunities; increase investment in research and development activities; compare yourself with the best bank in the industry to study; and learn from customers and suppliers

Second, Banks need to strengthen the exploitation of knowledge sources from within: increase access to new technology for the bank's employees and administrators, and train and foster them to have technology knowledge; enhance the ability to solve technology problems; have the ability to make appropriate decisions; and learn to improve professional knowledge.

Third, strengthen the sharing and exchange of innovation knowledge between departments in the bank. Innovative knowledge will only be truly valuable if it is widely shared and applied. Therefore, commercial banks also need to pay attention to encouraging and promoting the process of sharing knowledge internally. (1) Channel of transmission via intranet, electronic library, forum, public social network or internal social network. (2) Direct channel through various

TABLE 5: THE FIT OF THE MODEL (ANOVA TABLE)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	129.255	2	64.627	143.900	.000b
Residual	103.745	231	.449		
Total	233.000	233			

- a. Dependent Variable: FAC 1.2 Bank's product innovation
 b. Predictors: (Constant), FAC2.1, FAC1.1

types of training, seminars, seminars, meetings, conferences... (3) Communication channel through contests, exams, important events for employees... (4) Communication channel through newsletters, internal press. (4) Other non-formal channels such as exchanges, discussions, talks... among employees.

Fourth, the bank needs to establish a smooth information system, enhancing the effectiveness of internal communication. Banks need to generate an environment where members of the bank often support each other to share knowledge openly. Banks need to set up communication channels between departments, promote regular communication between departments and strengthen a culture of trust, carry out activities to connect members in the bank, so that they realize they are part of the Bank, have attachment and connection.

This study provides an important contribution to the innovation literature, shedding light on whether knowledge absorption enhance product innovation new product in Vietnamese commercial bank's. Our analysis indicates that Knowledge Scanning and Information Syste guarantee an increase product innovation capabilities of the bank.

Indeed, only in the presence of absorptive capacity do collaborative innovation networks improve innovative capacities. In other words, the degree of absorptive capacity determines how much collaboration with outside parties promotes innovative capabilities. In other words, when the level of absorptive capacity rises, the impact of collaborative innovation networks on both product and process innovation capabilities improves. Information systems and knowledge scanning are significant determinants of bank product innovation. For scholars and practitioners, our findings have a variety of significant theoretical and management consequences.

Besides the achievements, this study also has some limitations. Firstly, due to the indirect measurement method through the survey, it is subjective of the survey participants, more limited than statistical data according to the evaluation criteria of the objectivity of the data. Whether. Second, because the survey respondents' responses depend on their awareness and understanding of this issue, they may be biased, affecting the research results. Third, research data is collected in time for the current 3-year process evaluation, so there may be no limitation on the evaluation results. To overcome these limitations, future studies can analyze and collect statistical data according to the criteria for evaluating the results of the bank's innovation implementation.

REFERENCES

- [1] Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of management studies*, 38(1), 45-65.
- [2] Jiménez-Jimenez, D., Valle, R. S., & Hernandez-Espallardo, M. (2008). Fostering innovation: the role of market orientation and organizational learning. *European Journal of innovation management*, 11(3), 389-412.
- [3] OECD (2018). Oslo Manual: Guidelines for collecting, reporting and using data on innovation.
- [4] Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative science quarterly*, 128-152.
- [5] Knudsen, H. K., & Roman, P. M. (2004). Modeling the use of innovations in private treatment organizations: The role of absorptive capacity. *Journal of substance abuse treatment*, 26(1), 51-59.
- [6] Quinn, J. B., Anderson, P., & Finkelstein, S. (2009). Managing professional intellect: making the most of the best. In *The strategic Management of Intellectual capital* (pp. 87-98). Routledge.
- [7] Rajapathirana, R. J., & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge*, 3(1), 44-55.
- [8] Shi, W., Shambare, N., & Wang, J. (2008). The adoption of internet banking: An institutional theory perspective. *Journal of Financial Services Marketing*, 12(4), 272-286.
- [9] Hassanpour, A., & Mirfallahi, S. (2015). The impact of culture and strategic orientation on service innovation capability: Evidence from banking industry. *Management Science Letters*, 5(12), 1047-1052.
- [10] Tu, Q., Vonderembse, M. A., Ragu-Nathan, T. S., & Sharkey, T. W. (2006). Absorptive capacity: Enhancing the assimilation of time-based manufacturing practices. *Journal of operations management*, 24(5), 692-710.
- [11] Nordin, S. M., Sivapalan, S., Bhattacharyya, E., Ahmad, H. H., & Abdullah, A. (2014). Organizational communication climate and conflict management: communications management in an oil and gas company. *Procedia-Social and Behavioral Sciences*, 109, 1046-1058.
- [12] Najafi-Tavani, S., Najafi-Tavani, Z., Naudé, P., Oghazi, P., & Zeynaloo, E. (2018). How collaborative innovation networks affect new product performance: Product innovation capability, process innovation capability, and absorptive capacity. *Industrial marketing management*, 73, 193-205.
- [13] Bloch, C., & Bugge, M. M. (2013). Public sector innovation—From theory to measurement. *Structural change and economic dynamics*, 27, 133-145.
- [14] Lin, R. J., Chen, R. H., & Shun Chiu, K. K. (2010). Customer relationship management and innovation capability: an empirical study. *Industrial Management & Data systems*, 110(1), 111-133.
- [15] Payzin, E., Ulusoy, G., Kaylan, A. R., & Akova, B. (1997). New product development capabilities of the Turkish electronics industry. In *Innovation in Technology Management. The Key to Global Leadership. PICMET'97* (p. 481). IEEE.
- [16] Liao, S. H., Fei, W. C., & Chen, C. C. (2007). Knowledge sharing, absorptive capacity, and innovation capability: an empirical study of Taiwan's knowledge-intensive industries. *Journal of information science*, 33(3), 340-359.
- [17] Chen, S. T., & Chang, B. G. (2012). The effects of absorptive capacity and decision speed on organizational innovation: a study of organizational structure as an antecedent variable. *Contemporary Management Research*, 8(1)
- [18] Nordin, S. M., Sivapalan, S., Bhattacharyya, E., Ahmad, H. H., & Abdullah, A. (2014). Organizational communication climate and conflict management: communications management in an oil and gas company. *Procedia-Social and Behavioral Sciences*, 109, 1046-1058.
- [19] Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of management review*, 27(2), 185-203.
- [20] Najafi-Tavani, S., Najafi-Tavani, Z., Naudé, P., Oghazi, P., & Zeynaloo, E. (2018). How collaborative innovation networks affect new product performance: Product innovation capability, process innovation capability, and absorptive capacity. *Industrial marketing management*, 73, 193-205.

Online propaganda as crisis communication during the infodemic: the role of cultural factors

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Abstract—The Covid epidemic is a disaster that happens once every hundred years. Therefore, many problems that the authorities as well as the professionals do not know how to react during this epidemic including the crisis communication. In the early stages, when there was no consensus on how to communicate on the issue of Covid-19 disease, governments had different options for their communication campaigns. This study explores the impact of cultural factors on the choice of government communication campaigns during the pandemic using content analysis and discourse analysis techniques. The results of the study show that in the beginning cultural factors can lead to different choices in government propaganda campaigns on online platforms. However, over time, these campaigns gradually became similar, although cultural differences persisted.

Index Terms—culture, Covid-19, government communication, individualism/collectivism, power distance.

I. INTRODUCTION

Covid-19 pandemic is one of the global problems which impacts all countries all around the world. As this is a new virus to humanity, there was no standardization in dealing with it. Some countries chose the strict reaction with face-mask mandatory and lockdown the whole city, some other countries chose the non-interfering methods and left the decision to individuals. For example, for those who have close contact with a Covid patient, nations in the East such as China and VN required mandatory quarantine at a public center or a hotel while many countries in the West recommended self-quarantine at home.

Many observations pointed out the pattern “West versus East”

cultural difference between the responses of various countries, especially in the early stage of this pandemic, when this disease is an unknown risk. Marion, Tobias and Yong-Yueh (2018) [1] stated the way different governments in different areas responses to uncertainty risk of Covid-19 reflected their own cultural characteristics. For instance, these authors said that the swift and widespread actions of the Taiwan government and people is a sign of the high level of institutional collectivism in that country while the individualism in Sweden makes this country choose a softer approach. When examining the response of the VN government, Kris, Sarah & Azad (2021) [2] explained the success of this country in controlling the pandemic so far is due to the “whole country” approach, when everyone worked together to fight Covid-19. In the study of Moon and Sánchez-Rodríguez (2021), the Koreans with a higher social hierarchy mindset had more personal acceptability toward govern-

ment policies related to this pandemic than their Spanish counterparts.

This paper aims to understand how culture affects the government’s response regarding communication when dealing with uncertainty, with the comparison of two countries belonging to two cultural divides: Vietnam (VN) represented for the East and the United Kingdom (UK) represented for the West. The results would contribute scholarship on the integration between the relation of pandemic response and culture when dealing with uncertainty risk. Furthermore, this study will inform policy makers about a country’s cultural attributes in building the national image and communication with a global audience.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

A. Literature Review

There have been many studies stated these variants in governmental responses are due to the cultural differences between communities (Velamoor & Persad, 2020 [3]; Airhi-henbuwa et al., 2020 [4]; Darwin et al., 2021 [5]; Wang, Bandera & Yan, 2021 [6]). For example, Velamoor & Persad, (2020) suggested that countries with a strong political culture of command-and-control governance (Singapore, South Korea, China, Russia, North Korea), tend to use the strategies that apply for all populations, no matter if they like it or not. Meanwhile, in many countries in the West (USA, UK, Canada), with the cultural emphasis on individualism, the protective measures are more flexible, which can apply for citizens from diverse backgrounds. Atalay & Solmazer (2021) [7] pointed out that countries like the Netherlands, Sweden, and the UK with the culture of having high trust in individuals, had issued the social distancing regulations replying on the voluntary of their citizens while countries with the culture of having lower trust in the willingness of their citizens, such as Italy, Spain, and France had more strict strategies, which somewhat forced the people restrict their mobility. Meanwhile, the governmental responses in Germany were consistent and calculated, showing the high uncertainty avoidance culture of this country and the response of Sweden (Marion, Tobias and Yong-Yueh, 2018). Another author, Verma (2020) [8] also drew the relevance between the Chinese government’s support for other countries in Covid-19 after receiving the help from others with the tradition of repaying the kindness here.

Culture matters not only the institutional and individual response to a pandemic, but also the outcomes. Wang, Ban-

dera & Yan (2021) found the statistical relation between Individualism vs Collectivism (IDV) and death rate. The countries with higher IDV had higher regional mortality rate, which suggests the contribution of the “freedom” mindset but only focused on their own health, not of the others. Besides that, Gelfand et al (2020) stated the growth rates of COVID-19 is considerably slower in the countries with high collectivism (eg. Hong Kong, Taiwan, and South Korea). Other studies (Biddlestone, Green and Douglas, 2020 [9]; Im, Wang, Chen, 2021 [10]; Gokmen, Baskici & Ercil, 2021 [11]) also found vertical individualism has a negative relationship while horizontal collectivism has positive correlation with the willingness to engage in prevention measures of individuals in Covid-19. However, other research also stated that the responsible parties for the outcomes of Covid-19 are not just individual features but also the effectiveness of policies and the medical system (Lupu, Maha & Viorică, 2020) [12], national interpersonal distance preferences (Gokmen, Turen, Erdem & Tokmak, 2020) [13], socioeconomic factors, medical, environmental, and influenza-like illness factor (Cao et al, 2020) [14].

Regarding culture, although there is no unique frame for culture, (Cecilia, 2020) [15], culture is widely considered as an ecosystem of values, beliefs, and symbols in a community that will affect the behaviour of people of that culture (Peacock, 1981) [16]. Majority of scholars in the field agree that culture consists of three elements: (1) patterns of thought; (2) patterns of behavior and artifacts; (3) skills and knowledge for using these artifacts (Qingxue, 2003) [17]. In which, the culture value, which is defined as “shared conceptions of what is good and desirable in the culture, the cultural ideals” (Schwartz, 2011) [18] were examined in many studies, including those related to Covid-19 as it could help to explain the ways social actors conduct their behaviors. For example, the cultural values used to understand the reasons and effects of imposing various variants of social distancing measures and the expectation on voluntary behavior (Atalay & Solmazer, 2021).

When looking at the cultural patterns, many scholars pointed out the noticeable difference between Western and Eastern cultures, in the cultural values and orientations (Yang et al, 2019 [19]; Thomas et al, 2019 [20]; Jia & Krettenauer, 2017 [21]). With the note that these difference is base on the major views shared by the most influential group of people, (Qingxue, 2003) stated 4 main differences between two cultural patterns: (1) High-context Versus Low-context Communication; (2) Individualism Versus Collectivism; (3) Equality Versus Hierarchy; (4) Assertiveness Versus Interpersonal Harmony. Another distinction is Hofstede's model which divides culture into 6 different dimensions: individualism/collectivism, power distance, uncertainty avoidance, masculinity/femininity, long term orientation and indulgence. It can be seen that there are two similar characteristics between two approaches, including Individualism Versus Collectivism and Equality Versus Hierarchy. In their article, Marion, Tobias and Yong-Yueh (2018) suggested that the distinction in strategies of different nations could lie in the cultural values of them. For example, the influence of Confucianism in the East Asian countries makes the government tend to rely on hierarchy and thus citizens

have more acceptance from the citizens for the protective measures while the individualism in the West encourages a different approach.

Meanwhile, there are many studies pointing out the importance of media and communications in the pandemic. Anwar, Malik, Raees, & Anwar (2020) [22] argues that the media is the main source of getting information about Covid-19 for the citizens of many countries. It also helped the Center For Disease Control And Prevention (CDC) and the World Health Organization (WHO) provided quickly and widespread information for public health. Yan, Tang, Gabriele & Wu, (2016) [23] also the correlation between the media reports and behavior changes toward the 2009 A/H1N1 influenza epidemic in China. The UK COVID-19 news and information project [24] found out that the UK public, who are well-informed about COVID-19 tend to follow government guidelines and take precautionary measures if needed. These studies also stated that the miscommunication also brings negative consequences on citizens such as fear, psychological stress and anxiety. In which, government communication is considered as important lessons as it would help the nations deal with uncertainty risk and health communication in the future. The role of government communication has been examined in various countries, such as the United Arab Emirates (Radwan & Mousa, 2020) [25]; United States (Kim & Kreps, 2020) [26]; UK (Karen, 2020) [27]; VN (Kris, Sarah & Azad, 2021).

As Covid-19 is a global pandemic, there has been many published articles investigated different factors influence the institutional reactions to this unknown disease (Gokmen, Baskici & Ercil, 2021; Kapoor & Tagat, 2021 [28]; Marion, Tobias and Yong-Yueh, 2018). However, most of these studies focus on the policies and lack of articles comparing the difference of governmental communication about Covid-19 through the lens of culture, although mass media and communication have significant impacts on the behaviour of people in a country. There has been no studies comparing the Eastern–Western cultural differences reflected on two different approaches by government communication over time. To fill that gaps in literature review, this article aims to seek the answer for two research question

Research question 1: How the government communication of these East and West cultures have changed over the time?

Research question 2: How do those differences in cultural values affect the government communication about the SARS- CoV-2 virus?

To answer the research question 2, there are a couple of hypotheses developed as below

B. Hypothesis development

Although there are many characteristics of a national culture, this study will focus on two only: Individualism Versus Collectivism (IND and COL) and Equality Versus Hierarchy (power distance). The reasons, first of all, IND and COL are considered as the key cultural characteristics that explain the difference of different cultures (Triandis, 2001) [29]. Secondly, this cultural dimension also helps to explain why some governments use the strict preventive measures to protect the big population and why some other nations use the

mild methods to protect the rights of their individual citizens. The reason for using the power distance affects the decision to use technological solutions intervention for tracing, tracking and monitoring in Covid-19 (TSI), (Gupta, Shojia & Mikalef, 2021) [30]. The TSI could be considered as an important factor in the governmental responses to this pandemic.

Previous studies (Qingxue, 2003); Marion, Tobias and Yong- Yueh, 2018; Velamoor & Persad, 2020) explained that the difference between two cultural value with Eastern culture has a high level of institutional collectivism, while the Western culture has a high level of individualism, lead to difference reactions of the institution. Collectivism is defined as the tendency to place the need and interest of a group higher than those of individuals while individualism has the opposite meaning (Trubisky, Ting-Toomey & Lin, 1991) [31]. There are many articles examining the reflection of individualism and collectivism by words on books (Twenge, Campbell, & Gentile, 2012) [32], social media (Pezzuti & Leonhardt, 2020) [33], advertisement (Pineda et al, 2015) [34]. According to a multinational survey (Hofstede-insights, 2021a) [35], UK is considered as a country that highly values individualism with an 89 score in individualism. Meanwhile, according to this company, VN only has a 20 score of individualism, which means this country is highly collectivism (Hofstede-insights, 2021b) [36]. Regarding government communication, it's estimated that the UK would show more individualism and less collectivism than VN. Therefore, there are two hypotheses were developed:

Hypothesis 1a: UK government communication mentioned more individualism words than VN

Hypothesis 1b: UK government communication mentioned less collectivism words than VN

Another difference between the UK and VN is power distance

(PD), which implies the inequality in a society, regarding the distribution of power in society. The country with high PD would have the expectation that citizens will have a more accepting attitude to the institutional actions although the individuals might not have the preference of following these directions. VN scores 70 in the PD dimension, which means that people tend to accept an order from the government (Hofstede-insights, 2021b). Meanwhile, the UK scored only 35 in PD, which means people would not easily accept the orders from higher hierarchy positions. Regarding TSI, COVID-19 has forced authorities to use different strategies to mitigate the COVID-19 such as locking down, social distancing, contact tracing and self-quarantine. These solutions interfered with some part of the daily life of the subjects. For example, the contact tracing would reveal who, where, and when that person had close contact with others. The locking down, social distancing and self-quarantine have limited the movement of people. Therefore, it's expected that countries with high PD experienced little to no resistance from people in doing these TSI and government communication would mention more about them. Meanwhile, countries with low PD would not use the TSI often as they get strong reactions from their citizens. Therefore, there are two hypotheses for the PD of two countries, UK and VN:

Hypothesis 2: VN government communication mentioned more about TSI than UK.

III. METHODOLOGY

For analysing the government communication of VN, the published information related to Covid-19 posted on the English site of VN government portal (<http://chinhphu.vn/portal/page/portal/English>) was collected. The chosen time frame was one year, from April 2020 to April 2021. The English site was chosen for the comparison purpose with the UK site. Besides that, an English-language Vietnamese Government portal is chosen as this study aim to examine the propaganda that Vietnamese government to the international audiences as well as the Vietnamese living abroad.

On the UK counterpart, information in the News and Communication session, with the task Coronavirus (Covid-19) on the official website of the UK government (<https://www.gov.uk/>) were crawled. The time frame is similar to the information on VN government website.

The reason for choosing this time range is because there were three waves of Covid-19 in that time in VN, in which the latter is bigger than the previous one. Regarding to UK, this period also has many important events related to Covid-19 such as the UK Prime Minister Boris Johnson got Covid; The UK passes 100,000 coronavirus deaths.; UK human COVID-19 vaccine trials start; UK Prime Minister Boris Johnson confirms that the UK's easing of lockdown will go ahead as planned on the 12th April.

The tool for getting information is OutWit Hub, which is a tool for extracting information from a Web page. The author created many "scrapers" which define which part of the information on the website should be collected in the code source. After the "scrapers" was tested for effectiveness, it would be used for automatically collecting all the articles published on those websites in the defined time frame.

For data analysing, for answering Hypothesis 1, considering this article analyse written words in English, this study used the list of words developed by Twenge, Campbell, & Gentile, (2012). Base on its uniqueness, the top 10 individualistic words were chosen: "sole", "individual", "personal", "unique", "unique*", "self", "independen*", "oneself", "soloist", "identity". The top 10 collectivism words were chosen: "commun*", "unit*", "team*", "collecti*", "village", "group", "everyone", "family", "share", "union".

For answering Hypothesis 2, words related to TSI, including locking down/lockdown, social distancing/social distance, contact tracing/tracing and self-quarantine are used in analysing articles posted on these websites.

IV. RESULTS

A. Descriptive Statistics

VNese government portal published 1073 articles related to the information about Covid-19. There were three waves of Covid-19 in VN:

(1) 29 July 2020 to 23 August 2020,

(2) 26 January 2021 to 26 February 2021, (3) from 30 April 2021.

It can be seen from the chart that in the beginning, the government issued a lot of information about this pandemic.

However, this number was decreasing over the time and stable at 5-6 articles about this sickness although there was a new wave of vCovid-19. Interest in this topic in government communication over the time. The reason for this phenomenon is suggested as COVID fatigue (a term describing the sense of exhaustion from the audience to be exposed to the information related to this pandemic for too long and too often so that they don't want to hear about it again). Another reason for that decrease is that the coronavirus is not new information after one year and it is replaced by the more updated topics.

B. Statistical Analyse

Meanwhile, the UK government website also revealed a similar pattern with the total number of articles related to coronavirus in April 2020 is 1.5 times higher than in March 2020 and 3 times higher than in April 2020. Although in January 2021, there was a Covid-19 wave in UK, In March, 2020, there were several actions by the UK government to control and suppress the coronavirus (COVID-19) variant, to encourage the citizens to take vaccines, to provide practical sport for disabled children and so on.

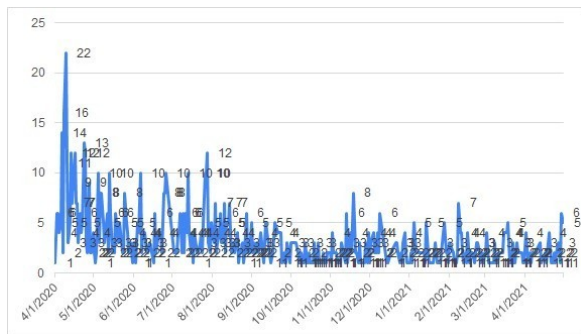


Fig. 1 The articles related to Covid-19 that was published on the VN government portal

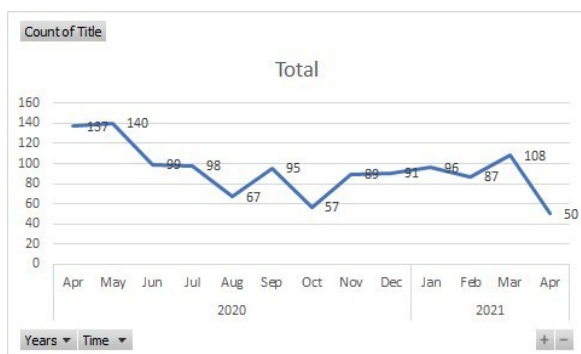


Fig. 2 The articles related to Covid-19 that was published on the UK government portal

The decrease in the number of published information related to Covid-19 on both websites showed that although two countries had two different approaches to Covid-19 in the early stage, the amount of information all decreased although there have been many waves of Covid-19 in both countries in that period of time. Both of the two countries showed the decrease of interest in the information of this sickness over the time. It could be explained as at the beginning of this pandemic, most nations did not know much about this virus so the government needed to provide lots of information about this virus. This finding is similar to the

study of (Pearman et al) [37] on media coverage of COVID-19 of 102 mainstream newspapers in seven regions from Dec 30, 2019 to Nov 1, 2020, which showed the decline in not just the number of published articles.

Therefore, the answer for research question 1 is that in general, both countries in two cultures showed a decreasing.

TABLE I
THE RESULT OF INDEPENDENT SAMPLES TEST OF THE INDIVIDUALISTIC WORDS AND COLLECTIVISM WORDS BETWEEN UK AND VN

	N	Sig.	Sig. (2-tailed)	Mean
Individualistic Words				
VN	1073	.000	.000	0.000932
UK	1265			0.062451
Collectivism words				
VN	1073	.000	.152	0.122088
UK	1265			0.097233

Regarding the reflection of IND and COL, the articles are analysed by computer for the presence of the IND and COL words. For individualism words, they are "sole", "individual", "personal", "unique", "unique*", "self", "independent*", "oneself", "soloist", "identity". For comparison purposes, the Independent Samples T-Test is used for each total presence of words related to individualism and collectivism in two samples to see if there are statistical differences between them. It can be seen in the analysis that there is a statistical significant difference between Individualistic Words of the articles published on the websites of two governments. In particular, the mean of UK in this variant is higher than in VN, therefore, the articles of UK showed more individualism in this case. Therefore, Hypothesis 1a is supported.

Meanwhile, in the variant Collectivism words, there is no statistical significant difference between UK and VN. Hypothesis 1b is not supported in this case.

TABLE II
THE RESULT OF INDEPENDENT SAMPLES TEST OF THE PD WORDS BETWEEN UK AND VN

	N	Sig.	Sig. (2-tailed)	Mean
Power Distance Words				
VN	1073	.001576	0.109782	0.4
UK	1265			0.6

It's expected that if Hypothesis 1a is supported then Hypothesis 1b is also supported. However, this finding, the UK government showed the same collectivism words in the government communication with VN. In a previous study of (Jiang & Wei & Zhang, 2021) [39], the authors suggested that although individualism and collectivism's cultural dimension could impact the outcomes of government responses to the coronavirus pandemic, the quality of government works can change the direction. Another possibility is that the UK Government had promoted collectivism to the citizens in later communication (University of Kent, 2020) [40].

Regarding the PD, the articles were analysed for the words: "lock* down", "social distanc*", "contact trac*" and "quarantine". For comparison purposes, the Independent Samples T-Test also is used.

Because $\text{Sig. (2-tailed)} = 0.109782 > 0.05$, therefore, there is no statistically significant difference between UK and VN in this cultural dimension. Therefore, the hypothesis 2 “VN government communication mentioned more about TSI than UK” is not supported.

This result contradicts with the expectation that the country with high PD like VN should mention more about the technological intervention to mitigate the COVID-19. However, this finding is aligned with the statements that VN has been one of the successful countries in controlling this pandemic (Kris, Sarah & Azad, 2021; Pham et al, 2021 [41]). Therefore, this country would use less intervention technologies to force the citizens to limit their mobilities.

V. DISCUSSION AND LIMITATIONS

A. Practical implications

When comparing two countries represented for two different cultural directions, the West and the East, this study found that although these cultures share the same decreasing interest with Covid-19 information over the time, the difference between two cultures is not much different. Although the nation with high individualism such as the UK showed the tendency of caring about individuals, it also moved more in the direction of promoting collectivism to its citizens during the pandemic. The reason for it could be that the collectivism mindset has proven its effectiveness in the early stage of pandemic. Besides that, as the country represented for the Eastern culture, VN, has been quite successful in isolating the coronavirus, it allows the government of this country to mention the same amount of intervention technologies with the country with high PD like UK. This result implies that the governmental responses in Covid-19 are influenced by many other factors, not just cultural values and the directions for the reactions are similar between two differences in culture over the time.

B. Regional hybridity and the impact of globalisation on Vietnam's response to COVID-19

Vietnamese culture combined various values from neighbour countries for many decades. Luong (2016) by his observations, pointed that the cultural hybridity of the postmodern era is rooted in the West's particular historical and cultural trajectories does not work well in the society like Vietnam due to its own historical development. This cultural hybridity lead to the similarities as well as the differences between two countries, representing for the East and the West toward one global health crisis. The unique cultural characteristics of Vietnam can be seen in the slogan in the Covid-19, which is "fighting the epidemic like fighting the enemy", "getting the people as the root".

Second, as Vietnam used the quarantine to control various disease before such as MERS-CoV, A/H5N1 bird flu, it's natural for the government choosing this approach at first rather than living with the virus. Secondly, the Eastern culture value the collectivism, therefore, the well-being of majority is put before the individuals.

The third consideration is the political landscape of Vietnam. As a communist country, Vietnam share the same approach with China, with the emphasis is “the state of Viet-

nam is a state of the people, by the people and for the people”. Going along with this motto is the guidelines and policies in Covid-19 that put people at the center, as the goal and driving force of socio-economic development, demonstrate the superiority of the socialist regime.

C. Limitations

Although this study is a unique attempt to understand government communication in Covid-19 pandemic through a cultural lens, it also has many limitations. First of all, regarding the theoretical aspects, it just examined the difference in two cultural dimensions. Therefore, the effects of other dimensions are unknown and need more investigation. Another limitation is there many other cross-cultural models which could be used in such a study. A wider range of these models are needed for comparison of all the possible aspects of a national culture. Secondly, the data is just collected in one recent year time frame. If the data is collected from the beginning of the pandemic to present, it would provide a more complete picture of the government communication over the time. Besides that, this study focuses only on the news provided by the government while the government communication in the pandemic includes many activities, in various channels. More investigation in other forms of government communication should be conducted in the future to understand the whole landscape of this field. Finally, there is a lack of considering other information communication technologies (ICTs) such as the apps developed by the government or social media. It could be the main source of information about preventive measures for citizens. Exploring the intersection of ICTs and government activities could insight the movement of these information and its impacts on human behaviours.

D. Further directions

This study showed the importance of further cross-cultural research in governmental responses to Covid-19 pandemic, especially the change of these actions over the time and the comparison between different nations in the latter stage of this pandemic to answer the questions such as: How can we see the whole view of the governmental responses to the pandemic? What are the role of other factors in the intersection with cultural values of each country? If the reactions to the pandemic are standardized for all the countries? If we could use the good practice responses in dealing with the unknown risk in the future? The results could contribute to the knowledge for risk communication from the institutional levels.

REFERENCES

- [1] Marion Festing, Tobias Schumacher and Yong-Yueh Lee (2020) National responses to the COVID-19 pandemic – Observations and cultural interpretations. ESCP Impact Paper No. IP2020-81-EN. <https://academ.escpeurope.eu/pub/Chair%20IP2020-81-EN%20FESTING%20ET%20AL2.pdf>
- [2] Kris Hartley, Sarah Bales & Azad Singh Bali (2021) COVID-19 response in a unitary state: emerging lessons from VN, Policy Design and Practice, 4:1, 152-168, DOI: 10.1080/25741292.2021.1877923
- [3] Velamoor, Varadaraj & Persad, Emmanuel. (2020). Covid-19: Cultural perspectives. Asian Journal of Psychiatry. 53. 102439. 10.1016/j.ajp.2020.102439.
- [4] Airhihenbuwa, Collins & Iwelunmor, Juliet & Munodawafa, Davison & Ford, C.L. & Oni, T. & Charles, Agyemang & Mota, C. &

- Ikuomola, O.B. & Simbayi, Leickness & Fallah, M.P. & Qian, Z. & Makinwa, B. & Niang, Cheikh & Okosun, Ike. (2020). Culture Matters in Communicating the Global Response to COVID-19. *Preventing Chronic Disease*. 17. 10.5888/pcd17.200245.
- [5] James Darwin N Lagman, Raymond John D Vergara, Philip Joseph D Sarmiento (2021), Culture as a contributory factor in combatting the Covid-19 pandemic, *Journal of Public Health*, fdaa280, <https://doi.org/10.1093/pubmed/fdaa280>
- [6] Wang, Jiali & Bandera, Cesar & Yan, Zhipeng. (2021). Culture and Coronavirus Disease Statistics Public Health Through the Lens of Hofstede's Cultural Dimensions, A Multiple Regression Analysis. 10.21203/rs.3.rs-239030/v1.
- [7] Atalay, S., & Solmazer, G. (2021). The Relationship Between Cultural Value Orientations and the Changes in Mobility During the Covid-19 Pandemic: A National-Level Analysis. *Frontiers in psychology*, 12, 578190. <https://doi.org/10.3389/fpsyg.2021.578190>
- [8] Verma, R. (2020). China's diplomacy and changing the COVID-19 narrative. *International Journal*, 75(2), 248–258. <https://doi.org/10.1177/0020702020930054>
- [9] Biddlestone, M., Green, R. and Douglas, K.M. (2020), Cultural orientation, power, belief in conspiracy theories, and intentions to reduce the spread of COVID-19. *Br. J. Soc. Psychol.*, 59: 663-673. <https://doi.org/10.1111/bjso.12397>
- [10] Im, Hohjin & Wang, Peiyi & Chen, Chuansheng. (2021). The Partisan Mask: Political Orientation, Collectivism, and Religiosity Predict Mask Use During COVID-19. 10.31234/osf.io/9s58f.
- [11] Gokmen, Y., Baskici, C., & Ercil, Y. (2021). The impact of national culture on the increase of COVID-19: A cross-country analysis of European countries. *International journal of intercultural relations* : IJIR, 81, 1–8. <https://doi.org/10.1016/j.ijintrel.2020.12.006>
- [12] Lupu, D., Maha, L., & Viorică, E. (2020). COVID-19 Incidence in Europe: Drivers and Government Interventions. *Transylvanian ReviewOf Administrative Sciences*, 16(SI), 80-93. doi:<http://dx.doi.org/10.24193/tras.SI2020.5>
- [13] Gokmen, Y., Turen, U., Erdem, H., & Tokmak, İ. (2020). National Preferred Interpersonal Distance Curbs the Spread of COVID-19: A Cross-Country Analysis. *Disaster medicine and public health preparedness*, 1–7. Advance online publication. <https://doi.org/10.1017/dmp.2020.295>
- [14] Cao Z, Tang F, Chen C, Zhang C, Guo Y, Lin R, Huang Z, Teng Y, Xie T, Xu Y, Song Y, Wu F, Dong P, Luo G, Jiang Y, Zou H, Chen Y, Sun L, Shu Y, Du X (2020). Impact of Systematic Factors on the Outbreak Outcomes of the Novel COVID-19 Disease in China: Factor Analysis Study. *J Med Internet Res* 2020;22(11):e23853. doi: 10.2196/23853
- [15] Cecilia Heyes (2020). *Current Biology* volume 30, issue 20, PR1246-R1250 2020 DOI: 10.1016/j.cub.2020.08.086
- [16] Peacock, J. L. (1981). Durkheim and the social anthropology of culture. *Soc. Forces* 59, 996–1008. doi: 10.2307/2577977
- [17] Qingxue, Liu. (2003). Understanding Different Cultural Patterns or Orientations Between East and West. *Investigationes Linguisticae*. 9. 10.14746/il.2003.9.3.
- [18] Schwartz, S. H. (2011). "Values: cultural and individual," in *Fundamental Questions in Cross-Cultural Psychology*, eds F. J. R. van de Vijver, A. Chasiotis, and S. M. Breugelmans (Cambridge, MA: Cambridge University Press), 463–493. doi: 10.1017/CBO9780511974090.019
- [19] Yang, T., Silveira, S., Formuli, A., Paolini, M., Pöppel, E., Sander, T., & Bao, Y. (2019). Aesthetic Experiences Across Cultures: Neural Correlates When Viewing Traditional Eastern or Western Landscape Paintings. *Frontiers in psychology*, 10, 798. <https://doi.org/10.3389/fpsyg.2019.00798>
- [20] Thomas, Andrew & Jonason, Peter & Blackburn, Jesse & Kennair, Leif Edward & Lowe, Rob & Malouff, John & Stewart-Williams, Steve & Sulikowski, Danielle & Li, Norman. (2019). Mate preference priorities in the East and West: A cross-cultural test of the mate preference priority model. *Journal of Personality*. 10.1111/jopy.12514.
- [21] Jia, F., & Krettenauer, T. (2017). Recognizing Moral Identity as a Cultural Construct. *Frontiers in psychology*, 8, 412. <https://doi.org/10.3389/fpsyg.2017.00412>
- [22] Anwar, A., Malik, M., Raees, V., & Anwar, A. (2020). Role of Mass Media and Public Health Communications in the COVID-19 Pandemic. *Cureus*, 12(9), e10453. <https://doi.org/10.7759/cureus.10453>
- [23] Yan, Q., Tang, S., Gabriele, S., & Wu, J. (2016). Media coverage and hospital notifications: Correlation analysis and optimal media impact duration to manage a pandemic. *Journal of theoretical biology*, 390, 1–13. <https://doi.org/10.1016/j.jtbi.2015.11.002>
- [24] The UK COVID-19 news and information project (2020). Reuters Institute for the Study of Journalism. <https://reutersinstitute.politics.ox.ac.uk/UK-COVID-19-news-and-information-project>
- [25] Radwan, A. F., & Mousa, S. A. (2020). Government Communication Strategies during Coronavirus Pandemic: United Arab Emirates Lessons. *Journal of Health Management*, 22(4), 516–527. <https://doi.org/10.1177/0972063420983091>
- [26] Kim, D., & Kreps, G. L. (2020). An Analysis of Government Communication in the United States During the COVID-19 Pandemic: Recommendations for Effective Government Health Risk Communication. *World medical & health policy*, 10.1002/wmh3.363. Advance online publication. <https://doi.org/10.1002/wmh3.363>
- [27] Karen B. Sanders (2020) British government communication during the 2020 COVID-19 pandemic: learning from high reliability organizations, *Church, Communication and Culture*, 5:3, 356-377, DOI: 10.1080/23753234.2020.1824582
- [28] Kapoor, H., & Tagat, A. (2021). Worry much? Preventive health behaviours related to worry across countries amid COVID-19. *Journal of Health Psychology*. <https://doi.org/10.1177/1359105321999090>
- [29] Triandis, H. C. (2001). Individualism-collectivism and personality. *Journal of Personality*, 69(6), 907–924. <https://doi.org/10.1111/1467-6494.696169>
- [30] Gupta, M., Shoja, A., & Mikalef, P. (2021). Toward the understanding of national culture in the success of non-pharmaceutical technological interventions in mitigating COVID-19 pandemic. *Annals of operations research*, 1–18. Advance online publication. <https://doi.org/10.1007/s10479-021-03962-z>
- [31] Trubisky, P., Ting-Toomey, S., & Lin, S. (1991). The influence of individualism-collectivism and self-monitoring on conflict styles. *International Journal of Intercultural Relations*, 15, 65-84.
- [32] Twenge, J. M., Campbell, W. K., & Gentile, B. (2012). Increases in individualistic words and phrases in American books, 1960-2008. *PloS one*, 7(7), e40181. <https://doi.org/10.1371/journal.pone.0040181>
- [33] Pezzuti, T., & Leonhardt, J. M. (2020). How collectivistic values affect online word-of-mouth. *International Journal of Market Research*. <https://doi.org/10.1177/1470785320929200>
- [34] Pineda, A., Hernández-Santaolalla, V., & Rubio-Hernández, M. del M. (2015). Individualism in Western advertising: A comparative study of Spanish and US newspaper advertisements. *European Journal of Communication*, 30(4), 437–453. <https://doi.org/10.1177/0267323115586722>
- [35] Hofstede-insights. (2021a). UK. <https://www.hofstede-insights.com/country/the-uk/>
- [36] Hofstede-insights. (2021b). VN. <https://www.hofstede-insights.com/country/VN/>
- [37] Pearman, O., Boykoff, M., Osborne-Gowey, J., Aoyagi, M., Ballantyne, A. G., Chandler, P., Daly, M., Doi, K., Fernández-Reyes, R., Jiménez-Gómez, I., Nacu-Schmidt, A., McAllister, L., McNatt, M., Mocatta, G., Petersen, L. K., Simonsen, A. H., & Ytterstad, A. (2021). COVID-19 media coverage decreasing despite deepening crisis. *The Lancet. Planetary health*, 5(1), e6–e7. [https://doi.org/10.1016/S2542-5196\(20\)30303-X](https://doi.org/10.1016/S2542-5196(20)30303-X)
- [38] JIANG, Shuguang & Wei, Qian & Zhang, Luyao. (2021). Individualism vs. Collectivism and the Early-Stage Transmission of COVID-19.
- [39] University of Kent. (2020, June 29). Collectivism drives efforts to reduce the spread of COVID-19. *ScienceDaily*. Retrieved May 23, 2021 from www.sciencedaily.com/releases/2020/06/20200629120140.htm
- [40] Pham, Quang & Stuart, Robyn & Nguyen, Thuong & Luong, Quang & Tran, Quang & Thai, Pham & Phan, Lan & Dang, Tan & Tran, Duong & Do, T. & Mistry, Dina & Klein, Daniel & Abeysuriya, Romesh & Oron, Assaf & Kerr, Cliff. (2021). Estimating and mitigating the risk of COVID-19 epidemic rebound associated with reopening of international borders in VN: a modelling study. *The Lancet Global Health*. 10.1016/S2214-109X(21)00103-0.
- [41] M. Young, *The Technical Writer's Handbook*, Mill Valley, CA: University Science, 1989.
- [42] Luong Van Huy (2016). Cultural Hybridity and Postmodernism: Vietnam and the West. *VNU Journal of Science*, Vol. 32, No. 1S (2016) 61-67

* means any words is accepted

The Influence of Traditional Cultural Factors on the Professional Ethics in Accounting and Auditing in Vietnam

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Abstract—In many countries, especially Asian countries, the influence of traditional cultural factors on professional ethics is clearly shown, especially in the accounting and auditing industry. This relationship has been present in previous studies with different spaces and times. This paper aims to reaffirm the influence of traditional cultural factors on the professional ethics in accounting and auditing in Vietnam. This study surveyed enterprises operating within Hanoi from October 2021 to January 2022. The study analyzed the degree of influence of these factors on the professional ethics in accounting and auditing in the enterprise and from that some solutions were proposed to improve the problem of professional ethics in accounting and auditing.

Index Terms—Professional ethics of accounting and auditing; cultural and traditional factors; affect.

I. INTRODUCTION

In society, we need to work ethically, conscientiously and the code of conduct of the profession. Professional ethics are standards and principles governing the behavior of practitioners in a specific career field, to ensure practitioners perform their tasks with good quality, comply with the provisions of law, and create a trust for the community about the quality of services provided. This is a difficult thing to do. It is also no exception for the accounting and auditing profession, especially in the current digital age. In many countries, especially Asian countries, the influence of traditional cultural factors on professional ethics is clearly shown, affecting the rise of socioeconomic status in general and in businesses in particular. This relationship has been present in previous studies with many different spaces and times; however, it is necessary to reaffirm this relationship by quantitative method to match the current trend in Vietnam.

This paper aims to identify cultural and traditional factors that affect the professional ethics of accounting and auditing. Analyze the impact of such factors on the professional ethics of accounting and auditing and state several solutions to raise the issue of professional ethics accounting and auditing. This study investigated enterprises operating within Hanoi, accounting and auditing professions, and tax authorities from October 2021 to January 2022 to determine the influence of traditional cultural factors on accounting and auditing professional ethics in enterprises in Hanoi.

II. LITERATURE REVIEW

A. International researches

Jeffrey R. Cohen et al. (1992) researched the cultural and socioeconomic factors that may hinder the acceptance and implementation of an occupation's international code of conduct. The research has applied the set of "Guidelines on Ethics for Professional Accountants" issued by the International Federation of Accountants (1990). The authors used four values related to Hofstede's work: Power distance, uncertainty avoidance, individualism, and masculinity. Socioeconomic factors are The level of development of the profession and The availability of economic resources. The authors assessed the applicability and relevance of the accounting guidelines and discussed the implications for accounting and other professions.

Rebecca LeFebvre (2011) studied the codes of conduct of 50 leading U.S. and Indian public companies to see how cultural differences have influenced the business ethics of corporations. Cultural differences have created enormous contrasts in work ethic in both countries such as the strict rules that apply to all employees in the business in the United States but in India, it only applies to senior management. Or in the United States, employees can anonymously denounce the violations of their colleagues, but in India, they can't... However, the common goal of both is strong expectations to protect the common interests of the business and bring the highest trust to the public when it comes to working there.

Olga Volkova (2016) points out the interdependence of accounting practices that ensure transparency in society, with the development of visual culture (objects that suggest their visual perception and the technologies that support them). The synchronicity between accounting revolutions and significant visual culture and technology changes is manifested in the 2nd millennium. General periodization is given to accounting practices and visual culture, based on changes in the mechanism of transparency in society.

B. Researches in Vietnam.

Nguyen Thi Bich Tram, Le Thi Thanh Xuan (2015) shown that there are three factors affecting the professional ethics of employees, including An absolute view of personal ethical values, Organizational policies for ethical behavior, and Awareness of ethical behavior of colleagues. In addition, 7 factors affect the formation of a new workforce's perception of professional ethics. Finally, the authors conclude

that: there are differences in the perception of professional ethics among the different groups of surveyed people in terms of the professional field, profession, type of organization, and work experience.

Le Anh Linh et al. (2020) studied 225 samples together with 6 factors: Equality, fairness; Honour; Stability and development; Solidarity, collective; Harmonization in relations, and Personal ethics affecting professional ethics. However, apart from these 6 factors, some other factors affect this issue.

Le Anh Tuan et al. (2021) evaluated the factors affecting the perception of professional ethics of accounting students at universities in Da Nang city, Vietnam. Through the use of mixed studies, the authors found that there are 3 factors affecting the perception of professional ethics of accounting students, respectively: Specialized law, Curriculum education, and Personalization. The results of this study aim to propose solutions to raise awareness of professional ethics of accounting students of universities in Da Nang city.

Le Thi Thu Ha (2021) has systematized the theoretical basis and research overview of factors affecting professional ethics of accounting and auditing based on the synthesis of some studies that have been carried out in the

world. The results show that there are many different factors, including factors belonging to individuals such as age, gender, work experience, as well as work environments such as professional ethics standards, corporate ethical values or national cultural environment can affect the ethical behavior of individuals. Each country that wants to develop socio-economic needs to have resources including natural resources, capital, science, technology, and people; in which human resources are the most important factor. For countries in Asia, national culture and professional ethics in human resources are one of the capital sources of business organizations, a resource for the development of enterprises in the global integration economy. In particular, experience in many countries shows that the impact of ethnic cultural factors affects the professional ethics of employees in enterprises, especially for accountants and auditors. This relationship directly impacts the development of the accounting and auditing industry in particular and all industries in general.

Doan Thanh Nga et al. (2021) considered the exact direction and importance of cultural factors such as education, gender, power distance, and risk-taking propensity. Data were collected from 194 interviewees in three groups: general business students, accounting students, professional auditors in Vietnam. Pathway analysis is used to examine the impact of cultural factors on cognitive ethics, ethical judgment, and moral intent in various questionable situations at the individual level such as independent variables, mediating variables, and moderating variables. This indicator is the percentage of respondents who believe that a particular behavior is unethical based on a set of ethical principles. The results show the differences between the two groups of students and experts on measures, suggesting that all four factors influence ethical decision-making. Based on the research results, some recommendations are proposed related to 4 factors to improve the ethics of the future generation of auditors in Vietnam. This research also contributes to the theory of culture in particular and the cultural intersection in

general in the field of accounting and auditing in Vietnam in the process of international integration.

In conclusion, it can be seen that these studies have only stopped in a small number of parts, have not expanded into many components related to these two fields, the research subjects on the geographical location are too wide, so the opinions are only general but not deeply focused on specific research. Therefore, the new point of this article is that we want to research more deeply about cultural and traditional factors affecting professional ethics of accounting and auditing at enterprises in Hanoi.

III. THEORETICAL

A. Overview of professional ethics of accounting and auditing

Professional ethics are "standards and qualities of an individual in the process of working, work, a certain activity, ethical qualities, principles, and behavioral measures of professional ethics that depend on each possible industry and field" (Nguyen Van Phi, 2021). Moral qualities in the process of working and working are recognized and promoted by the state and society. Professional ethics also has a strong relationship with personal ethics, which is expressed partly through personal ethics. At any stage of history or any profession, professional ethics is an invaluable asset to everyone and is recognized and respected by society. In a state organization, social organization, or even in enterprises, professional ethics is extremely important because it expresses the cultural level and prestige of the organization or enterprise.

Professional ethics in accounting and auditing is the system of ethical principles applicable to individuals and organizations practicing in the field of accounting and auditing. It is one of the most important requirements for practitioners in the field of accounting and auditing stemming from the importance of accounting and financial information of enterprises. Therefore, the responsibility of professional accountants and auditors must not only stop at meeting the needs of single customers or enterprises where professional accountants and auditors work but must also grasp and comply with specific standards (Ministry of Finance, 2015). In addition, professional accountants must ensure compliance with five basic ethical principles: Integrity; Impartiality; Professional competence and discretion; Confidentiality; Professional standing.

B. Overview of national culture and traditions

National culture and traditions are a concept made up of three concepts, culture, tradition, and ethnicity.

+ Culture is the product (physical and mental) that people create.

+ Traditions are not modern things or things from the past.

+ Ethnicity is said here to be different ethnicities converging in a territory.

National culture and traditions are the whole material and spiritual products of 54 Vietnamese ethnics who create or acquire essences from other peoples formed from the past and passed on from generation to generation. Therefore,

Vietnamese culture in general and Vietnamese culture in enterprises, in particular, are very clearly expressed through the following characteristics: Community and autonomy; Spirit of solidarity, collectivity; Equality, fairness; Harmony in relations; Stability and development; Fusion; Personal ethics; Honourability.

IV. RESEARCH METHODS AND MODELS

A. Research methods

The authors used two research methods:

- Qualitative method: Through the collection, information, analysis, synthesis to the theoretical basis system related to the topic's content, the authors has raised some preliminary questions. The authors conducted the editing by (interviewing) online four experts in accountants and auditors to calibrate the questionnaire and from there can come up with an accurate and appropriate questionnaire. The authors had a complete and widely available questionnaire, collecting answers from survey participants.

- Quantitative method: The authors analyzed data collected on the following software: SPSS, Stata, Eview to evaluate the scale using Cronbach's Alpha reliability coefficient; EPA discovery factor analysis; correlation analysis, and regression analysis.

The following, the authors will describe in detail each specific stage:

- Phase 1: Set up a questionnaire

- Based on the theoretical premises, the concepts of ethics, accounting and auditing professional ethics, characteristics of traditional national culture, and the relationship between traditional national culture and professional ethics, the authors developed a questionnaire on the influence of cultural factors, traditional to professional ethics of accounting, auditing.

- The authors conducted in-depth interviews with two accounting experts, one tax expert, one audit specialist to assess the reasonable and objective level of the appropriateness of the variables included in the questionnaire. Thereby calibrating the questionnaire, adding the necessary questions, and removing the questions that were not in the proper focus, the team came up with an official questionnaire. The questionnaire is designed using the Likert scale with five levels: 1- Completely disagree; 2- Disagree; 3- Neutral; 4- Agree; 5- Completely agree.

- Phase 2: Survey questionnaires and collect data

- Secondary data: The authors has identified the information necessary for the research tool, including the theoretical premises, concepts, characteristics, and expressions presented in the above section.

- Primary data: The authors collected data mainly through questionnaires. This is a necessary and feasible method, consisting of 3 demographic questions: Gender, Workplace, Job Placement and 27 questions with seven independent variables: Equality and Fairness; Stability and development; Honors; Solidarity and collective; Harmony in relations; Personal ethics; Learn to advance. The authors conducted through ways to collect data, including sending questionnaires on Google docs to accounting and auditing groups on

social networking sites; Direct surveys through questionnaires that have been printed on paper.

- Phase 3: Sample design

- Based on research by Hair et al. (1998) for reference to the expected sample size. Accordingly, the minimum sample size is five times the total number of observed variables. This is the appropriate sample size for research that uses factor analysis (Comrey, 1973; Roger et al., 2006).

- $n=5*m$, where: m is the number of questions in the article.

- In the article, there are 27 observed variables, so the minimum sample size number is: $5*27=135$.

- With 135 minimum sample size above, but to ensure the smallest accuracy and error, the team took 213 survey samples. The authors will also select surveys on a variety of characteristic factors according to different ages, positions, and genders so that the data is generalized. The group was surveyed between October 2021 and January 2022.

- Phase 4: Processing and analyzing data

Based on the collected data, the authors processed the data:

- Remove substandard surveys such as: Not filling in enough information ...

- The collected data will be presented in an Excel file to be easily looked up and calculated data.

And after processing the data, the authors conducted data analysis through SPSS software.

B. Building research models and hypotheses

1) Research framework

Based on the theory of professional ethics of accounting and auditing, traditional Vietnamese cultures, along with the discussion of the expert group, the authors have come up with the research model as follows

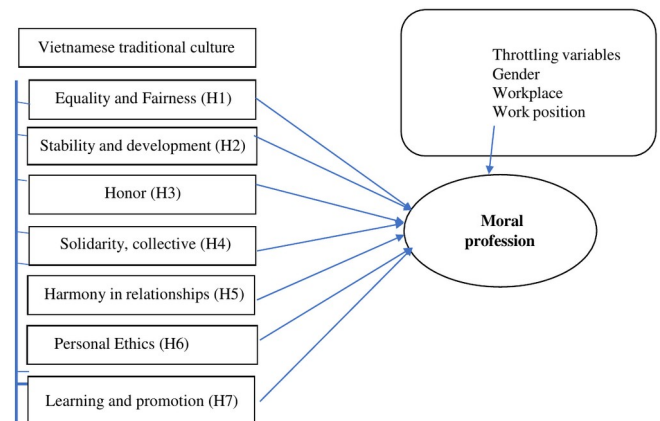


Fig 1. Research Model

2) The content describes the variables, measurement methods, and research hypotheses

- Independent variables

• Equality and Equity Factor (VCB)

In the history of Vietnam, this attribute of individuals often develops into the collective resilience of the whole nation to gain fairness and equality of government. Hofstede

(1991), Phan Dinh Quyen (2008) have the same comments: Vietnamese people belong to neutral culture (hide, suppress emotions). For the accounting and auditing profession, gender equality, positions, and powers of accountants and auditors are also put first.

H1: Equality and fairness are Vietnamese cultural factors that affect the professional ethics of accounting and auditing.

• **Stability and Development Factor (VOD)**

Phan Ngoc Minh (2006) said that Vietnamese people, stemming from their own needs and interests, are never satisfied with the objective conditions they already have but always create new objective conditions. Drucker (2008) also argues that employees working in the business should share long-term goal values, missions, or philosophies to ensure the stability of work and family life of employees. For Vietnamese accountants and auditors, being assured of peace at work and family makes them focused and put in their best efforts.

H2: Stability and development of Vietnamese cultural factors affect the professional ethics of accounting and auditing.

• **Honor factor (VVD)**

According to Nguyen Hong Phong (2000), respect and the desire to be respected is the mental entity that exists independently. Consideration is one of the main elements of the Vietnamese value system. Nguyen Hai San (2007) analyzed honor in an organization: The reward of employee contributions, reflecting the behavior, needs, and endurance of people in the organization. For Vietnamese accountants and auditors, the desire to be promoted is inevitable.

H3: Honorability belongs to the cultural factor of Vietnam affecting the professional ethics of accounting and auditing.

• **Element of solidarity, collective (VDK)**

According to Tran Ngoc Them (1999), the spirit of community, personal cohesion - Family - Village - Organization are the advantages in the traditional spiritual values of the Vietnamese people. Explaining the synergy resonance from the element of solidarity, Hofstede (1991) determined that in a culture that values collectivism, the

organization takes care of the interests of its members, and members must operate and behave according to organizational interests. Vietnamese accountants and auditors are teamwork, regular solidarity, and always highly appreciated.

H4: Solidarity and collective Vietnamese cultural factors affect the professional ethics of accounting and auditing.

• **Harmonization factor in relationships (VQD)**

According to Tran Ngoc Them (1999), the village's autonomy is a fundamental feature of traditional Vietnamese culture that creates a patriarchal and religious mind. Tran Dinh Huou (1996) said that for the historical process, the Vietnamese mind influenced by Confucius thought deeper the path of humanism, loving rule, and respect for democracy. Vietnam's traditional culture unites values of respect and democracy; patriarchy and respect always accompany and develop. Characteristics: "Harmonization in relationships" is essential in business management, is the harmony between superiors and subordinates, each relationship between decision-making and decision enforcement. There-

fore, peace in the relationship affects the general professional ethics in general and the professional ethics of accounting and auditing in particular.

H5: Harmony in relations belonging to Vietnamese cultural factors affects the professional ethics of accounting and auditing.

• **Personal Ethics (DDCN)**

Some studies have shown that ethical decisions are influenced by factors that belong to each individual. Individual factors are defined as personal values (including knowledge, attitudes, and intentions) that are personal experiences, and these values have an important influence on the attitudes and decision-making behaviors of individuals in the profession (Le Thi Thanh Xuan et al. 2015). Contact with the accounting and auditing profession, personal ethics expressed through honesty, objectivity, prudence, confidentiality, and professional status of accountants and auditors. From there, it can be seen that personal ethics and work ethic are closely related.

H6: Personal ethics are cultural factors that affect the professional ethics of accounting and auditing.

• **Learning and promotion factors (VHH)**

Tran Ngoc Them (1999) said that in the heart of traditional Vietnamese society, educated people are valued and topped the list of professions. Cultural researcher Lewis (1999) has commented that the value of the Vietnamese mind is to learn and be highly qualified. For

the profession of accountants and auditors, accountants, and auditors must always cultivate professional knowledge, learn knowledge from colleagues, domestic and foreign research materials to improve their qualifications as well as improve their positions.

H7: Learning and promotion belong to cultural factors that affect the professional ethics of accounting and auditing.

The above independent variables are measured through the application of the Likert scale, the surveyor will answer the questions with 5 levels: (1) Completely disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Completely agree. The above independent variables are measured by the following criteria

3) *Dependent variables*

Professional Ethic (DDNN). The dependent variable is built on five requirements for accountants and auditors in the Accounting and Auditing Professional Ethics Standards. This factor is measured through the following scales:

The quantitative research model is defined as:

$$DDNN = \beta_0 + \beta_1 * VCB + \beta_2 * VOD + \beta_3 * VVD + \beta_4 * VDK + \beta_5 * VQD + \beta_6 * DDCN + \beta_7 * VHH + e_i$$

V. ANALYSIS AND DISCUSSION OF RESEARCH RESULTS

A. *Statistical analysis describing variables*

According to the results of the study sample:

In terms of gender, there is a disparity between men and women, of which 49 are men, 164 are females, respectively, with 23% and 77%.

TABLE 1: SPECIFIC CRITERIA FOR MEASURING DEPENDENT VARIABLES

Element	Symbol	Criteria	Source
Equality and Equity	VCB1	The income of accountants and auditors is suitable for their work.	Dinh Phi Ho, Hoang Trong Tan (2012); Le Anh Linh et al (2020)
	VCB2	The policy of promotion and reward for accountants and auditors is fair.	
	VCB3	There is no bias in considering salary increases, promotions for accountants and auditors.	
	VCB4	Superiors always consistently enforce policies related to accountants and auditors	
Stability and Development	VOD1	Accountants and auditors are invested by the company, encouraging learning and skill development.	Drucker (2008); Dinh Phi Ho, Hoang Trong Tan (2012); Le Anh Linh et al (2020)
	VOD2	Accountants and auditors are allowed to share and understand the company's objectives.	
	VOD3	The company of accountants and auditors has a clear development strategy.	
Honor	VVD1	Accountants and auditors always receive praise and recognition from superiors when performing good work.	Nguyen Hai San (2007); Dinh Phi Ho, Hoang Trong Tan (2012); Le Anh Linh et al (2020)
	VVD2	Accountants and auditors receive rewards corresponding to the results of contributions.	
	VVD3	Accountants and auditors always know the bonus levels and benefits of the company.	
	VVD4	Accountants and auditors are involved in decision-making.	
Unite, collective	VDK1	Accountants and auditors prefer teamwork (team, department) rather than individual work.	Hofstede (1991); Dinh Phi Ho, Hoang Trong Tan (2012); Le Anh Linh et al (2020)
	VDK2	Accountants and auditors are willing to work together to get the job done most efficiently.	
	VDK3	Accountants and auditors always receive the help and cooperation of other departments in the company.	
	VDK4	The company always encourages accountants and auditors to cooperate to carry out the work.	
Harmony in relationship	VQD1	Decisions from superiors are always supported by accountants and auditors.	Dinh Phi Ho, Hoang Trong Tan (2012); Le Anh Linh et al (2020)
	VQD2	Accountants and auditors are involved in business decision-making.	
	VQD3	Accountants and auditors are fully informed and thoroughly analyzed before making a decision.	
Moral individual	DDCN1	For the benefit of individuals, accountants and auditors should not violate the company's regulations.	Le Thi Thanh Xuan et al (2017)
	DDCN2	Accountants and auditors should not harm the dignity and honor of others.	
	DDCN3	Accountants and auditors should not harm the welfare of others.	
	DDCN4	Accountants and auditors should not harm the physical well-being of others.	
	DDCN5	Accountants and auditors should not adversely affect the psychology of others.	
Learn, promotion	VHH1	The company always organizes training programs for accountants and auditors to improve their knowledge.	Dinh Phi Ho, Hoang Trong Tan (2012)
	VHH2	Accountants and auditors are always trained in working skills as well as improving their qualifications through discussions with experts.	
	VHH3	Accountants and auditors always take advantage of the opportunity to advance in the job.	
	VHH4	Accountants and auditors always have the opportunity to develop all their skills at work.	

TABLE 2: SPECIFIC CRITERIA FOR DEMONSTRATING PROFESSIONAL ETHIC

Element	Criteria	Source
DDNN1	Accountants and auditors are frank, honest in all professional and business relationships.	Dinh Phi Ho, Hoang Trong Tan (2012)
DDNN 2	Accountants and auditors do not let bias, conflicts of interest, or any unreasonable influence dominate professional and business judgments.	
DDNN 3	Accountants and auditors always maintain professional competence and prudence in their work.	
DDNN 4	Accountants and auditors always comply with the company's information security regulations and do not use the information for personal purposes.	
DDNN 5	Accountants and auditors always comply with relevant laws and regulations, avoiding actions that undermine professional reputation.	

Regarding the place of work, state-owned enterprises had 54 participants in the survey, corresponding to 25.4%; private enterprises had 26 participants in the survey, corresponding to 12.2%; Co., Ltd. has 12 people, corresponding to 5.6%; 1 member limited liability company has 7 people corresponding to 3.3%; the joint-stock company has 24 applicants with 11.3%; the joint venture enterprise has 4 people corresponding to 1.9%; 100% foreign-owned companies accounted for 6 people with 2.8%, the rest were other types of enterprises with 80 people, corresponding to 37.6%.

B. Analysis of regression model

1) Correlation analysis between variables

The correlation coefficient of VCB, VVD, VDK, VQD, DDCN, and VHH variables with DDNN variables of 0.617, 0.589, 0.539, 0.608 at a meaningful level of 1% indicates a highly close variable correlation between these independent variables and the DDNN variable. The VOD variable has a slightly lower correlation coefficient of 0.440, but this is also a number that represents a very close homomorphic correlation with the dependent variable.

2) Rate scale by Cronbach's Alpha reliability coefficient

In this study, there were a total of 8 scales (1 dependent variable and 7 independent variables), and each scale had a measurement of >3 variables, so the scales all assessed the reliability of Cronbach's Alpha

Table 4 results show that the general Cronbach's Alpha coefficient of independent variables is good (from the lowest VCB is 0.751 to the highest DDCN is 0.83) and is larger than the standard (0.6), so the scales of independent variables are acceptable in terms of reliability. All specific scales of variables have a coefficient of correlation of total correction variables reaching a value of 0.646 or higher, indicating that the measurement level of variables is excellent.

3) Discovery Factor Analysis

The authors included seven factors in the EFA analysis, which analyzed these factors' convergence value and differential value. In addition, the authors also used matrix rotation to identify the extractor and thereby find new factors.

		Correlations					
		DDNN	VCB	VOD	VVD	VDK	VQD
DDNN	Pearson Correlation	1	.617**	.440**	.589**	.539**	.608**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	213	213	213	213	213	213
VCB	Pearson Correlation	.617**	1	.411**	.387**	.376**	.410**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	213	213	213	213	213	213
VOD	Pearson Correlation	.440**	.411**	1	.361**	.355**	.383**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	213	213	213	213	213	213
VVD	Pearson Correlation	.589**	.387**	.361**	1	.389**	.402**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	213	213	213	213	213	213
VDK	Pearson Correlation	.539**	.376**	.355**	.389**	1	.433**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	213	213	213	213	213	213
VQD	Pearson Correlation	.608**	.410**	.383**	.402**	.433**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	213	213	213	213	213	213
DDCN	Pearson Correlation	.556**	.395**	.383**	.339**	.373**	.401**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	213	213	213	213	213	213
VHH	Pearson Correlation	.591**	.427**	.362**	.395**	.352**	.388**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	213	213	213	213	213	213

(Source: SPSS running results)

TABLE 4: ASSESSMENT OF SCALE RELIABILITY

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha of the Equal and Fair Scale: 0.79				
VCB1	11.83	5.613	.615	.731
VCB2	11.76	5.636	.579	.749
VCB3	11.79	5.262	.619	.729
VCB4	11.77	5.666	.585	.746
Cronbach's Alpha of the Stability and Development Scale: 0.751				
VOD1	8.03	2.721	.598	.646
VOD2	7.99	2.769	.563	.686
VOD3	7.92	2.776	.576	.671
Cronbach's Alpha of the Honor Scale: 0.81				
VVD1	11.68	5.965	.675	.739
VVD2	11.63	6.263	.693	.735
VVD3	11.70	6.277	.546	.801
VVD4	11.81	5.927	.611	.771
Cronbach's Alpha of the Collective Solidarity scale:0.82				
VDK1	12.15	4.999	.644	.772
VDK2	12.04	5.310	.582	.800
VDK3	12.20	5.152	.633	.777
VDK4	12.13	4.932	.710	.741
Cronbach's Alpha of the Harmony in Relation scale: 0.754				
VQD1	7.62	3.001	.584	.670
VQD2	7.69	2.685	.586	.672
VQD3	7.45	3.031	.583	.672
Cronbach's Alpha of Personal moral scale: 0. 83				
DDCN1	16.85	8.100	.705	.772
DDCN2	16.66	8.594	.628	.795
DDCN3	16.67	8.799	.602	.803
DDCN4	16.64	8.834	.582	.808
DDCN5	16.68	8.786	.618	.798
Cronbach's Alpha of the Advanced learning Scale: 0.814				
VHH1	11.92	5.578	.657	.756
VHH2	11.99	5.641	.558	.805
VHH3	11.89	5.723	.621	.773
VHH4	11.91	5.450	.708	.732

(Source: SPSS running results)

According to Meyers (2006), the most common method combines Principal Components Analysis and Varimax rota-

tion. So the authors applied this method to analyze the factors.

• KMO and Bartlerrs inspection

Table 5: KMO and Bartlett's Test of the original 7 factors

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.862
Approx. Chi-Square	1733.865
Bartlett's Test of Sphericity Df	253
Sig.	.000

(Source: SPSS running results)

TABLE 6: ROTATIONAL MATRIX OF FACTORS

Rotated Component Matrix							
	Component						
	1	2	3	4	5	6	7
VCB4	.747						
VCB3	.731						
VCB1	.711						
VCB2	.706						
DDCN2		.754					
DDCN4		.720					
DDCN5		.712					
DDCN3		.676					
VQD1			.788				
VQD3			.747				
VQD2			.716				
VDK1				.756			
VDK2				.743			
VDK3				.736			
VHH1					.808		
VHH3					.734		
VHH2					.660		
VVD3						.768	
VVD4						.753	
VVD1						.689	
VOD1							.811
VOD2							.758
VOD3							.691

(Source: SPSS running results)

According to the data of the table above, the KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) value of the scale of factors affecting the Professional ethics of accounting and auditing in Vietnam is 0.862 (meeting condition $0.5 < \text{KMO} < 1$). The new model demonstrates that the variables included in the analysis are meaningful and consistent with the set factors. In addition, Bartlett's Test of Sphericity has $\text{Sig} = 0.000 < 0.05$ demonstrating the scales of 7 factors eligible for EFA analysis.

The sample size is 213, so the factor loading factor is 0.5. From the result table, the factor load factor coefficients are more significant than 0.5, and there are no cases where both elements are uploaded simultaneously with a close load factor. Thus, the expressions that satisfy the above condition, and after analyzing the aspect, these independent factors are maintained, not increased or decreased.

The seven factors extracted after performing the matrix rotation have shown a high convergent and distinguishing value (the factor weights of all variables are more significant than 0.5). The KMO system reaching 0.862 has proved that the variables included in the factor analysis are meaningful, and the analysis model is in line with the specified Factor. On the other hand, Bartlett's Test of Sphericity has $\text{Sig} = 0.000 < 0.05$. This proves that the H_0 hypothesis: "Variables are not correlated with each other" is refused, i.e., variables are linearly correlated with the representative Factor. In addition, the total variance of the seven extracted factors is

worth $1.16 > 1$. It reaches 65.915%, which means that 65.915% of the changes of the Factor explained by the observed variables (components of the Factor) and the number of determinants are entirely satisfactory.

With the above values, we can conclude that the EFA model of the elements of traditional culture affecting the professional ethics of accounting and auditing in Vietnam is appropriate.

4) Regression Analysis

Analysis of the multiple regression model with 7 independent variables introduced using the Entered method, the regression model with $R^2 = 0.694$; R^2 correction = 0.684. We notice that R^2 correction is more minor than R^2 , so we use it to assess the model's suitability will be safer because it does not inflate the appropriateness of the multivariate regression model (Hoang Trong & Chu Nguyen Mong Ngoc, 2008).

R^2 correction = 0.684 indicates about 68.4% of the variability of cultural and traditional factors affecting the professional ethics of accounting - auditing is explanatory, and independent variables in the Durbin-Watson statistical quantity model ($d = 1.879 < 2$) show no correlation between the residuals. This means that the model does not violate the assumption of the independence of the error.

In the table 9, the value $F = 66.520$ makes sense to $\text{Sig} = 0.000 < (0.05)$ means that the linear regression model is consistent with the actual data collected, and the variables included are statistically significant at a meaningful level

TABLE 7: SUMMARY OF VARIANCES CITING DISCOVERY FACTORS

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.057	30.682	30.682	7.057	30.682	30.682
2	1.581	6.873	37.555	1.581	6.873	37.555
3	1.501	6.527	44.082	1.501	6.527	44.082
4	1.357	5.899	49.982	1.357	5.899	49.982
5	1.314	5.712	55.694	1.314	5.712	55.694
6	1.191	5.178	60.872	1.191	5.178	60.872
7	1.160	5.043	65.915	1.160	5.043	65.915
8	.795	3.458	69.373			
9	.776	3.376	72.749			
10	.641	2.785	75.534			
11	.589	2.562	78.096			
12	.574	2.494	80.590			
13	.552	2.399	82.989			
14	.518	2.251	85.240			
15	.504	2.191	87.431			
16	.472	2.051	89.482			
17	.436	1.895	91.377			
18	.394	1.714	93.091			
19	.372	1.618	94.709			
20	.342	1.486	96.195			
21	.333	1.447	97.642			
22	.289	1.256	98.898			
23	.253	1.102	100.000			

(Source: SPSS running results)

of 5%. Thus, the linear regression model for this sample can be expanded and applied to the whole.

The consideration of what factors impact professional ethics directly will be done using a multivariate linear regression equation.

Table 10 indicates that Sig. of the 5 variables explaining VCB, VVD, VQD, DDCN, VHH is 0.000 and the VDK

interpretation variable is 0.003 is less than 0.05; that is, these 6 variables have statistical significance with a reliability of 95%, so they are suitable and meaningful to the model. Void variable type because Sig. = 0.86 > 0.05, so the dependent variable has no statistical significance.

TABLE 8: ASSESSMENT OF THE SUITABILITY OF THE REGRESSION MODEL
MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.833 ^a	.694	.684	.47181	1.879

a. Predictors: (Constant), VHH, VDK, VOD, VVD, DDCN, VCB, VQD

b. Dependent Variable: DDNN

(Source: SPSS running results)

TABLE 9: TEST THE HYPOTHESIS OF SUITABILITY FOR THE OVERALL MODEL ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	103.656	7			
1 Residual	45.635	205	14.808	66.520	.000 ^b
Total	149.291	212	.223		

a. Dependent Variable: DDNN

b. Predictors: (Constant), VHH, VDK, VOD, VVD, DDCN, VCB, VQD

(Source: SPSS running results)

TABLE 10: HYPOTHESIS TEST

The consideration of what factors impact professional ethics directly will be done using a multivariate linear regression equation.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
(Constant)	-.974	.249		-3.908	.000		
VCB	.268	.052	.243	5.124	.000	.666	1.502
VOD	-.009	.049	-.008	-.176	.860	.711	1.406
VVD	.223	.046	.222	4.822	.000	.704	1.420
VDK	.156	.052	.137	2.974	.003	.700	1.428
VQD	.227	.050	.218	4.591	.000	.662	1.512
DDCN	.195	.055	.166	3.573	.000	.694	1.441
VHH	.217	.050	.201	4.304	.000	.682	1.465

(Source: SPSS running results)

5) Discussion of research results

After analyzing the regression, we obtained the following model:

$$\begin{aligned} \text{DDNN} = & -0.974 + 0.268 \cdot \text{VCB} + 0.223 \cdot \text{VVD} \\ & + 0.156 \cdot \text{VDK} + 0.227 \cdot \text{VQD} + 0.195 \cdot \text{DDCN} \\ & + 0.217 \cdot \text{VHH}. \end{aligned}$$

Table 10 indicates that Sig. of the 5 variables explaining VCB, VVD, VQD, DDCN, VHH is 0.000 and the VDK interpretation variable is 0.003 problems less than 0.05, that is, these 6 variables have statistical significance with a reliability of 95%, so they are suitable and meaningful to the model. In contrast, the VOD variable with Sig. is 0.860 > 0.05, but there is no relationship between the VOD independent variable and the dependency variable. In addition, the Beta coefficient of 6 variables VCB, VVD, VDK, VQD, DDCN, VHH is 0.243, respectively; 0.222; 0.137; 0.218; 0.166; 0.201 is greater than 0 indicating the positive effect of these 6 variables on the professional ethics of accounting and auditing. In particular, the VCB variable has the largest regression factor of 0.268, so the VCB (reliability) variable has the greatest impact on accounting and auditing professional ethics, followed by VQD, VVD, VHH, DDCN, VDK, and finally VOD.

Based on the development of the research model of Dinh Phi Ho, Hoang Trong Tan (2012) in combination with previous studies, the team has built a model of the influence of traditional cultural factors on the professional ethics of accounting and auditing in Vietnam, use a combination of methods of comparing and synthesizing secondary information from available documents and quantitative research methods. The results are as follows:

Accepting the H1, H3, H4, H5, H6, H7 hypotheses but H2 hypothesis: "Stability and development of Vietnamese cultural factors have an impact on the professional ethics of accounting and auditing," with sig= 0.86>0.05 rejected.

In summary, there are 6 factors belonging to Vietnamese cultural and traditional factors that affect the professional ethics of accounting and auditing at Vietnamese enterprises: (1) Equality- fairness, (2) Honor,

(3) Solidarity, collective; (4) Harmony in relations; (5) Personal ethics; (6) Learning and promotion. All factors are consistent with market data.

The level of impact of the factors is different, but all have a favorable effect on the dependent variable. In which the aspect of "Equality and fairness" has the most substantial impact, followed by the factor "Harmony in relations," followed by "Honor," and finally the factor with the most negligible effect is the factor "Collective solidarity."

VI. DISCUSSION AND CONCLUSION

Based on the research results of the topic, the authors propose several recommendations to improve the professional ethics of accountants and auditors at Vietnamese enterprises as follows:

A. For accountants and auditors:

- Independence: accountants and auditors should have honesty and objectivity, not to perform audits for clients who have family ties, relatives, or economic interests, need to draw the line between auditing and consulting for accountants, the auditor is not involved in conflicts of interest.

- In-depth level of industry and future advancement: In the process of working at companies, accountants and auditors must always learn constantly, regularly exchange and communicate experiences with people working in the same field.

- Audit time: To reduce the pressure on audit time, especially at the end of the fiscal year, accountants and auditors can conduct preliminary audits during the year.

- Professional skills: accountants and auditors need to strictly implement ethical standards for accountants and auditors, in which it is necessary to understand and implement the following basic ethical principles: Integrity, Objectivity, Professional competence and Prudence, Confidentiality, Professional Status.

B. For businesses:

- Equality: Businesses should apply equality policies to employees, whose rewards are adapted to employee expression.

◦ Honors: There are systems to evaluate the performance of employees thereby promoting work progress as well as rewarding when employees complete tasks well.

◦ Solidarity, collective: It is necessary to build a cooperation mechanism between departments and units in the company, encourage employees to work in groups to complete the work better, regularly organize parties, company gatherings.

◦ Harmony in relationships: The decisions of the company's leaders need the support of employees, as well as the leadership, should create conditions for employees to participate in expressing opinions and objections.

◦ Learning and promotion: It is necessary to regularly organize training programs, skills training with experts.

The study provided a realistic perspective on the professional ethics of accounting and auditing in Vietnam and pointed out what factors can affect the professional ethics of people working in this sector. Combining practical information with results, the authors have proposed several solutions and recommendations to improve professional ethics in the business. Although there are many limitations, this is also a space for future studies to go deeper, expanding the scope to be able to re-examine the conclusions; at the same time, it also discovered that other factors were included in the research model to more fully and accurately reflect the relationship between traditional Vietnamese cultural elements and the professional ethics of accountants and auditors in Vietnam.

REFERENCES

- [1] Comrey, A. L. (1973). *A First Course in Factors Analysis*, New York: Academic Press.
- [2] Drucker, P.F. (2008), *Nhà quản trị thành công*, NXB Trẻ.
- [3] Dinh Phi Ho, Hoang Trong Tan (2012), Tác động của yếu tố văn hóa truyền thống Việt Nam đến đạo đức nghề nghiệp trong các doanh nghiệp. Liên Hiệp Các Hội Khoa Học và Kỹ Thuật Việt Nam, truy cập ngày 24 tháng 10 năm 2021 từ < <http://www.vusta.vn/vi/news/Thong-tinSu-kien-Thanh-tuu-KH-CN/Tac-dongcua-yeu-to-van-hoa-truyen-thong-VietNam-den-dao-duc-nghe-nghiep-trongcac-doanh-nghiep-42443.html> > .
- [4] Doan Thanh Nga et al (2020), Cultural Factors Affecting Tendency of Ethical Decision - Making by Accounting Students: An Empirical Study in Vietnam, *Journal of Asian Finance, Economics, and Business*, vol.9, no.2, pp. 159-168.
- [5] Hair J.F., Tatham R.L., Anderson R.E. and Black W. (1998). *Multivariate Data Analysis*, 5th Edition, New Jersey: Prentice-Hall, Inc.
- [6] Hofstede, G. (1991), *Cultures and Organizations - Software of the mind*, McGraw-Hill.
- [7] Jeffrey R. Cohen, Laurie W. Pant & David J. Sharp (1992), Cultural and socioeconomic constraints on international codes of ethics: Lessons from accounting, *Journal of Business Ethics*, vol 11, pp 687–700.
- [8] Lewis, D. Richard (1999), *When Culture collides*. Nicholas Brealey Publishing-London.
- [9] Le Thi Thu Ha (2021), Tổng quan nghiên cứu về nhân tố ảnh hưởng đến đạo đức nghề nghiệp Kế toán - Kiểm toán, *Tạp chí khoa học và đào tạo Ngân hàng*, 227, 54-64.
- [10] Le Anh Linh et al. (2020), Yếu tố văn hóa truyền thống Việt Nam ảnh hưởng đến đạo đức nghề nghiệp trong các doanh nghiệp: Nghiên cứu điển hình ở TP. Phan Thiết, *Tạp chí Nghiên cứu khoa học và Phát triển kinh tế Trường Đại học Tây Đô*, Số 10, 158-177.
- [11] Le Anh Tuan, Nguyen Thi Huyen Tram and Mai Thi Quynh Nhu (2021), Factors affecting the awareness of accounting ethics of accounting students at Universities in Da Nang city, Vietnam, *Academic Journal of Interdisciplinary Studies*, Vol.10. No.6, 70-81.
- [12] Le Thi Thanh Xuan, Vo Thi Thanh Nhan and Ha Van Hiep (2015), Đạo đức nghề nghiệp và ảnh hưởng từ các yếu tố giá trị cá nhân và giá trị tổ chức – một nghiên cứu trong lực lượng lao động trẻ tại TP. HCM, *Tạp Chí Phát Triển Khoa Học và Công Nghệ*, 18(Q4), 07– 15.
- [13] Ministry of Finance (2015), Thông tư số 70/2015/TT-BTC quy định chung về Chuẩn mực đạo đức Kế toán - Kiểm toán, ban hành ngày 08 tháng 5 năm 2015.
- [14] Phan Ngoc Minh (2006), *Nhân tố chủ quan và nhân tố khách quan*, NXB Giáo dục.
- [15] Nguyen Dinh Tho (2013), *Phương pháp nghiên cứu học trong kinh doanh*, NXB Tài chính, Hà Nội.
- [16] Nguyen Van Phi (2021), Đạo đức nghề nghiệp là gì?, Truy cập lần cuối ngày 15 tháng 12 năm 2021, từ < <https://luathoangphi.vn/dao-duc-nghe-nghiep-la-gi/> > .
- [17] Nguyen Hong Phong (2000), *Văn hóa chính trị Việt Nam - Truyền thống và hiện đại*, Chương trình Khoa học Công nghệ cấp Nhà nước KX06.
- [18] Nguyen Hai San (2007), *Quản trị học*. NXB Thống Kê.
- [19] Nguyen Thi Bich Tram & Le Thi Thanh Xuan (2015), Nghiên cứu các yếu tố ảnh hưởng đến đạo đức nghề nghiệp của lực lượng lao động mới, *Tạp Chí Khoa Học - Trường Đại Học Mở Thành Phố Hồ Chí Minh*, Số 5 (44), 01–15.
- [20] Olga Volkova (2016), Do Visual Culture Revolutions Affect Accounting Practices?, *Journal of the New Economic Association*, New Economic Association, vol. 29(1), pp 54-82.
- [21] Phan Dinh Quyen (2008), Những ảnh hưởng của lịch sử, giáo dục và kinh tế-xã hội Việt Nam truyền thống đối với văn hóa doanh nghiệp. *Văn hóa doanh nhân*, 02/2009.
- [22] Rebecca LeFebvre (2011), Cross-Cultural Comparison of Business Ethics in the U.S. and India: A Study of Business Codes of Conduct, *Journal of Emerging Knowledge on Emerging Markets*, Vol 3, pp 391-409.
- [23] Roger L. Worthington & Tiffanny A. Whittaker (2006), *Scale Development Research: A Content Analysis and Recommendations for Best Practices*, Published by SAGE.
- [24] Tran Dinh Huou (1996), *Đến hiện đại từ truyền thống Việt Nam*, NXB Khoa học xã hội, Hà Nội.
- [25] Tran Ngoc Them (1999), *Cơ sở văn hóa Việt Nam*, NXB Giáo Dục, Hà Nội.

Users' Adoption Intention to Use Wealth Tech Services: Toward an insight into users in Ha Noi and Ho Chi Minh City during Covid-19 and Beyond

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Abstract - This paper seeks to identify and evaluate the factors influencing the adoption of Wealth Tech services in Hanoi and Ho Chi Minh to provide insights into the intention of Vietnamese users to use Wealth Tech services post-Covid-19. This study proposes an integrated model of Technology Acceptance Model 2 (TAM 2) and Unified Theory of Acceptance and Utilize of Technology 2 (UTAUT2), which incorporates determinants such as Intention to Use (IU), Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Government Support (GS), Financial Health (FH), Financial Literacy (FL), Perceived Risks (PR), and Brand Image (BI). The results of an online survey of 157 Vietnamese users reveal substantial connections between Performance Expectation (PE), Effort Expectation (EE), Social Influence (SI), Government Support (GS), Financial Health (FH), and Brand Image (BI) and the intention of users to use Wealth Tech services. However, the impacts of Perceived Risks (PE) and Financial Literacy (FL) are not statistically significant. A regression analysis was performed on two sample groups, current and future users. This study contributes to the literature by incorporating models to explore Vietnamese users' intention to use Wealth Tech services. In addition, the findings offer Vietnamese Wealthtech service providers fresh insights for thriving in this uncertain world. Further research is suggested to examine the adoption model of Wealth Tech services.

Index Terms—adoption, intention to use, Wealth Tech services, COVID-19.

I. INTRODUCTION

Wealth Tech or digital wealth management is a subset of fintech that mixes money with technology.

In terms of digitalization, the wealth management sector has already come a long way, and innovation is accelerating every day. According to CB Insights [1], the wealth technology sector saw a fundraising boom in Q1'21, raising \$5.6 billion, which is an increase from the \$5.2 billion raised at the end of 2020. The wealth management platform market is anticipated to grow from \$3.71 billion in 2021 to \$9.19 billion in 2028 at a CAGR of 13.8% [2]. With the country's rapid digitalization of wealth management, Vietnam's wealth management business is seen as a rising star in Southeast Asia. Money Lover, Finhay, Techcom Securities, Tikop, and other well-known brands are only a few. The International Trade Association estimates that the Personal Finance sector in Vietnam, which includes Wealth Tech

services and Remittance/International Money Transfer, made up 9% of the country's Fintech market in 2017 and will increase by 31% by 2025 (Vietnam Fintech, 2020). The Vietnamese spent a total of 1.958 million USD on digital investments in 2021, according to Statista [3].

In addition to the potential and growth of the wealth technology sector, numerous studies and papers exist on theoretical and practical elements in the global setting. But things have changed more quickly than ever, thanks to technology and the Covid-19 pandemic. To improve and revisit the current findings, more research is therefore required. Furthermore, there is still much to learn and understand about this topic in the context of Vietnam. This research aims to determine and evaluate the factors influencing Vietnam's acceptance of Wealth Tech services.

II. THEORETICAL BACKGROUND

A. Literature Review

1) Wealth Tech

Wealth Tech is one of the FinTech service trends that have emerged due to the digitalization of the global financial system. Wealth Tech services include Robo-advisory, Robo-retirement, Digital brokerage, Micro investment, Algorithmic trading, and B2B Software [4], [5], [6]. Wealth Tech is broadly defined by Chishti and Puschmann [7] as the impact of technology on the global investment and wealth management business, which encompasses private banking and asset management. Wealth Tech is defined in this article as a digital financial solution that assists clients with investing and asset management.

2) Overview of Conceptual Framework

As a new subsector of FinTech services, there is so far no research examining the factors influencing the intention to adopt Wealth Tech services. Regarding FinTech research, TAM/TAM2 and UTAUT/UTAUT2 are widely applied.

Davis [8] initially proposed TAM to identify the variables influencing computer acceptance and user behavior across end-user computing technologies and user groups. [9]. Perceived Usefulness (PU) and Perceived Ease of Use (PE) are two factors that influence the user's attitude toward the system, which affect the user's intention to use. TAM2, an abbreviated version of

TAM, was developed by Venkatesh and David [10] in 2000, adding subjective norm, voluntariness, image, work relevance, output quality, and outcome demonstration. The TAM2 model then postulated that PU and PE directly affect IE [10, p. 195]. Several researchers have adapted the model to anticipate user intentions in several FinTech categories, such as internet banking [11], mobile wallet [12], and Bitcoin [13]. To examine Chinese user adoption, Hu et al. [14] integrated TAM model determinants with trust constructs: user innovativeness (UI), government support (GS), brand image (BI), and perceived risks (PR). The study showed that users' trust in FinTech services substantially impacts their adoption attitudes [15]. Nathan et al. [16] also included trust, BI, GS, and UI with PU and PE in the TAM model to analyze financial literacy, fintech adoption, and the impact of the COVID-19 outbreak on Vietnamese consumers' financial health. The data indicated that user innovativeness and attitude have an apparent effect on FinTech adoption; however financial literacy has a negative effect [15].

UTAUT is an enhanced model derived from TAM and TAM2. In addition, UTAUT 2 [17] added three more components to the UTAUT framework: hedonic motivation, price value, and habit. Xie et al. [18] utilized perceived value (PV) and perceived risks (PR) as two financial consumption attributes. Another research [19] exploring the factors driving mobile financial service (MFS) adoption intention during the Covid-19 outbreak in Bangladesh integrated the primary components of UTAUT and PV, PR, and perceived trust. This study found that PR had no influence on user intention to utilize MFS platforms during the epidemic [19].

In this study, we will incorporate the core elements of the TAM and UTAUT 2 models with FH, FL, GS, BI, UI, and PR as the primary determinants of financial trust and consumption.

B. *Relevant theoretical models*

In parallel with the proliferation of technology [20], there are a plethora of preliminary studies on individual behavior and rational action models of emerging technology adoption. In 1975, Fishbein and Ajzen's Theory of Reasoned Action (TRA) [21] asserted that a person's intentions determine their actual conduct, while attitudes and subjective standards impact their behavioral tendencies. Ajzen [22] further developed the Theory of Planned Behaviour (TPB) during the next two decades. Specifically, Icek Ajzen included perceived behavioral control factors comprising internal and external elements [22]. While acknowledging that the intention to perform governs behavior, Davis's TAM [9] discovered that the intention was generated from attitude, which comprised PU and PE as determinants. UTAUT was originally proposed by Venkatesh et al. in 2003 [16] as the most integrated model with four factors of user behavior [16]: PE, EE, SI, and FC. In 2012, Venkatesh et al. added three variables to the UTAUT2 model: hedonic motivation, price value, and habit [18]. UTAUT2 has proven to be an effective tool for researching the adoption of technology in the banking industry [14], blockchain [24], cryptocurrencies [25], mobile payment [26], and digital payment [27], [28].

While TAM and UTAUT2 are the most prominent models for technological adoption, some elements must be modified in the FinTech services industry and Wealth Tech services. For

example, Hu et al.'s [14] research on the adoption intention of financial technology services by bank customers provided a TAM model that adapted the distinctiveness of Fintech services using empirical evidence in China. Specifically, the model was developed using the TAM model and a literature assessment on the uptake of Fintech services. The findings suggested that BI, GS, and user innovation (UI) significantly influence the uptake of Fintech services [14]. Similarly, BI and GS positively relate to SME adoption intentions of Fintech services in Peru [23]. However, UI has no substantial effect.

Overall, the research model based on previously tested research appears to have great adaptability. However, as previously analyzed, there has been little research on WealthTech services adoption in a Southeast Asian country like Vietnam. Hence, this study will evaluate a combination of components in the TAM and UTAUT2 models, customized for Wealth Tech services in Vietnam.

C. *Hypotheses development and research model*

The research goal is to indicate the determinants of Wealth Tech services adoption in Vietnam in the post-Covid-19 pandemic and beyond. Factors evaluated in this study were: Performance Expectancy, Effort Expectancy, Intention to Use, Social Influence, Facilitating Conditions, Perceived Risks, Financial Literacy, Government Support, User Innovativeness, Financial Health, and Brand Image. These factors are adopted from the UTAUT2 by Venkatesh et al. [17], the recently updated theoretical model to investigate the acceptance and the use of technology under customer context, integrating with financial services consumption element (perceived risks), and TAM model by Venkatesh and David [10]. Financial Literacy, Government Support, Financial Health, and User Innovativeness were added for further customer Wealth Tech services adoption analysis.

1) *Intention to Use*

Intention to use (ITU) is defined as a factor reflecting the extent of customer desire to adopt or use new technology [21], an immediate precursor of a particular behavior [28].

In this study, ITU refers to customers' willingness to adopt Wealth Tech services. Turner et al. [29] performing a meta-analysis of TAM revealed that 'Intention to Use' is a reliable determinant of technology usage in both subjective and objective evaluation. Thus, this research proposes the following hypothesis:

H1: Intention to use has a positive impact on customers' adoption of Wealth Tech services.

2) *Performance Expectancy*

Performance Expectancy (PE) indicates to which extent a person believes that adopting or utilizing new technology will advance his/her life quality [16], [17]. PE is considered to be equivalent to perceived usefulness in TAM [9], extrinsic motivation on the Motivational Model [30], job-fit in the model of PC utilization [31], a comparative advantage in Innovation Diffusion Theory [32], expected results in Social Cognitive Theory [33]. Prior empirical studies have indicated PE as the strongest indicator predicting customers' intention to use new technology, with the result providing positive outcomes in Fintech services, banking services, or m-payment [34]-[36].

However, there is little evidence of this relationship under the context of Wealth Tech services adoption solely. Since Wealth Tech services provide effective and efficient financial investment and asset management solutions (cash, gold, ...) through digital tools (applications, website) for customers, the intention to use new technology can be impacted by such expectations. Hence:

H2: Performance Expectancy is positively correlated to customers' intention to use towards the adoption of Wealth Tech services.

3) *Effort Expectancy*

Effort Expectancy (EE) is interpreted as the level of simplicity perceived by users when they use a given system [16], built on three root constructs of perceived ease of use (TAM/TAM2), complexity (MPCU), and ease of use (IDT) [16, p. 450]. David et al. [9, p.320] supported the idea that users are more inclined to adopt an application that is deemed to be easy to use than another. Therefore, EE has been considered as a determinant of customer's intention to use technology, associated with customers' expectation of ease of use of Wealth Tech services in this research. To adopt Wealth Tech services, customers need either a mobile phone or computer to gain access to the application or the website, the platform compatibility level, and user interface friendliness degree thus could affect customers' ease of use, and eventually affect their intention to use Wealth Tech services. Therefore:

H3: Effort Expectancy is positively correlated to users' intention to use towards the adoption of Wealth Tech services.

4) *Social Influence*

Venkatesh et al. [16] has defined social influence (SI) as the extent to which an individual evaluates the recommendation on using new system from his/her important people. It is considered as a direct factor affecting behavioral intention and equivalent to subjective norms (TRA, TAM2, TPB/DTPB, C-TAM-TPB), social factors (MPCU), and image (IDT) [16, p. 451]. Researchers have identified that this factor can influence customer behaviours generally and their technology adoption particularly. In this study, SI refers to users' thoughts of essential others (family, colleagues, and friends) who encourage them to use Wealth Tech services. Studies have implied that social influence is positively correlated users' technology adoption in mobile applications [37]; mobile payment [38]; and Fintech adoption [34]. Hence:

H4: Social Influence is positively correlated to users' intention to use towards the adoption of Wealth Tech services.

5) *Facilitating Conditions*

Facilitating conditions (FC) refers to the extent people believe that organisational and technical infrastructures are available to assist the utilization of technology [16]. This term is developed from determinants of perceived behavioral control (TPB/ DTPB, C-TAM-TPB), facilitating conditions (MPCU), and compatibility (IDT) [16, p. 453]. Support infrastructure, as a key concept involved in this construct, has a deep relation to the effort expectancy construct that indicates the ease of the tool [10]. In this study context, FC is perceived as people's attitude toward available resources and supports i.e. smartphone, Wealth Tech platforms, and Wealth Tech firms' advisors) during their Wealth

Tech services adoption process. Prior research on the new-technology adoption have supported the hypothesis of a positive correlation between FC and users' ITU in mobile banking adoption, mobile commerce, and fintech platform [35], [39]. Hence:

H5: Facilitating conditions is positively related to users' intention to use towards the adoption of Wealth Tech services.

6) *Government Support*

Government support (GS) is vital for industrial development as its regulations and policies would aid the industry to grow and benefit stakeholders and companies in that industry [14], [40]. Hu et al. [14] also considered as a component of the trust construct, which implies that an application supported by the government tends to appear more reliable and easier to be adopted by users. The research in online banking adoption of Marakarkandy et al. [40] supported the argument that as the government has credibility among the citizens, therefore, a sign of support from the government to a particular industry: Wealth Tech - would increase the services' reliability and validity when the regulations support the services in providing investment advisory services or wealth management. However, the empirical findings of government support impact on adoption intention of Wealth Tech services are still limited. Hence, the study proposes:

H6: Government Support positively affects users' intention to use towards the adoption of Wealth Tech services.

7) *Financial Health*

Financial Health (FH) has been defined as the state of individual financial affairs including monetary situation (behaviors, attitudes) and financial satisfaction [41], [42]. Research findings from prior studies have shown a positive association between FH and Fintech adoption behavior [44]. Hence:

H7: Financial Health positively affects users' intention to use Wealth Tech services.

8) *Financial Literacy*

Financial Literacy (FL) presents an individual's understanding of fundamental financial knowledge. In their research, Morgan and Trinh [43], Junger and Mietzner [45] have shown a positive relationship between FL and adoption behavior. Therefore:

H8: Financial literacy has a positive relation with customers' intention to use Wealth Tech services.

9) *User Innovativeness*

User Innovativeness (UI) is one of a technology pioneer's important traits, it represents to what extent an individual is willing to explore novel innovation, so it is considered as a primary determinant of technology adoption's behavior [14], [34], [46], [47]. Hence:

H9: User Innovativeness positively affects users' intention to use towards the adoption of Wealth Tech services.

10) *Perceived Risks*

Perceived Risk (PR) refers to users' concern towards actions that potentially bringing adverse effects [48] or a factor influencing on customers in the initial stage of decision-making [49]. To explore novel innovation, users may encounter multiple risks (data privacy, IoT, documentation) which can hinder their adoption intention towards new technology [50]. Studies have

found a negative association between PR and users' ITU novel innovation [51], [52]. Hence:

H10: Perceived risks negatively influences on customers' intention to use toward the adoption of Wealth Tech services.

11) Brand Image

Brand Image (BI) refers to a determinant affecting users' acumen or represents users' impression and perceptions towards the brand [53], [54]. Research findings have indicated a positive association between BI and users' ITU novel technology by assessing BI with customers' fondness, and company reputation [14], [15], [34], [55], [56]. Therefore:

H11: Brand image has a positive correlation with customers' intention to use toward the adoption of Wealth Tech services.

III. RESEARCHING METHOD

A. Data Processing Method

The survey's subjects were Vietnamese 16 to 50-year-olds, mostly from Hanoi and Ho Chi Minh City. After preliminary screening, 58 invalid surveys with inconsistency, bias, and random filling were eliminated, leaving 157 genuine responses for a 73.02 percent effective response rate.

The structural equation model was used to process and analyze the data in this paper. Multiple statistical methods were used to investigate the relationship between multiple variables based on the covariance matrix, encompassing correlation analysis, regression analysis, reliability testing, factor analysis (principal component), average variance extracted, and composite reliability. In the fields of behavioral science and technology adoption, these methods are commonly used to explain the causal relationship between independent and dependent variables. SPSS 26.0 and Microsoft Excel are the primary statistical tools used in this paper to examine the reliability and relationship between variables.

TABLE I
SAMPLE CHARACTERISTICS

Demographic Variable and Category		Frequency	Percentage
Gender	Female	109	69.4
	Male	43	27.4
	Prefer not to disclose	5	3.2
Age	16-22	108	68.9
	23-29	36	22.9
	30-50	13	8.2
Education	High School	16	10.2
	Bachelor	124	79
	Masters	16	10.2
	PhD	0	0
Location	Hanoi	86	54.8

Service usage frequency	Ho Chi Minh City	53	33.8
	Others	18	11.4
	Daily/Every day	4	2.5
	4-6 times/ week	8	5.1
	2-3 time/ week	23	14.6
	Once/ week	14	8.9
	2-3 times/ month	12	7.6
	Once/ month	4	2.5
	Less often than once/month	20	12.7
	Never	72	45.9

IV. RESULTS

A. Reliability and validity

Reliability implies the level of consistency of the questionnaire measurements. The study used composite reliability (CR) and Cronbach's alpha to evaluate the measurements' internal consistency. The result showed that all measurements have an adequate internal consistency with CR and Cronbach's alpha value ranging from .77 to .91 and .711 to .941 respectively, which are higher than critical value [57] [58].

Validity refers to the accuracy of the measure that includes convergent and discriminant validity. Factor analysis was conducted with the extraction method as principal component

analysis to test discriminant validity, which refers to the measures of the distinction between each variable. Ten independent variables emerged with Eigenvalues greater than 1, presenting 71.96% of variances. Two factors namely facilitating condition and user innovativeness were removed, along with nine items of perceived risk, intention to use, perceived ease of use, social influence, financial literacy, financial health and brand image factors, due to the low loading. After the removals, there were no cross loading between each considered variable, indicating the acceptable discriminant validity for the constructs [59]. All of the variables have the AVE values of above .50, except financial health (.471). Nonetheless, CR of financial health is .775, proving that the construct has convergent validity as suggested by Fornell and Larcker [57]. Perceived ease of use has the highest mean (3.605) whereas social influence gets the lowest mean value (3.15).

B. Hypotheses testing

Based on the illustration in Table III, seven hypotheses are statistically supported with p-value (< .05) except H8, H10 with p-value (> .05) indicating two results of null hypotheses, and H5, H9 (having inconsistencies in the scale items of factors). It can be seen that Performance Expectancy (PE) has the most positive influence for users' ITU with the highest value $\beta = .706$.

Standardised coefficient (β) of all variables > 0 indicating positive correlations between IVs and DV in the research model.

TABLE III
HYPOTHESES TESTING

	Hypotheses	Standardised Coefficient β	Sig	Decision
H1	Intention to use -> Actual Adoption	0.499	.000	Supported
H2	Performance Expectancy -> Intention to Use	0.706	.000	Supported
H3	Effort Expectancy -> Intention to Use	0.535	.000	Supported
H4	Social Influence -> Intention to Use	0.503	.000	Supported
H5	Facilitating Conditions -> Intention to Use	0.45	.000	Removed due to inconsistency in scale items
H6	Government Support -> Intention to Use	0.270	.001	Supported
H7	Financial Health -> Intention to Use	0.242	.002	Supported
H8	Financial Literacy -> Intention to Use	0.146	.067	Unsupported
H9	User Innovativeness -> Intention to Use	0.477	.000	Removed due to inconsistency in scale items
H10	Perceived Risks -> Intention to Use	-0.116	.146	Unsupported
H11	Brand Image -> Intention to Use	0.381	.000	Supported

V. DISCUSSION CONCLUSION AND FUTURE RESEARCH DIRECTIONS

There are major theoretical contributions. In the first place, it improves the theoretical model framework of the factors that affect customers' intentions to utilize Wealth Tech services in Vietnam. By introducing four more factors—financial health, user innovation, government support, and financial literacy—this study expands the UTAUT. These four elements have already been mentioned as having an impact on the use of Wealth Tech services. And the data's findings supported this claim, showing that two of them have a favorable influence on customers' usage intentions. The empirical data of Vietnamese consumers is the second. Such studies are scarce in the Vietnamese environment, which is made worse by the fact that there hasn't been enough study done specifically concentrating on Wealth Tech services globally. As Vietnam's wealth technology industry develops, this study's focus on Vietnamese users may be able to offer some useful insights to Vietnamese businesses. Additionally, it offers more thorough and in-depth details regarding the Vietnamese market, laying the foundation for additional study on the subject.

From the statistical findings, practical implications encompass three main points: (1) enhancing managers' awareness of influential factors to Vietnamese users' Wealth Tech services adoption intention, (2) providing proper support and attention to the motivating factors of users' wealth tech services adoption, (3) provisioning of differences in influential factors between used and have-not-used users for further strategy development. Firstly, this study indicates that PE and EE variables play vital roles in persuading customers to adopt wealth tech services in both current user and future user groups. Vietnamese people are aware of the benefit of wealth tech management solutions and expect easy-to-use platforms to facilitate their asset management process. Wealth Tech companies can increase individuals' perceived value of wealth tech management platforms by making their platforms more friendly-user. Secondly, the SI factor has an influential impact on individuals' adoption intentions, being a foundation for wealth tech companies' marketing strategies. Lastly, the paper points out that people who have not used wealth tech services tend to be affected by fundamental factors such as performance expectancy, social influence, effort expectancy, and financial health while current users are not only influenced by fundamental factors but also affected by brand image and government support. Wealth tech firms can segment these two types of users and use appropriate tactics to increase conversion and retention rates in their marketing campaigns.

However, the study still has notable limitations. Firstly, the generalizability of the results may be compromised as a majority of samples were obtained from university students. Therefore, future study is suggested to be conducted with a larger scope and extended sample size to increase statistical power. Secondly, the research is cross-sectional, as the data were gathered at a single point in time and in a setting where early adopters of Wealth Tech services in Vietnam. After the Covid-19 epidemic, there may be a change in user uptake and market evolution, necessitating longitudinal studies tracking user pattern variations over time. Thirdly, while examining user perspectives on the adoption of

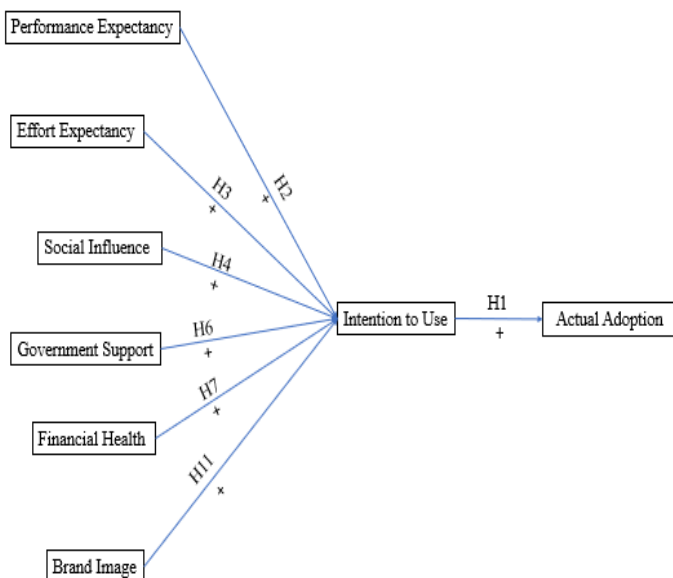


Fig. 9 Results of hypothesis tests.

Wealth Tech services in a developing nation such as Vietnam, the study did not focus on other influencing elements such as trust and user demographic aspects such as field of expertise and industry of employment. Thus, to better analyze the adoption model of Wealth Tech services, the subsequent research should develop a more comprehensive model by re-testing the model and exploring new factors. In particular, future studies can investigate three external factors across regions that influence FinTech adoption, namely, digital capabilities, macroeconomic perspective, and regulatory environment [60].

REFERENCES

- [1] CB Insights, "State Of Wealth Tech Q1'21 Report: Investment & Sector Trends To Watch", *CB Insights*, 2021. Available: <https://www.cbinsights.com/research/report/wealth-tech-trends-q1-2021/>. [Accessed 29 May 2022].
- [2] The Insight Partner, "Wealth Management Platform Market Size Worth \$9.19Bn, Globally, by 2028 at 13.8% CAGR", *The Insight Partner*, 2022.
- [3] Statista, FinTech - Vietnam | Statista Market Forecast, 2022. Available: https://www.statista.com/topics/7840/fintech-in-vietnam/#topicHeader_wrapper [Accessed 29 May 2022].
- [4] P. Kondraciuk and M. Zaleska, "Theory and practice of innovation development in the banking sector", *Financial Sciences - Nauki o finansach*, vol. 24, no. 2, pp. 76-87, 2019.
- [5] E. Ślęzak, "FinTech i jego znaczenie dla usług finansowych (FinTech and its' importance for financial services)", *Bank Spółdzielczy*, no 4/590, 2018.
- [6] T. Dziawgo, "Wealth Tech Impact on the Wealth Management Sector", *European Research Studies Journal*, vol. 24, p. 146, 2021.
- [7] S. Chishti and T. Puschman, *The WEALTH TECH: The FinTech Handbook for Investors, Entrepreneurs and Finance Visionary*, Wiley, 2018.
- [8] F. D. Davis, "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results", *Sloan School of Management*, Massachusetts Institute of Technology, 1986.
- [9] F. D. Davis, R. Bagozzi and P. Warshaw, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models", *Management Science*, vol. 35, no. 8, pp. 982-1003, 1989.
- [10] V. Venkatesh and F. D. Davis, "A theoretical extension of the technology acceptance model: Four longitudinal field studies", *Management science*, vol. 46, no. 2, pp. 186-204, 2000.
- [11] T. C. E. Cheng, D. Y. C. Lam and A. C. L. Yeung, "Adoption of internet banking: An empirical study in Hong Kong", *Decision Support Systems*, vol. 42, no. 3, pp. 1558-1572, 2006.
- [12] A. T. To & T. H. M. Trinh, "Understanding behavioral intention to use mobile wallets in Vietnam: Extending the tam model with trust and enjoyment", *Cogent Business & Management*, vol. 8, no. 1, p. 1891661, 2021.
- [13] D. Folkinshteyn and M. Lennon, "Braving Bitcoin: A technology acceptance model (TAM) analysis", *Journal of Information Technology Case and Application Research*, vol. 18, no. 4, pp. 220-249, 2016.
- [14] Z. Hu, S. Ding, S. Li, L. Chen and S. Yang, "Adoption Intention of Fintech Services for Bank Users: An Empirical Examination with an Extended Technology Acceptance Model", *Symmetry*, vol. 11, no. 3, 2019.
- [15] R. J. Nathan, B. Setiawan and M. N. Quynh, "Fintech and Financial Health in Vietnam during the COVID-19 Pandemic: In-Depth Descriptive Analysis", *Journal of Risk and Financial Management*, vol. 15, no. 3, p. 125, 2022.
- [16] V. Venkatesh, M. G. Morris, G. B. Davis and F. D. Davis, "User acceptance of information technology: toward a unified view", *MIS Quarterly*, vol. 27, no. 3, pp. 425-478, 2003.
- [17] V. Venkatesh, J. Y. Thong and X. Xu, "Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology", *MIS Quarterly*, vol. 36, no. 1, pp. 157-178, 2012.
- [18] J. Xie, L. Ye, W. Huang and M. Ye, "Understanding FinTech Platform Adoption: Impacts of Perceived Value and Perceived Risk", *Journal of Theoretical and Applied Electronic Commerce Research*, vol. 16, no. 5, pp. 1893-1911, 2021.
- [19] C. Yan, A. B. Siddik, N. Akter and Q. Dong, "Factors influencing the adoption intention of using mobile financial service during the COVID-19 pandemic: the role of FinTech", *Environmental Science and Pollution Research*, 2021.
- [20] D. R. Cavalcanti, T. Oliveira and F. De Oliveira Santini, "Drivers of digital transformation adoption: A weight and meta-analysis", *Heliyon*, vol. 8, no. 2, p. e08911, 2022.
- [21] M. Fishbein and I. Ajzen, *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Massachusetts: Addison-Wesley, 1975.
- [22] I. Ajzen, "The theory of planned behaviour", *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991.
- [23] J. J. Merino Balcázar and A. E. Llatas Rivas, "Determining Factors of the Intention to Adopt Fintech Services by Micro and Small Business Owners from Chiclayo", *Journal of business - Universidad Del Pacifico*, Peru, vol. 13, no. 2, pp. 19-43, 2021.
- [24] M. M. Queiroz and S. Fosso Wamba, "Blockchain adoption challenges in supply chain: An empirical investigation of the main drivers in India and the USA", *International journal of information management*, vol. 46, pp. 70-82, 2019.
- [25] M. Arias-Oliva, J. Pelegrín-Borondo, and G. Matías-Clavero, "Variables Influencing Cryptocurrency Use: A Technology Acceptance Model in Spain," *Frontiers in Psychology*, vol. 10, 2019. DOI: 10.3389/fpsyg.2019.00475.
- [26] P. Patil, K. Tamilmani, N. P. Rana and V. Raghavan, "Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal", *International Journal of Information Management*, vol. 54, p. 102-144, 2020.
- [27] V. Balakrishnan and N. L. M. Shuib, "Drivers and inhibitors for digital payment adoption using the Cashless Society Readiness-Adoption model in Malaysia", *Technology in society*, vol. 65, 2021.
- [28] S. G. Yaseen and S. Zayed, "Exploring determinants in deploying mobile commerce technology: Amman stock exchange", 2010.
- [29] M. Turner, B. Kitchenham, P. Brereton, S. Charters and D. Budgen, "Does the technology acceptance model predict actual use? A systematic literature review", *Information and Software Technology*, vol. 52, no. 5, pp. 463-479, 2010.
- [30] F. D. Davis, R. P. Bagozzi and P. R. Warshaw, "Extrinsic and Intrinsic Motivation to Use Computers in the Workplace", *Journal of Applied Social Psychology*, vol. 22, no. 14, pp. 1111-1132, 1992.
- [31] R. L. Thompson, C. A. Higgins and J. M. Howell, "Personal Computing: Toward a Conceptual Model of Utilization", *MIS Quarterly*, vol. 15, no. 1, pp. 125-143, 1991.
- [32] G. C. Moore and I. Benbasat, "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation", *Information Systems Research*, vol. 2, no. 3, 1991.
- [33] D. R. Compeau and C. A. Higgins, "Computer Self-Efficacy: Development of a Measure and Initial Test", *MIS Quarterly*, vol. 19, no. 2, pp 189-211, 1995.
- [34] B. Setiawan, D. P. Nugraha, A. Irawan, R. J. Nathan and Z. Zoltan, "User Innovativeness and Fintech Adoption in Indonesia", *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 7, no. 3, p. 188, 2021.
- [35] T. Oliveira, M. Faria, M. A. Thomas and A. Popović, "Extending the understanding of mobile banking adoption: when UTAUT meets TTF and ITM", *International Journal of Information Management*, vol. 34, no. 5, pp. 689-703, 2014.
- [36] A. Tarhini, M. El-Masri, M. Ali and A. Serrano, "Extending the UTAUT model to understand the customers' acceptance and use of internet banking in Lebanon", *Information Technology & People*, vol. 29, no. 4, pp. 830-849, 2016.
- [37] D. G. Taylor, T. A. Voelker and I. Pentina, "Mobile Application Adoption by Young Adults: A Social Network Perspective", *WCOB Faculty Publications*, 2011.
- [38] S. Yang, Y. Lu, S. Gupta, Y. Cao and R. Zhang, "Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits", *Computers in human behavior*, vol. 28, no. 1, pp. 129-142, 2012.
- [39] N. Shaw and K. Sergueeva, "The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value", *International journal of information management*, vol. 45, Pergamon, [Oxford]; [New York] :, pp. 44-55, 2019.

- [40] B. Marakarkandy, N. Yajnik, and C. Dasgupta, "Enabling internet banking adoption", *Journal of enterprise information management*, vol. 30, no. 2, pp. 263–294, 2017, DOI: 10.1108/JEIM-10-2015-0094.
- [41] S. Joo, *Personal Financial Wellness. In Handbook of Consumer Finance Research*, Springer: New York, USA, 2008.
- [42] J. Kagan, "Financial Health - What is financial health?", *Investopedia*, Available: <https://www.investopedia.com/terms/f/financial-health.asp#:~:text=Financial%20health%20is%20a%20term,fixed%20or%20non-discretionary%20expenses>. [Accessed 29 May 2022].
- [43] P. Morgan and Q. L. Trinh, "Financial Literacy, financial inclusion, and savings behavior in Laos", *Journal of Asian Economics*, vol. 68, 2020.
- [44] A. Lusardi, "Financial literacy and the need for financial education: Evidence and implications", *Swiss J Econ*, vol. 155, pp. 1– 8, 2019.
- [45] M. Jünger and M. Mietzner, "Banking goes digital: The adoption of FinTech services by German households", *Finance Research Letters*, Elsevier, vol. 34, 2020.
- [46] C. Morosan and M. DeFranco, "When tradition meets the new technology: An examination of the antecedents of attitudes and intentions to use mobile devices in private clubs", *International Journal of Hospitality Management*, vol. 42, pp. 126–136, 2014.
- [47] L. Huang, Y. Hsieh and S. Chang, "The effect of consumer innovativeness on adoption of location-based services", *Review of Global Management and Service Science*, vol. 1, pp. 17-31, 2011.
- [48] R. Bauer R, "Consumer behavior as risk taking. In: Cox D (ed) Risk taking and information handling in consumer behavior", *Harvard University Press*, Cambridge, MA, pp 23–33, 1967.
- [49] A. Wilson, V. Zeithaml, M. Bitner and D. Gremler, *Services Marketing: Integrating Customer Service Across the Firm 4e: Integrating Customer Focus Across the Firm*, 4th ed, Boston, MA: McGraw-Hill Education, 2006.
- [50] H. Bauer, S. Barnes, T. Reichardt and M. Neumann, "Driving consumer acceptance of mobile marketing: a theoretical framework and empirical study", *Journal of Electronic Commerce and Research*, Vol. 6 No. 3, pp. 181-191, 2005.
- [51] T. Zhou, "An empirical examination of continuance intention of mobile payment services", *Decision Support Systems*, Vol. 54 No. 2, pp. 1085-1091, 2013.
- [52] G. Wachinger, O. Renn, C. Begg, and C. Kuhlicke, "The risk perception paradox: implications for governance and communication of natural hazards", *Risk Analysis*, Vol. 33 No. 6, pp. 1049-1065, 2013.
- [53] K. Ryu, H. Han and T. H. Kim, "The relationships among overall quick-casual restaurant image, perceived value, customer satisfaction, and behavioural intentions", *International Journal of Hospitality Management*, vol. 27, no. 3, pp. 459-469, 2008.
- [54] D. Roy and S. Banerjee, "CARE-ing strategy for integration of brand identity with brand image", *International journal of commerce and management: IJCM*, vol. 17, no. 1/2, College of Business, Indiana University of Pennsylvania, Indiana, PA, pp. 140–148, 2007.
- [55] M. Aghekyan-Simonian, S. Forsythe, W. S. Kwon and V. Chattaraman, "The role of product brand image and online store image on perceived risks and online purchase intentions for apparel", *Journal of Retailing and Consumer Services*, vol. 19, no. 3, pp. 12-24, 2012.
- [56] F. Caviggioli, L. Lamberti, P. Landoni and P. Meola, "Technology adoption news and corporate reputation: sentiment analysis about the introduction of Bitcoin", *Journal of Product & Brand Management*, vol. 29, no. 7, pp. 877–897, 2020.
- [57] C. Fornell and D. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, vol. 18, no. 1, p. 39, 1981.
- [58] M. Cortina, "What is coefficient alpha? An examination of theory and applications", *Journal of applied psychology*, vol. 78, no. 1, p. 98, 1993.
- [59] J. Hair, W. Black, B. Babin and R. Anderson, *Multivariate data analysis*, Harlow: Pearson Education UK, 2013.
- [60] KPMG, "Digital Wealth Management in Asia Pacific 2021 A comparative analysis across eight key markets", *KPMG*, 2021. Available: https://assets.kpmg/content/dam/kpmg/cn/pdf/en/2021/03/digital-wealth-management-in-asia-pacific.pdf?fbclid=IwAR1_TNe7DOUNdkbpPoYQ_JHdqspvgf3DheMRQLhgEXBC546EprIQakra_40. [Accessed 29 May 2022]

Impacts of electronic word-of-mouth (eWOM) from social networks sites (SNS) on the intention to purchase tourism accommodation of Gen Z in Vietnam

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Abstract—Social networking sites (SNSs) have been playing a significant role in spreading electronic word-of-mouth (eWOM) amongst gen Z tourists in Vietnam recently. However, the underlying process by which customer-to-customer (C2C) eWOM from SNSs affects tourism consumers has not been fully studied. The author of this paper introduces a comprehensive research model that concentrates on the impacts of C2C eWOM using the information/ persuasion relationship as regards to the intention to make purchases. This research gathered data from 382 Vietnamese participants through traditional paper questionnaires. The collected quantitative data was processed through SPSS. The statistical results suggest that perceived persuasiveness, perceived expertise, and perceived trustworthiness are a positive relationship with eWOM usefulness from SNSs. Also, eWOM usefulness was confirmed to increase the probability of eWOM adoption, which, in turn, can boost the purchase intention toward the tourism accommodations proposed in the eWOM. This empirical study can enable marketers to gain an in-depth understanding of the impacts of eWOM from SNSs, especially from key opinion leaders (KOLs), on consumer purchase behaviour of tourism products. Accordingly, our findings can inspire marketers to plan and execute effective SNSs marketing campaigns to generate trustworthy and useful C2C eWOM, thus, increasing the intention to purchase tourism accommodations.

Index Terms—eWOM Social, networking sites, information usefulness, information adoption, purchase intention.

I. INTRODUCTION

Social media is regarded as one of the most powerful communication channels all over the world. At the beginning of 2022, Facebook was still the most popular social networking site (SNS) with 2.9 billion active users per month. Ranking in second place is Wechat (1.2 billion), Instagram (1 billion), and Tiktok (1 billion). The prosperity of SNSs has created a perfect environment for the rise of online key opinion leaders (KOLs) and their social word-of-mouth (sWOM), an “expanded” form of electronic word-of-mouth (eWOM), to be passed to SNSs users [1]. On the other hand, today consumers are becoming increasingly dependent on product-related information provided by others, especially from their acquaintances and KOLs, when forming their purchase intention [2]. Accordingly, owing to SNS, companies have better chance to increase the exposure of their products thus, improving product commercialization.

Tourism accommodations have been picked up as the focus of this paper. Owing to the rise of disposal income, the thirst for new experiences, and the anxiety to relax after a

long social lockdown, the domestic tourism market in Vietnam has grown dramatically since the beginning of 2022 of which per cent accounted by gen Z consumers [3]. According to [4], gen Z tourists are the heaviest SNSs users so that their behaviours are more likely to be influenced by product-related information collected from such channels. Likewise, authors like [5] believe that gen Z new online consumption behaviours has given the thriving chance for new marketing practices of KOLs in tourism, which have not been effectively utilized. Accordingly, the study on the mechanism by which SNSs’ eWOM affects the decision to purchase tourism accommodations amongst Vietnam gen Z consumers is appropriate and necessary.

To provide consumers with informative eWOM, many brands have been focusing on developing their own SNS fan pages through various tactics [6]. In detail, they are employing the practices of encouraging user comments on their official posts, creating a forum for followers to exchange product-related information, and seeding positive posts on other related online groups [6]. However, according to [7], the usage of only B2C SNS platforms is not sufficient for firms to gain the upper hand as consumers often perceived eWOM from C2C SNS platforms are more trustworthy. Accordingly, today consumers are more likely to formulate their purchase intentions based on the reviews or suggestions gathered from C2C interaction [8,9,10]. However, the underlying process which contains the receiving and evaluating of eWOM and the adoption of such eWOM from C2C SNS platforms in making purchase decision remains largely unknown. This is because most existing studies in this area focus on eWOM gathered from brand fan pages or brand-sponsored sites [11], while many others evaluate purchase intention based on the collected (but not evaluated) C2C eWOM only [12]. To overcome such shortcomings, the author of this paper studies C2C SNS platforms’ eWOM which is the outcome of various actions including watching video reviews, interacting with reviewers (through their posts and private messaging), and communicating with other users. Accordingly, this study can provide marketers with a more accurate knowledge of such user-generated content of the way consumers process them to come up with a more effective online content strategy [13].

C2C eWOM can significantly influence customer attitude towards the products and the buying decisions; therefore, an in-depth assessment of the mechanism behind it is required

[7]. In addition, as suggested by [14], the impact of eWOM from SNSs is different from those of other eWOM platforms, such as OTA websites in the case of tourism accommodation, owing to the difference in the relationship between the reviewers and the potential buyers. While the latter has received a lot of attention from researchers in the field of tourism consumer behaviours, the former, resulting from C2C interaction on SNSs, is largely overlooked [10]. However, studies on the behaviour of the rising tourism segment of gen Z consumers indicate that C2C eWOM from SNSs is the most popular source of preference for the decision-making process [5]. Besides, there is the lack of homogeneity amongst the findings concerning the influences of eWOM in the tourism industry, which confuses the current marketing practitioners of the accommodation sector [15]. Thus, a more thoughtful and stronger research framework is required to unify and reinforce existing literature on the effects of SNSs' eWOM on gen Z consumers buying behaviours.

The employment of the information adoption model (IAM) to explain relationship between eWOM and consumer behaviours has raised the concern about validity [16]. However, scholars like [17] state that the processing of information acquired from eWOM can influence the decision whether or not to believe in and to buy the products/services informed. Therefore, the IAM can be regarded as effective in examining the underlying process by which the characteristics of the eWOM and its "creator" could influence consumers' opinions about its usefulness and their decision to accept the information it contains [18]. A study conducted by Forbes on gen Z consumers in the US indicates that 97% of them read online user-generated content and 65% of such people make their decision to buy based on those consulted eWOM [5]. Similar findings are recorded in the works of Djafarova and Bowes (2021) in the fashion industry [19], Boateng in the cosmetic industry [20], and especially Liu et al. in the tourism industry [21]. On the other hand, the adoption of information has been regularly employed by authors like Song et al. to describe the process of how eWOM can facilitate the purchase decision, the cause-and-effect relationship between the adoption of information contained in SNSs' eWOM and intention to buy has not been widely studied [22]. Therefore, by employing the IAM, the author of this paper hopes to fill such research gap and to offer a more comprehensive and effective guideline on persuading online consumers to make purchase decision through SNSs' eWOM.

In spite of the fact that such relationships have been widely examined in many empirical studies of various backgrounds, the findings from this research are remarkably important owing to the distinct nature of its context. In the highly competitive tourism industry in Vietnam where the gen Z consumers, who belong to a highly collectivist culture, often value tourism product-related advice from both sources of their elders (offline) and equals (online) [3]. Accordingly, their attitudes toward eWOM may have special characteristics that, in turn, modify the way eWOM usefulness and eWOM adoption are interrelated and their impacts on customer purchase intention as opposed to other existing literatures.

Only positive eWOM were evaluated in this paper to evaluate the influence of SNSs' user-generated content on consumers' purchase intention as the negative ones are proven to produce strong but unfavourable effects [23]. As stated above, this paper aims to assess the underlying process by which the perceived features of eWOM (persuasiveness and informativeness) and its creator's profile (expertise and trustworthiness) affect the level of perceived usefulness, the adoption of eWOM, and the intention to buy. To meet such aim, at first, the IAM is reviewed in the context of eWOM. After that, existing literature on the same topic is critically assessed to develop the hypotheses for this study. That part is followed by the description of the employed methodology and the findings, which provided the base for the contributions in both academic literature and real-life implication. In the end, some shortcomings of the research and the proposals for future studies are provided.

II. LITERATURE REVIEW

A. Information adoption model (IAM)

In 2003, Sussman and Siegal introduced the information adoption model (IAM) which has been the primary framework for the assessment of the underlying process by which persuasive information is received, interpreted, and accepted in many studies [24]. Such model is developed based on the two essential works of Petty and Cacioppo (1986), the Elaboration Likelihood Model expressing the transition in attitude [25], and of Davis (1989), the Technology Acceptance Model describing how users take on the usage of technology [26]. As can be seen from figure 1, the IAM consists of four basic elements of information adoption, information usefulness, argument quality, and source credibility. Consumers will process a certain detail in both central and peripheral routes to assess its usefulness based on which they will decide to follow or ignore the suggestion [24,25]. In the former route, consumers carefully examine the quality of the argument, which is the information concerning their personal preference on social media. In particular, arguments which are perceived as powerful, and persuasive are more favourable than feeble and unbelievable ones [25]. In the latter route, consumers inspect the credibility of the information sources, which consist mainly of the content generator in the case SNSs such as other users or KOLs. Owing to the nature of SNSs where everyone can become the source of information (from eWOM), the issue of source credibility seems to be a more compelling element of the persuasion process [27].

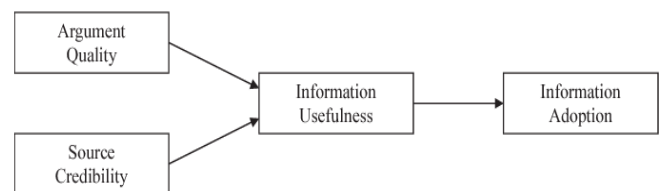


Fig. 1 Information adoption model (IAM) (Sussman & Siegal, 2003)

However, Cheung et al. (2008) discovered that the initial IAM proposed by Sussman and Siegal cannot be employed to fully interpret the perceived information usefulness in the

context of SNSs and online forums [28]. To overcome such weaknesses, in the following part, several variables taken from various studies in the same context are closely examined and, thus, chosen to articulate and replace argument quality and source credibility. Based on the original information adoption model, the author of this paper postulates that consumers who acquire product-related information from SNSs will store such information in their mind as a reference for later decision-making process.

B. Determinants of perceived usefulness

According to Alhammad and Gulliver (2014), perceived persuasiveness of an eWOM refers to its ability to convince receivers to adopt it to alter their behaviour [29]. Similarly, Drozd et al. (2012) indicate that eWOM is perceived as highly persuasive when it is regarded as highly convincing, influential, and relevant so that its receivers want to rely on the information it contains to change their behaviour [30].

Accordingly, the level of argument's persuasiveness perceived by the consumers has been confirmed to be in a significant and positive relationship with their responding actions [31,32]. Schreiner et al. (2017) proved that a persuasive statement can indirectly influence the consumer's perception of its suitability and practicality [33]. Along the same line, finding from a study conducted by Bench-Capon et al. (2004) indicate that consumers' perceived value of a product-related message correlates with their impression of its persuasiveness [34]. In the case of SNSs, Gunawan and Huarng (2015) believe that the more convincing the argument is, the stronger the consumer's favour towards the information is, and thus, its perceived usefulness [35]. Thus, it is hypothesized that:

H1. The perceived persuasiveness can positively influence the perceived usefulness of eWOM collected from SNSs.

Perceived informativeness refer to the extent to which the eWOM can provide a consumer with helpful product/service information [36]. Likewise, informativeness can be decided based on target receiver's evaluation of information's helpfulness and resourcefulness, those are in fact perceived usefulness [37].

As empirically suggested by Sussman and Siegal (2003), higher quality of the message received can better facilitate the decision to/ not to purchase the products [24]. This argument was later supported in the works of Racherla et al. (2012) and Lee and Shin (2014), who found out that consumers tend to value product-related messages which are perceived as higher quality [38,39]. In the context of SNSs, as consumers are often overloaded with suggestions and recommendations about their desired products from many information sources, they must use a set of criteria to examine such information [40]. In general, those criteria are in accordance with the receiver's preferences and demands [41]. Rani and Shivaprasad (2019) discovered that message's relevance can significantly improve online business outcomes [42]. On the other hand, online consumers expect to receive product-related information which is regularly updated and renewed [43]. Moreover, they tend to interact with, purchase from, or recommend brands offering detailed information at a great amount [44] (Xiaorong et al., 2011). A study con-

ducted by Ho Nguyen et al. (2022) indicates that the recipient's perceived informativeness of the eWOM is strongly and positively tied to the message's timeliness, relevance, and comprehensiveness [45]. Besides, perceived informativeness, in turn, is proven to improve consumer's attitude toward the message value, suitability and practicality [46]. In the case of eWOM in the tourism industry, timeliness, relevance, and comprehensiveness are regularly pointed out as determinants of perceived message usefulness [47]. Accordingly, the following hypothesis is developed:

H2. The perceived informativeness can positively influence the perceived usefulness of eWOM collected from SNSs.

Source expertise is defined as the sum of knowledge and skills gathered thorough real-life experience [48]. However, it is hard to identify the level of source expertise of users/influencers in the online environment owing to the inaccessibility of personal information [28]. Therefore, the determination of source expertise can only be possible when audiences assess the information disclosed or attached to the eWOM [49]. In the case of today SNSs' reviewers, they tend to showcase their expertism through various profile information such as qualification, professional, connection, past experiences, etc..., thus, self-proclaiming as experts in their areas [50]. Since humans are "cognitive misers", who only need to rely on "just enough" amount of information to form an attitude, while ignoring the actual information quality [51]. Accordingly, in this study, source expertise was measured based on three items of the creator's profile and only one of the actual eWOM's content.

Source trustworthiness, on the other hand, is defined as the level of belief perceived by the target audiences after examining the reviewers' motives behind their WOM [52]. In the case on eWOM, online consumers, especially gen Z ones, are becoming more and more suspicious owing to the blurring boundary between commercial advertisements and actual product reviews [53].

As mentioned in part 2.1, in the online environment, the credibility of the information source is a crucial factor in evaluating the message. Consumers tend to rely on product reviews and advice from people, who are regarded as "professional", during their decision-making process [54]. The higher the capability and competency of message creators, the higher the possibility at which receivers believe in and employ the information provided in eWOM [55]. In the context of SNSs, expert's recommendations are proven to produce much stronger effects on consumers perceived message usefulness than do those from ordinary online users [56]. Nevertheless, owing to the limitation in experience with the content creators, many consumers find it hard to figure out their level of expertise and trustworthiness [57]. Such argument is supported by the findings from the works of [58,59] suggesting that source credibility does not significantly influence consumer perceived usefulness of the communicated message. However, due to the rise of personal branding of SNSs platforms and the rise of KOLs is a very example, consumers nowadays can assess and validate the information source's expertise and trustworthiness based on many B2C and C2C content from various channels. Such validation, in turn, serves as the motivator for recipients to em-

play/ or to drop a certain piece of information from SNSs' eWOM in their decision-making process [59]. All in all, based on the suggestion from Kang and Namkung (2019) in the context of SNS's eWOM, the author of this study theorizes that if the consumers develop a strong and favourable perception of the source expertise and trustworthiness, they will judge the information as highly useful, regardless of the nature of the relationship between them and the content creators [60]. Accordingly, it is hypothesized that:

H3. The perceived source trustworthiness can positively influence the perceived usefulness of eWOM collected from SNSs.

H4. The perceived source expertise can positively influence the perceived usefulness of eWOM collected from SNSs.

C. Perceived usefulness and eWOM adoption

Information adoption, according to [60] Wang (2016), "is a process in which people purposefully engage in using information" and is one of the most significant acts that audience seek to perform in the online environment. Besides, in the social media platforms, product-related content is constantly generated, articulated, and spread so that online user tends to form his/her own attitude toward each of such content. In particular, he/she can decide which information is useful enough for better decision-making process [28]. In other words, if a piece of eWOM is perceived as more useful than the others, it is more likely to be adopted by the receiver (Ibid). In the context of this study, eWOM adoption is measured based on four items proposed by Fang (2014), indicating the level of knowledge provided by the piece of eWOM, its helpfulness in the decision-making process, and its motivation on making purchase actions of tourism products [61].

As mentioned in the IAM of Sussman and Siegal (2003), the intention to adopt information is significantly influenced by the consumer perceived usefulness of such information. In the online context, a study conducted by Kawakami and Parry (2013) supports that the more useful the piece of information is judged, the higher the possibility that information is received, processed, and exploited by the forum's members [62]. Along the same line, users of B2C platforms, under the pressure to deal with a large amount of information, tend to evaluate eWOM in terms of suitability and practicality before choosing which ones to follow and which to drop [63]. A similar study in the C2C SNS's platform suggests similar process by which the most valuable and useful recommendations are picked up and utilized to facilitate the buying decision-making process [64]. Accordingly, the following hypothesis is developed:

H5. Perceived usefulness can positively influence the adoption of eWOM.

D. eWOM adoption and purchase intention

The adoption of eWOM collected from SNSs has been confirmed to drive the purchase intention of the product reviewed [65]. According to the authors, the receiving and following of useful information from eWOM provide consumers with product knowledge, which, in turn, fosters their intention to purchase the products. Likewise, Pousttchi and Wiedemann (2007) prove that highly successful viral mar-

keting campaigns can increase the perceived usefulness of the communicated SNSs' information and can increase the tendency to buy [66]. In the context of the online retailing industry, a study conducted by Sandar et al. (2021) indicates that the higher level of eWOM adoption from online users, the higher the chance that they will purchase from the communicated online retailers [67]. In the case of tourism accommodation, the vital role of eWOM adoption is also confirmed. Scholars like Song et al. (2021) discovered a positive relationship between the visit frequency of third-party forums and the intention to purchase accommodation from the site [22]. Thus, it is hypothesized that:

H6. eWOM adoption can positively influence purchase intention.

The research framework for this paper is shown in figure 2.

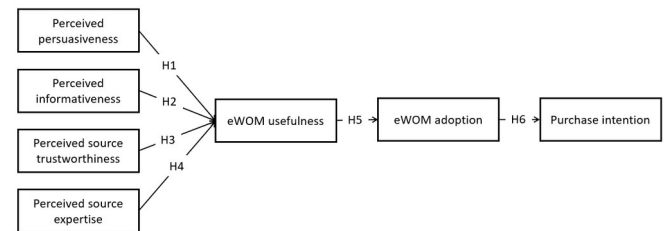


Fig. 2 Research framework

III. METHODOLOGY

A. The measurement scales

Argument quality represents the ability of the communicated message in convincing its receivers [68]. On the other hand, the quality of the argument is also measured based on the quality of the information perceived by the receivers regarding the aspects of accurateness, completeness, and timeliness [28,24,69]. Both approaches are necessary for accessing the true nature of argument quality, thus, must be included in the measurement of such elements in the IAM [70]. Therefore, the author of this paper suggests two variables to represent/ replace argument quality in the original IAM, which are "perceived persuasiveness" and "perceived informativeness". Source credibility refers to the level of belief, trust, and compliance the message receivers hold toward the posters [54]. However, source credibility reflects the extent of understanding and proficiency possessed by the message creators toward the mentioned products [71]. Cheung et al. (2008) suggest that source credibility should be examined through both of such aspects [28]. Accordingly, this paper employs both "source trustworthiness" and "source expertise" to illustrate "source credibility" from the original IAM.

Perceived usefulness is measured based on the users' viewpoint that the employment of innovative technology may improve their efficiency in the technology acceptance model [26]. In the context of SNSs, the author of this paper regards perceived usefulness as the online users' perception that the information gathered from eWOM on social sites is valuable during their product-consumption process [24]. Accordingly, eWOM adoption can be seen as the level by which recipients of eWOM recognize and keep in mind the

recommendations from SNSs during their decision-making process [72]. Last but not least, purchase intention is the probability that a consumer will buy the products/services mentioned, reviewed, or recommended by another on the SNS platform [73].

All in all, this study's framework consists of seven constructs "perceived persuasiveness", "perceived informativeness", "source trustworthiness", "source expertise", "eWOM usefulness", "eWOM adoption", and "purchase intention. The five-point Likert scales were employed to score all of such items ranging from highly disagree (1) to highly agree (5). In particular, either "perceived persuasiveness" or "perceived informativeness" were measured based on three items suggested in the work of Zhang et al. (2014). On the other hand, "source trustworthiness" was determined based on five elements picked up from Ghazisaeedi et al. (2012). Four items employed to assess the proficiency and competence of content creators through their SNSs profile in the work of Ohanian (1990) were employed to measure "source expertise" in this study. Fang's work in 2014 was also utilized to provide three measurement items for eWOM adoption, while eWOM usefulness was measured with three items adapted from Sussman and Siegal (2003). Lastly, three items taken from the measurement scaled in Chang et al. (2014) study were employed to measure purchase intention (Table 1).

The original questionnaire was planned and developed in English before being translated into Vietnamese by three different translators to ensure meaning consistency. The participants were requested to interact with one sample of eWOM from each of three different SNSs (Facebook, YouTube, and Instagram). Such interaction serves as the foundation for the response to all questions.

B. Data collection

The author of this paper asked 450 (371) students from two universities in Hanoi: Banking Academy and Thang Long University for several reasons. First of all, out of 450 respondents, the expected number of valid ones is around 400, which is sufficient to maintain the margin error of about 5% at a 95% confidence level. Also, all university students belong to the group of Gen Z consumers and those from large cities like Hanoi account for the majority part of gen Z tourism consumers in Vietnam [3]. Amongst 450 participants, 227 of them are male while 223 of them are female, representing the accurate (and evenly) gender distribution of gen Z in Vietnam [3]. Before the actual questionnaire takes place, a screening test was employed to identify the ineligible those who do not purchase tourism accommodation (25 – 5.56%) and those who do not consult SNSs' eWOM before making their purchase decision (19 – 4.22%). The remaining 406 participants were asked to view one of three different reviews regarding a tourism accommodation published on either Facebook, Instagram or TikTok of their choice (the three most influential SNSs amongst Vietnam's gen Z). In this step, the participants were asked to go to the reviewers' sites to interact with them during the process of answering all the questions that follow. Out of 406 received responses, 35 were removed owing to contradicting answers and incompleteness while the rest (371) are taken as valid

TABLE I
MEASUREMENT SCALES

Constructs	Items	Sources
Perceived persuasiveness	In general, I am convinced by the positive argument	[70]
	In general, I think the positive argument is strong	
	In general, I think the positive argument is good	
Perceived informativeness	In general, I think the information about the service is relevant.	[70]
	In general, I think the information about the service is complete.	
	In general, I think the information about the service is timely.	
Perceived trustworthiness	The creator of the piece of eWOM is undependable.	[74]
	The creator of the piece of eWOM is honest.	
	The creator of the piece of eWOM is reliable.	
	The creator of the piece of eWOM is sincere.	
Perceived expertise	The creator of the piece of eWOM is knowledgeable in evaluating tourism accommodations.	[75]
	The creator of the piece of eWOM is an expert in evaluating the quality of tourism accommodations.	
	The creator of the piece of eWOM is highly experienced in consuming tourism accommodations.	
	The creator of the piece of eWOM is capable of providing product-related information and knowledge in the form of posts and comments compared to others.	
Perceived usefulness	In general, I think the information about the service is valuable.	[24]
	In general, I think the information about the service is informative.	
	In general, I think the information about the service is helpful.	
eWOM adoption	The piece of eWOM increased my knowledge of the service discussed.	[61]
	The piece of eWOM made it easier for me to make my purchase decision.	
	The piece of eWOM enhanced my effectiveness in making a purchase decision.	
	The post motivated me to take purchasing action.	
Purchase intention	It is very likely that I will book the accommodation.	[76]
	I will book the accommodation next time I need a place to sleep during my travel.	
	I will definitely try the tourism accommodation service.	

for further analysis. The features of this sample can be seen in Table 2. As can be seen from that Table, 49.87% of the respondents are female while 50.13% of them are male, representing the accurate (and evenly) gender distribution of gen Z in Vietnam. Notably, the majority of the respondents employed Facebook's posts (167 – 45.01%) to solve the questionnaires. Such figure is followed by those using YouTube (139 – 37.47%), and Instagram (65 - 17.52%). Such statistics are in line with those reported by Decision Lab in its Connected Consumer Report for Q1 2021.

TABLE II
CHARACTERISTICS OF THE SAMPLE

Description		Percentage
Gender	Female	49.87%
	Male	50.13%
Used SNS platforms to solve the questionnaire	Facebook	45.01%
	YouTube	37.47%
	Instagram	17.52%

IV. RESULTS AND DISCUSSIONS

A. Assessment of measurement model

The reliability and validity of measurement scales for constructs used in the conceptual model are firstly evaluated upon the guidance of Anderson and Gerbing (1988) [77]. Specifically, the reliability of the seven constructs, including perceived persuasiveness, perceived expertise, perceived trustworthiness, perceived informativeness, eWOM usefulness, eWOM adoption, and purchase intention are evaluated through the calculation of Cronbach's alpha. According to the figures shown in Table 3, all of Cronbach's alpha values are greater than 0.6. These results indicate that the internal consistency of measurement properties for all constructs is acceptable.

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are conducted to check for the validity of measurement scales. First, EFA is conducted on SPSS with the principal factor as extraction method followed by a varimax rotation. According to EFA results, as shown in Table 4, there are seven factors emerged as subjected to how these constructs were initially measured. The unidimensionality and discriminant validity of the measurement properties is, therefore, confirmed (Straub, 1989). All the measurement items are then retained to undergo confirmatory factor analysis (CFA) as conducted on AMOS 22 to check the convergent validity. The CFA results for the seven latent variables as shown in Table 5 reveal that all factor loadings are statistically significant and higher than the cut-off value of 0.4. Based on the conditions as suggested in [78], the construct validity of the measurement properties is acceptable [79].

Additionally, the discrimination test is further conducted by calculating the value of Average Variance Extracted (AVE) indicators and comparing them to the square of correlations between each of the two constructs [77,80]. The results featured in Table 6 indicate that all AVE indicators are greater than the threshold value of 0.5 and much greater than the square of correlations between pairs of constructs. The convergent validity and discriminant validity of the measurement properties for all seven concepts are confirmed [77,80].

TABLE III
RELIABILITY AND CORRELATION OF CONSTRUCTS

	PER	EXP	TR US T	INFO	USE	AD T	P I	C.R
PER	1							0.639
EXP	0.394	1						0.814
TRUST	0.354	0.158	1					0.856
INFO	0.439	0.249	0.262	1				0.707
USE	0.455	0.447	0.326	0.205	1			0.785
ADT	0.245	0.245	0.137	0.145	0.291	1		0.834
PI	0.049	0.037	0.001	0.032	0.024	0.028	1	0.909

TABLE IV
EXPLORATORY FACTOR ANALYSIS RESULTS

	Component						
	1	2	3	4	5	6	7
TRUST5	0.914						
TRUST4	0.887						
TRUST3	0.8						
TRUST2	0.733						
TRUST1	0.544					0.311	
EXP3		0.825					
EXP2		0.788					
EXP1		0.763					
EXP4		0.744					
PI3			0.994				
PI1			0.884				
PI2			0.882				
USE1				0.833			
USE2				0.795			
USE3				0.669			
ADT2					0.851		
ADT3					0.795		
ADT1					0.685		
INFO2						0.845	
INFO1						0.731	
INFO3						0.703	
PER2							0.78
PER1							0.751
PER3							0.621

TABLE V
CONFIRMATORY FACTOR ANALYSIS RESULTS

Construct scale items	Mean	Standard deviation	Factor loading	t-value
PER1	3.17	0.632	0.549	0.121
PER2	3.15	0.674	0.712	0.153
PER3	3.20	0.667	0.585	
EXP1	2.75	0.689	0.769	0.089
EXP2	2.98	0.737	0.76	0.095
EXP3	2.77	0.751	0.77	0.097
EXP4	2.67	0.858	0.621	
TRUST1	3.06	0.844	0.418	0.054
TRUST2	3.58	0.717	0.684	0.039
TRUST3	3.30	0.810	0.791	0.039
TRUST4	3.33	0.810	0.858	0.036
TRUST5	3.42	0.806	0.957	
INFO1	3.79	0.749	0.521	0.082
INFO2	3.29	0.840	0.866	0.137
INFO3	3.16	0.853	0.663	
USE1	3.30	0.794	0.75	
USE2	3.30	0.806	0.796	0.086
USE3	3.16	0.836	0.687	0.083
ADT1	3.16	0.712	0.555	
ADT2	3.08	0.789	0.805	0.144
ADT3	2.86	0.848	0.694	0.146
ADT4	3.01	0.817	0.963	0.172
PI1	3.50	0.762	0.757	
PI2	3.50	0.769	0.758	0.055
PI3	3.49	0.675	1.168	0.065

Notes: Measurement model fit details: CMIN/df = 1.744; p=.000; RMR=0.033; GFI=0.914; CFI = 0.965; AGFI= 0.890; RMSEA=0.045; PCLOSE=0.889; “ ” denotes loading fixed to 1

In addition, a CFA on the six-factor model also demonstrated a good model fit (CMIN/df = 1.744; p=.000; RMR=0.033; GFI=0.914; CFI = 0.965; AGFI= 0.890; RMSEA=0.045; PCLOSE=0.889) as shown in Table 5.

Based on the above results, the original pool of measurement properties as shown in Table 1 is all retained for the hypothesis testing phase.

TABLE VI
AVERAGE VARIANCE EXTRACTED AND DISCRIMINANT VALIDITY TEST

	PER	EXP	TRUS T	INFO	USE	ADT	PI
PER	0.519						
EXP	0.155 2	0.609					
TRUS T	0.125 3	0.025 0	0.619				
INFO	0.192 7	0.062 0	0.0686	0.581			
USE	0.207 0	0.199 8	0.1063	0.042 0	0.591		
ADT	0.060 0	0.060 0	0.0188	0.021 0	0.084 7	0.608	
PI	0.002 4	0.001 4	<0.001 1	0.001 0	0.000 6	0.000 8	0.84 9

Notes: The numbers in bold represent AVE values

B. Hypotheses testing

Structural equation modelling (SEM) analysis is employed to allow the estimation for both direct and indirect hypothesized relationships as shown in Figure 1 [81]. Specifically, the SEM analysis is conducted in AMOS 22 for estimating the significance and magnitude of hypothesized effects. The estimation results are shown in Table 7. The model fit indicators indicate that the proposed model demonstrates a reasonably good fit to the data.

TABLE VII
SEM ANALYSIS RESULTS

Construct path	Coefficients
PER→USE	0.439*
INFO→USE	0.045
TRUST→USE	0.142*
EXP→USE	0.359**
USE→ADT	0.211**
ADT→PI	0.041*
Fit indices	
CMIN/df	1.765
CFI	0.963
GFI	0.910
AGFI	0.889
RMR	0.035
RMSEA	0.045
PCLOSE	0.862

Notes: *p<0.05; **p<0.001.

According to statistical results shown in Table 7, all three factors including perceived persuasiveness, perceived expertise, and trust have direct positive impacts on eWOM usefulness which, in turn, positively affects eWOM adoption (Accept H1, H2, H3, H5). Next, eWOM adoption significantly and favourably contributes to purchase intention (Accept H6)

In contrast to our expectation, there is no significant relationship between perceived informativeness and purchase intention (Reject H4).

According to statistical results shown in Table 7, perceived persuasiveness produces significant and positive effects on consumer perception of eWOM usefulness, thus, hypothesis H1 is accepted. This finding is in agreement with that of Pentina et al. (2015), Schreiner et al. (2017), and Cassar et al. (2019) who discovered that higher levels of eWOM persuasiveness can offer the readers strong argument for their declaration and urging them to willingly receive the relevant information [31,32,33]. Furthermore, this

result also explains the outcomes of earlier studies on the dimensions of eWOM quality including comprehensiveness, relevance, and timeliness. Scholars like Cheung et al. (2008) stress the importance of relevance and comprehensiveness while Tien et al. (2019) confirms the vital role of comprehensiveness and timeliness [28,82]. On the contrary, low-quality reviews that are irrelevant, out-of-date, or incomprehensive are confirmed to generate negative perception amongst recipients [83].

The influence of perceived informativeness on perceived usefulness, on the other hand, is not significant according to statistical results shown in Table 7, thus hypothesis H2 is rejected. This finding contradicts to those from [44] and [41] suggesting a strong and positive relationship between such two constructs. It can be explained by Li's 2016 study in the online retailing industry suggesting that online consumers, who are often overloaded with information, often favour concise pieces of eWOM over others. Such an argument is support by the work of (Li, 2016), who articulate that eWOM providing too much information (more than necessary) can create confusion within its recipients' minds, thus, is not perceived as useful for their decision-making process [84]. In the case of gen Z consumers, it is the fact that such consumers tend to check through various posts from different SNSs platforms before making their purchase decision (Finneman, 2020). Accordingly, they do not have a lot of time to spend on one piece of eWOM so the ones with precise and just enough information can be perceived as more useful than the others [85].

Statistical results from Table 7 also indicate that both source trustworthiness and source expertise can significantly influence perceived usefulness toward a piece of eWOM so that hypotheses H3 and H4 are accepted. Furthermore, it is also proven source expertise can produce more significant effect on perceived usefulness than source trustworthiness does in the context of SNSs. Previous studies in the context of third-party websites and forums do not support the significant link between source expertise and perceived usefulness [28]. It may be owing to the limitation in the interaction between the users and content creators, which is the nature of web-based platforms [28]. However, in this study, as the participants are encouraged to freely examine and get in touch with the author of the posts through various SNSs chat tools, source expertise can be recognized, increasing such author's eWOM usefulness.

In addition, eWOM usefulness was confirmed to produce strong impacts on eWOM adoption, thus hypothesis H5 is accepted. This finding agrees with those from the works of Kim and Prabhakar (2004) and Kawakami and Parry (2013), suggesting the cause-and-effect relationship between perceived usefulness and the intention to adopt information [62,63]. The environment of SNSs fosters the quick and efficient exchange of product-related information and usage experiences, thus, decreasing the level of doubt while increasing the level of perceived usefulness of the SNSs' eWOM [85]. Accordingly, the perceived usefulness can drive consumers toward adopting the information extracted from eWOM during their future decision-making process.

Last but not least, eWOM adoption was proven to have a significant influence on purchase intention amongst the re-

cipients, therefore hypothesis H6 is accepted. This is in the same line with the findings from the works of Ngarmwongnoi et al. (2020), Sandar et al. (2021), and Song et al. (2021). Combining with the above-accepted hypotheses, it can be concluded that perceive usefulness of eWOM can influence the intention to buy directly through eWOM adoption. In other words, to facilitate purchase intention of eWOM recipients, marketers should find a way to increase their perception of its usefulness.

V. CONCLUSION AND IMPLICATIONS

The determinants of eWOM of persuasiveness, source expertise, and source trustworthiness are important elements in the examination and recognition of eWOM usefulness in the context of C2C SNSs. The most influential factor is perceived persuasiveness, followed by source expertise and source trustworthiness.

The findings from this paper can provide various implications for both academic and practical purposes.

A. Academic implications

First of all, the information adoption model has been confirmed to be valid in assessing the underlying process by which SNSs' eWOM fosters purchase intention amongst gen Z consumers in the context of tourism accommodation. In addition, the author of this paper also helps to settle the uncertainty of current literature in the dimensions of argument quality by proposing the incorporation of both perceived persuasiveness and perceived informativeness. Thirdly, this paper supports the existing studies in the field of SNSs, suggesting that argument quality generates a stronger influence on consumer perception than source credibility does [59,86]. The SNSs provide consumers with better conditions and more tools (photos, stories, videos, status, private messaging) to examine the eWOM authors [87]. Based on such conditions, the author of this paper amongst a few scholars in Vietnam urges participants to perform such action to come up with their perceptions about eWOM source expertise and trustworthiness, thus, reinforcing the competence of the employed research model.

B. Managerial implications

The findings drawn from this paper's statistical results suggest that SNS is a flourishing environment for C2C eWOM, which can produce strong impacts on purchase intention. Therefore, tourism accommodation firms must carefully monitor the consumer-generated content from such platforms. Such strategy can be carried out by the employment of various tactics including the seeding of positive and relevant information on SNSs groups interested in their products/services, replying to potential consumer requests, and spreading positive and high-quality product reviews. By doing so, the firm can ensure that its potential customers can receive the product-related information, which is highly persuasive from trustworthy sources, thus, facilitating their intention to book the tourism accommodation service the firm offers. This strategy is particularly relevant to the target gen Z consumers, who, according to Tran (2022), spend most of their time on SNSs and place more trust on advice from online sources than those from the others [88].

From the marketer's point of view, the findings from this paper can be applied to increase the effectiveness of their online marketing activities, especially the employment of KOLs. In detail, as perceived persuasiveness plays the most significant role in affecting purchase intention, the message communicated by contracted KOLs must be carefully designed to be highly relevant, positive, and comprehensive. Furthermore, KOLs' eWOM must contain a sufficient amount of information but not too much to avoid creating confusion in the recipient's mind as perceived informativeness is not well-praised by the target consumers. Regarding source credibility, as source expertise produces stronger impacts on perceived usefulness, the chosen KOLs must be regarded as knowledgeable, experienced, and helpful amongst target consumers of gen Z travellers. KOLs can also participate in the process of improving argument quality (thus, perceived persuasiveness) by encouraging their fans and followers to provide feedback containing their actual user experience with the communicated accommodation services. Moreover, KOLs and their team should provide up-to-date information and quickly reply to users' comments on their posts about tourism accommodation. This is very important to satisfy and retain gen Z consumers, who, as suggested by Asare (2019), are "demanding" and "not patient", and tend to quickly lose interest on brand offering limited product related information or irrelevant one [89].

C. Limitations and future research directions

The paper still possesses several shortcomings. First of all, the author of this paper has chosen only four constructs to examine eWOM usefulness, thus, reducing the chance by which the mechanism behind eWOM is better explained. To overcome such drawbacks, other antecedents of eWOM such as source attractiveness, source perception and source style [56], social relationship, satisfaction, and subjective norms [90] can be included in the research framework.

On the other hand, this paper has not examined the effect produced by negative eWOM as it cannot be incorporated into the research model. However, future studies on the same topic could include the hypothesis that eWOM valence (positive or negative) can moderate the relationship between perceived usefulness and purchase intention [91].

Also, the sample of this paper includes only students in Hanoi, who do not properly represent the whole population of gen Z tourists in Vietnam. The sample of future studies must be designed to consist of gen Z consumers from other big cities in Vietnam such as Ho Chi Minh and Danang. Last but not least, as tourism accommodations can be categorized into different groups of various budget levels or service quality levels, additional studies could treat product categories as a moderator on the relationship between perceived usefulness and eWOM adoption.

REFERENCES

- [1] Lee, K. Y., & Choi, H. (2019). Predictors of electronic word-of-mouth behavior on social networking sites in the United States and Korea: Cultural and social relationship variables. *Computers in Human Behaviour*, 94, 9–18. <https://doi.org/10.1016/j.chb.2018.12.025>
- [2] Liu, Z., Lei, S.-H., Guo, Y.-L., & Zhou, Z.-A. (2020). The interaction effect of online review language style and product type on consumers' purchase intentions. *Palgrave Communications*, 6(1), 1–8. <https://doi.org/10.1057/s41599-020-0387-6>

- [3] Outbox. (2021, April 20). *Stay stunned for insight snapshot Vietnamese travel behaviors - summer 2021*. Outbox. <http://outbox-consulting.com/stay-stunned-for-insight-snapshot-vietnamese-travel-behaviors-summer-2021.html>
- [4] Dimitriou, C. K., & AbouElgeith, E. (2019). Understanding generation Z's travel social decision-making. *Tourism and Hospitality Management*, 25(2), 311–334. <https://doi.org/10.20867/thm.25.2.4>
- [5] Kastenholz, C. (2021, May 17). *Gen Z And the Rise Of Social Commerce*. Forbes. <https://www.forbes.com/sites/forbesagencycouncil/2021/05/17/gen-z-and-the-rise-of-social-commerce/?sh=5a0b84251d0d>
- [6] de Vries, L., Gensler, S., & Leeflang, P. S. H. (2012). Popularity of brand posts on brand fan pages: An investigation of the effects of social media marketing. *Journal of Interactive Marketing*, 26(2), 83–91. <https://doi.org/10.1016/j.intmar.2012.01.003>
- [7] Libai, B., Bolton, R., Bügel, M. S., de Ruyter, K., Götz, O., Risselada, H., & Stephen, A. T. (2010). Customer-to-customer interactions: Broadening the scope of word-of-mouth research. *Journal of Service Research*, 13(3), 267–282. <https://doi.org/10.1177/1094670510375600>
- [8] Mikalef, P., Pateli, A., & Giannakos, M. (2013). Why are users of social media inclined to word-of-mouth? In *IFIP Advances in Information and Communication Technology* (pp. 112–123). Springer Berlin Heidelberg.
- [9] Barreto, A. M. (2014). The word-of-mouth phenomenon in the social media era. *International Journal of Market Research*, 56(5), 631–654. <https://doi.org/10.2501/ijmr-2014-043>
- [10] Sweeney, J., Payne, A., Frow, P., & Liu, D. (2020). Customer advocacy: A distinctive form of word of mouth. *Journal of Service Research*, 23(2), 139–155. <https://doi.org/10.1177/1094670519900541>
- [11] Chen, Y.-L., Tang, K., Wu, C.-C., & Jheng, R.-Y. (2014). Predicting the influence of users' posted information for eWOM advertising in social networks. *Electronic Commerce Research and Applications*, 13(6), 431–439. <https://doi.org/10.1016/j.elerap.2014.10.001>
- [12] Wang, X., Yu, C., & Wei, Y. (2012). Social media peer communication and impacts on purchase intentions: A consumer socialization framework. *Journal of Interactive Marketing*, 26(4), 198–208. <https://doi.org/10.1016/j.intmar.2011.11.004>
- [13] Mayrhofer, M., Matthes, J., Einwiller, S., & Naderer, B. (2020). User generated content presenting brands on social media increases young adults' purchase intention. *International Journal of Advertising*, 39(1), 166–186. <https://doi.org/10.1080/02650487.2019.1596447>
- [14] Vargo, C., Gangadharbatla, H., & Hopp, T. (2019). eWOM across channels: comparing the impact of self-enhancement, positivity bias and vengeance on Facebook and Twitter. *International Journal of Advertising*, 38(8), 1153–1172. <https://doi.org/10.1080/02650487.2019.1593720>
- [15] Litvin, S. W., Goldsmith, R. E., & Pan, B. (2018). A retrospective view of electronic word-of-mouth in hospitality and tourism management. *International Journal of Contemporary Hospitality Management*, 30(1), 313–325. <https://doi.org/10.1108/ijchm-08-2016-0461>
- [16] Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. *Procedia Manufacturing*, 22, 960–967. <https://doi.org/10.1016/j.promfg.2018.03.137>
- [17] Sánchez Torres, J. A., Arroyo-Cañada, F.-J., Solé-Moro, M.-L., & Argila-Irurita, A. (2018). Impact of gender on the acceptance of electronic word-of-mouth (eWOM) information in Spain. *Contaduría y Administración*, 63(4), 61. <https://doi.org/10.22201/fca.24488410e.2018.1428>
- [18] Wang, S., Cunningham, N. R., & Eastin, M. S. (2015). The impact of eWOM message characteristics on the perceived effectiveness of online consumer reviews. *Journal of Interactive Advertising*, 15(2), 151–159. <https://doi.org/10.1080/15252019.2015.1091755>
- [19] Djafarova, E., & Bowes, T. (2021). 'Instagram made Me buy it': Generation Z impulse purchases in fashion industry. *Journal of Retailing and Consumer Services*, 59(102345), 102345. <https://doi.org/10.1016/j.jretconser.2020.102345>
- [20] Boateng, S. L. (2021). Electronic word of mouth (eWOM) and makeup purchase intention among Gen-Z females: The serial mediating effect of brand image and brand integrity. *International journal of customer relationship marketing and management*, 12(2), 17–35. <https://doi.org/10.4018/ijcrmm.2021040102>
- [21] Liu, J., Wang, C., Zhang, T. (christina), & Qiao, H. (2022). Delineating the effects of social media marketing activities on generation Z travel behaviors. *Journal of Travel Research*, 004728752211063. <https://doi.org/10.1177/00472875221106394>
- [22] zinSong, B. L., Liew, C. Y., Sia, J. Y., & Gopal, K. (2021). Electronic word-of-mouth in travel social networking sites and young consumers' purchase intentions: an extended information adoption model. *Young Consumers Insight and Ideas for Responsible Marketers*, 22(4), 521–538. <https://doi.org/10.1108/yc-03-2021-1288>
- [23] Zinko, R., Patrick, A., Furner, C. P., Gaines, S., Kim, M. D., Negri, M., Orellana, E., Torres, S., & Villarreal, C. (2021). Responding to negative electronic word of mouth to improve purchase intention. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(6), 1945–1959. <https://doi.org/10.3390/jtaer16060109>
- [24] Sussman, S. W., & Siegal, W. S. (2003). Informational influence in organizations: An integrated approach to knowledge adoption. *Information Systems Research: ISR*, 14(1), 47–65. <https://doi.org/10.1287/isre.14.1.47.14767>
- [25] Petty, R. E., & Cacioppo, J. T. (1986). *Communication and Persuasion*. Springer New York.
- [26] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, 13(3), 319. <https://doi.org/10.2307/249008>
- [27] Dedeoglu, B. B. (2019). Are information quality and source credibility really important for shared content on social media?: The moderating role of gender. *International Journal of Contemporary Hospitality Management*, 31(1), 513–534. <https://doi.org/10.1108/ijchm-10-2017-0691>
- [28] Cheung, C. M. K., Lee, M. K. O., & Rabjohn, N. (2008). The impact of electronic word-of-mouth: The adoption of online opinions in online customer communities. *Internet Research*, 18(3), 229–247. <https://doi.org/10.1108/10662240810883290>
- [29] Alhammad, M. M., & Gulliver, S. R. (2014). Persuasive technology and users acceptance of E-commerce: Users perceptions of website persuasiveness. *Journal of Electronic Commerce in Organizations*, 12(2), 1–13. https://econpapers.repec.org/article/jiggico00/v_3a12_3ay_3a2014_3ai_3a2_3ap_3a1-13.htm
- [30] Drozd, F., Bergsund, H. B., Hammerström, K. T., Hansen, M. B., & Jacobsen, H. (2018). A systematic review of courses, training, and interventions for adoptive parents. *Journal of Child and Family Studies*, 27(2), 339–354. <https://doi.org/10.1007/s10826-017-0901-7>
- [31] Pentina, I., Bailey, A. A., & Zhang, L. (2018). Exploring effects of source similarity, message valence, and receiver regulatory focus on yelp review persuasiveness and purchase intentions. *Journal of Marketing Communications*, 24(2), 125–145. <https://doi.org/10.1080/13527266.2015.1005115>
- [32] Cassar, M. L., Caruana, A., Konietzny, J., & Chohan, R. (2019). The effect of narrative believability on persuasiveness and purchase intention: An abstract. In *Developments in Marketing Science: Proceedings of the Academy of Marketing Science* (pp. 657–657). Springer International Publishing.
- [33] Schreiner, C., Appel, M., Isberner, M.-B., & Richter, T. (2018). Argument strength and the persuasiveness of stories. *Discourse Processes*, 55(4), 371–386. <https://doi.org/10.1080/0163853x.2016.1257406>
- [34] gBench-Capon, T., Atkinson, K., & Chorley, A. (2005). Persuasion and Value in Legal Argument. *Journal of Logic and Computation*, 15(6), 1075–1097. <https://doi.org/10.1093/logcom/exi058>
- [35] Gunawan, D. D., & Huarng, K.-H. (2015). Viral effects of social network and media on consumers' purchase intention. *Journal of Business Research*, 68(11), 2237–2241. <https://doi.org/10.1016/j.jbusres.2015.06.004>
- [36] Huang, A. H., Chen, K., Yen, D. C., & Tran, T. P. (2015). A study of factors that contribute to online review helpfulness. *Computers in Human Behavior*, 48, 17–27. <https://doi.org/10.1016/j.chb.2015.01.010>
- [37] Fischhoff, B. (1977). Perceived informativeness of facts. *Journal of Experimental Psychology. Human Perception and Performance*, 3(2), 349–358. <https://doi.org/10.1037/0096-1523.3.2.349>
- [38] lRacherla, P., Mandviwalla, M., & Connolly, D. J. (2012). Factors affecting consumers' trust in online product reviews: Consumer trust in online product reviews. *Journal of Consumer Behaviour*, 11(2), 94–104. <https://doi.org/10.1002/cb.385>
- [39] Lee, E.-J., & Shin, S. Y. (2014). When do consumers buy online product reviews? Effects of review quality, product type, and reviewer's photo. *Computers in Human Behavior*, 31, 356–366. <https://doi.org/10.1016/j.chb.2013.10.050>
- [40] Haridasan, A., Fernando, A. G., & Saju, B. (2021). A systematic review of consumer information search in online and offline environments. *RAUSP Management Journal*, 56(2), 234–253. <https://doi.org/10.1108/rausp-08-2019-0174>

- [41] Sun, Y., Zhang, Y., Gwizdka, J., & Trace, C. B. (2019). Consumer evaluation of the quality of online health information: Systematic literature review of relevant criteria and indicators. *Journal of Medical Internet Research*, 21(5), e12522. <https://doi.org/10.2196/12522>
- [42] khaRani, A., & Shivaprasad, H. N. (2019). Electronic word of mouth (eWOM) strategies to manage innovation and digital business model. In *Advances in Human Resources Management and Organizational Development* (pp. 41–63). IGI Global.
- [43] Davis, A., & Khazanchi, D. (2008). An empirical study of online word of mouth as a predictor for multi-product category e-commerce sales. *Electronic Markets*, 18(2), 130–141. <https://doi.org/10.1080/10196780802044776>
- [44] Fu, X., Southwestern University of Finance and Economics, Zhang, B., Xie, Q., Xiao, L., & Che, Y. (2011). Impact of quantity and timeliness of EWOM information on consumer's online purchase intention under C2C environment. *Asian Journal of Business Research*, 1(2). <https://doi.org/10.14707/ajbr.110010>
- [45] Ho Nguyen, H., Nguyen-Viet, B., Hoang Nguyen, Y. T., & Hoang Le, T. (2022). Understanding online purchase intention: the mediating role of attitude towards advertising. *Cogent Business & Management*, 9(1). <https://doi.org/10.1080/23311975.2022.2095950>
- [46] Arora, T., & Agarwal, B. (2019). Empirical study on perceived value and attitude of millennials towards social media advertising: A structural equation modelling approach. *Vision The Journal of Business Perspective*, 23(1), 56–69. <https://doi.org/10.1177/0972262918821248>
- [47] Wang, P. (2015). Exploring the influence of electronic word-of-mouth on tourists' visit intention: A dual process approach. *Journal of Systems and Information Technology*, 17(4), 381–395. <https://doi.org/10.1108/jsit-04-2015-0027>
- [48] Gotlieb, J. B., & Sarel, D. (1991). Comparative advertising effectiveness: The role of involvement and source credibility. *Journal of Advertising*, 20(1), 38–45. <https://doi.org/10.1080/00913367.1991.10673205>
- [49] Brown, J., Broderick, A. J., & Lee, N. (2007). Word of mouth communication within online communities: Conceptualizing the online social network. *Journal of Interactive Marketing*, 21(3), 2–20. <https://doi.org/10.1002/dir.20082>
- [50] Mackiewicz, J. (2010). Assertions of expertise in online product reviews. *Journal of Business and Technical Communication*, 24(1), 3–28. <https://doi.org/10.1177/1050651909346929>
- [51] Taylor, S. E., & Fiske, S. T. (1978). Salience, attention, and attribution: Top of the head phenomena. In *Advances in Experimental Social Psychology* (pp. 249–288). Elsevier.
- [52] McCracken, G. (1989). Who is the celebrity endorser? Cultural foundations of the endorsement process. *The Journal of Consumer Research*, 16(3), 310. <https://doi.org/10.1086/209217>
- [53] Metzger, M. J., Flanagin, A. J., & Medders, R. B. (2010). Social and heuristic approaches to credibility evaluation online. *The Journal of Communication*, 60(3), 413–439. <https://doi.org/10.1111/j.1460-2466.2010.01488.x>
- [54] O'Reilly, K., MacMillan, A., Mumuni, A. G., & Lancendorfer, K. M. (2016). Extending our understanding of eWOM impact: The role of source credibility and message relevance. *Journal of Internet Commerce*, 15(2), 77–96. <https://doi.org/10.1080/15332861.2016.1143215>
- [55] Girish, Park, E., & Lee, C.-K. (2021). Testing the influence of destination source credibility, destination image, and destination fascination on the decision-making process: Case of the Cayman Islands. *International Journal of Tourism Research*, 23(4), 569–580. <https://doi.org/10.1002/jtr.2427>
- [56] Teng, S., Wei Khong, K., Wei Goh, W., & Yee Loong Chong, A. (2014). Examining the antecedents of persuasive eWOM messages in social media. *Online Information Review*, 38(6), 746–768. <https://doi.org/10.1108/oir-04-2014-0089>
- [57] Houmb, S. H., Ray, I., & Ray, I. (2006). Estimating the relative trustworthiness of information sources in security solution evaluation. In *Lecture Notes in Computer Science* (pp. 135–149). Springer Berlin Heidelberg.
- [58] Kalafatis, S. P., Riley, D., Tsogas, M. H., & Clodine-Florent, J. (2012). The effects of source credibility and message variation on mail survey response behaviour. *International Journal of Market Research*, 54(3), 391–406. <https://doi.org/10.2501/ijmr-54-3-391-406>
- [59] Li, C.-Y. (2015). The effects of source credibility and argument quality on employees' responses toward information system usage. *Asia Pacific Management Review*, 20(2), 56–64. <https://doi.org/10.1016/j.apmr.2014.12.003>
- [60] Kang, J.-W., & Namkung, Y. (2019). The information quality and source credibility matter in customers' evaluation toward food O2O commerce. *International Journal of Hospitality Management*, 78, 189–198. <https://doi.org/10.1016/j.ijhm.2018.10.011>
- [61] Fang, Y.-H. (2014). Beyond the credibility of electronic word of mouth: Exploring eWOM adoption on social networking sites from affective and curiosity perspectives. *International Journal of Electronic Commerce*, 18(3), 67–102. <https://doi.org/10.2753/jec1086-4415180303>
- [62] Kawakami, T., & Parry, M. E. (2013). The impact of word of mouth sources on the perceived usefulness of an innovation: Word-of-mouth and information credibility. *The Journal of Product Innovation Management*, 30(6), 1112–1127. <https://doi.org/10.1111/jpim.12049>
- [63] Kim, K. K., & Prabhakar, B. (2004). Initial trust and the adoption of B2C e-commerce: The case of internet banking. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, 35(2), 50–64. <https://doi.org/10.1145/1007965.1007970>
- [64] Zhu, D. H., Chang, Y. P., & Luo, J. J. (2016). Understanding the influence of C2C communication on purchase decision in online communities from a perspective of information adoption model. *Telematics and Informatics*, 33(1), 8–16. <https://doi.org/10.1016/j.tele.2015.06.001>
- [65] Ngarmwongnoi, C., Oliveira, J. S., AbedRabbo, M., & Mousavi, S. (2020). The implications of eWOM adoption on the customer journey. *The Journal of Consumer Marketing*, 37(7), 749–759. <https://doi.org/10.1108/jcm-10-2019-3450>
- [66] Pousttchi, K., & Wiedemann, D. G. (2007). Success Factors in Mobile Viral Marketing: A Multi-Case Study Approach. *International Conference on the Management of Mobile Business (ICMB 2007)*, 34–34.
- [67] Sardar, A., Manzoor, A., Shaikh, K. A., & Ali, L. (2021). An empirical examination of the impact of eWom information on young consumers' online purchase intention: Mediating role of eWom information adoption. *SAGE Open*, 11(4), 215824402110525. <https://doi.org/10.1177/21582440211052547>
- [68] Teng, S., Khong, K. W., Chong, A. Y. L., & Lin, B. (2017). Persuasive electronic word-of-mouth messages in social media. *Journal of Computer Information Systems*, 57(1), 76–88. <https://doi.org/10.1080/08874417.2016.1181501>
- [69] Yoo, C. W., Lee, J., Yoo, C., & Xiao, N. (2021). Coping behaviors in short message service (SMS)-based disaster alert systems: From the lens of protection motivation theory as elaboration likelihood. *Information & Management*, 58(4), 103454. <https://doi.org/10.1016/j.im.2021.103454>
- [70] Zhang, K. Z. K., Zhao, S. J., Cheung, C. M. K., & Lee, M. K. O. (2014). Examining the influence of online reviews on consumers' decision-making: A heuristic-systematic model. *Decision Support Systems*, 67, 78–89. <https://doi.org/10.1016/j.dss.2014.08.005>
- [71] Joshi, K. D., Sarker, S., & Sarker, S. (2007). Knowledge transfer within information systems development teams: Examining the role of knowledge source attributes. *Decision Support Systems*, 43(2), 322–335. <https://doi.org/10.1016/j.dss.2006.10.003>
- [72] Zeng, C. F., & Seock, Y.-K. (2019). Chinese consumers' perceptions toward social media platform for shopping and eWOM intention: a study of WeChat. *International Journal of Fashion Design Technology and Education*, 12(2), 1–9. <https://doi.org/10.1080/17543266.2019.1572230>
- [73] Moslehpour, M., Dadvari, A., Nugroho, W., & Do, B.-R. (2020). The dynamic stimulus of social media marketing on purchase intention of Indonesian airline products and services. *Asia Pacific Journal of Marketing and Logistics*, 33(2), 561–583. <https://doi.org/10.1108/apjml-07-2019-0442>
- [74] Ghazisaeedi, M., Steyn, P. G., & Van Heerden, G. (2012). Trustworthiness of product review blogs: A source trustworthiness scale validation. *African Journal of Business Management*. <https://doi.org/10.5897/AJBM12.079>
- [75] Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, 19(3), 39–52. <https://doi.org/10.1080/00913367.1990.10673191>
- [76] Chang, Y., Dong, X., & Sun, W. (2014). Influence of characteristics of the Internet of Things on consumer purchase intention. *Social Behaviour and Personality*, 42(2), 321–330. <https://doi.org/10.2224/sbp.2014.42.2.321>
- [77] Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *JMR, Journal of Marketing Research*, 25(2), 186–192. <https://doi.org/10.1177/002224378802500207>

- [78] Nunnally, J.C. & Bernstein, I.H. (1994). The Assessment of Reliability. *Psychometric Theory*, 3, pp. 248-292.
- [79] Straub, D. W. (1989). Validating Instruments in MIS Research. *MIS Quarterly: Management Information Systems*, 13(2), 147. <https://doi.org/10.2307/248922>
- [80] Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *JMR, Journal of Marketing Research*, 18(3), 382–388. <https://doi.org/10.1177/002224378101800313>
- [81] Hoyle, R. H. (Ed.). (1995). *Structural equation modeling: Concepts, issues, and applications*. Sage Publications, Inc.
- [82] Tien, D. H., Amaya Rivas, A. A., & Liao, Y.-K. (2019). Examining the influence of customer-to-customer electronic word-of-mouth on purchase intention in social networking sites. *Asia Pacific Management Review*, 24(3), 238–249. <https://doi.org/10.1016/j.apmr.2018.06.003>
- [83] Lee, J., Park, D.-H., & Han, I. (2008). The effect of negative online consumer reviews on product attitude: An information processing view. *Electronic Commerce Research and Applications*, 7(3), 341–352. <https://doi.org/10.1016/j.elerap.2007.05.004>
- [84] Li, C.-Y. (2016). Why do online consumers experience information overload? An extension of communication theory. *Journal of Information Science*, 43(6), 835–851. <https://doi.org/10.1177/0165551516670096>
- [85] Finneman, B. (2020, August 4). *Meet Generation Z: Shaping the future of shopping*. McKinsey & Company. <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/meet-generation-z-shaping-the-future-of-shopping>
- [86] Lee, Z. W. Y., Cheung, C. M. K., & Thadani, D. R. (2012). An investigation into the problematic use of Facebook. *2012 45th Hawaii International Conference on System Sciences*, 1768–1776.
- [87] Shan, Y. (2016). How credible are online product reviews? The effects of self-generated and system-generated cues on source credibility evaluation. *Computers in Human Behavior*, 55, 633–641. <https://doi.org/10.1016/j.chb.2015.10.013>
- [88] Walther, J. B., & Jang, J.-W. (2012). Communication processes in participatory websites. *Journal of Computer-Mediated Communication: JCMC*, 18(1), 2–15. <https://doi.org/10.1111/j.1083-6101.2012.01592.x>
- [89] Tran, K. (2022, June 22). *Trust isn't everything when it comes to Gen Z news consumption*. Morning Consult. <https://morningconsult.com/2022/06/22/gen-z-trust-social-media-news-consumption/>
- [90] Asare, J. G. (2019, November 11). *Dear Businesses: Generation Z Does Not Want To Hear "Please Hold."* Forbes. <https://www.forbes.com/sites/janicegassam/2019/11/11/dear-businesses-generation-z-does-not-want-to-hear-please-hold/?sh=612dda1e6b46>
- [91] Sijoria, C., Mukherjee, S., & Datta, B. (2018). Impact of the antecedents of eWOM on CBBE. *Marketing Intelligence & Planning*, 36(5), 528–542. <https://doi.org/10.1108/mip-10-2017-0221>
- [92] Albayrak, M., & Ceylan, C. (2021). Effect of eWom on purchase intention: meta-analysis. *Data Technologies and Applications*, 55(5), 810–840. <https://doi.org/10.1108/dta-03-2020-0068>

Do Board Friendliness and Economic Development Affect Firm Abnormal Earnings?

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Abstract—This research examines the effect of board friendliness and economic development on the quality of earnings reports using the Vietstock database of all listed firms on the HOSE and HNX in Vietnam from 2011 to 2021. We discovered that higher-quality earnings reports result from firm executives who have previously worked for the same organization, whereas lower-quality financial reports can be the result of directors who acted opportunistically or the development of local GDP and firm growth or directors who graduated from the same university. There is also a negative/positive association between alumni directors/ex-coworking directors and firm's current and future operating cash flows. Finally, firms with misreported financial statements, particularly earnings, spread among well-connected firm executives who operate as channels for the knowledge transfer regarding the practice.

Index Terms—Earnings management, Board friendliness, Economy development

I. INTRODUCTION

Nowadays, legislators, investors, practitioners, and academics are paying increasing attention to earnings management since earnings are important in terms of increasing investor confidence, company value (Eugster & Wagner, 2021; Orazalin & Akhmetzhanov, 2019); offering information about the financial statement's quality (Eugster & Wagner, 2021; Maglio et al., 2020; Orazalin & Akhmetzhanov, 2019); showing the incentive of the management (Eugster & Wagner, 2021); reflecting the degree to which a business is willing to take risks (Alhadab et al., 2015; Campa & Hajbaba, 2016; Huang et al., 2019; Kim et al., 2021; Kothari et al., 2016); calculating the cost of debt for a company and the number of loan spreads (Kim et al., 2021; Orazalin & Akhmetzhanov, 2019); forecasting a company's future profits (Alhadab et al., 2015; Eugster & Wagner, 2021; Kothari et al., 2016; Neifar & Utz, 2019); anticipating pecuniary resources and future yield from activities for a company (Alhadab et al., 2015; Kothari et al., 2016); and forecasting upcoming financial difficulties (Li et al., 2021); especially in distinct groupings of seasoned equity offering and non-seasoned equity offering (Bertomeu et al., 2021).

First, one of the most significant performance metrics for investors and the most essential thing for CFOs is earnings which helps present the accuracy of financial data externally, leads to improved performance and increases the firm value (Eugster & Wagner, 2021; Orazalin & Akhmetzhanov, 2019). Second, the market may utilize prior earnings behavior as a more sophisticated "litmus test" of management's adherence to accurate information. Less activity-based earning management and higher quality accruals are seen in more socially responsible businesses, both of which have an influence on financial reporting quality and, as a result, on

the cost of capital (Eugster & Wagner, 2021; Maglio et al., 2020; Orazalin & Akhmetzhanov, 2019). Third, managers have distinct motivations to participate in earnings management which shareholders are aware of. It is demonstrated that when a factor conceals information against the financial incentives, their level of inner integrity is higher (Eugster & Wagner, 2021). As a result of recognizing and considering earnings as a risk-increasing activity, reputable and relationship banks expect increasingly bigger margins for earnings management. The most popular approach for overstating earnings is to reduce discretionary costs like Costs of R&D and marketing, general and managerial expenses (Alhadab et al., 2015; Campa & Hajbaba, 2016; Huang et al., 2019; Kim et al., 2021; Kothari et al., 2016). Furthermore, earnings management is critical in defining a company's credit rating, calculating its debt cost and presenting the level of loan spreads in both accruals and actual earnings (Kim et al., 2021; Orazalin & Akhmetzhanov, 2019). Also, businesses that use real earnings management to just achieve standards have greater operational effectiveness in the future than firms that do not use which might be explained by managers using earning management as a signal (Alhadab et al., 2015; Eugster & Wagner, 2021; Kothari et al., 2016; Neifar & Utz, 2019). Besides, since reduced discretionary costs, particularly R&D can boost earnings while also allowing a company to claim greater profit margins and cash flow from operations, managers prefer to manipulate real-world activities over accrual-based activities (Alhadab et al., 2015; Kothari et al., 2016). It is possible to conclude that real earning management is an efficient predictor of future financial difficulty, according to the empirical findings of (Li et al., 2021). Because larger firms have greater resources to spend in lawsuit situations, larger businesses are scrutinized harder. Companies with seasoned equity offerings generate more money, in part because they have greater capital market incentives than companies without seasoned equity offerings and non-seasoned equity offering groups (Bertomeu et al., 2021). To conclude, in recent years, the investigation of earnings management and other internal, external factors has been a relevant issue.

Since earning administration plays a crucial role in financial records to shareholders as well as corporate governance, Over the last few decades, it has been one of the most prominent subjects in finance and accounting literature. In non-financial industries, previous researches have documented a positive connection between earning manipulation and a variety of external factors such as outside investor rights (C. C. S. Chen et al., 2020), social trust (S. Chen et al., 2021), mar-

ket concentration (El Diri et al., 2020; Tasneem Sajjad, Nasir Abbas, Shahzad Hussain, Sabeeh Ullah, 2019) and media coverage (S. Chen et al., 2021). Furthermore, previous research demonstrated that environmental conditions and climate risk positively influence firms' engagements in earnings management (Ding et al., 2021). On the other hand, relevant literature has focused on inside-related factors such as board characteristics (Kapoor & Goel, 2017), CEO attributes (Alam et al., 2020; Cai et al., 2019; Li & Kuo, 2017; Oskouei & Sureshjani, 2021), firm policy (Yung & Root, 2019), financial regulation (García Lara et al., 2020), corporate governance (El Diri et al., 2020; Tasneem Sajjad, Nasir Abbas, Shahzad Hussain, Sabeeh Ullah, 2019), corporate social responsibility (R. C. Y. Chen & Hung, 2021; Hickman et al., 2021), audit committee organization (Kapoor & Goel, 2017), equity incentives and equity pay (Lee & Hwang, 2019; Li & Kuo, 2017). Although these studies have investigated a number of board characteristic components including board size, board independence, board busyness, board meetings (Kapoor & Goel, 2017), board gender (Fan et al., 2019) and board internationalization (Hooghiemstra et al., 2019), there are no published papers that examined whether earnings management is associated with board friendliness.

The study of (Chen et al., 2021) using 28,074 firm-year observations of Chinese non-financial firms during 2001–2016 has recognized that social trust negatively influences on earnings, and this impact is larger for companies with a poor legal environment and a lot of media coverage. According to (Chen et al., 2020), the paper investigates a robust association between earnings management and country factors including market monitoring, investor protection, and liquidity using the sample of 430 American Depository Receipts firms in the United States from 2000 to 2017. Their initial findings are that organizations with a strong legal foundation, strong outside investor rights, strong institutional ownership, and more financial analysts following are negatively affecting earnings management. Besides that, (Yung & Root, 2019) discovered a strong connection between policy uncertainty and alteration of financial reports in a global context by estimating 81,395 firms across 18 countries for the period of 2001–2014. Firms enhance earning manipulations when regime uncertainty is high and in reverse, while the uncertainty of policy will dampen the next-year earnings. They utilize 75,790 observations of 12,874 unique firms in 43 countries to assess the influence of external investment on earnings (Zhang et al., 2020). They identified proof that a company's reliance on outside capital is positively associated. According to (Ding et al., 2021), From 2005 to 2017, the paper used a sample of 184,897 firm-years from 64 countries to explore a solid relationship between earnings management and climate condition which results that accruals-based and actual profits management actions in businesses are benefited by climate risk (CRI). From 1998 to 2008, a sample of 402 Germany-listed family companies was studied to determine the effects of family firms on real earnings and accrual-based earnings management (R. C. Y. Chen & Hung, 2021). Using 4,937 observations, family corporations have an adverse influence on the management of real earnings while non-family firms have a positive effect. Comprising 6,063 firm-year observa-

tions of 1,487 different US firms between 2005 and 2009, (Cai et al., 2019) analyze the beneficial impact of equity incentives for the chief executive officer on the management of earnings. (Kung et al., 2019) utilizing the Taiwan Economic Journal database to collect 10,474 observations covering the period from 2005 to 2015 demonstrate gender pair composition of joint auditors significantly positively associated with real earning management. Another study analyzing incentive compensation has a certain influence on banks' earnings management by estimating a merged dataset from 99 South Korean banks for the period from 2009 to 2016 shows that earnings management will improve if there is an increase in the proportion of equity-linked and variable pay in incentive wages and benefits. More deferred compensation, on the other hand, tends to reduce earnings management (Lee & Hwang, 2019). (Cai et al., 2019) document that religious CEOs run businesses are likely less engaged in earnings and less marked in the post-Sarbanes-Oxley Act period. They also discovered that CEO religiosity is correlated to genuine earnings as well as accruals-based earnings in 2,698 samples of business, equipment, manufacturing and healthcare industries in the US for 10 years (2000–2010). (El Diri et al., 2020) after analyzing 6,873 observations in the US indicate that lower accrual earnings and higher real earnings are associated with efficient company governance in concentrated markets. (Yuanhui et al., 2020) state that a study in the context of Chinese listed companies presented how financial difficulties affected the choice of profits management strategies. The results of prediction tests conducted on 52,849 firm-year data collected between 1990 and 2018 show that conservatism increases real earnings while decreasing accruals earnings (Juan et al., 2020). Using 6,570 firm-year data from non-financial enterprises in India from 2012 to 2017, the major research of Hickman et al, 2020 explores the association between corporate social responsibility and potential revenue management. The data show that the Act lowered total profit management, but that the corporate social responsibility mandate had no further impact. Mercedes et al., 2019 undertook a Spanish-language study to determine the link between Corporate Social Responsibility (CSR) and Earning Management (EM). They demonstrated that Organizations who are more devoted to CSR participation shows that CSR influence negatively on earnings, using data from 100 of Spain's most respected companies from 2011 to 2015. (R. C. Y. Chen & Hung, 2021) investigated the connection between corporate social responsibility index (CSRI) and earnings in Taiwan. They also discovered that the corporate social responsibility index (CSRI) has a deleterious effect on earnings and that organizations who are more devoted to corporate social responsibility index (CSRI) engage in fewer earnings management using data from 699 enterprises and a total of 3,495 values were detected. of Taiwan from 2010 to 2014. (X. Chen et al., 2020) show that development incentive measure that compares provincial and national levels has a beneficial impact on the management of profits. While the second growth incentive metric, which compares provincial GDP growth to the average GDP growth of nearby provinces, has a detrimental effect on earnings management relying on a merged dataset containing 21,702 findings of financial businesses

for the period 2002 to 2016 in China. The study of (Oskouei & Sureshjani, 2021) observing 1,872 year-firm data during 2012–2017, illustrates that the manager ability has a considerable and negative connection on earnings, which shows the high abilities managers use fewer earnings. (Fan et al., 2019) found that women on boards had a non-linear influence on bank profitability management based on a collected data that uses 4,823 observations of 91 bank holding companies from 2000 to 2014. Until there are three or more women directors, the effect of women on earnings shifts from positive to adverse. The study of (Maglio et al., 2020), using 1,640 firm observations of Italy during 2013 - 2015 has found that the number of women on the board affects destructively on profits management and this impact is higher for non-small and medium businesses. (Hooghiemstra et al., 2019) discovered that if the board includes a foreign director, the company would have higher profits management by running prediction tests on 3,249 firm-year data gathered between 2001 and 2008 in the Nordic firms. (Alam et al., 2020) investigated financial and accounting companies in the top 10 Islamic countries with 1,165 observations between 2006 to 2016 and the findings show that there were no signs that Islamic financial organizations were reducing management opportunism and moreover board quality and CEO power helped both commercial and Islamic banks reduce management of earnings. While institutional ownership, CEO duality, and product market competition are positively associated with earning management, the larger corporate board, board independence, board meetings, and audit quality are negatively associated, according to a study by (Abbas & Waheed, 2019) that collected data from 84 non-financial firms in Pakistan for five years (2010–2015).

Many previous studies have revealed that a variety of factors influence earning management. However, the element of board friendliness has gotten little attention recently. According to Song (2016) and Adams (2007), friendly management in boards can increase business value, because board friendliness may advise management more effectively. As a result, in this article, we concentrate on investigating whether and to what extent that aspect of board friendliness is one of the adjustment values of corporate earnings management activities. (Göx & Hemmer, 2020) show that favorable boards reward managers with better pay and more stock options, but fewer options in their study. Based on this research objective, we study how the friendliness of boards has an influence on manipulating firm earnings in the context of Vietnam. This study is primarily intended for academic and practical implications. Firstly, it presents a novel corporate governance measure for listed Vietnamese companies that aims to evaluate if managers who were coworking friends or schoolmates have a greater impact on the company's profits management. When the executive board needs more personnel, both officials and businesses can hire acquaintances. Second, our results point to the need of studying board friendliness in corporate governance theory to conduct earnings management activities to improve stakeholder participation, minimize agency costs, and achieve higher earnings effectively.

The remaining portions of the essay are structured as follows: Our study hypotheses are developed in Section 2 after

a survey of the pertinent literature. Section 3 details the methodology for our study, research methodology and variable measurement. In Section 4, the results are presented. Final section will consider our discussion, conclusions, and the implications of the research.

II. LITERATURE REVIEW

A. Board friendliness

Previous researchers have provided details and theories on the various corporate governance. (Platt, 2012). As of late, business financing specialists have discovered that, In addition to the qualities of the board, the systems The board of directors has a big influence on corporate governance and business decision-making. Many investigations find that board networks fundamentally affect firm choices, incorporating organizational design and strategic cooperation (Srinivasan et al., 2018); acquisition procedures; Transferring stock exchanges; option retroactivity; operational effectiveness and financial situation; enhance firm wealth (Rose, 2014); generate an information advantage (Berkman et al., 2020); and reduce information asymmetry (Granovetter, 1995; Calvo - Armengol & Jackson, 2004; Berkman et al., 2020).

According to (Adams & Ferreira, 2007), the board can affect the value of the company by disciplining and assuring the CEO. How well every function works depends on how much data administrators and board's individually exchange. In the model of Adams and Ferreira, the concept of board friendliness does not exclude outside directors from being friendly. Raheja (2005) locate that outside the members of board are are more likely to assume the position of CEOs at low-performing businesses, have strong reputational incentives and help enlarge the stock price around the announcement. (Linck et al., 2008) show that a great amount of outside director observation on all corporations is forced to have a net negative value that has an impact on businesses with expensive monitoring costs. The investigation by (Srinivasan et al., 2018) has considered the benefits and drawbacks of board member networks' significance on organizations' strategy and performance, in addition to the fundamental obligations of corporate management. In (Bizjak et al.) research, they claim that involvement in earnings management is more likely to occur in firms if their board of directors have a strong association with companies who greatly utilize earnings management techniques, as the strategic concessions made by other organizations serve as a supportive example for businesses thinking about their own arrangements. Businesses really like to have a well-connected board of directors because they are a valuable source of additional outside knowledge that can help the company make strategic concessions. Furthermore, Barnes demonstrates how charitable organizations, social corporations, university boards, policy planning organizations and private social clubs allow board members' networks to be seen. Finding the friendliness among board individuals and the CEO will lead to a terrible consequence, which comes about within the director having diminished monitoring capacity of the CEO. Even without the CEO, inside director networks provide very compelling governance outcomes, such as firm

price, monitoring eminence, and financial journalism quality, that are not covered by the CEO's contract. Therefore, They should take into account any potential benefits from improving board independence. Friends on boards may have a certain reinforcement of firm value by establishing a scene beneficial to sharing of information from the CEO, followed by, Spend well advice. Furthermore, Holmstrom (2005) recommends that in order to get management's cooperation in sharing information, boards must be forced to do so. (Larcker et al. 2013) reveal that relations among directors generate a database dominance Since they have much better access to information about the business environment, a well-connected board, trends in the manufacturing, upriver and downriver companies, and market conditions. Directors can better support senior management in managing investment portfolios and develop a competitive investment strategy that gives first-mover advantages thanks to the notable information flow across these networks. Burt (2004) also documents that social associations support individuals with valuable elective perspectives when there is a need for direct reference or the situation is dubious. (Davis, 1991; Stuart and Yim, 2010) investigate that board connections may assign corporations better access to credit. Additionally, associate boards may be more knowledgeable about business partners who can change contract terms. (Uzzi, 1999), such as permitting for orders and payments to be briefly changed. (Calvo - Armengol & Jackson, 2004) show that social networks formed through interconnected directors can make a certain reduction on Conflicts between agencies and information asymmetry prevent overinvestment. companies started in either the middle or the structural hole positions of the network have boards with well - connected networks as a tax housing (Brown 2011) and standard option expensing (Reppenhagen 2010). Nevertheless, it particularly addresses earnings management contagion, in spite of the fact that Backdating options could be viewed as a type of earnings management. The earnings management practices considered do not include option backdating because the sample period predates the earliest restatement for backdating options. To sum up, board connections are crucial for easing the conveyance of information with high value in addition to corporate policies and consistent across firms (Berkman et al., 2020). However, the idea of board friendliness affecting maximizing earnings has not been researched a lot.

Existing research has identified board friendliness measurement, such as the degree of centrality, betweenness and closeness (Wu et al., 2021); the number of administrative relationships and external board members (Schmidt, 2015); or the number of director correlations to politically linked firms, state-run enterprises, and family-owned businesses (Freeman, 1978). Freeman viewed the "degree centrality," "betweenness centrality," and "closeness centrality" as the three main markers of network centrality for the social network gauge. A metric is called degree centrality of how many direct board connections one foundation has with its neighbors. Betweenness centrality depicts the number of an enterprise that relies on the briefest distance between any two additional network organizations. Closeness Centrality in a network is defined as the sum of all shortest paths from one organization to every other organization. A foundation

may access resources more quickly if it is close to all other foundations in the network, which gives it a high proximity centrality, efficiently and receive databases more quickly from outside (Tao et al., 2019; Wu et al., 2021). According to (Schmidt, 2015), the primary criterion for board friendliness depends on social association between board administrators and external board participants (Kang et al., 2018). (Domhoff, 2009) build many indicators for the index that represent friends on boards, based on the number of social associations, and a board is considered friendly if it has minimum one chief who is outside of work relevant to the CEO due to shared academic interests and extracurricular activities. (Carney et al., 2020) also examine director associations of companies which have political, state-owned, and family business connections. A family business foundation is a group of non-illegally self-governing firms under the possession of a particular family (Baek et al., 2006). Businesses that are state-run undergo the same types of preoccupation costs as self-governing firms mentioned above. Enterprises possessing a political connection directors experience somewhat common tradeoffs as companies that are state-run. Businesses with political correlations (do not involve direct political tie) are pressured to expensive measures are put in place for political purposes, but they are one step removed from having an impact on politics. In spite of these benefits, (Carney et al., 2020) find that businesses with political ties will be in the shortage of the availability of data on adjustments to accounts payable or the granting of trade credit. (Wintoki & Xi, 2019) document that the primary and primary criterion for the costs of external director monitoring is the extent to which a company's board was included of directors who were outside the boardroom at the time of SOX adoption and the listing requirements on the exchange. (Gupta et al., 2021) suggests that a multiplex board connection is made up of two main layers—the direct and indirect relationships between board members, as well as four levels of relationships resulting from their affiliation with businesses, nonprofits, common undergraduate institutions, or military or governmental affiliations. (Gupta et al., 2021) also distinguishes By adding weight loadings to each layer of the multiplex connection, it is possible to convert the multiplex connection into a single-layer association with direct and indirect links. Those arranged association layer weight loadings permit observing the correlation between board connections and business groups. By adjusting the value of network layer weight loadings, (Gupta et al., 2021) Describe how the network characteristics of the board members change and align with the enterprise characteristics. According to social network research, a link's core location and structural hole location are two crucial factors influencing decision-making (Chahine et al., 2019). While the degree of structural hole richness deputizes the role of the business in correlating with other indirectly related businesses in the connection, network centrality concerns the centrality of an enterprise's place in a relationship. (Figure below).

Although the usage of personal databases is not confirmed, it is thought that their findings are most in line with the notion that insiders have an edge when picking companies because of their expertise with their own industry. The insider's right to obtain information via interlock networks

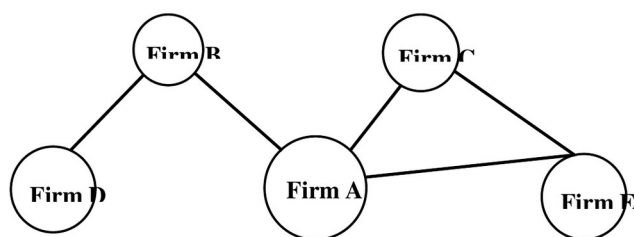


Figure 1: Network centrality

to the board connection is not taken into account. (Berkman et al., 2020) analyze director's transactions and conclude that interlocking purchases are better than the same administrator's own out-of-connection purchases. Additionally, the directors of these funds assume that inside board networks have a positive and significant relation to director compensation (Souther, 2018) and are relevant to a greater likelihood of SEC enforcement. (Chang & Wu, 2021) build social networks between two characters by the use of a database of information about their up-to-date and earlier occupation, educational institutions, and common social activities. Two people have a shared employment association if they are employed at this time or were recruited by the same company in the past, apparently at the same time. They have a linked education association if they have the same educational background or are relevant in time. They have a similar activity association if they both relate or are related to a non-profit corporation, such as an academic or sport club and charity activities. According to (Chang & Wu, 2021), A director holds an active position in all corporations, with the exception of clubs, which are associations in which one or both of the individuals are purely members. To sum up, from the measures that bring out meaningful results that were listed above, we will use the internal board networks to display the level of friendliness of the firms according to (Chang & Wu, 2021).

B. Earnings Management

By reviewing prior studies on the result of elements on the management of earnings in industrialised countries, we can see that political issues and cultural aspects, such as country factors, were some of the main factors examined. (Chen et al., 2020), religious beliefs (Cai et al.) and conditional conservatism (García Lara et al., 2020). Besides, researchers in developed countries also focused on macroeconomics (X. Chen et al., 2020), firm policy (Yung & Root, 2019), strategy development (Tasneem Sajjad, Nasir Abbas, Shahzad Hussain, Sabeeh Ullah, 2019), and firm characteristics (Oskouei & Sureshjani, 2021). For example, (X. Chen et al., 2020; Lee & Hwang, 2019; Li & Kuo, 2017) investigated the compensation system and GDP growth incentives in the aspect of the macro-economic and policy of CEO equity compensation; In consolidated markets, corporate governance and earnings management corporate social responsibility (R. C. Y. Chen & Hung, 2021; Maglio et al., 2020), financial distress, internal control (Y. Li et al., 2020), auditors' characteristics, gender of CEO (Fan et al., 2019), managerial ability (Oskouei & Sureshjani, 2021) and foreigners

on the board (Hooghiemstra et al., 2019). The previous study of. This study, which concentrate on how corporate governance and agency dynamics affect manipulating earnings, found that there is a helpful correlation among board independence and earning management in dual banking systems. The data was gathered from 10 Islamic countries. When (Yung & Root, 2019) researched in 18 Islamic countries about key factors influencing the financial decisions and earning manipulation of the companies, they discovered uncertainty in policy and earnings management has a positive relationship in an international context. In particular, when policy uncertainty grows, earnings management also swells. After observing impactful elements on manipulating earnings in the scope of 43 Islamic nations, (Zhang et al., 2020), the benefits of real earnings management and accrual-based earnings management can be positively impacted by the firms' external financing earnings management, according to research. Overall, it should be noted that previous papers have not studied board characteristics' effects on earnings management. In other words, the effect of the board's features on manipulating earnings is not emphasized in developing nations.

Diverging from earnings management research that collected pre-financial crisis, before 2009, we find that prior studies focused on popular considerations such as religious beliefs, CEO equity compensation, family firms' manipulation and board internationalization. (Cai et al., 2019) suggested evidence that CEOs of companies who practice religion are less likely to manage earnings. For instance, When a company names a religious CEO to its board, real earnings management suffers statistically. Examining the relationship of family businesses and two types of profits management is another discovery, fewer real earning management are more likely to be manipulated by founding family firms. and manage reported discretionary accruals downward. In low growth firms, Equity incentives for chief executive officers (CEOs) have been linked to managing earnings. The additional analysis investigated the connection between earning management and the foreign director present on the boards; they exhibit a positive association among foreign directors and the levels of earnings management. Overall, the published factors affecting a firm's earning management in the period of pre-financial crisis are mostly relevant to internal elements, which play significant roles in earning management.

On the other hand, researches on earnings management after 2009 indicate that earning management is not only affected by internal elements such as the CEO's managerial ability and compensations but corporate social responsibility (CSR) also give a significant impact on earning practices. (Oskouei & Sureshjani, 2021) believe that if a firm has managers with great abilities, there is a decrease in the firm's earnings manipulation. This implies that high-powered executives are capable of coordinating the firms' operating decisions with strategies of the economic announcement. (Lee & Hwang, 2019) insist that the incentive compensation may attribute a significant influence to both the adventurous behaviors of banks and their management of earnings. In study of (Tasneem, 2019), while board size, independent directors, board meetings and audit quality are negatively accompa-

nied with earnings, the institutional ownership and CEO dualism and discretionary accruals are positively correlated. This demonstrates how company governance and product market rivalry have an management strategies' impact on earnings. Regarding the partnership between CSR and earnings management, (Palacios-Manzano et al., 2021) examined the affiliation between retributions quality and corporate social duty, which mitigates managers' compliance to operate earning practices and discover proficiency strategies. Furthermore, the proportion of corporate boards with women leads to the assumption of fewer earning manipulation (Maglio et al., 2020). According to (Chen & Hung, 2021), the worthiest of note is that by achieving their CSR goals, Businesses may prevent managers from using their discretion and information advantage to influence profitability for their personal benefit. Additionally, our observation showed that while earning practices were substantially less prevalent in companies with greater CSR performance, they were actually increasing in companies with worse CSR performance.

However, existing international earnings management research is still extremely limited. The first barrier is the annual report of a sample financial firm differs from the corporate governance announcement. (Alam et al., 2020). Since each country has their own specific format for publishing finance reports, this explains why researchers have difficulty in collecting data for the corporate governance variables. Besides that, (Yung & Root, 2019) also indicated limitations worth noting such as limited time span of the independent variable, number of countries and theory linking uncertainty to firm investment decisions. The first barrier is the annual report of a sample financial firm differs from the corporate governance announcement, however, (Chen et al., 2021) acknowledge that their conclusions are just from a single country, It prevents the results from being applied to other economies. Following this, the previous paper considered only one aspect of earning management – accrual-based, (Chen et al., 2021) do not examine the relationship of social trust with other Earnings aspects such as conservatism, firm characteristic and reasonableness.

C. The relationship between board friendliness and abnormal earnings

According to governance theory, board independence is critical corporate governance is being improved, and protecting shareholders by overseeing and directing management on their behalf, managers engage in self-dealing minimizing informational asymmetries and investors by compelling hesitant managers should disclose information and verify the accuracy of the information. Companies with superior equity ratings acknowledge that social ties may compromise director independence (Westphal and Graebner, 2010; Bhojraj and Sengupta, 2003). The connection between directors and CEO, such as graduating from the same universities, participating in similar clubs, association, can threaten the shareholder's benefits (Langevoort, 2006; Hwang & Kim, 2009; Dey & Liu, 2010). If directors have friendly relationships with the relevant parties, they will have more opportunities to learn a great number of innovative methods for managing financial reporting items about

discretionary accruals, such as planning costs and revenues, employing asset exchange agreements, connection sales, or collection agencies. According to Krishnan et al. (2011), CFOs/CEOs choose more socially adept directors in the post-Sarbanes-Oxley Act (SOX) period which result in increased earnings management. According to Guan et al. (2016), highly social the likelihood of auditors to offer good opinions from audits, and audited organizations report much larger earnings quality. Likewise, He et al. (2017) show that social relationships relating to audit and members of the audit panel lower the quality of the audit and increase fees. when the auditor and audit committee have social ties, signalling that reciprocity is based on social networks. Because politically linked firms fewer faces supervision and less negative repercussions for bold managing earnings, Chaney et al. (2011) show that earnings quality in corporate insiders is much lower than in equivalent non-connected enterprises. Correia (2014) also discovers that politically linked companies less inclined to be subjected to SEC disciplinary actions and more susceptible to suffering reduced punishments if they are prosecuted.

According to the research on discretionary accruals, connections to networks contribute to increasing both forms of REM (Griffin et al., 2021). On the plus side, using REM to smooth reported earnings and meet standards may help a company overcome ambiguity, improve its trust, spectral efficiency, and convey management expertise to the stock market, vendors, and customers (Bartov et al., 2002; Chaney and Lewis, 1995; Sankar and Subramanyam, 2001; Tucker and Zarowin, 2006). On the downside, real earnings management (REM) practices may be a sign of lease activity, which lowers business value. REM is less observable than accrual earnings management (AEM) activities, which may provide equal personal advantages, and does not attract the same amount of scrutiny concerning proper generally accepted accounting principles (GAAP). Whereas problematic accounting practices and policies are subject to audit risk and litigation risk., running successfully or unsuccessfully and managing actual earnings have important differences that also result from successful or unsuccessful managerial choices for business value.. Well-connected CEOs may choose the less expense and attention of REM over less-connected CEOs in order to preserve or improving their reputation or increase their clout and influence. A substantial increase to income by AEM, on the other hand, might be expensive to business participants and managers participants and managers if its identification raises concerns about a suspected GAAP violation. Once discovered, AEM may do enormous damage to the reputations and social capital of well-connected CEOs. To meet or outperform market expectations, (Griffin et al., 2021) anticipate well-connected CEOs to avoid AEM and substitute for a reduced level of AEM with a greater level of REM.

D. Hypothesis development

Vietnam's economy is in transition and is now a rapidly expanding market. Market risks may rise as a result of earnings management in nations with lax legal systems. Vietnam may eventually become a market with poor corporate governance and a closed economy (Gupta et al., 2014). Less board

independence may be advantageous to shareholders, according to (Adams & Ferreira, 2007).

Hypothesis 1. *Positive correlation exists between board friendliness and abnormal earnings.*

Friendly boards are unlikely to be capable conduct efficient supervision and supervision, notwithstanding their superior ability to counsel and advise management. However, advantages of financial reporting guidance supplied by a "friendly" board are likely to outweigh the risks of monitoring the board's social relationships in terms of less monitoring and consequently worse information quality. According to financial reporting, it has been shown that connected businesses frequently use financial restatements, tax accounting, and goodwill write-offs (Brown and Drake 2014). Businesses that do not manage their earnings are more likely to do so in order to keep up with their competitors or even because they believe their competitors have superior information (Hirshleifer and Teoh 2003; Lieberman and Asaba, 2006). Board of director networks are the best channels for the organic dissemination of information on earnings reporting and efficient profit management across enterprises. We predict that board networks will encourage earnings management across connected businesses as a result of a chain reaction, taking into account the following reasons. Poor financial reporting for the purpose of limiting profits is contagious and spreads quickly through business. More central enterprises have more knowledge and resources for controlling earnings, and their earnings management has fewer negative repercussions. Consequently, we anticipate that firm networks will have a contagious effect on underperforming businesses, while businesses that perform well operationally are less likely to spread bad financial reporting practices throughout their networks. As a result, we propose research model (1) as follows:

$$EM_{(i,t)} = \alpha_0 + \alpha_1 \times Board\ friendliness_{(i,t)} + \alpha_2 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

$$EM_{(i,t)} = \alpha_0 + \alpha_1 \times Board\ friendliness_{(i,t)} + \alpha_2 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

Hypothesis 2. *Positive correlation exists between board friendliness and firm performance.*

When considering the effects of a connected board within a particular industry, David Blanco-Alcántara, José María Díez-Esteban, M Elena Romero-Merino (2018) discover that the degree has a positive and substantial influence on both the firm's market to book ratio (MTB) and its return on assets (ROA). The benefits of so-called "board capital depth" are supported by these findings, which show that networks concentrating on the same sector improve business performance. In this regard, we believe that intraindustry relationships provide directors with valuable particular resources that assist them in better performing their monitoring and advisory functions. As a result, we propose research model (2) as follows:

$$EM_{(i,t)} = \alpha_0 + \alpha_1 \times Board\ friendliness_{(i,t)} + \alpha_2 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

Where Firm performance (i,t) is measured by Market-to-book ratio (MTB), Net operating assets (NOA), Return on asset of a firm and industry (ROA, ROA_ind), Revenue and Plant, property and equipment.

Hypothesis 3. *There is a positive relationship between firm size, country's economy development and earnings management.*

(G.Cai et al., 2022) find a significant positive connection in between management of regional GDP data and the management of earnings by regional businesses. This connection is more powerful when local politicians face greater implementation challenges or are more driven to pursue professional advancement. They also demonstrate that local politicians will probably repay the favor the following year by providing these organizations with additional government grants. These results support the idea that local politicians inflate regional GDP numbers to advance their political careers. These statements then trade favors with local companies and put pressure on them to manage their corporate earnings in order to support their exaggerated claims of economic growth. As a result, we propose research model (3) as follows:

$$EM_{(i,t)} = \alpha_0 + \alpha_1 \times Size_grow_{(i,t)} + \alpha_2 \times GDP_grow_{(i,t)} + \alpha_3 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

Hypothesis 4. *There is a positive relation between internal board networks and operating cash flows.*

When companies have more socially connected through different channels such as shared experiences in the workplace, school, and other areas, the directors are more likely to coordinate deliberately because of familiarity with facts acquired by interpersonal relationships. According to (Li et al., 2020), board networks create a considerable impact on a firm's cash holding in different circumstances. In specific, since the boards have a better supportive network, firms can receive more external financial resources such as bank loans, fundings. Hence, the firms hold less cash when their interlocking networks are connected intimately. On the other hand, friendly board constructed from employment and other shared experiences have a positive significance on cash holdings as well as cash managements. For instance, firms with well-connected directors have more good conditions of employment and sales, which allows the firm's operating cash flows to swell through inner more director connections. As a result, we propose research model (4) as follows:

$$OCF_{(i,t)} = \alpha_0 + \alpha_1 \times Board\ friendliness_{(i,t)} + \alpha_2 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

$$OCF_{(i,t+1)} = \alpha_0 + \alpha_1 \times Board\ friendliness_{(i,t)} + \alpha_2 \times Control\ variables_{(i,t)} + \varepsilon_{i,t}$$

III. METHODOLOGY

A. Board friendliness measurement

There are three types of board friendliness, such as educational tie, professional tie and educational – professional

ties. A professional tie exists if two people formerly held director or high-level management positions in the same organization (apart from the one where they presently work). If two people attended the same school and graduated within the same academic year, they have a common educational tie. When two people not only worked in the same historical employment at the same time but also graduated from the same school within one year, this is referred to as an educational-professional tie. Furthermore, to capture the level of board friendliness, a binary indicator is used as an independent variable which will get the result at one if the board is friendly and zero otherwise (Kang et al., 2018).

To obtain the information of board inside network, we did the following steps. Step 1, we list the names of board of management of each company by quarter. This data can be taken manually from companies' financial reports. Step 2, we take the information of managers' biographical data such as education background and employment history from the management report. For senior managers and directors, the annual management report provides the following details: college, graduate, and professional education. As the Decree 71/2017 / ND-CP guiding companies to apply for their representative companies, listed companies are obliged to report every six months and disclose information about the company that manages the company's image according to the provisions of securities law on disclosed information. Therefore, in management reports, it is clearly shown the background information of managers and directors. We utilize this regulation by choosing post-2011 windows due to the same concerns (Lee & Hwang, 2019; Tasneem et al., 2019; Yung & Root, 2019; Maglio et al., 2020; Palacios-Manzano et al., 2021; Chen & Hung, 2021; Alam et al., 2020; Chen et al., 2021; Oskouei & Sureshjani, 2021). Step 3, we list the names of executive's schools as well as their history employment and carefully checked whether they are the same. If two individuals have the same educational institutions or professional employment, the friendliness of board exists.

B. Abnormal earnings measurement

With the aim of manipulating reported results, accrual-based earnings management entails choosing a specific accounting method for certain activities (El Diri, 2017). As a result, manipulations through accruals do not have any effect on the firm's cash flows or economic activities. In the meanwhile, managers engage in real earnings management by implementing "measures that deviate from standard business procedures," such as loosening up sales credit standards, cutting down on discretionary spending, or overproducing to hit earnings targets (Roychowdhury, 2006). Real earnings management, which can be concealed in routine corporate operations, is more elusive to detect when compared to these two forms of earnings management (Anagnostopoulou and Tsekrekos, 2016). Real earnings management, however, poses a greater risk to businesses because it directly impacts cash flows and business decisions. To measure earnings, we employ:

Jones' model (1991). The first indicator of effective earnings management is abnormal accruals using the Jones model who was the first person to use the discretionary to

calculate earnings manipulation in corporations. This measurement is referred to as "AbsAccJJ" in our model and findings. AbsAccJJ is the absolute value of the residuals of regression (1):

$$TAccr_{i,t} = b_0 + b_1 \Delta REV_{i,t} + b_2 PPE_{i,t} + \epsilon_{i,t} \quad (1)$$

where Total accruals, abbreviated TAccr, are the variance between net income and operating cash flow; revenues, abbreviated ΔRev ; and property, plant, and equipment, abbreviated PPE.

Francis et al. model (2005). The aim of earnings management is to find out the abnormal accruals. Discretionary accruals are supposed to be the consequence of accounting manipulation. The last computation of EM is accruals quality. This measurement is referred to as "AQ" in our model and findings. AQ is the standard departure of the residuals of regression (4):

$$TAccr_{i,t} = b_0 + b_1 FCF_{i,t-1} + b_2 FCF_{i,t} + b_3 FCF_{i,t+1} + b_4 \Delta REV_{i,t} + b_5 PPE_{i,t} + \epsilon_{i,t} \quad (4)$$

which Total accruals, or TAccr, are the variance between net income and cash flow from operations; financing cash flow, or FCF, is the cash flow generated by financing during the firm's i th quarter; revenues, or ΔRev , are the change in revenues; and property, plant, and equipment, or PPE, are their gross values.

C. Measuring control variables

According prior researches, we use Firm size (LOG_TA and TA_gro); Firm Age (AGE); Market-to-book ratio (MTB1); Leverage ratio (DE; CAP); GDP growth rate (GDP_Gro); Risk (CF_Vol); Net operating assets (NOA); Sales growth (Salegrow); Operating cash flows (OCF; OCFt1) and Return on Assets (ROA; ROAt1) as control variables (Griffin et al., 2021).

Firm size. One of the factors influencing economic decisions made by users of financial statements is firm size (Dang et al., 2017). The greater the separation between ownership and management, the larger the company. The wider the gap between ownership and management, the more serious financial statements must be prepared for management's benefit rather than for the benefit of financial statement users. Furthermore, compared to a small firm, a large firm has a great number of economic transactions and substantial quantities. As a result, when a larger corporation changes its accounting procedures, it has an impact on profit margins. Myers and Skinner (2000) provided empirical evidence that a large corporation reports erroneous earnings. As a result, earnings manipulation shows a positive connection with firm size. **Firm size.** Another issue is that the older corporation has a larger profit potential. According to Barto and Simko (2002), an older corporation is under a lot of pressure to overstate financial performance in order to maintain a positive image with analysts. Because they want to produce predicted profits, listed companies utilize earnings management to deceive investors. **Market-to-book ratio.** Businesses with less wealthy stockholders are more inclined to serve retail investors who are less knowledgeable with REM's workings. Investors use published financial statements on the stock exchange, such as stock price, audited financial re-

ports, to make economic decisions (Dang et al., 2017). Stock prices and firm values fall when financial performance is bad (Charfeddine et al., 2003). As a result, earnings management was created in order to maintain a positive reputation among stakeholders (Charfeddine et al., 2013). Earnings management has been implemented to have a beneficial impact on the stock market. **Leverage ratio.** Borrowings once had finances for corporate operations and enabled a corporation to avoid agency expenditures that develop between manager and investors, in addition to collecting investment from stockholders (Jensen and Meckling, 1976). Financial leverage is a set of indicators that indicate a company's financial structure and can be calculated using the liability-to-equity ratio. This means that the assets' size has grown as a result of borrowings and has been utilized to denote the autonomous finance from an entity. Therefore, financial leverage is also a factor affecting earnings management (Charfeddine et al., 2013; Fathi, 2013). **GDP growth rate.** Policy uncertainty and earnings management has a positive relationship in an international context. In particular, when policy uncertainty grows, earnings management also swells. **Risk.** The more volatility in cash flow, the more manipulating earnings activities may occur (Malaysia & Alves; 2012). **Net operating assets.** When a firm has more net operating assets, the earnings manipulation would increase, due to the board of directors may involve dipping further into accruals than they would otherwise do which results in abnormal earnings (Sknier, 2000). **Sales growth.** Firms with a regular record of sales growth would feel pressure from the market to try harder which results in manipulating earnings to meet stakeholders' expectation (Fakhfakh & Nasfi, 2012; Nasirzadeh et al., 2012). **ROA.** According to Chen et al. (2006), the worse an entity's financial performance is, the more earnings management exists. Many metrics, such as ROA, revenue growth, cash flow, company growth, and others, are used to assess financial performance were proved to have a good association with earnings.

IV. DATA

Our sample is collected from the Vietstock database. Specifically, we take quarterly data of all the listed companies on HOSE and HNX in Vietnam during 2011 to 2021. Utilities and financial institutions are omitted from our sample because of the disparities in accounting and reporting as well as industry regulation, which is consistent with earlier studies on earnings management (Phillips et al. 2003). Data is winsorized at the 1% level. After eradicating missing value and outliers, our dataset includes 241 companies on Vietnam stock markets is 9,201 firm-year observations in final sample. By construction, our analysis captures board links to internal networks as opposed to external social connections to other organizations. Data processing: based on the panel data, regression has been employed for investigating the impact levels of factors on EM in the sample of listed firms on Vietnam Stock Exchange. Ordinary least squares (OLS) is used in this study. We test the models and evaluate the defects of the models. In case of having defects in the models, we robust standard errors.

V. RESULTS AND DISCUSSIONS

A. Summary statistics

All major variables' summary statistics are presented in Table 1. We found that the average number of directors who have graduated from the same university is 3 persons, the minimum number is 0 and the maximum number is 6. This is consistent with (Mejbel et al., 2013) that educational ties to be between 0 to 3. The average number of directors who worked in the same companies in the past is 4 persons, in which the minimum number is 0 and the maximum number is 8. This finding is consistent with prior research (Alesina & Giuliano, 2014). The control variables and earnings management statistics are comparable to those from other studies. REM has a mean value of 0.4193, which is comparable to Kim et al. 's stated mean REM value of 0.29.

TABLE 1. VARIABLES DESCRIPTION

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent variables					
AbsAccJJ	4,499	0.4193	0.4299	0.0002	1.0902
AQ	4,499	0.0315	0.5489	-0.0497	1.0913
Independent variables					
EduT	7,706	3.375	0.0931	0	6
ProT	7,706	4.109	0.0149	0	8
EduProT	7,706	1.102	0.0434	0	3
Control variables					
LOG_TA	4,499	27.2068	1.5483	23.1462	33.6948
TA_gro	4,499	0.1407	0.6116	-0.9220	29.0018
Age	4,499	5.9799	4.1373	0	21.5
MTB1	4,499	3.7083	15.9060	0.0475	785.5494
DE	4,499	2.2160	8.7107	0.0019	648.1732
CAP	4,499	0.4698	0.2235	0.0015	0.9980
GDP_Gro	4,499	0.0128	0.0351	-0.0000223	0.0001653
CF_VOL	4,499	0.2914	1.8170	0.0742	65.9227
NOA	4,499	2.1567	6.9475	-0.1351	319.3346
Salegrow	4,499	0.9894	40.9963	-0.9998	4703.255
ROA	4,499	0.0140	0.0275	-0.3104	0.6468
ROA1	4,103	0.0139	0.0274	-0.3104	0.6468
OCF	5,185	0.0113	0.7844	-18.3452	47.7778
OCFt1	3,823	0.0936	0.0408	-0.0127	0.0112

B. Board friendliness and Abnormal earnings

Our regression findings for board friendliness and abnormal earnings are shown in Table 2. We also account for cluster standard errors at the company level in addition to the control variables outlined in Section 3. Winsorizing is done on all variables at a 1% level of significance. The baseline results for Discretionary Accruals (AbsAccJJ and AQ) as the dependent variables are presented in the first two columns, and the regression results with the addition of control variables are presented in the following two columns. The results for Real Earnings Management, which is considered

TABLE 2. BOARD FRIENDLINESS AND ABNORMAL EARNINGS

	AbsAccJJ	AQ	AbsAccJJ	AQ
EduT	0.0218*	0.0344*	-0.0406	0.0134**
ProT	-0.0290*	-0.0735*	-0.0822***	-0.0262***
EduProT	-0.0058	-0.0287*	0.00477	0.0085
LOG_TA			-0.00667**	-0.00597
TA_gro			0.0389***	0.0344**
Age			0.00105	0.00791***
MTBI			0.00546***	0.00775**
DE			0.00502*	0.0154***
CAP			-0.133***	-0.0202
OCF			-0.0379***	0.00792
GDP_Gro			2717.6	9092.8***
CF_VOL			-0.00895***	0.0371***
Salegrow			0.0000378	-0.00012
_cons			0.567***	0.129
N	4176	3580	4176	3580
Years	10	10	10	10
Firms	214	214	214	214
F-test	1.39	1.38	1.39	1.46
Adj. R-Sq	0.2429	0.1162	0.2513	0.2065
Breusch test	0.3289	0.2316	0.2122	0.1552
Hausman test	0.8714	0.8714	0.8714	0.8009
Wooldridge test	0.2549	0.9679	0.1254	0.1614
Max VIF	1.51	1.51	1.51	1.51

t statistics in brackets
 * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

as the dependent variable, are shown in the last two columns. The independent variables of interest are Education ties, Professional ties and Education – Professional ties. We find that the coefficients on Education ties are positively related with Abnormal Earnings. The coefficients of EduT with dependent variable AbsAccJJ are 0.0218* (column 1) and -0.00406 (column 3). The coefficients of EduT with dependent variable AQ are 0.0344* (column 2) and 0.0134* (column 4). The results show that earnings quality enhances with board of directors who graduated at the same universities. Our estimate is similar to (Jha, 2017).

Nevertheless, we find that the coefficient of Professional ties is negatively correlated with Abnormal Earnings. The coefficients of ProT with dependent variable AbsAccJJ are -0.0290* (column 1) and -0.822*** (column 3). The coefficients of ProT with dependent variable AQ are -0.0735* (column 2) and -0.0262* (column 4). The outcome displays that earnings quality declines with board of directors who graduated at the same universities. Our estimate is similar to (Kim et al., 2012) and (Jha, 2017). The findings imply that more correlated enterprises are more aggressive in their earnings management, which is consistent with our Hypothesis 1. Board of director networks are ideal conduits for the

natural transmission of knowledge on earnings reporting and how to effectively manage profits across businesses.

The coefficients of the control variables are mostly consistent with the literature. The findings for our control variables demonstrate that firm scale hinders earnings management. Companies with high growth, leveraged form seem to control earnings. The literature and these estimates are in agreement. The relationship in inverse between market-to-book ratio and discretionary accruals displays that companies with more open information settings control earnings less. We applied F-test, Breusch Bargan test, Wooldridge test to ensure the model does not have autocorrelation and problems.

C. Board friendliness and Firm performance

TABLE 3. BOARD FRIENDLINESS AND FIRM PERFORMANCE

	MTBI	NOA	ROA	ROAt1
EduT	-0.0237***	-0.0238***	-0.000575**	-0.000849**
ProT	-0.00568***	0.00167	-0.00061***	-0.00179***
EduProT	0.0334***	0.0215***	0.00545***	0.00593***
Control	Yes	Yes	Yes	Yes
_cons	0.568***	0.695***	-0.00584	0.0138**
N	4499	4047	4493	4103

t statistics in brackets
 * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3 presents our regression outcomes for board friendliness and firm performance. We find that board of directors who have graduated from the same university or used to work at the same employment would lower the firm profit. However, when directors both graduated from the same university and used to work at the same history company will strongly improve the firm's performance. The coefficients of EduProT with dependent variable MTBI, NOA, ROA, future ROA are 0.0334***; 0.0215***; 0.00545***; 0.00593***, respectively. These results are similar to the (Krishnan, 2012) and (David, 2018). The benefits of so-called "board capital depth" are supported by these findings, which show that networks concentrating on the same sector improve business performance. We applied F-test, Breusch Bargan test, Wooldridge test to ensure the model do not have autocorrelation and heteroscedasticity problems.

D. Economy development and Earnings Management

TABLE 4. ECONOMY DEVELOPMENT AND EARNINGS MANAGEMENT

	AbsAccJJ	AQ	AbsAccJJ	AQ
TA_gro	0.0224**	0.0207*	0.0463***	0.0283*
GDP_Gro	507.1	1311.7	2011.5**	4926.5**
Control	No	No	Yes	Yes
_cons	0.337***	0.0146***	0.430***	-0.0161
N	6165	4431	5720	4106

t statistics in brackets
 * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4 presents the regression outcomes for firm size growth and GDP growth with abnormal earnings. We present a positive correlation of this regression. The coefficient of TA_gro with dependent variable AbsAccJJ is 0.0463*** (column 3) and with dependent variable AQ is

0.0283* (column 4). The coefficient of GDP_Gro with dependent variable AbsAccJJ is 2011.5** (column 3) and with dependent variable AQ 4926.5** (column 4). This results are similar to (G.Cai et al., 2022) which also suggests that firm growth and economy development have the positive effect of abnormal earnings and resulted in lower information quality. The change increases the pressure on the board of directors to act or their motive to pursue career growth. The next year, it's likely that the local lawmakers would repay the favor by providing these organizations with further government funding. These results assist the idea that local statemens exaggerate regional GDP numbers to further their political careers. Then, in order to assist their overstated claims of economic growth, these declarations trade favors with local businesses and put pressure on them to adjust their profitability. We applied F-test, Breusch Bagan test, Wooldridge test to ensure the model do not have autocorrelation and hedekedascity problems.

E. Board friendliness and operating cashflows

TABLE 5. BOARD FRIENDLINESS AND OPERATING CASHFLOWS

	OCF	OCFt1	OCF	OCFt1
EduT	-0.00508***	-3.359***	-0.00892***	-1.7621**
ProT	0.00258***	4.661***	0.0380***	9.438**
Control	No	No	Yes	Yes
N	7706	3823	5185	3823

t statistics in brackets
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The evidence from Table 5 also suggests that board friendliness could be a relevant predictor for corporate cash holdings decision. We find that the board of directors who have graduated at the same university would decrease current and future operating cash flows where the board of directors who used to be co-workers in the past would enhance the firm's current and future cash flows. These results are comparable to (Li et al., 2020). This could mean that since the boards have the same educational background, firms can receive more external financial resources their interlocking networks are connected intimately which results in holding less cash. On the other hand, friendly boards constructed from employment have more good conditions of employment and sales, which allows the firm's operating cash flows to swell through inner more director connections. We applied F-test, Breusch Bagan test, Wooldridge test to ensure the model do not have autocorrelation and hedekedascity problems.

VI. CONCLUSIONS

In this paper, we observed the development of local GDP, firm growth and opportunistic behavior by directors who attended the same university, were found to be causes of lower-quality financial reports, while firm executives who had previously worked for the same organization were found to be responsible for higher-quality earnings reports. Higher quality of earnings report can be the result of firm executives who shared the same working experiences in the past (Kim et al., 2012; Jha, 2017). Furthermore, when directors both graduated at the same university and used to work at the same history company will strongly improve the firm

performance. Finally, the board of directors who have graduated at the same university would decrease current and future operating cash flows where the board of directors who used to be co-workers in the past would enhance present and upcoming cash flows for the company.

Our findings significantly advance specialized literature and show the value of the practices employed by Vietnam's non-financial listed firms. Notwithstanding, contrary to much earlier study in developed markets, this study shows that the firm network centrality and earnings management are positively and significantly related. We found that there is only a positive correlation between educational ties and irregular accruals earnings, but a negative significant relationship between professional ties on both abnormal real earnings and abnormal accruals earnings. Furthermore, the adverse consequences can be amplified if the directors have strong professional and academic affiliations. The consequences for policymakers are to increase the efficiency of procedures for protecting investors' rights and to give investors more options for monitoring. An increased risk of lawsuit would drive the auditor's attempts to manage earnings.

Secondly, our research demonstrates the proof of managers' friendliness level, particularly when they have been friends in previous educational settings and have collaborated in prior businesses, encouraging them to meet profit benchmarks and manage operating cashflow. This extends these meanings to an emerging market channel like Vietnam, in contrast to the findings of earlier studies that were largely done in established nations (Chang & Wu, 2021; Chiu et al., 2013; Kang et al., 2018; Wintoki & Xi, 2019).

Thirdly, the research also shows that economic growth and abnormal real and accruals earnings have a favorable link. As a result of the confirmation of the idea that local statesmen inflate regional GDP estimates for political promotion, this should serve as a warning to investors when researching well-established enterprises. This study examines a substantial result to the literature on corporate governance in the field of finance, with indications that board friendliness and economic growth are equally crucial predictors of the quality of the earnings.

Our research has limitations since the measures we use to define board friendliness simply count the number of directors who have a relationship with job or study, rather than focusing on the length of time they spent in each activity. Future studies may look at how firm characteristics and board friendliness affect abnormal earnings management in specific situations.

In conclusion, we discover that corporate practices, such as misreporting financial statements, particularly earnings, proliferate among well-connected directors who serve as conduits for the dissemination of knowledge about the practice. This demonstrates that a director's network centrality may incur costs, which are reflected in board oversight of financial reporting quality based on the network contagion influence of directors.

REFERENCES

- [1] Achleitner, A. K., Günther, N., Kaserer, C., & Siciliano, G. (2014). Real Earnings Management and Accrual-based Earnings Management

- in Family Firms. *European Accounting Review*, 23(3), 431–461. <https://doi.org/10.1080/09638180.2014.895620>
- [2] Alam, N., Ramachandran, J., & Nahomy, A. H. (2020). The impact of corporate governance and agency effect on earnings management – A test of the dual banking system. *Research in International Business and Finance*, 54, 101242. <https://doi.org/10.1016/j.ribaf.2020.101242>
 - [3] Alhadab, M., Clacher, I., & Keasey, K. (2014). Real and accrual earnings management and IPO failure risk. *Accounting and Business Research*, 45(1), 55–92. <https://doi.org/10.1080/00014788.2014.969187>
 - [4] Berkman, H., Koch, P., & Westerholm, P. J. (2020). Inside the director network: When directors trade or hold inside, interlock, and unconnected stocks. *Journal of Banking & Finance*, 118, 105892. <https://doi.org/10.1016/j.jbankfin.2020.105892>
 - [5] Bertomeu, J., Cheynel, E., Li, E. X., & Liang, Y. (2021). How Pervasive Is Earnings Management? Evidence from a Structural Model. *Management Science*, 67(8), 5145–5162. <https://doi.org/10.1287/mnsc.2020.3717>
 - [6] Cai, Y., Kim, Y., Li, S., & Pan, C. (2019). Tone at the top: CEOs' religious beliefs and earnings management. *Journal of Banking & Finance*, 106, 195–213. <https://doi.org/10.1016/j.jbankfin.2019.06.002>
 - [7] Campa, D., & Hajbaba, A. (2016). Do targets grab the cash in takeovers: The role of earnings management. *International Review of Financial Analysis*, 44, 56–64. <https://doi.org/10.1016/j.irfa.2016.01.008>
 - [8] Carney, R. W., Child, T. B., & Li, X. (2020). Board connections and crisis performance: Family, state, and political networks. *Journal of Corporate Finance*, 64, 101630. <https://doi.org/10.1016/j.jcorpfin.2020.101630>
 - [9] Chang, C. H., & Wu, Q. (2021). Board Networks and Corporate Innovation. *Management Science*, 67(6), 3618–3654. <https://doi.org/10.1287/mnsc.2020.3587>
 - [10] Chen, C. C. S., Chou, Y. Y., & Wei, P. (2020). Country factors in earnings management of ADR firms. *Finance Research Letters*, 32, 101146. <https://doi.org/10.1016/j.frl.2019.04.003>
 - [11] Chen, R. C., & Hung, S. (2020). Exploring the impact of corporate social responsibility on real earning management and discretionary accruals. *Corporate Social Responsibility and Environmental Management*, 28(1), 333–351. <https://doi.org/10.1002/csr.2052>
 - [12] Chen, S., Cai, W., & Jebran, K. (2019). Does Social Trust Mitigate Earnings Management? Evidence from China. *Emerging Markets Finance and Trade*, 57(10), 2995–3016. <https://doi.org/10.1080/1540496x.2019.1675046>
 - [13] Chen, X., Cheng, Q., Hao, Y., & Liu, Q. (2020). GDP growth incentives and earnings management: evidence from China. *Review of Accounting Studies*, 25(3), 1002–1039. <https://doi.org/10.1007/s11142-020-09547-8>
 - [14] Ding, R., Liu, M., Wang, T., & Wu, Z. (2021). The impact of climate risk on earnings management: International evidence. *Journal of Accounting and Public Policy*, 40(2), 106818. <https://doi.org/10.1016/j.jaccpubpol.2021.106818>
 - [15] el Diri, M., Lambrinoudakis, C., & Alhadab, M. (2020). Corporate governance and earnings management in concentrated markets. *Journal of Business Research*, 108, 291–306. <https://doi.org/10.1016/j.jbusres.2019.11.013>
 - [16] Eugster, F., & Wagner, A. F. (2020a). Earning investor trust: The role of past earnings management. *Journal of Business Finance & Accounting*, 48(1–2), 269–307. <https://doi.org/10.1111/jbfa.12477>
 - [17] Eugster, F., & Wagner, A. F. (2020b). Earning investor trust: The role of past earnings management. *Journal of Business Finance & Accounting*, 48(1–2), 269–307. <https://doi.org/10.1111/jbfa.12477>
 - [18] Fan, Y., Jiang, Y., Zhang, X., & Zhou, Y. (2019). Women on boards and bank earnings management: From zero to hero. *Journal of Banking & Finance*, 107, 105607. <https://doi.org/10.1016/j.jbankfin.2019.105607>
 - [19] Fang, M., Francis, B., Hasan, I., & Wu, Q. (2021). External social networks and earnings management. *The British Accounting Review*, 101044. <https://doi.org/10.1016/j.bar.2021.101044>
 - [20] García Lara, J. M., García Osma, B., & Penalva, F. (2020). Conditional conservatism and the limits to earnings management. *Journal of Accounting and Public Policy*, 39(4), 106738. <https://doi.org/10.1016/j.jaccpubpol.2020.106738>
 - [21] Garel, A., Martin-Flores, J. M., Petit-Romec, A., & Scott, A. (2021). Institutional investor distraction and earnings management. *Journal of Corporate Finance*, 66, 101801. <https://doi.org/10.1016/j.jcorpfin.2020.101801>
 - [22] Godigbe, B. G., Chui, C. M., & Liu, C. L. (2018). Directors network centrality and earnings quality. *Applied Economics*, 50(50), 5381–5400. <https://doi.org/10.1080/00036846.2018.1486992>
 - [23] Griffin, P. A., Hong, H. A., Liu, Y., & Ryou, J. W. (2021). The dark side of CEO social capital: Evidence from real earnings management and future operating performance. *Journal of Corporate Finance*, 68, 101920. <https://doi.org/10.1016/j.jcorpfin.2021.101920>
 - [24] Gupta, A., Owusu, A., & Zou, L. (2021). Identifying board of director network influence for firm characteristics. *Physica A: Statistical Mechanics and Its Applications*, 581, 126212. <https://doi.org/10.1016/j.physa.2021.126212>
 - [25] Hickman, L. E., Iyer, S. R., & Jadyappa, N. (2021). The effect of voluntary and mandatory corporate social responsibility on earnings management: Evidence from India and the 2% rule. *Emerging Markets Review*, 46, 100750. <https://doi.org/10.1016/j.ememar.2020.100750>
 - [26] Hooghiemstra, R., Hermes, N., Oxelheim, L., & Randøy, T. (2019). Strangers on the board: The impact of board internationalization on earnings management of Nordic firms. *International Business Review*, 28(1), 119–134. <https://doi.org/10.1016/j.ibusrev.2018.08.007>
 - [27] Huang, W., Goodell, J. W., & Zhang, H. (2019). Pre-merger management in developing markets: The role of earnings glamor. *International Review of Financial Analysis*, 65, 101375. <https://doi.org/10.1016/j.irfa.2019.101375>
 - [28] Kang, J. K., Liu, W. L., Low, A., & Zhang, L. (2018). Friendly boards and innovation. *Journal of Empirical Finance*, 45, 1–25. <https://doi.org/10.1016/j.jempfin.2017.09.007>
 - [29] Kapoor, N., & Goel, S. (2016). Board Characteristics, Firm Profitability and Earnings Management: Evidence from India. *Australian Accounting Review*, 27(2), 180–194. <https://doi.org/10.1111/auar.12144>
 - [30] Kim, Y. S., Kim, Y., & Yi, H. C. (2021). Vice or virtue? The impact of earnings management on bank loan agreements. *International Review of Economics & Finance*, 73, 303–324. <https://doi.org/10.1016/j.iref.2020.12.028>
 - [31] Kothari, S. P., Mizik, N., & Roychowdhury, S. (2015). Managing for the Moment: The Role of Earnings Management via Real Activities versus Accruals in SEO Valuation. *The Accounting Review*, 91(2), 559–586. <https://doi.org/10.2308/accr-51153>
 - [32] Krishnan, G. V., Raman, K. K., Yang, K., & Yu, W. (2011). CFO/CEO-Board Social Ties, Sarbanes-Oxley, and Earnings Management. *Accounting Horizons*, 25(3), 537–557. <https://doi.org/10.2308/acch-50028>
 - [33] Kung, F. H., Chang, Y. S., & Zhou, M. (2019). The effect of gender composition in joint audits on earnings management. *Managerial Auditing Journal*, 34(5), 549–574. <https://doi.org/10.1108/maj-05-2018-1885>
 - [34] Lee, M., & Hwang, I. T. (2019). The Effect of the Compensation System on Earnings Management and Sustainability: Evidence from Korea Banks. *Sustainability*, 11(11), 3165. <https://doi.org/10.3390/su11113165>
 - [35] Li, C., Lou, C., Luo, D., & Xing, K. (2021). Chinese corporate distress prediction using LASSO: The role of earnings management. *International Review of Financial Analysis*, 76, 101776. <https://doi.org/10.1016/j.irfa.2021.101776>
 - [36] Li, L., & Kuo, C. S. (2017). CEO equity compensation and earnings management: The role of growth opportunities. *Finance Research Letters*, 20, 289–295. <https://doi.org/10.1016/j.frl.2016.10.013>
 - [37] Li, Y., Li, X., Xiang, E., & Geri Djajadikerta, H. (2020). Financial distress, internal control, and earnings management: Evidence from China. *Journal of Contemporary Accounting & Economics*, 16(3), 100210. <https://doi.org/10.1016/j.jcae.2020.100210>
 - [38] Maglio, R., Rey, A., Agliata, F., & Lombardi, R. (2019). Connecting earnings management and corporate social responsibility: A renewed perspective. *Corporate Social Responsibility and Environmental Management*, 27(2), 1108–1116. <https://doi.org/10.1002/csr.1868>
 - [39] Neifar, S., & Utz, S. (2019). The effect of earnings management and tax aggressiveness on shareholder wealth and stock price crash risk of German companies. *Journal of Applied Accounting Research*, 20(1), 94–119. <https://doi.org/10.1108/jaar-11-2016-0106>
 - [40] Orazalin, N., & Akhmetzhanov, R. (2019). Earnings management, audit quality, and cost of debt: evidence from a Central Asian economy. *Managerial Auditing Journal*, 34(6), 696–721. <https://doi.org/10.1108/maj-12-2017-1730>
 - [41] Oskoue, Z. H., & Sureshjani, Z. H. (2020). Studying the relationship between managerial ability and real earnings management in economic and financial crisis conditions. *International Journal of*

Finance & Economics, 26(3), 4574–4589. <https://doi.org/10.1002/ijfe.2031>

- [42] Palacios-Manzano, M., Gras-Gil, E., & Santos-Jaen, J. M. (2019). Corporate social responsibility and its effect on earnings management: an empirical research on Spanish firms. *Total Quality Management & Business Excellence*, 32(7–8), 921–937. <https://doi.org/10.1080/14783363.2019.1652586>
- [43] Schmidt, B. (2015). Costs and benefits of friendly boards during mergers and acquisitions. *Journal of Financial Economics*, 117(2), 424–447. <https://doi.org/10.1016/j.jfineco.2015.02.007>
- [44] Shu, P. G., Yeh, Y. H., Chiu, S. B., & Yang, Y. W. (2015). Board external connectedness and earnings management. *Asia Pacific Management Review*, 20(4), 265–274. <https://doi.org/10.1016/j.apmr.2015.03.003>
- [45] Souther, M. E. (2018). The effects of internal board networks: Evidence from closed-end funds. *Journal of Accounting and Economics*, 66(1), 266–290. <https://doi.org/10.1016/j.jacceco.2018.06.001>
- [46] Tao, Q., Li, H., Wu, Q., Zhang, T., & Zhu, Y. (2019). The dark side of board network centrality: Evidence from merger performance. *Journal of Business Research*, 104, 215–232. <https://doi.org/10.1016/j.jbusres.2019.07.019>
- [47] Thanh, S. D., Canh, N. P., & Ha, N. T. T. (2020). Debt structure and earnings management: A non-linear analysis from an emerging economy. *Finance Research Letters*, 35, 101283. <https://doi.org/10.1016/j.frl.2019.08.031>
- [48] Wintoki, M. B., & Xi, Y. (2019). Friendly directors and the cost of regulatory compliance. *Journal of Corporate Finance*, 58, 112–141. <https://doi.org/10.1016/j.jcorpfin.2019.04.011>
- [49] Wu, Y., Zhang, Y., & Chen, Y. (2020). The influence of board interlocking network centrality on foundation performance: evidence from China. *Journal of Chinese Governance*, 6(1), 43–57. <https://doi.org/10.1080/23812346.2020.1841483>
- [50] Yung, K., & Root, A. (2019). Policy uncertainty and earnings management: International evidence. *Journal of Business Research*, 100, 255–267. <https://doi.org/10.1016/j.jbusres.2019.03.058>
- [51] Zhang, Y., Uchida, K., & Dong, L. (2020). External financing and earnings management: Evidence from international data. *Research in International Business and Finance*, 54, 101275. <https://doi.org/10.1016/j.ribaf.2020.101275>
- [52] Zhao, T. (2021). Board network, investment efficiency, and the mediating role of CSR: Evidence from China. *International Review of Economics & Finance*, 76, 897–919. <https://doi.org/10.1016/j.iref.2021.08.005>
- [53] Dang, N. H. (2017). Factors Affecting Earnings Management: The Case of Listed Firms in Vietnam. *International Journal of Economic Research*.
- [54] Khanh, M. T. (2019). The effect of financial leverage on real and accrual-based earnings management in vietnamese firms. *Economics and Sociology*, 285–298.
- [55] Khanh, H. K. N. (2018). Audit Quality, Firm Characteristics and Real Earnings Management: The Case of Listed Vietnamese Firms. *International Journal of Economics and Financial Issues*, 243–249.
- [56] N. Khuong, N. M. (2020). Earnings management and cash holdings: Evidence from energy firms in Vietnam. *ournal of International Studies*, 247–261.
- [57] Quy, V. T. (2017). Detecting Earning Management of Companies Listing on HOSE. *Asian Journal of Social Sciences and Management Studies*, 82–87.

ACKNOWLEDGMENT

We are grateful to all of those with whom we have had the pleasure to work during this and other related projects. Each of the members of this research project has provided extensive personal and professional guidance and resulted in a great deal about both scientific research and life in general.

APPENDIX

Measuring independent variables		
Code	Measurement	Reference
Edu_Pro T	The number of individuals with whom directors shares common employment and education.	(Chang & Wu, 2021)

Measuring independent variables		
Code	Measurement	Reference
EduT	Natural logarithm of one plus the number of individuals with whom directors share common education background.	(Chang & Wu, 2021)
ProT	The number of individuals with whom directors share a common employment history	(Chang & Wu, 2021)

Measuring dependent variables		
Code	Measurement	Reference
AbsAccJJ	Jones' model (1991)	(Yung & Root, 2019)
AQ	The methodology of Francis et al. (2005)	(Yung & Root, 2019)

Measuring control variables		
Code	Measurement	Reference
LOG_TA	Natural logarithm of total assets in millions	(Yung & Root, 2019; Chen et al., 2020; Fan et al., 2019; El Diri et al., 2020; Cai et al., 2019)
TA_gro	Quarterly growth rate of total assets.	(Fan et al., 2019)
Age	The number of years since a firm first initial public	(Cai et al., 2019)
MTB1	Market value of equity over book value of equity	(Yung & Root, 2019; Fan et al., 2019; Cai et al., 2019; Chen et al., 2020; El Diri et al., 2020)
DE	Total liability over stockholder's equity	(Yung & Root, 2019; Chen et al., 2020)
CAP	Total equity over total assets.	(Cai et al., 2019; Fan et al., 2019)
OCF	Operating cash flow scaled by total assets.	(Yung & Root, 2019)
CF_VOL	The standard deviation of (cash from operations / average assets) over at least three of the last five years	(Cai et al., 2019; El Diri et al., 2020)
GDP_Gro	Rate of growth of GDP/capita, obtained from the World Bank.	(Yung & Root, 2019; Cai et al., 2019)
Salegrow	Current year's sales less prior year's sales less the increase in receivables all scaled by prior year's sales and decile ranked by industry and year.	(El Diri et al., 2020)
ROA	Return on assets.	(Cai et al., 2019; Fan et al., 2019)
NOA	Net operating assets over total assets, whereas net operating assets is defined as the sum of common equity, long-term debt, and debt in current liabilities less cash and short-term investments	(Cai et al., 2019)

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The Impact of Paradoxical Leadership on Public Sector Innovation Through Entrepreneurial Orientation and Goal Congruence

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Abstract—While leadership and entrepreneurship are recognized as essential factors in influencing innovation, the extent to which the constructs are interconnected and dependent on the public sector contextual environment is less well understood. In response, this study examined how public managers' paradoxical leadership and entrepreneurial orientation interact with public employees' perceptions of innovation at different levels of their goal congruence. Informed by the theory of ambidextrous leadership, we created a moderated mediation model of the influence of paradoxical leadership on public sector innovation via entrepreneurial orientation and goal congruence. Survey results were gathered from 339 subordinate-supervisor dyads in 69 teams from public sector departments in Ho Chi Minh City, Vietnam. SPSS was used to analyze the data using PROCESS-Macro. The results showed that the relationship between paradoxical leadership and public employees' innovation was totally mediated by the entrepreneurial orientation of public organizations. It was also found that paradoxical leadership fosters entrepreneurial orientation when there is a high level of goal congruence team members. However, paradoxical behavior of managers still increases entrepreneurial orientation in public organizations though goal congruence is at the low level. Thus, whether the goal congruence at a high or low rate, public managers appear to stimulate entrepreneurship correspondingly. Significantly, this study recommends a new theoretical model of paradoxical leadership as a feasible strategy to be implemented in the public sector, which may help public employees be innovative in unpredictable public-working situations. It is proposed that this research paradigm can be expanded to public organizations in cultural contexts comparable to Vietnam's.

Index Terms—Paradoxical Leadership, Entrepreneurial Orientation, Public Sector Innovation, Goal Congruence, Vietnam

I. INTRODUCTION

Recent empirical research has demonstrated the significance of the effect of leadership on innovation. Many scholars validate transformational leadership with its alternating ability to stimulate innovation, as in [1],[2],[3]. Servant leadership are also proven to be an antecedent of innovative thinking [4], [5]. In addition, innovation at work is highly influenced by ethical leadership [6]. This research line has shed light on innovative actions of managers who inspire

productive action in themselves and others during times of uncertainty, ambiguity, and risks. Following the stream, this current study explores how paradoxical leadership (PL) affects innovation in public sector because it has not been studied yet. Literature shows that paradoxical leaders with their ability to lead teams and individuals even when there are contradictory tensions show the key to their organizational success [7]. Thanks to paradoxical behaviors, these leaders, by harmonizing organizational goals and individual goals, are also able to satisfy both structural requirements and the needs of their followers. By balancing corporate aims with personal aspirations, these leaders are also able to satisfy followers' desires while taking into account structural factors. [8]. In public organizations, the paradox-based perspective can assist public managers in fostering entrepreneurship as a means of coping with rising changeability, which frequently involves competition for potentials pertinent to governmental renovation [9],[10]. However, in public sector, little is known whether or not PL of public managers has significant impact on public employee's outcomes within public service organizations. Most recently, Franken and his colleagues proved how PL increases staff resilience and their individual ability to deal with difficulties and uncertain organizational situations [11]. Other authors, such as Backhaus, Reuber, Vogel, gathered data from German district offices and carried out a structural equation modeling, which reveals that PL has an effect on the levels of job satisfaction and work engagement favorably [12]. In Vietnam, it is considered that PL of public leaders are related to civil servants' public service motivation [13]. Thus, following this research flow, this study further highlights PL as a potential scheme to be adopted in public sector, which may help public employees to become innovative.

In order to foster public sector innovation (PSI), entrepreneurial orientation (EO) is considered to be a driving factor [14]. According to previous research, EO encourages state administrators to think like entrepreneurs in order to uncover new possibilities, gain from risk-taking, produce novel services, and position themselves proactively in the market

[15]. Existing research also emphasizes the significance of risk-taking, innovation, and proactiveness that was referred as EO in public service reform, which focuses on the quality and efficiency of services provided to citizens [16]. However, in the literature, research on EO in non-US corporate contexts is not thoroughly established [17]. For example, few empirical research on the Vietnamese public sector, in particular, have been done, despite the fact that EO in the public sector has long been addressed [18], [19]. Therefore, this study looks at whether or not there is a perceived EO among public managers in Vietnamese public organizations. Also, it is questioned if these managers' EO is derived from their PL behavior, which might, in turn, affect their public employees' innovation.

To apply EO for achieving PSI, people in multiple levels of the public organizations need to reach a common goal [20]. Goal congruence (GC) should be well thought-out in organizational design because GC results in a condition in which people are able to work together to accomplish a specific strategy. However, a perfect congruence between individual goals and organizational goals does not exist [21]. Thus, if there is no completed congruence of goals, to what degree do individual goals and organizational goals in public sector impact on leadership and innovation? To the best of our understanding, study on GC between managers and employees in public sector is still a void in literature. Therefore, this study has incorporated the role of GC within the paradoxical theory framework. Specifically, it will clarify how GC can moderate the relationship between PL, EO and PSI. In doing so, it provides the first empirical evidence to support the inclusion of GC within teams, as a mechanism for understanding how the application of PL among public leaders can lead to the practice of entrepreneurship.

The Vietnam context, particularly Ho Chi Minh city is an appropriate research site for this research. Recently, the country's circumstances necessitate a shift in incorporating EO in order to operate successful corporate systems [22]. The government both at central level and local level is now advocating civil service reform based on the idea of New Public Management (NPM)¹ that employs technology to improve how citizens engage with government. Because individuals have grown more aware and public expectations have risen, the government must be able to adapt to the problems and the requirements of civic groups to come up with new ideas, to test new techniques, and to operate the service system in new ways [23]. In the Vietnamese setting, public leaders serve in both administrative and political capacities. So, the issue is that public leaders must pursue contradictory values at the same time. For example, in order to develop a credible and creative public service, leaders must provide autonomy to their staff. They do, however, tend to regulate actions that may be useful to control groups since they fear of losing power [24]. As a result, it is claimed to be difficult, if not dangerous, to apply innovative public management into administrative reform in Vietnam, as well as

other developing countries that have similar situation to Vietnam's. However, the difficulty can be solved if authorities build mechanism with the right choice of leadership style, entrepreneurial mindset and innovation in public administration. To achieve the purpose, this study hopes to contribute to this mechanism. Studying Vietnam provided a context for bringing a better understanding about public managers' leadership behaviors. We believe that a paradoxical way actively supports the capacity-building of public sector innovation (PSI) among employees through the establishment of an enterprise-like system of public service, and through leader-follower agreement on common goals. We analyze data from Vietnamese governmental organizations in an effort to address two primary research questions: (1) *How does paradoxical leadership of public managers empower public employees' innovation through entrepreneurial orientation?* (2) *To what extent does goal congruence at team level impact the prediction of paradoxical leadership on entrepreneurial orientation that leads to public employees' innovation in public organizations?*

II. BACKGROUND THEORIES

This study's hypothesized model is based on the ambidextrous leadership theory offered by Rosing et al., [25]. The idea of ambidextrous leadership is based on a paradox that innovation requires a leadership style with dual facets [26]. Specifically, The model assumes that "opening" and "closing" leadership behaviors have a reciprocal relationship that predicts individual and team innovation such that the level of innovation is greatest when both are present. In particular, "opening leaders" employed "exploring" to inspire followers to spark creativity in their work by enabling them to think and act independently. Concurrently, "closing leaders" employ "exploiting" aspects in followers' work processes and push followers to comply by taking corrective actions, establishing explicit standards, and monitoring goal attainment [27]. Also, reference [28] states that flexibility of leadership behaviors, both opening and closing tends to get people to think of new ideas more than a single leadership style.

Drawing on the ambidextrous leadership, as mentioned above, this study adopts the term "paradoxical leader behavior" examined in [29] and [30], as a crucial source of ambidextrous leadership that can indicate PSI. In reference [29], Zhang and his colleagues examined leadership in an Eastern culture with a philosophical justification of Yin-Yang, and paradoxical leadership is positively related to innovation. According to the authors, PL refers to leader behaviors that appear to be opposing, yet are interconnected in order to address competing workplace needs simultaneously and over time. Five aspects of paradoxical behavior are described: (1) being both self-centered and focused on others, (2) keeping a distance and being close at the same time, (3) treating subordinates the same while letting them be unique, (4) enforcing work requirements while allowing flexibility, and (5) keeping control over decisions while letting people make their own choices. Reference [29] also states that paradoxical behaviors of leaders can predict their proactivity, adaptability, and creativity. Also, Zhang and his colleagues have recently found that PL positively affects individual and team innovation through ambidexterity [30]. Throughout the

¹ New Public Management (NPM) is an organizational approach to public service that is applied in government and public service institutions and agencies. This is a part of an effort to make the public service more "businesslike" and to improve its efficiency by using private sector management models

development of leadership domain, several scholars, such as in [31],[32], have claimed that complexity, ambiguity, and contradiction are justifications for leadership in overcoming change resistance. When organizational tensions arise from competing demands, adaptive leaders embrace inconsistencies and simultaneously endeavor to promote conflicting parts. The emotional harmony of flow and change is fostered by this type of leadership, which in turn encourages followers to take more risks and be more open to new experiences [33].

This current study further integrates PL theories to the basis of entrepreneurship research developed by Covin and Slevin, as in [34]. In the literature of entrepreneurship, innovativeness, risk-taking, and proactive behavior are components of entrepreneurship, which are referred to as having an entrepreneurial attitude or posture [35]. Employees may be encouraged by this mindset to look for creative ways to increase the value of their performance, such as process flexibility, effectiveness, product quality, or effective delivery methods [36]. By bringing these concepts into the public sector, an entrepreneurial mindset or orientation may help with the creation of fresh, original concepts as well as the planning and delivery of public services [37]. As a part of NPM reform, the demand for markets and civil society motivates the public leaders to foster an entrepreneurial spirit [38]. Therefore, public leaders may reshape public service into new forms or structures if they adopt a flexible leadership style as a private enterprise, and public service innovation has become key features of the public sector [39].

Goal congruence has emerged as a new concept in leadership and entrepreneurship research [40]. References [41], [42] imply that the relationship between leadership styles and entrepreneurship can be influenced by the congruence of organizational members' goals. Empirically, it was demonstrated how much the alignment of members' goals reflects the value of innovativeness for that firm. [43]. As a result, the GC has been defined as a cognitive aspect of social capital. This aspect in some manner corresponds to the goals that organizational members have, and these goals converge to form the organization's vision. [44]. In the acceptance phase of the innovation process, however, GC can become a significant barrier [45]. In these uncertain situations, public sector managers are frequently accused of a lack of organizational innovation since their goals at important strategic decision points are incongruent [46]. According to a qualitative study, as in [47] conducted among organizational professionals, the traditional concept of organizational commitment as "a good state of mind" must be replaced with a more comprehensive perspective that incorporates "task-related GC". In doing so, objectives and values are matched, workplace efforts are focused on attaining outcomes and exhibiting creative and innovative behavior. Therefore, this study proposed a machinery that the leadership practice for growing the EO may be contingent on the GC of organizational members, which results in the desire of public leaders to increase innovation in public service.

III. HYPOTHESES

A. Paradoxical leadership and entrepreneurial orientation

The degree of flexibility for entrepreneurial activities within an organization is greatly influenced by leadership styles. In an uncertain time, leaders need to manage solid strategic process systems while embracing the risk, innovativeness, and proactivity that constitute entrepreneurial activity [48]. PL has emerged as a leadership behavior that adopts "both controlling and empowering" attributes. This kind of behavior assists businesses in managing an unpredictable environment that requires both stability and adaptability [49]. During the process of public service reform, businesses in the public sector have confronted an unstable environment. Public executives in public organizations appear to be quite ambidextrous in achieving the goals of public service reform by using market methods influenced by New Public Management [50]. The paradox necessitates an entrepreneurial mindset capable of dealing with contradictory situations. While achieving market viability encourages efficiency in pursuit of economic gain, achieving public service missions focuses on effectiveness in addressing social challenges [51]. As such, public managers need to balance the economic and social challenge, so they can use PL to develop an entrepreneurial attitude as a principle of entrepreneurship to figure out the right solutions [52]. In particular, paradoxical leaders with controlling behaviors are best suited for everyday organizational goal attainment, and their empowering behaviors increase the levels of involvement and participation that allows for greater job decisions and creativity. In doing so, paradoxical leaders have become entrepreneurs who know when and how to be administrators and innovators.

Logically, we hypothesized:

H1: Paradoxical leadership is positively related to entrepreneurial orientation.

B. Entrepreneurial orientation and public sector innovation

Public entrepreneurship connected with organizational innovation attempts to increase social capital via the delivery of public services, as in [53]. To create new products or services, organizations employ EO as a direction that outlines the decision-making techniques and practices in the readiness to take risks, as well as competitiveness and market proactivity [54]. Innovations in the public sector primarily target administrative procedures, good public service, restructuring, and communication. As a result, both citizens and businesses benefit from a competent and modern public administration in the form of better governance, faster service delivery, and participation in policy making [55]. As an organizational design, EO entails the public organization's general propensity for innovation and innate capabilities such as managerial skills, technologies, and administrative systems [56]. For example, Arzubaga et al., based on data from 230 Spanish family-owned small-to-medium enterprises (SMEs), discovered that an entrepreneurial mindset positively affects innovation performances in [57]. Iqbal et al. (2021) also revealed a similar conclusion in the predic-

tion of entrepreneurial mindset on innovative activities in Pakistani SMEs. Accordingly, when leadership paves the way for entrepreneurial orientation, people are highly motivated to discover and embrace creative ideas to develop processes and/or services [58]. Under an entrepreneurial strategy, personnel will be ready to take risks [59], so they will go above and beyond their allotted tasks and responsibilities to increase process flexibility. These capabilities can develop specific processes or routines that combine, modify, or renew resources to produce new talents in the public sector as markets change [60]. As a result, EO is viewed as a dynamic skill that supports the identification of creative opportunities in timely, inventive, and market-driven public service [61]. Thus, the following hypothesis is tested

H2: Entrepreneurial orientation is positively related to public sector innovation.

C. Entrepreneurial orientation as a mediator

Leadership and entrepreneurship have been conceptualized as a unique collection of underlying characteristics, actions, and skills [62]. The essential idea is that an entrepreneur (who is also a leader) contributes to original success by his or her risk-taking tendency [63] or her capacity to spot opportunities that others do not [64]. Recently, positive association was established between PL and employee innovation behavior. [65]. This shed light on PSI where entrepreneurial spirit has become a key concept. In this situation, public managers as catalysts for bringing creativity and novelty, scheme and implementation of the innovative idea into public service practice. With an entrepreneurial spirit, those public leaders are moving from stability to flexibility to learning new things and coaching their followers. They may use temporal closeness of concentration and give autonomy to foster synergies and drives innovative performance in public employees [66] and [67]. In the domain of public entrepreneurship, it is suggested that public organizations instill a PL style to activate the entrepreneurial mindset. As mentioned above, paradoxical leaders lead by both empowering and controlling, which communicate an assertive point of view, promoting creative and divergent thinking. On the one hand, they allow different ways in which their public employee accomplish a task; and they encourage their employees to share different ideas as well as motivate risk-taking. On the other hand, they monitor and control goal attainment, establish routines and take corrective actions that give the self-assurance for their fellows with the feeling of "dare to do" innovation. Thus, public managers with a paradox and entrepreneurial mindset adopt a "both/and" thinking and perceive contradictions between multiple demands [68], thereby increasing the number of ideas and solutions considered as innovations in public sector. Accordingly, it is proposed that:

H3: Entrepreneurial orientation mediates the relationship between paradoxical leadership and public sector innovation.

D. Goal congruence as a moderator

Definitions of leadership of all kinds point to several crucial elements, including organizations, goals and people influences [69]. To lead their organizations in a changing world, public managers are more likely to embrace the en-

trepreneurial mentality while their PL style established a long-lasting connections and goal harmony. GC, therefore, interacts with the managers' paradoxical traits, such as their capacity to balance stability and flexibility, in order to foster EO inside their company [70]. When an organizational objective can be effectively linked with the goals of subordinates and superiors, entrepreneurial attitude, such as risk-taking and idea generation, is fostered [71]. Thus, it is proposed that:

H4a. Goal congruence moderates the relationship between paradoxical leadership and entrepreneur orientation, such that the relationship is stronger when the level of goal congruence within the organization is high rather than low.

What is more, when objectives are in line, employees are more committed to the company to which they belong; consequently, they are more likely to devote their time and energy to adopting current procedures as well as actively seeking out new methods to develop processes, goods, and services [72]and [73]. Theoretically, a paradoxical leader is characterized by autonomous leadership, which tends to raise the level of socially-oriented entrepreneurial activities [74]. However, those leaders seem to be consistent with controlling characteristics that can actively participate in problem solving Hence, they aim to establish GC in their public organization to ensure that everyone agrees on how a problem can be fixed. Eventually, it results in a common knowledge of how an entrepreneurial mindset proactively innovates processes and products across personnel. Reference [75] shows the paradigm makes them even more motivated by GC to pursue their organizational endeavors. Because of this, they all gradually pick up on and adjust to the exploratory strategy, acting as entrepreneurs. Thus, a paradoxical leader tends to encourage entrepreneurial behaviors affecting on PSI in an organization when they perceive a high degree of GC. We proposed a hypothesis as follows:

H4b. Goal congruence moderates the mediation of entrepreneur orientation on the relationship between paradoxical leadership and public sector innovation, such that the relationship is stronger when the level of goal congruence within the organization is high rather than low.

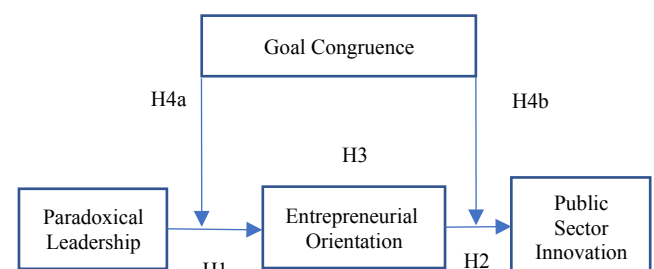


Fig 1: The hypothesized model

IV. METHOD

A. Data Collection

Data was collected from public managers and employees who work for four state agencies in Ho Chi Minh City, southern Vietnam, participated in the current study: Educa-

tion and Training, Healthcare, Culture-Sports & Tourism, Resources & Environment, and Planning & Investment. Public managers and employees were given separate questionnaires. The supervisor surveys were given to 69 public managers, while the subordinate questionnaires were given to 281 of these managers' immediate employees. Each supervisor was asked to rate his or her own leadership styles, as well as the EO and innovation indicators of around four of his/her subordinates. Each subordinate was asked to rank their supervisor's leadership style and to self-rate their own public-sector innovation. Both supervisors and subordinates were asked to rate the congruence of their organization's goals. The surveys with structured questions were cross-sectionally mailed to 20 administrative units of the specified departments of the mentioned-above agencies with the support of the Ho Chi Minh Cadre Academy in the south of Vietnam. As a consequence, 350 completed surveys were received, with 339 retained with 69 teams. Respondents were advised that the survey's purpose was to explore their perceptions of the department's leadership and innovation, and they were assured that their responses would be kept confidential. Individually completed surveys were returned to a box in an administrative unit designated for that purpose.

B. Measure

Four variables in the construct (Fig.1) were measured by scales developed by previous scholars. All the items in the scales are rated on a Likert type with answer categories ranged from 1 (totally disagree) to 5 (totally agree).

1) *Paradoxical leadership*: This variable was assessed using 22-item scale of the original measures developed by Zhang et al., as in [29]. There are five dimensions of PL measured. The first dimension is treating subordinates uniformly while allowing individualization (e.g., *Uses a fair approach to treat all subordinates uniformly, but also treats them as individuals*). The second dimension is "combining self-centeredness with other-centeredness" (e.g., *Shows a desire to lead, but allows others to share the leadership role*). The third dimension is "maintaining decision control while allowing autonomy (e.g., *Controls important work issues, but allows subordinates to handle details*). The fourth dimension is "enforcing work requirements while allowing flexibility" (e.g., *Stresses conformity in task performance, but allows for exceptions*). The last one is "maintaining both distance and closeness" involves four items (e.g., *Recognizes the distinction between supervisors and subordinates, but does not act superior in the leadership role*). This scale had a Cronbach's α of 0.80.

2) *Entrepreneurial Orientation*: An EO scale of 8-items originally devised by Covin and Slevin as in [76] which comprises the three dimensions. First, proactivity consists of two items (e.g., *Our organization is very often the first to introduce new products or services, administrative systems, methods of production, etc*). Secondly, innovativeness consists of three items (e.g., *Our organization has introduced a lot of new products or services in the past five years*). Thirdly, risk-taking consists of three items (e.g., *Our organization has a strong propensity toward getting involved in*

high-risk projects). The measure of this scale has a Cronbach's α of 0.93.

3) *Goal congruence*: To assess the perceived goal congruence, we used Vande Walle's 13-item goal orientation scale was used, as in [77]. This scale identifies three dimensions, learning, prove and avoid. An item example for learning is "I enjoy challenging and difficult tasks at work where I'll learn new skills". For the prove dimension, items consist of organization members' response to "I am concerned with showing that I can perform better than my coworkers". For the avoid dimension, the organization members responded to "I prefer to avoid situations at work where I might perform poorly". This scale had a Cronbach's α of 0.83.

4) *Public sector innovation*: To measure PSI, we used the five items on which is extracted from the Fedview survey for the Office of Personnel Management, as in [78], developed by Asencio and Mujkic in 2016. This is consistent with assessing the extent to which public employees' innovation is encouraged by public leaders. Items included their responses to statements. For example, "I feel encouraged to come up with new and better ways of doing things; and I am constantly looking for ways to do my job better". This scale had a Cronbach's α of 0.87.

C. Analysis strategy

The proposed theoretical model (Fig 1) was examined using moderated mediation analysis, also known as conditional indirect process modeling, by The Hayes PROCESS-macro (Model 8) for SPSS, as in [79] and [80]. Two models were developed to determine if (1) *the effect of PL on EO is dependent on SG levels* and (2) *the effect of PL on PSI via EO is dependent on SG levels*. This method permits the investigation of both the direct and indirect effects of an independent variable on a dependent variable via a mediator, as well as the conditional effects that moderate these associations [80]. All four hypotheses were examined simultaneously. Based on 5,000 bootstrap samples, bias-corrected bootstrap confidence intervals were calculated for conditional indirect effects at the low, average, and high levels since this method has been recommended for testing moderated mediation models [80]. Point estimates were considered significant if the 95 % confidence interval did not contain 0.

V. RESULT

A. Reliability Analysis

The variable goal congruence (GC) is proposed as a moderator at the group level. To build the moderating variable from the group data set, we first calculated IntraClass Correlation (ICC) for a group-level aggregation [81]. Then, the elements on the GC scale would be statistically summed to their mean through the moderated mediation process analysis. According to Table I, ICC represents the proportion of variation attributed to level two. In this study, ICC estimates and their 95% confidence intervals were made using version 24 of the SPSS statistical software. The absolute agreement label was given to the alpha two-way random effects model. The outcome indicated that Cronbach's alpha is 0.932. Therefore, it is reasonable to conclude that the level of reliability is excellent. This study's calculations based on the

ANOVA output revealed an ICC of more than 80% (ICC2 = 0.85), confirming that the within-group agreement is strong.

TABLE I
INTRACLASS CORRELATION COEFFICIENT

Scale and Reliability Statistics				
Mean	Variance	Std. Deviation	Cronbach's Alpha	N of Items
58.78	163.513	12.787	.933	14

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between People	3935.986	337	11.679		
Within People					
Between Items	614.230	13	47.248	59.911	.000
Residual	3455.056	4381	.789		
Total	4069.286	4394	.926		
Total	8005.271	4731	1.692		

Grand Mean = 4.20

Intraclass Correlation Coefficient

	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig.
Single Measures	.457 ^a	.407	.508	14.810	337	4381	.000
Average Measures	.922	.906	.935	14.810	337	4381	.000

Two-way random effects model where both people effects and measures effects are random.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type A intraclass correlation coefficients using an absolute agreement definition.

After calculating the mean of 14 items within the group data, the researcher aggregates them into a variable labelled SG. The construct then includes four variables being tested: the independent variable- PL, the mediating variable-EO, the dependent variable-PSI and the moderating variable- SG (which was computed from the group data). All of these variables were tested their correlations before putting it together in the expected moderated mediation modelling. Control variables did not involve in this study because they are not relevant.

B. Correlations and Descriptive Analysis

TABLE II
CORRELATIONS

Paradoxical leadership	Pearson Correlation	1	.677*	.349**	.402**
	Sig. (2-tailed)		.000	.000	.000
	N	339	339	339	339
Entrepreneurial Orientation	Pearson Correlation	.677*	1	.456**	.410**
	Sig. (2-tailed)	.000		.000	.000
	N	339	339	339	339
Public Sector Innovation	Pearson Correlation	.349*	.456*	1	.193**
	Sig. (2-tailed)	.000	.000		.000
	N	339	339	339	339
Goal Congruence	Pearson Correlation	.402*	.410*	.193**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	339	339	339	339

** . Correlation is significant at the 0.01 level (2-tailed).

C. Moderated Mediation Analysis

Based on the moderated mediation model described by Hayes and Preacher in 2013 and their way of analysis, as in [80]. The hypothesis path will be explained step by steps as follows.

Hypothesis Paths: (1) $PL \Rightarrow EO$; (2) $EO \Rightarrow PSI$; (3) $PL \times EO \Rightarrow PSI$; (4a) $PL \times SG \Rightarrow EO$; (4b) $PL \times SG \times EO \Rightarrow PSI$

Firstly, the result (in Table III) showed that both PL and SG had a significant effect on EO, and that EO has significant relationship with PSI, $\Delta R1 = .049$, $P < 0.001$. The interaction term of PL-SG effect on EO was also statistically significant, ($p < 0.005$), and the Confident Interval (CI), (-.3031, -.0617) does not contains 0. This test also initially reveals some evidences for conditional indirect effect for a moderation model. Therefore, *Hypothesis 1 was supported; PL predicts EO*.

TABLE III
ENTREPRENEURIAL ORIENTATION AS A MEDIATOR

Outcome: EO Model Summary						
R	R-sq	MSE	F	df1	df2	p
.7028	.4939	.4248	108.9669	3.0000	335.0000	.0000
Model 1						
	coeff	se	t	p	LLCI	ULCI
constant	-2.6340	1.3130	-2.0062	.0456	-5.2168	-.0513
PL	1.2770	.2434	5.2459	.0000	.7981	1.7558
SG	1.2499	.3373	3.7054	.0002	.5864	1.9134
int_1	-.1824	.0614	-2.9716	.0032	-.3031	-.0617

Product terms key: int_1 PL X SG

Secondly, the result (in Table IV) illustrate that EO has significant relationship with PSI, $\Delta R2 = 0.2555$, $p < 0.001$. In this model, the effect of interaction term of SG and PL on PSI in this test is also significant, $p < 0.001$, and the CI (-.5235, -.2035) does not contains 0. This test continues to reveal some evidences for conditional indirect effect for a mediation model. Hence, *hypothesis 2 was supported; EO predicts PSI*.

TABLE IV
PUBLIC SECTOR INNOVATION AS AN OUT COME

Outcome: PSI Model Summary						
R	R-sq	MSE	F	df1	df2	p
.5055	.2555	.7273	28.6552	4.0000	334.0000	.0000
Model 2						
	coeff	se	t	p	LLCI	ULCI
constant	-5.3025	1.7282	-3.0683	.0023	-8.7021	-
EO	1.9030	.3872	.0715			
PL	5.4169	.0000	.2466	.5279		
SG	1.5264	.3313	4.6071	.0000	.8747	
int_2	2.1781	1.9610	.4503	4.3550	.0000	1.0753
int_2	2.8468	-.3635	.0814	-4.4685	.0000	-.5235

Product terms key: int_2 PL X SG

Thirdly, as shown in (Table V), the boost trapping test revealed a conditional indirect influence of PL on PSI at EO levels. The test result demonstrates that CI do not contain 0 (.1461,.3465;.1162,.3087;.0763,.2870) for the three various levels of EO from low to average to high. As a result, EO's mediating role is critical. *Hypothesis 3 was supported: PL and EO predict PSI.*

TABLE V
DIRECT AND INDIRECT EFFECT

Conditional direct effect(s) of X on Y at values of the moderator(s):						
SG	Effect	SE	t	p	LLCI	ULCI
3.6445	.2015	.0708	2.8481	.0047	.0623	.3407
4.1999	-.0003	.0669	-.0051	.9959	-.1320	.1313
4.7552	-.2022	.0896	-2.2560	.0247	-.3785	-.0259
Conditional indirect effect(s) of X on Y at values of the moderator(s):						
Mediator						
	SG	Effect	Boot SE	BootLLCI	BootULCI	
EO	3.6445	.2371	.0511	.1461	.3465	
EO	4.1999	.1979	.0491	.1162	.3087	
EO	4.7552	.1587	.0528	.0763	.2870	
Values for quantitative moderators are the mean and plus/minus one SD from mean; Values for dichotomous moderators are the two values of the moderator.						
Indirect effect of highest order product:						
Mediator						
	Effect	SE(Boot)	BootLLCI	BootULCI		
EO	-.0706	.0308	-.1420	-.0180		

Fourthly, in Table V, the test revealed the conditional direct influence of PL on EO at GC levels. There is no 0 in the confidence interval (-0.3785, -.0259), showing that the moderating effect of SG is significant. With low leader–employee GG, the test findings showed that the confidence interval (.0623,.3407) did not contain 0, showing that the moderating influence of SG is substantial. Consequently, *hypothesis 4a was supported. GC moderates the relationship between PL and PSI, provided that a high GC boosts the link, but a low GC also enhances it.* Additionally, there is a new evidence that the relationship is negative if the GC level is average, as seen CI (-0.1320,0.1313) contains 0; so, the relationship is not statistically significant.

Finally, the leader–employee GC moderated the mediation impact of EO on the relationship between a leader's PL and an employee's PSI. This can be seen in Table VI as measured by a bootstrap sample of 5,000, CI (-.1420,-.0180) did not have 0. Level of confidence is 95.00 %. Thus, *hypothesis 4b was supported.*

TABLE VI
INDEX OF MODERATED MEDIATION

Mediator	Index	SE(Boot)	BootLLCI	BootULCI
EO	-.0706	.0308	-.1420	-.0180

Notes: Number of bootstrap samples for bias corrected bootstrap confidence intervals: 5000; Level of confidence for all confidence intervals in output: 95.00 %

Overall, the index for moderated mediation (Table VI) support the construct presented in this study, the ICs of that particular index do not have a 0 in it, so it is evident for the indirect effect. A report of the analysis result with the model 8 PROCESS via SPSS can be seen in Fig 2. The plotting graph of the moderated mediation effect on PSI is visualized in Fig 3

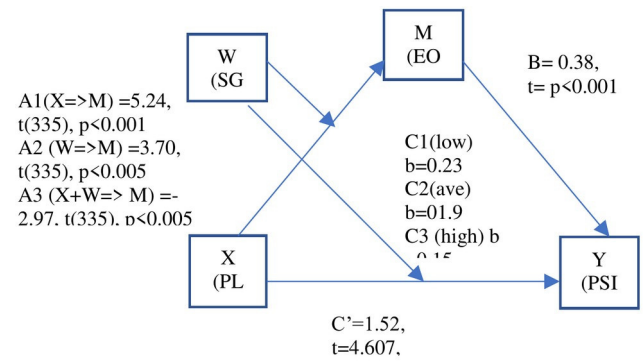


Fig 2: Report the analysis result with the model 8 process

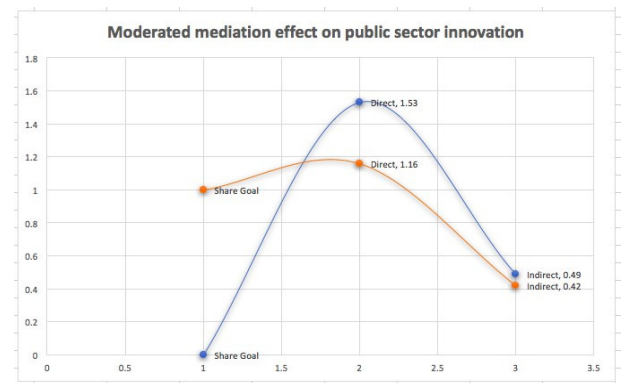


Fig 3: The moderated mediation effect on public sector innovation

VI. DISCUSSION AND CONCLUSION

A. Discussion

While leadership and entrepreneurship are regarded as important variables in determining innovation, the extent to which the constructs are interrelated as well as dependent on the public sector contextual environment is less well known. In response, this study investigates the interaction of public managers' PL and EO with public employees' perceptions of innovation at various levels of GC. The study verified the assumption that PL of managers predicts their entrepreneurial mindset, which leads to staff creativity in public organizations. More precisely, the study discovers that the process of PSI in Vietnam is difficult to achieve without the PL abilities of public managers chosen to promote an entrepreneurial mentality in order to encourage public employees' innovativeness. As a result, the research design gives insights into the backdrop of Vietnam's public sector in the country's rising economy. Previous research has found relationships between leadership and entrepreneurship [82] and leadership and PSI as in [83]. This study confirms the precursor role of paradoxical-entrepreneurial leadership and identifies a new result- *public sector innovation*.

The examination of a moderated mediation model—that links PL, EO, GC and PSI—provides support for a paradoxical perspective, as in advanced e.g. by Zhang and his colleagues, mentioned above in [7]. Thus, the study considers that PL is manifested by the balance influences: control and autonomy, stability and flexibility, and overall vigor in situations of reforming public service. This can be effective no

matter how high the level of organizational GC is. As long as public employees are provided a working environment in which the entrepreneurial activities are applied to obtaining resources, there will be an exploring opportunities for innovation. Additionally, in such context of low GC, the managers are facilitated in seeking to motivate employees to give of their best understanding of GC in support of the leadership and the innovation progress. This study is in line with several research on the relationship between PL and EO e.g. [84], [85], and [86]

The study initially finds that with higher GC, public managers are more likely to rely on their PL skills and more likely to be motivated to build EO for their organizations. As such, the managers end up with enriching employees' way of working, to reform rules and procedures, to create a knowledge sharing environment and to enhance people's work motivation (an integrated framework of PSI). However, this result prompts the assumption that in situations when the GC are ill-defined, paradoxical managers are also more resilient to foster EO in building relationships with their employees for coaching new approaches and work in new ways. This finding reveals that leaders adopt PL styles have a capacity to maintain their entrepreneurial direction even when their organization's goal does not coincide with. In reality, perfect congruence between individual goals and organizational goals does not exist. So, regardless the imperfection, whether GC is high or low, paradoxical leader remain their commitment to PSI by applying entrepreneurship. Nevertheless, in order to test these judgments, further studies are required.

The findings of this study can suggest a solution for governments in developing countries that are prone to the failure in the face of public administration reform [87]. PSI cannot be successful without fully present public leadership. To get there, leadership must become more paradoxical in practice, and public leaders should start adopting NPM as their managerial philosophy that had employed by the private sector. In doing so, public administration has aimed at generating efficiency, reducing costs and achieving effectiveness in service delivery. However, the change from old public administration to NPM, in practice, is not an easy task because it requires public leaders to involve entrepreneur models, to have sufficient aptitude and to face organizational circumstances different from or inconsistent with their existing traditional system [88]. Therefore, the framework of this study can be adopted in such a way that the paradoxical approach in leadership challenges bureaucrats to become entrepreneurs and challenges them to balance dyad organizational elements to create an innovative environment for public employees [89]. At the same time, public employees are also required to endorse public interest by enforcing regulation while they have to take initiatives to meet the need of citizens as customers in the market. Thus, this practice endures paradoxical tensions that need to have the balance between markets and government [90]. Applying this study framework, the public managers can adopt paradoxical behaviors which are considered to strengthen subordinates' proactivity, innovativeness, and risk-taking to achieve organizational goals. Additionally, an EO can be considered as a vital component to assist PSI together with GC, in the long

run, that hold people together and allows public managers to coordinate their efforts and work together for mutual benefits.

B. Conclusion

In the context of Vietnam's rising market economy, this study explored appropriately the relationship between entrepreneurial attitude and PL under the condition of collective GC. Investigating the public sector, the study confirms the impact of PL on PSI through EO as the optimal strategy for public sector innovation. The fact that the results of this study were the same as those of other studies shows how important it is to have both PL skills and an entrepreneurial mindset.

The study also reveals that a sense of PL and organizational GC moderate the public sector's potential to create innovative achievements among individuals involved in the innovation process. The study discovered that entrepreneurial orientation, as evaluated by innovativeness and proactivity, may be the outcome of PL influence on the ambiguity of GC. Thus, paradoxical managers can increase EO by instilling a spirit of innovation and initiative in public personnel. These paradoxical leaders are likely adapted at seeming sincere and trustworthy in order to persuade their followers to support the entrepreneurial orientation. Despite appearing aggressive and able to handle confrontation, they will conform adequately to attain social acceptance.

The study suggests intriguing avenues for future research. In particular, the interrelationships between PL, EO, and GC in relation to their contribution to innovation in the public sector was investigated. Additional research investigating the direction of causality would be requested; and a further qualitative explanatory study would be invited. Moreover, Vietnam's socioeconomic and cultural expectations are the focus of this study, so in this context, the study has highlighted how individuals in public sector exercise PL in social relationships. Extending the study to different geographical cultures (and/or different sectors) and comparing the findings to such differences will definitely yield enlightening results.

The research is restricted to a cross-sectional design with a small sample size; therefore, future research could evaluate the long-term effects of the variable association using a larger sample size from the community in order to boost generalizability. The survey's scope suggests a degree of restriction. On a conceptual level, the analysis of PL is limited to an emphasis on "both autonomy and control" and "both flexibility and stability". On a methodological level, the paper's questionnaire survey approach also has limitations, such as the necessity to substitute a long-term evaluation of GC within groups. In addition, the study relied heavily on replies from public managers and employees, whose views were interpreted as representative of entrepreneurs in general. Thus, the extensive breadth of the study necessitates constraints; and so additional research can be conducted to explain the rationality of the findings.

REFERENCES

- [1] B. Harsanto and H. Roelfsema, "Asian leadership styles, entrepreneurial firm orientation and business performance," *International Journal*

- of *Entrepreneurship and Small Business*, vol. 26, no. 4, pp. 490-499, 2015.
- [2] R.Qu, O. Janssen and K. Shi, (2015). "Transformational leadership and follower creativity: The mediating role of follower relational identification and the moderating role of leader creativity expectations," *The Leadership Quarterly*, vol.26, no.2, pp. 286-299, 2015.
 - [3] S.Widianto and B.Harsanto, "The Impact of Transformational Leadership and Organizational Culture on Firm Performance in Indonesia SMEs," *The Palgrave Handbook of Leadership in Transforming Asia*, pp. 503-517, Springer, 2017.
 - [4] D.Van Dierendonck, L.Rook, "Enhancing innovation and creativity through servant leadership," In *Servant Leadership*, pp. 155-165, Palgrave Macmillan, London, 2010.
 - [5] D.Yoshida, S.Sendjaya, G.Hirst and B. Cooper, "Does servant leadership foster creativity and innovation? A multi-level mediation study of identification and prototypicality," *Journal of Business Research*, vol.67, no.7, pp.1395-1404, 2014.
 - [6] T.Yidong and L. Xinxin, "How ethical leadership influence employees' innovative work behavior: A perspective of intrinsic motivation," *Journal of Business Ethics*, vol.116, no.2, pp.441-455, 2013.
 - [7] A.Waldman, L. Putnam and E. Miron-Spektor, E., & D.Siegel, "The role of paradox theory in decision making and management research" *Organizational Behavior and Human Decision Processes*, no.155, pp.1-6, 2019.
 - [8] Y.Zhang, A.Waldman, Y-L.Han, and B.Li, "Paradoxical leader behaviors in people management: Antecedents and consequences," *Academy of Management Journal*, vol.58, no. 2, pp. 538-566, 2015.
 - [9] S.Raisch, J. Birkinshaw, G. Probst & L.Tushman, "Organizational ambidexterity: Balancing exploitation and exploration for sustained performance," *Organization Science*, vol.20, no.4, pp.685-695, 2009.
 - [10] K.Smith, L.Besharov, L.Wessels and M.Chertok, "A paradoxical leadership model for social entrepreneurs: Challenges, leadership skills, and pedagogical tools for managing social and commercial demands," *Academy of Management Learning & Education*, vol 11, no 3, pp.463-478, 2012.
 - [11] E.Franken, G.Plimmer and S, "Malinen Paradoxical leadership in public sector organisations: Its role in fostering employee resilience," *Australian Journal of Public Administration*, vol.79, no.1, pp, 93-110, 2020
 - [12] Backhaus, L., Reuber, A., Vogel, D., & Vogel, R. (2021). Giving sense about paradoxes: paradoxical leadership in the public sector. *Public Management Review*, 1-21.
 - [13] T. Nguyen, H.Tse, L.Sugianto and S. Sendjaya "Confucian Values and Public Service Motivation: The Mediating Role of Paradoxical Leadership", ISSN: 2187-4735, *The Asian Conference on Asian Studies Official Conference Proceedings*, 2020
 - [14] S.Kraus, M. Breier, P. Jones and M.Hughes. Individual entrepreneurial orientation and intrapreneurship in the public sector. *International Entrepreneurship and Management Journal*, vol.15, no.4, pp.1247-1268, 2019.
 - [15] Y.Kim, "Improving performance in US state governments: Risk-taking, innovativeness, and proactiveness practices," *Public Performance & Management Review*, vol.34, no.1, pp.104-129, 2010.
 - [16] J.Ferreira, A.Coelho and L. Moutinho, "Dynamic capabilities, creativity and innovation capability and their impact on competitive advantage and firm performance: The moderating role of entrepreneurial orientation," *Technovation*, vol.92, 10206, 2020.
 - [17] C.Runyan, B.Ge, B. Dong and L. Swinney, "Entrepreneurial orientation in cross-cultural research: Assessing measurement invariance in the construct," *Entrepreneurship Theory and Practice*, vol.36, no.4, pp.819-836, 2012.
 - [18] A.Caruana, T.Ewing and Ramaseshan, "Effects of some environmental challenges and centralization on the entrepreneurial orientation and performance of public sector entities," *Service Industries Journal*, vol. 22, no.2, pp.43-58, 2002.
 - [19] K.Karyotakis and V. Moustakis, "Organizational factors, organizational culture, job satisfaction and entrepreneurial orientation in public administration," *The European Journal of Applied Economics*, vol.13, no.1, p.47-59, 2016.
 - [20] S.Jung, "Why are goals important in the public sector? Exploring the benefits of goal clarity for reducing turnover intention," *Journal of Public Administration Research and Theory*, vol.24, no.1, pp.209-234, 2014.
 - [21] D.De Clercq, Z.Mohammad Rahman and I.Belausteguigoitia, "Task conflict and employee creativity: The critical roles of learning orientation and goal congruence," *Human Resource Management*, vol.56, no.1, pp. 93-109, 2017.
 - [22] M.Painter, "Public administration reform in Vietnam: problems and prospects," *Public Administration and Development*, vol. 23, no.3, pp. 259-271, 2003.
 - [23] Y.Poon, K.Hung, and T. Do Xuan, "The reform of the civil service system as Viet Nam moves into the middle-income country category," *Reforming public administration in Viet nam*, p.199, 2009.
 - [24] B.Espedal, "Understanding how balancing autonomy and power might occur in leading organizational change," *European Management Journal*, vol.35, no2, pp.155-163, 2017.
 - [25] K.Rosing, M.Frese, A.Bausch, "Explaining the heterogeneity of the leadership-innovation relationship: ambidextrous leadership," *Leadership Quarterly*, vol.22, no.5, pp. 956-974, 2011.
 - [26] T.Hunter, D.Cushenbery, B.Jayne, "Why dual leaders will drive innovation: Resolving the exploration and exploitation dilemma with a conservation of resources solution," *Journal of Organizational Behavior*, vol.38, no.8, pp.1183-1195, 2017.
 - [27] H.Zacher, J.Robinson and K.Rosing, "Ambidextrous leadership and employees' self-reported innovative performance: The role of exploration and exploitation behaviors," *The Journal of Creative Behavior*, vol.50, no.1, pp.24-46, 2016.
 - [28] F.Gerlach, K.Rosing and H.Zacher, "Flexible adaptation of leader behavior: An experimental analysis of the beneficial effect of flexibility in innovation processes" *Journal of Personnel Psychology*, vol.20, no.4, p.198, 2021.
 - [29] Y.Zhang and L. Han, "Paradoxical leader behavior in long-term corporate development: Antecedents and consequences. *Organizational Behavior and Human Decision Processes*, 155, 42-54, 2019.
 - [30] J.Zhang, Y.Zhang and S.Law, "Paradoxical leadership and innovation in work teams: The multilevel mediating role of ambidexterity and leader vision as a boundary condition," *Academy of Management Journal*, (ja), 2021.
 - [31] M.Kan and M.Parry, "Identifying paradox: A grounded theory of leadership in overcoming resistance to change," *The Leadership Quarterly*, vol.15, no.4, pp.467-491, 2004.
 - [32] E.Quinn and S. Cameron, "Paradox and transformation: Toward a theory of change in organization and management," *Ballinger Publishing Co/Harper & Row Publishers*, 1988.
 - [33] B.Luo, S. Zheng, .HJi and L.Liang, "Ambidextrous leadership and TMT-member ambidextrous behavior: the role of TMT behavioral integration and TMT risk propensity. *The International Journal of human resource management*, vol.29, no.2, 338-359, 2018.
 - [34] G.Covin, and P. Slevin, "A conceptual model of entrepreneurship as firm behavior," *Entrepreneurship theory and practice*, vol.16, no.1, pp.7-26, 1991.
 - [35] H.Dickson, T.Solomon and M.Weaver, "Entrepreneurial selection and success: does education matter?". *Journal of small business and enterprise development*, 2008.
 - [36] M.Sarkees and J.Hulland, J, "Innovation and efficiency: It is possible to have it all" *Business horizons*, vol.52, no.1, pp.45-55, 2009.
 - [37] S.Zerbinati and V.Souitaris, "Entrepreneurship in the public sector: a framework of analysis in European local governments," *Entrepreneurship & regional development*, vol.17, no.1, pp.43-64, 2005.
 - [38] B.Denhardt and V.Denhardt, "The new public service: Serving rather than steering," *Public administration review*, vol.60, no.6, pp.549-559, 2000.
 - [39] G.Anggadwita, (2013), "Service innovation in public sector: a case study on PT. Kereta Api Indonesia," *Journal of Social and Development Sciences*, 4(7), 308-315, 2013.
 - [40] S.Chai, J.Hwang and K. Joo, "Transformational leadership and organizational commitment in teams: The mediating roles of shared vision and team-goal commitment" *Performance Improvement Quarterly*, vol.30, no.2, pp.137-158, 2017.
 - [41] D.Bouckennooghe, A. Zafar and U. Raja, "How ethical leadership shapes employees' job performance: The mediating roles of goal congruence and psychological capital," *Journal of Business Ethics*, vol.129, no.2, pp. 251-264, 2015.
 - [42] J.Matanda and O.Ndubisi, "Internal marketing, internal branding, and organisational outcomes: The moderating role of perceived goal congruence," *Journal of Marketing Management*, vol.29, no.9-10, pp.1030-1055, 2013.
 - [43] C.Martins and F.Terblanche. "Building organisational culture that stimulates creativity and innovation," *European journal of innovation management*, 2013.
 - [44] S.Khazanchi, W.Lewis and K.Boyer, "Innovation-supportive culture: The impact of organizational values on process innovation," *Journal of operations management*, vol.25, no.4, pp.871-884, 2007.
 - [45] T.Bland, B. Bruk, D.Kim and T. Lee, "Enhancing public sector innovation: Examining the network-innovation relationship," *The innova-*

- tion journal: *The public sector innovation journal*, vol.15, no.3, pp.1-17, 2010.
- [46] T. Rana, D.Wickramasinghe and E. Bracci, "New development: Integrating risk management in management control systems—lessons for public sector managers," *Public Money & Management*, vol.39, no.2, pp.148-151, 2019.
- [47] S.Swailes, "Goals, creativity and achievement: commitment in contemporary organizations," *Creativity and Innovation Management*, vol.9, no.3, pp.185-194, 2000.
- [48] J.Wiklund and D.Shepherd, "Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses," *Strategic management journal*, 24(13), pp.1307-1314, 2003.
- [49] W.Lewis, C.Andriopoulos and K. Smith, "Paradoxical leadership to enable strategic agility," *California management review*, 56(3), 58-77, 2014.
- [50] A. Schmitt, N.Den Hartog and D.Belschak, "Transformational leadership and proactive work behaviour: A moderated mediation model including work engagement and job strain. *Journal of occupational and organizational psychology*, vol.89, no.3, pp.588-610, 2016.
- [51] J.Bryson, C. Crosby and L.Bloomberg, "Public value governance: Moving beyond traditional public administration and the new public management," *Public administration review*, vol.74, no.4, pp.445-456, 2014.
- [52] D.Nofiani, N.Indarti, S. Lukito-Budi and G.Manik, "The dynamics between balanced and combined ambidextrous strategies: a paradoxical affair about the effect of entrepreneurial orientation on SMEs' performance," *Journal of Entrepreneurship in Emerging Economies*, 2021.
- [53] M. Kodama, "Business innovation through holistic leadership-developing organizational adaptability," *Systems Research and Behavioral Science*, vol.36, no.4, pp.365-394, 2019.
- [54] D.Hjorth, "Chapter 15: Entrepreneurship in public organizations," *In Handbook on Organisational Entrepreneurship*. Cheltenham, UK: Edward Elgar Publishing, 2012.
- [55] W.Barbosa, B. Ladeira, V.de Oliveira, and R. de Sousa, "The effects of internationalization orientation in the sustainable performance of the agri-food industry through environmental collaboration: An emerging economy perspective," *Sustainable Production and Consumption*, vol.31, pp.407-418, 2022.
- [56] L.Kimbell and J. Bailey, "Prototyping and the new spirit of policy-making," *CoDesign*, vol.13, no.3, pp. 214-226, 2017
- [57] A.Caruaana, T.Ewing and Ramaseshan, " Effects of some environmental challenges and centralization on the entrepreneurial orientation and performance of public sector entities," *Service Industries Journal*, vol.22, no.2, pp.43-58, 2002.
- [58] U.Arzubiaga, J.Kotlar, A. De Massis, A. Maseda, and T. Iturralde, " Entrepreneurial orientation and innovation in family SMEs: Unveiling the (actual) impact of the Board of Directors," *Journal of Business Venturing*, vol.33, no.4, pp.455-469, 2018.
- [59] A.Zhang, F.Edgar, A.Geare and C. O'Kane, "The interactive effects of entrepreneurial orientation and capability-based HRM on firm performance: The mediating role of innovation ambidexterity," *Industrial Marketing Management*, vol.59, pp.131-143, 2016.
- [60] G.Klein, T.Mahoney, M. McGahan and N. Pitelis, "Capabilities and strategic entrepreneurship in public organizations. *Strategic Entrepreneurship Journal*, vol.7, no.1, pp.70-91, 2013.
- [61] T.Meynhardt and E. Diefenbach, "What drives entrepreneurial orientation in the public sector? Evidence from Germany's federal labor agency," *Journal of Public Administration Research and Theory*, vol.22, no.4, pp.761-792, 2012.
- [62] C.Cogliser and H.Brigham, "The intersection of leadership and entrepreneurship: Mutual lessons to be learned," *The Leadership Quarterly*, vol.15, no.6, pp.771-799, 2004.
- [63] C.Harrison, I. Omeihe, A.Simba and K. Omeihe, "Leading the way: the entrepreneur or the leader?," *Journal of Small Business & Entrepreneurship*, pp.1-17, 2020.
- [64] A. Alvarez and W. Busenitz, "The entrepreneurship of resource-based theory. *Journal of management*, vol.27, no.6, pp.755-775, 2001.
- [65] M.Wang, J. Zhang, J.He and Y. Bi, "Paradoxical leadership and employee innovation: Organization-based self-esteem and harmonious passion as sequential mediators," *Social Behavior and Personality: an international journal*, vol. 50, no.7, pp. 1-10, 2022.
- [66] R.Bledow, M. Frese, N.Anderson, M. Erez and J. Farr, "A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity," *Industrial and Organizational Psychology*, vol.2, no. 3, pp.305-337, 2009.
- [67] D. Hisrich and A. Al-Dabbagh, "Governpreneurship: Establishing a thriving entrepreneurial spirit in government," *Edward Elgar Publishing*, 2012.
- [68] Y. Liu, S. Xu, B. Zhang, "Thriving at Work: How a Paradox Mindset Influences Innovative Work Behavior," *The Journal of Applied Behavioral Science*, vol. 56, no.3, pp. 347-366, 2020.
- [69] W. Humborstad, G.Nerstad and A. Dysvik, "Empowering leadership, employee goal orientations and work performance: A competing hypothesis approach," *Personnel Review*, 2014.
- [70] H.Kang, T.Solomon and Y.Choi, "CEOs' leadership styles and managers' innovative behaviour: Investigation of intervening effects in an entrepreneurial context," *Journal of Management studies*, vol.52, no.4, pp.531-554, 2015.
- [71] E.Amah and T.Okoisama, "Risk Taking and Survival of Small and Medium Scale Enterprises in Nigeria, " *Archives of Business Research*, vol.5, no.11, 2017.
- [72] D.Chai, J.Hwang and K.Joo, "Transformational leadership and organizational commitment in teams: The mediating roles of shared vision and team-goal commitment," *Performance Improvement Quarterly*, vol.30, no.2, pp.137-158, 2017.
- [73] M.Hoegl and P.Parboteeah, "Team goal commitment in innovative projects," *International Journal of Innovation Management*, vol.10, no.03, pp.299-324, 2006.
- [74] C.Felix, S. Aparicio and D.Urbano, "Leadership as a driver of entrepreneurship: an international exploratory study," *Journal of Small Business and Enterprise Development*, 2018.
- [75] J.Matanda and O. Ndubisi, "Internal marketing, internal branding, and organisational outcomes: The moderating role of perceived goal congruence," *Journal of Marketing Management*, 29(9-10), 1030-1055.
- [76] G.Covin and P. Slevin. "Strategic management of small firms in hostile and benign environments," *Strategic management journal*, vol.10, no.1, pp.75-87, 1989.
- [77] D.VandeWalle, "Development and validation of a work domain goal orientation instrument," *Educational and psychological measurement*, vol.57, no.6, pp.995-1015, 1997.
- [78] H.Asencio and E.Mujkic, "Leadership behaviors and trust in leaders: Evidence from the US federal government," *Public Administration Quarterly*, pp.156-179, 2016.
- [79] F.Hayes, K. Montoya & J.Rockwood, "The analysis of mechanisms and their contingencies: PROCESS versus structural equation modeling," *Australasian Marketing Journal (AMJ)*, vol.25, no.1, pp.76-81, 2017.
- [80] F.Hayes and J.Preacher, "Conditional process modeling: Using structural equation modeling to examine contingent causal processes," *Structural equation modeling: A second course*, IAP Information Age Publishing, pp. 219–266, 2013.
- [81] L.Castro, "Data analytic methods for the analysis of multilevel questions: A comparison of intraclass correlation coefficients, rwg (j), hierarchical linear modeling, within-and between-analysis, and random group resampling," *The Leadership Quarterly*, vol.13, no.1, pp. 69-93, 2022
- [82] E. McElhatton and B. Jackson, "Paradox in harmony: Formulating a Chinese model of leadership," *Leadership*, vol.8, no.4, pp.441-461, 2012.
- [83] F. Damanpour and M. Schneider, "Characteristics of innovation and innovation adoption in public organizations: Assessing the role of managers," *Journal of public administration research and theory*, vol. 19, no.3, pp. 495-522, 2009.
- [84] E.Ingram, M. Lewis, S. Barton and B. Gartner, "Paradoxes and innovation in family firms: The role of paradoxical thinking," *Entrepreneurship Theory and Practice*, vol.40, no.1, pp.161-176, 2016.
- [85] E. Klonek, T. Volery and K.Parker, "Managing the paradox: Individual ambidexterity, paradoxical leadership and multitasking in entrepreneurs across firm life cycle stages," *International Small Business Journal*, vol.39, no.1, pp. 40-63, 2021.
- [86] T. Volery and S.Mueller, "Managing paradoxes and tensions: a key element of entrepreneurs' leadership behaviour. In *Research Handbook on Entrepreneurship and Leadership*, Edward Elgar Publishing, 2018.
- [87] W. Brinkerhoff and M. Brinkerhoff, "Public sector management reform in developing countries: Perspectives beyond NPM orthodoxy," *Public Administration and Development*, 35(4), 222-237, 2015.
- [88] Y.Bangura and A.Larbi, "Public sector reform in developing countries: capacity challenges to improve services," *Basingstoke: Palgrave Macmillan*, 2016.
- [89] B. Sørensen, "Bureaucracy and entrepreneurship: Workplace effects on entrepreneurial entry," *Administrative Science Quarterly*, 52(3), 387-412, 2007.
- [90] M.Sundaramurthy, "Control and collaboration: Paradoxes of governance," *Academy of management review*, vol.28, no.3, pp. 397-415, 2003.

Investigate the relationships leading to green entrepreneurial behaviour: A case study of FPT University Da Nang

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Abstract—The negative environmental impacts of globalization have given birth to the concept of green entrepreneurship, which might still be absent in many courses in higher education. Furthermore, despite its prominent role, intention does not translate into behaviour that makes entrepreneurial activities happen. Therefore, green entrepreneurial behaviour in students plays an essential part in helping develop and enhance green entrepreneurship. This study tries to investigate the factors affecting the green entrepreneurial behaviour of students. An online questionnaire assessing the impact of 5 factors was distributed to 157 students from FPT University Da Nang in Vietnam, who have had experience studying any course related to entrepreneurship in the school. The results show the relations and correlations between five important factors and Green entrepreneurial behaviour. These findings could contribute to the literature relating to Green entrepreneurial behaviour and help educators in making decisions for green entrepreneurial development in higher school.

Index Terms—Green entrepreneurial behaviour, University entrepreneurial support, Green entrepreneurial intention.

I. INTRODUCTION

Because of the globalization trend, organizations are forced to obtain competitive advantages. This has led to many harms to the natural environment, such as environmental pollution, natural resources being unconsciously consumed, and the decrease in biodiversity [1]. Therefore, the demand for green entrepreneurs, the enablers of green entrepreneurship, is expanding since they prioritize 2 aspects of business model: creating more acceptable quality employment with the utilization of environmentally friendly processes, while also moderating the total negative effect on the environment from people or companies using the final product or service [2]. Many higher education institutions have provided courses related to entrepreneurship, but they lack experience in introducing sustainability and environmentally-friendly business topics into the study programmes [3]. Furthermore, despite the fact that most studies mention intention as a notable conterminous predictor of how a person does green activities [2], it does not always lead to actual behaviour to do entrepreneurship related activity [4] [5] [6] [7] [8]. Therefore, the demand for a group of factors that directly affect green entrepreneurial behaviour of students is often a pressing concern. Because of sustainable values are of interest to the FPT student community as well as the school administration [9], but students at FPT still lack knowledge and understanding about green entrepreneurship

during their studies at the school, this study will emphasize the case of FPT University Da Nang, Vietnam to discover the factors affecting green entrepreneurial behaviour of students in higher education.

In this study, from the results of the literature review, the authors propose a model of 5 impacting factors, including University entrepreneurial support, Green entrepreneurial intentions, Commitment to the environment, Entrepreneurial motivation, and Entrepreneurial education to examine how they affect green entrepreneurial behaviour of students in higher education in Da Nang, Vietnam. The remaining structure of the paper continues with literature review to develop the hypotheses and theoretical framework. After that, the research method will be presented with samples, procedure and the related measurements. The results are then presented, followed by an in-depth discussion and observations. Based on the discussion, the final part of the paper identifies limitations and suggests future research directions.

II. LITERATURE REVIEW

A. Resource-Based View Theory

The resource-based view (RBV) expresses the relationships between resources, capabilities, and competitive advantage of the firm [10]. The theory emphasizes the internal resources to progress a competitive advantage, and lack of resources hinders the growth of the firm [11].

This study links the RBV with the green entrepreneurial behaviour, in which the university provides resources to students to the ambitious entrepreneurs. In this study, “University Green Entrepreneurial Support” has been based on the tendency above.

B. Flow Theory

The Flow Theory (FT) is defined as “the state in which people are so intensely involved in an activity that nothing else seems to matter the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” [12]. The theory was originally presented as a tool to understand motivation [13].

Students with environmental-related motivation are keener on to try and initiate a new green business [14]. Flow theory served as the foundation for entrepreneurial motivation in this study.

C. Green entrepreneurship and green entrepreneurial behaviour

This concept is created from the mix of entrepreneurial and environmental terms coined by authors such as Blue and Bennett in the early 1990s [15] [16]. Green entrepreneurship is a recent idea that connects sustainable development and enterprise [17].

Entrepreneurship behaviour is defined as “a combination of ideas, capital, and resources, as well as a creative and empowerment component” [18]. According to Awang et al. green entrepreneurs are viewed as disruptive thinkers capable of saving the sociological landscape from environmental threats [19]. Thus, green entrepreneurship serves not only as a type of business anymore but also as a social engagement that strives to protect and conserve the natural environment [20].

Based on previous literature review, there are five hypotheses proposed in this research. We suggest that the five main factors affecting students' green entrepreneurship behaviour, which are university entrepreneurial support, green entrepreneurial intentions, commitment to the environment, entrepreneurial motivation, entrepreneurial education.

D. University entrepreneurial support and green entrepreneurship behaviour

University entrepreneurial support (UES) is crucial in promoting innovation and entrepreneurial activities since UES can specify the environment and enable the talent that will stimulate an increase in new green ideas. This will also be put to practical use by keeping the deal flow going, which will enable more possibilities for university students to participate in venture capital and help green entrepreneurship firms develop [21].

University entrepreneurship programs, particularly experiential-learning programs, were correlated with students' entrepreneurial behaviour, and hands-on experiential programs are a more effective way for educational institutions to change students' entrepreneurial behaviour and encourage campus venture creation [22]. Universities can contribute to promoting green entrepreneurship behavior among students and economic development through active participation. Thus, this study proposed that:

H1: University entrepreneurial support is correlated to green entrepreneurship behaviour

E. Entrepreneurial intention and green entrepreneurship behaviour

Entrepreneurial intention, according to Hmieleski and Corbett, can be characterized as plans to launch a high-growth business [23]. Entrepreneurship intention has become the focus of entrepreneurship study because it is widely seen as an intentional behaviour [24], and ‘entrepreneurial behaviours are the outcome of intention’ [25] [26]

Researchers have previously used intention-based models to understand the entrepreneurial phenomena better and provide insight into why people participate in entrepreneurial behaviour [24]. This is in agreement with Ajzen theory of planned behaviour (TPB), which uses attitudes, perceived behavioural control (PBC), and subjective norms to explain intentions [27].

According to Bae et al., planned behaviour defines intention as “an individual's preparedness to adopt entrepreneurship conduct as a desire to develop a new business” [28]. Therefore, the following hypothesis will be tested:

H2: Green entrepreneurial intention is correlated to green entrepreneurship behaviour

F. Commitment to environment and green entrepreneurship behaviour

According to the researchers, the new generation is more committed to the safety of the ecosystem [29]. Their commitment motivates them to participate in the economy [30]. Individuals committed to the environment are more motivated to work for the environment's best well-being than their self-interest [31]. Thus, we proposed that:

H3: Commitment to the environment is correlated to green entrepreneurial behaviour

G. Entrepreneurial motivation and green entrepreneurship behaviour

Chang and colleagues define entrepreneurial motivation as an individual's effort directed toward the “entrepreneurship” work goal [32]. Farhangmehr, M et al also agreed that motivation entrepreneurship is to gather individual ideas in entrepreneurship which the future entrepreneurs desire and believe in achieving these goals [33]. Entrepreneurs' motivation motivates them to formulate strategies and engage in entrepreneurial activities that contribute to the development of sustainable businesses [34]. Motivation can change a person's behaviour and encourage them to start a new business as a career option [29]. Therefore, the author hypothesized that:

H4: Entrepreneurial motivation is correlated to green entrepreneurship behaviour

H. Entrepreneurial education and green entrepreneurship behaviour

The area of entrepreneurial education is quite popular and has been a growing subject in higher education around the globe. These days, people are increasingly concerned with start-up programs in universities. Furthermore, Academics and researchers both appreciate the potential benefits of entrepreneurial education [35]. Entrepreneurial education programs are thought to be an effective way of providing potential entrepreneurs with the necessary skills and information [36] [37].

An individual can have access to the skills and knowledge required to establish and expand their own company through education [38]. Entrepreneurship education increases students' entrepreneurial behaviour, as evidenced by correlation relationship between program participation and entrepreneurial engagement [39]

H5: Entrepreneurial education is correlated to green entrepreneurship behaviour.

III. METHODOLOGY

A. Data collection

By a quantitative method, an online survey was distributed to the students who had learnt at least 1 subject related to entrepreneurship at FPT University Da Nang. A question-

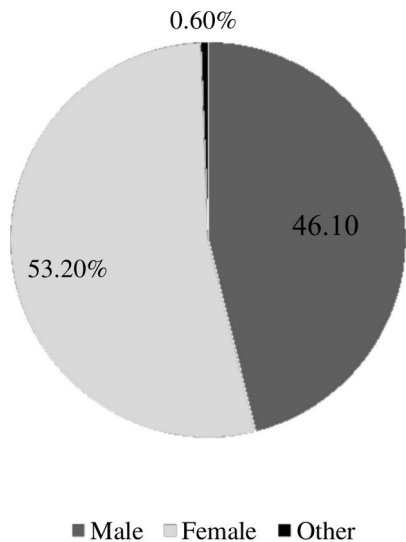


Fig. 1 Gender of Respondents

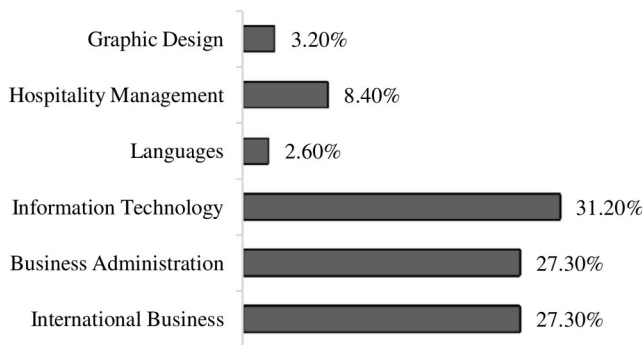


Fig. 2 Major of Respondents

naire survey has two parts, including general information about respondents and five factors affecting Green entrepreneurial behaviour. Additionally, this questionnaire uses a five-point Likert scale that ranges between 1 = “strongly disagree” and 5 = “strongly agree”.

According to Hair and et. al (2014), the minimum sample size to use EFA is 50, and the best-observed ratio is 5:1 [40]. Therefore, the requirement for a minimum sample size is $24 \times 5 = 120$. Overall, 3 respondents were unusable out of a total of 157 collected respondents. Thus, the sample size of 154 respondents was acceptable because there satisfied the above condition.

B. Data analysis

The study uses SPSS to evaluate and discover the most influential factors that impact Green entrepreneurial behaviour. All of the indicators were analysed in this study, even descriptive statistics. Meanwhile, Cronbach Alpha and EFA are used for measuring the scale reliability of independent factors affecting Green entrepreneurial behaviour. Lastly, correlation analysis will help to determine the relations between independent factors and dependent variable.

IV. FINDING

A. Demographic

The demographic result shows that the percentage of gender is pretty much the same, including 46.1 % males and 53.2% females. There is no difference in gender when they intend to do a start-up or become an entrepreneur. In order to collect accurate samples, the students who are in two groups of last year's students will be reached. While the first-year students account for 11.7% and the second-year students have the lowest number, at 10.4%. The propositions of the top 3 majors of FPT University Da Nang campus in this survey are 27.3%, 27.3% and 31.2% respectively. Finally, the ratio of subjects has the exact percentages from 20% to 34%. Fig. 1 and Fig. 2 illustrate detailed information on the student's characteristics.

B. Reliability analysis

Cronbach's alpha values for 6 variables exceed the threshold values, indicating that all 24 items are reliable. From Table 1, Entrepreneurship education (EE) has the highest Cronbach's Alpha rate of 0.918. Green entrepreneurial intentions, University entrepreneurial support, Commitment to environment, Entrepreneurial motivation, and Green Entrepreneurial Behaviour are 0.816; 0.904; 0.861; 0.876, and 0.877, respectively. These variables, therefore, are reliable because all coefficients are greater than 0.70. In addition, the Corrected item-total Correlation index is more than 0.3.

TABLE I
RELIABILITY OF SCALE (CRONBACH ALPHA 0.7)

Factors	Items	Cronbach Alpha
Green entrepreneurial intentions (GEI)	4	0.816
University entrepreneurial support (UES)	4	0.904
Commitment to environment (CE)	4	0.861
Entrepreneurial motivation (EM)	4	0.876
Entrepreneurship education (EE)	4	0.927
Green entrepreneurial behaviour (GEB)	4	0.877

C. EFA analysis

Ximénez (2009) [41] and Hair (2014) [40] stated that any factor loading under 0.5 will be rejected to ensure the quality of the structural model when assessing the EFA. As a result, GEI1 should be removed because of no factor loading.

Thus, this study defines 5 groups of factors, which are presented in Table 2, that influence Green entrepreneurial behavior:

1. *Green entrepreneurial intentions*, GEI is a representative variable for GEI2, GEI3, GEI4.
2. *University entrepreneurial support*, UES1, UES2, UES3, UES4 are represented by variable UES.
3. *Commitment to environment*, CE is a representative variable, including CE1, CE2, CE3, CE4.

4. *Entrepreneurial motivation*, the present variable EM includes EM1, EM2, EM3, EM4.
5. *Entrepreneurship education* includes EE1, EE2, EE3, EE4. The representative variable of this group is EE.

TABLE II
ROTATED COMPONENT MATRIX

	Component				
	1	2	3	4	5
UES2	0.837				
UES 3	0.815				
UES 1	0.772				
UES 4	0.742				
EM 3		0.833			
EM 1		0.814			
EM 4		0.746			
EM 2		0.732			
EE 3			0.799		
EE 2			0.787		
EE 1			0.737		
EE 4			0.666		
CE 3				0.762	
CE 4				0.719	
CE 2				0.649	
CE 1				0.644	
GEI 3					0.871
GEI 4					0.798
GEI 2					0.680

D. Correlation analysis

Table 3 displays the findings of the correlation between the studied variables. University entrepreneurial support (UES) is positively and significantly associated with Green entrepreneurial behaviour (GEB) ($r = .604^{**}$, $\text{sig} \leq 0.05$). Similarly, there is a substantial and positive correlation between entrepreneurial motivation (EM) and green entrepreneurial behaviour (GEB) ($r = .577^{**}$, $\text{sig} \leq 0.05$). Entrepreneurship education (EE) also has a strong positive correlation with Green entrepreneurial behaviour (GEB) ($r = .756^{**}$, $\text{sig} \leq 0.05$). Likewise, Commitment to environment (CE) and Green entrepreneurial intentions (GEI) correlate with Green entrepreneurial behaviour (GEB) respectively ($r = .617^{**}$, $\text{sig} \leq 0.05$) and ($r = .629^{**}$, $\text{sig} \leq 0.05$).

TABLE III
CORRELATIONS TABLE

Variables	UES	EM	EE	CE	GEI	GEB
UES	1					
EM	.335**	1				
EE	.676**	.543**	1			
CE	.541**	.696**	.662**	1		
GEI	.582**	.306**	.570**	.388**	1	
GEB	.604**	.577**	.756**	.617**	.629**	1

** . Correlation is significant at the 0.01 level (2-tailed).

The independent variables, however, are substantially correlated as well because they meet the requirement of sig 0.05.

V. DISCUSSION

The Green entrepreneurial behaviour of university students was chosen as the study's new topic for entrepreneurship education. From previous studies, the factors Green entrepreneurial intentions (GEI), University entrepreneurial support (UES), Commitment to Environment (CE) and Entrepreneurial motivation (EM) are considered a lot in Green entrepreneurial behaviours (GEB). Entrepreneurship education (EE) factor is only an external factor affecting Commitment to Environment (CE) [42]. However, many previous researchers found a positive impact of EE on entrepreneurial behaviour [43-45]. This is considered a potential factor that can affect Green entrepreneurial behaviours. Therefore, this research model has proposed a factor Entrepreneurship education (EE) as a direct factor.

The data are well matched with the proposed original hypotheses. The results of green entrepreneurial intention here is consistent with the works of Yi (2020), with the similar results showed that green entrepreneurial intention and university entrepreneurial support correlated with the degree a person will more likely to engage in green entrepreneurial behaviour [8]. Similarly, Rauch et al. (2015) also confirm that entrepreneurial education and intention are positively related to the entrepreneurial behaviour of students [45]. In terms of the correlation between commitment of environment and green entrepreneurial behaviour, the results of this study match the findings of Hamed et al. (2021) and Ho et al. (2014), where the authors indicate that commitment to the environment is a significant element in building green entrepreneurial behaviour [42,43]. However, there is a conflict in the findings where motivation did not correlate with green entrepreneurial behaviour in the past study of Hameed et al. (2021) [42]. This can be explained where the past findings are concluded in multiple institutions while this study is in only one, which can affect such result. Furthermore, the participants in this study have more opportunities to participate in the workshops, competitions, and project-based learning activities related explicitly to entrepreneurship provided by the school or the local government. In contrast, in

the past study, the student only studied the formal course about entrepreneurship.

VI. CONCLUSION

The purpose of this study is to identify the relations and correlations between 5 important factors on Green entrepreneurial behaviour of students. From that, the educators and schools can base on this research findings to develop their curriculums for green start-ups. The research has synthesized three models of previous authors to develop a proposed research model and two theories, as Resource-Based View and Flow Theory. And 5 factors are collected to develop the proposed research model of Green Entrepreneurial behaviour.

The results from analysis reveal that the dependent variable and the independent variables are positively and strongly correlated. Therefore, all hypotheses are supported in this study. In other words, the educational programs and support from school, with the intention, motivation, commitment with green entrepreneurship have a significant role in develop green entrepreneurial behaviour in students in higher education.

This study has some limitations. The first is affecting factors. The authors just used 5 factors as the predictors of green entrepreneurship behaviour. However, there may be other factors affecting green start-up behaviour. Alternatively, these factors may not directly affect green start-up behaviour but indirectly through an intermediary factor. Therefore, in the future, research papers can develop more influencing factors and exploit the intermediary relationships of these factors to determine the major impact of promoting green start-up behaviour. This leads to the second limitation, where the quantitative research method and the use of the SPSS tool might only help to find the correlations between the 5 important factors on green start-up behaviour. This does not overestimate how meaningful the variables excluded from the model are. Therefore, future research papers might apply linear regression technique to identify what factors has the most influence on the dependent variable and employ other tools such as PLS-Smart (PLS-SEM method) to solve the above problem. On top of that, this study was carried out only among students in FPT University in Danang, Vietnam, which can make the results not be fully generalized in other locations in the world.

Furthermore, although the results in this study do not similar with the findings from the past study, it still provides a strong pillar as a future research direction. Further study is needed to determine the cause-and-effect relationship. Future research direction will be to use regression, which will demonstrate the degree of the independent variable's positive and significant influence on the dependent variable (GEB).

ACKNOWLEDGMENT

The contributions of our colleagues in terms of knowledge and specialization have been valuable in this study. We confirm that there has been no funding received for the research.

REFERENCES

- [1] J. Amankwah and H. Sesen, "On the relation between green entrepreneurship intention and behavior," *Sustainability*, vol. 13, no. 13, p. 7474, 2021.
- [2] D. T. Miller, J. E. Dannals, and J. J. Zlatev, "Behavioral processes in long-lag intervention studies," *Perspectives on psychological science*, vol. 12, no. 3, pp. 454-467, 2017.
- [3] J. C. Allen and S. Malin, "Green entrepreneurship: a method for managing natural resources?," *Society and natural resources*, vol. 21, no. 9, pp. 828-844, 2008.
- [4] C. Li, M. Murad, F. Shahzad, M. A. S. Khan, S. F. Ashraf, and C. S. K. Dogbe, "Entrepreneurial passion to entrepreneurial behavior: Role of entrepreneurial alertness, entrepreneurial self-efficacy and proactive personality," *Frontiers in psychology*, p. 1611, 2020.
- [5] A. T. Nguyen, T. H. H. Do, T. B. T. Vu, K. A. Dang, and H. L. Nguyen, "Factors affecting entrepreneurial intentions among youths in Vietnam," *Children and Youth Services Review*, vol. 99, pp. 186-193, 2019.
- [6] N. Ozaralli and N. K. Rivenburgh, "Entrepreneurial intention: antecedents to entrepreneurial behavior in the USA and Turkey," *Journal of Global Entrepreneurship Research*, vol. 6, no. 1, pp. 1-32, 2016.
- [7] M. Van Gelderen, T. Kautonen, and M. Fink, "From entrepreneurial intentions to actions: Self-control and action-related doubt, fear, and aversion," *Journal of Business Venturing*, vol. 30, no. 5, pp. 655-673, 2015.
- [8] G. Yi, "From green entrepreneurial intentions to green entrepreneurial behaviors: The role of university entrepreneurial support and external institutional support," *International Entrepreneurship and Management Journal*, vol. 17, no. 2, pp. 963-979, 2021.
- [9] T. Anh, "How good is FPT Edu Biz Talent 2021 that makes FPT Edu students nationwide so excited? .". FPT Education. <https://cantho.fpt.edu.vn/fpt-edu-biz-talent-2021-xin-c-nao-ma-khien-hssv-fpt-edu-toan-quoc-xon-xao-den-the>
- [10] S. L. Hart, "A natural-resource-based view of the firm," *Academy of management review*, vol. 20, no. 4, pp. 986-1014, 1995.
- [11] K. Fichter and I. Tiemann, "Factors influencing university support for sustainable entrepreneurship: Insights from explorative case studies," *Journal of Cleaner Production*, vol. 175, pp. 512-524, 2018.
- [12] M. Csikszentmihalyi, "Beyond Boredom and Anxiety," *San Francisco: Jossey-Bass*, vol. 2, no. 3, p. 1, 1975.
- [13] M. Csikszentmihalyi and M. Csikszentmihalyi, *Flow: The psychology of optimal experience*. Harper & Row New York, 1990.
- [14] M. J. Mustafa, E. Hernandez, C. Mahon, and L. K. Chee, "Entrepreneurial intentions of university students in an emerging economy: The influence of university support and proactive personality on students' entrepreneurial intention," *Journal of Entrepreneurship in Emerging Economies*, 2016.
- [15] S. J. Bennett, *Ecopreneuring: The Complete Guide to Small Business Opportunities from the Environmental Revolution*, 1 ed. Wiley (in English), 1991.
- [16] R. J. Blue, *Ecopreneuring: managing for results*. Scott, Foresman, 1990.
- [17] S. Schaltegger and M. Wagner, "Types of sustainable entrepreneurship and conditions for sustainability innovation: from the administration of a technical challenge to the management of an entrepreneurial opportunity," *Sustainable innovation and entrepreneurship*, pp. 27-48, 2008.
- [18] R. Borasi and K. Finnigan, "Entrepreneurial attitudes and behaviors that can help prepare successful change-agents in education," *The New Educator*, vol. 6, no. 1, pp. 1-29, 2010.
- [19] H. Awang and M. Iranmanesh, "Determinants and outcomes of environmental practices in Malaysian construction projects," *Journal of cleaner production*, vol. 156, pp. 345-354, 2017.
- [20] M. Lotfi, A. Yousefi, and S. Jafari, "The effect of emerging green market on green entrepreneurship and sustainable development in knowledge-based companies," *Sustainability*, vol. 10, no. 7, p. 2308, 2018.
- [21] M. Dodgson and D. Gann, *Philanthropy, Innovation and Entrepreneurship* (Springer Books). 2020, pp. 35-64.
- [22] Y.-P. Ho, P.-C. Low, and P.-K. Wong, "Do university entrepreneurship programs influence students' entrepreneurial behavior? An empirical analysis of university students in Singapore," in *Innovative pathways for university entrepreneurship in the 21st Century*: Emerald Group Publishing Limited, 2014.

- [23] K. M. Hmieleski and A. C. Corbett, "Proclivity for improvisation as a predictor of entrepreneurial intentions," *Journal of small business management*, vol. 44, no. 1, pp. 45-63, 2006.
- [24] F. Liñán and A. Fayolle, "A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda," *International Entrepreneurship and Management Journal*, vol. 11, no. 4, pp. 907-933, 2015.
- [25] A. Fayolle, F. Liñán, and J. A. Moriano, "Beyond entrepreneurial intentions: values and motivations in entrepreneurship," *International entrepreneurship and management journal*, vol. 10, no. 4, pp. 679-689, 2014.
- [26] T. Kautonen, I. Hatak, E. Kibler, and T. Wainwright, "Emergence of entrepreneurial behaviour: The role of age-based self-image," *Journal of Economic Psychology*, vol. 50, pp. 41-51, 2015.
- [27] I. Ajzen, "The Theory of Planned Behavior-Organizational Behavior and Human Decision Processes 50," *Ajzen, I.(2002) Perceived Behavioural Control, Self-efficacy, Locus of Control and the Theory of Planned Behaviour. Journal of Applied Social Psychology*, vol. 32, no. 4, pp. 665-683, 1991.
- [28] T. J. Bae, S. Qian, C. Miao, and J. O. Fiet, "The relationship between entrepreneurship education and entrepreneurial intentions: A meta-analytic review," *Entrepreneurship theory and practice*, vol. 38, no. 2, pp. 217-254, 2014.
- [29] M. Z. Alam, S. Kousar, and C. Rehman, "Role of entrepreneurial motivation on entrepreneurial intentions and behaviour: theory of planned behaviour extension on engineering students in Pakistan," *Journal of Global Entrepreneurship Research*, vol. 9, no. 1, pp. 1-20, 2019.
- [30] I. Alcock, "Measuring commitment to environmental sustainability: The development of a valid and reliable measure," *Methodological Innovations Online*, vol. 7, no. 2, pp. 13-26, 2012.
- [31] J. L. Davis, J. D. Green, and A. Reed, "Interdependence with the environment: Commitment, interconnectedness, and environmental behavior," *Journal of environmental psychology*, vol. 29, no. 2, pp. 173-180, 2009.
- [32] J. Chang, F. Sui, H. Hsiao, and P. Chiang, "The important impact factors of entrepreneurial motivation for college students," in *2016 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, 2016: IEEE, pp. 1856-1860.
- [33] M. Farhangmehr, P. Gonçalves, and M. Sarmiento, "Predicting entrepreneurial motivation among university students: The role of entrepreneurship education," *Education+ Training*, 2016.
- [34] C. J. Collins, P. J. Hanges, and E. A. Locke, "The relationship of achievement motivation to entrepreneurial behavior: A meta-analysis," *Human performance*, vol. 17, no. 1, pp. 95-117, 2004.
- [35] S. Karimi, H. J. Biemans, T. Lans, M. Chizari, and M. Mulder, "The impact of entrepreneurship education: A study of Iranian students' entrepreneurial intentions and opportunity identification," *Journal of Small Business Management*, vol. 54, no. 1, pp. 187-209, 2016.
- [36] R. Henderson and M. Robertson, "Who wants to be an entrepreneur? Young adult attitudes to entrepreneurship as a career," *Career development international*, vol. 5, no. 6, pp. 279-287, 2000.
- [37] V. Souitaris, S. Zerbinati, and A. Al-Laham, "Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources," *Journal of Business venturing*, vol. 22, no. 4, pp. 566-591, 2007.
- [38] N. Jwara and M. Hoque, "Entrepreneurial intentions among university students: A case study of Durban University of Technology," *Academy of Entrepreneurship Journal*, vol. 24, no. 3, pp. 1-19, 2018.
- [39] A. Rauch and W. Hulsink, "Putting entrepreneurship education where the intention to act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior," *Academy of management learning & education*, vol. 14, no. 2, pp. 187-204, 2015.
- [40] J. F. Hair, W. Black, B. Babin, R. Anderson, and R. Tatham, "Pearson new international edition: Multivariate data analysis," *Exploratory Data Analysis in Business and Economics*, pp. 23-60, 2014.
- [41] C. Ximénez, "Recovery of weak factor loadings in confirmatory factor analysis under conditions of model misspecification," *Behavior Research Methods*, vol. 41, no. 4, pp. 1038-1052, 2009.
- [42] I. Hameed, U. Zaman, I. Waris, and O. Shafique, "A serial-mediation model to link entrepreneurship education and green entrepreneurial behavior: application of resource-based view and flow theory," *International journal of environmental research and public health*, vol. 18, no. 2, p. 550, 2021.
- [43] Y.-P. Ho, P.-C. Low, and P.-K. Wong, "Do university entrepreneurship programs influence students' entrepreneurial behavior? An empirical analysis of university students in Singapore," in *Innovative pathways for university entrepreneurship in the 21st Century*: Emerald Group Publishing Limited, 2014.
- [44] R. Nyello, N. Kalufya, C. Rengua, M. J. Nsolezi, and C. Ngirwa, "Effect of Entrepreneurship Education on the Entrepreneurial Behaviour: The Case of Graduates in the Higher Learning Institutions in Tanzania," *Asian Journal of Business Management*, vol. 7, no. 2, pp. 37-42, 2015.
- [45] A. Rauch and W. Hulsink, "Putting entrepreneurship education where the intention to act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior," *Academy of management learning & education*, vol. 14, no. 2, pp. 187-204, 2015.

Factor Affecting Consumer's Willingness of Purchasing Medication Online

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Abstract—Vietnam's pharmaceutical industry is one of the fastest-growing sectors in the region. E-pharmacy in Vietnam is predicted to undergo remarkable growth in the near future due to the demand for online shopping, which has been accelerated by the impact of the COVID-19 pandemic [1]. However, in Vietnam, merely 3% of purchases were made via online platforms [2], [3] affirmed purchase intentions continue to be a vital concept in marketing.

Based on the background, the research aims to assist the Swinburne undergraduate student team in investigating the correlation between factors that affect people from purchasing pharmacies online and using e-pharmacy. The research method is a survey, which aids in the collection of critical data that may be utilized to address the research objectives and reveal diverse opinions among consumers and university members. The data is collected from 83 respondents, aged 18 and up, living in cities, rural, and suburban. Not only univariate and bivariate approaches but also analysis and multiple regression analysis can be used to will be used to assess the correlations and contrasts throughout the original dataset. Swinburne Pharmacy also utilized age and sex quantifiable extrapolation to estimate whether or not consumers entered an e-pharmacy.

Regarding the result, the research has shown that the factor of convenience has positively affected the eagerness to buy medicine online, while other values do not predict the willingness to buy medication online. However, it is not a significant element of the consumers' willingness. The research also determines the correlation between consumers' willingness and location. From a managerial perspective, pharmaceutical marketing managers of drug companies can use the research findings to better design their strategies directed at the e-pharmacy market.

Index Terms—Online medication, Customers' purchase willingness, Covid 19 pandemic.

I. INTRODUCTION

There have been countless studies that concur on the significant benefits of market research on the development of successful marketing programs and overall success in the field. [4] have discussed the necessity of market research and its involvement in the goal-achieving process. Other studies have bridged the gap between market research, brand awareness, and positive customer attitude and behavior [5] [6]. Therefore, the study of [7] mentioned that technological advancement, especially the internet, had a significant effect

on changes in consumer behavior and mindset; it enables a firm to discover its potential customers, their awareness of the products offered, and other key behavioral insights that dictate future purchase intention [8].

Businesses should be able to identify the markets where they will operate, manufacture goods that meet their target markets, and set the price at which they will make their offer [9]. The importance of this study stretches further as the dynamics between market problems become more complex with a myriad of its moving parts integrating and influencing each other more extensively than ever before [10]. Because of this development, succinct and well-developed research methods will go a long way in producing a deeper understanding of the customer.

Throughout our research, the pharmaceutical industry is considered to lack clear and compact analysis and studies on market research, customer surveys, and how to effectively create organizational values from the data collected. As this sector is more "niche" compared to other consumer products on the market, fewer quality studies on the topic are found. For industries that are less experienced in terms of market research, it is certainly harder to curate a successful and efficient market survey [11].

For the pharmaceutical industry, the population's well-being, the pharmaceutical business's product portfolio, and drug costs are a few of the variables that affect how the sector develops [12]. However, in this study, we paid particular attention to how data from marketing research can be implemented to improve pharma companies' overall market performances. The significance of understanding client demands is not only a great indicator for developing new marketing campaigns and increasing the firm's financial performance but also enhances consumers' well-being through clearer and more effective communication means via marketing and advertising.

In Vietnam, although the overall statistics illustrate a potential growth and expansion of the pharmaceutical industry in the future with e-pharmacy due to COVID-19, there is still a limited number of consumers purchasing pharmacies online consumers. Based on the review of the context and previous studies, the research is conducted by the Swinburne undergraduate student team in investigating the association between factors that affect customers from purchasing pharmacies online and utilizing e-pharmacy.

II. THEORETICAL BACKGROUND

The study's purpose is to identify the determinants of online pharmacy adoption in post-pandemic in Vietnamese market. The chosen factors are unreliable quality, convenience, and the fear of Covid-19 pandemic. These determinants are generated based on certain research and prevalent existence in Vietnamese online market.

A. Unreliable quality

Trust is the cornerstone of a company's reputation which has a great positive influence on their perception of the product's quality [13]. The reliability of the product and consuming platforms refers to consumer trust in product information and promotion through various information channels [14]. Third-party judgements, such as information from forums, websites, and search engines, are frequently used to assess the credibility of online sales tools [14]. Product hazards exist in online purchasing, particularly for newcomers or amateurs, because customers are unable to inspect and evaluate product quality prior to making a purchase [15]. According to Ryland, merely 3% of pharmacy products are purchased online as the fear of counterfeit products. In Vietnam, studies into the relationship between unreliable quality of the product and e-commerce platforms have been conducted in two biggest cities: Ha Noi and Ho Chi Minh city. The study considers elements including reliability on the website, social media and forums, advertisement in newspapers and social media platforms, and consumer reference [16].

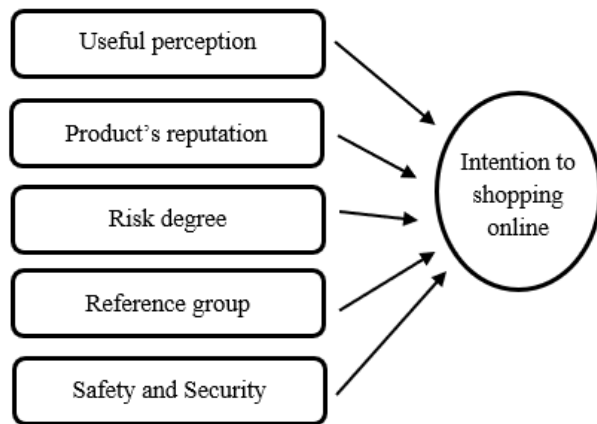


Fig.1 Research model of factors affecting online shopping intention of consumers in Ho Chi Minh City during the Covid-19 pandemic

In another research, channel trust which related to the long-term relationship with customers proposed a positive impact on customers' willingness. The research is presented based on the Bayesian network model (Fig.2). Thus, it can be concluded that unreliability negatively affects the willingness to purchase medication online.

Hypothesis 1: Unreliable quality of pharmacy products and purchasing platforms negatively affect the willingness to purchase pharmacy products online.

B. The convenience

Convenience concepts of time savings, accessibility, availability, simplicity, affordably decreased purchase anxi-

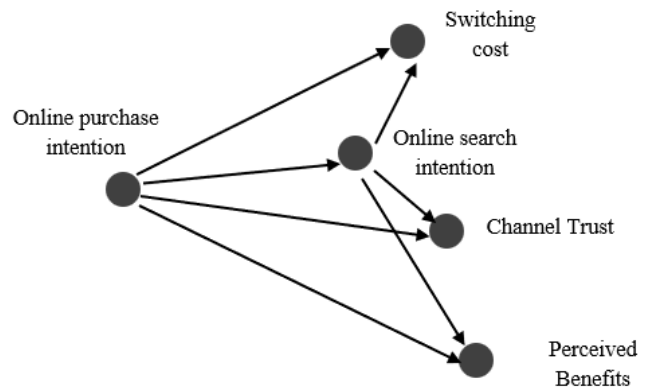


Fig. 2 Bayesian network model of consumers' willingness to make decision of purchasing medication online.

ety, and shopping engagement are all part of the handy notion [17]. Convenience is considered a key element for an online pharmacy to succeed as benefits both business operations and customers' value [18] (Convenience). One study cites the benefits of using an online pharmacy for its privacy and convenience, with the majority of surveyed respondents using this service for convenience and discounts [19]. In another survey by Tunsakul, a similar relationship is found in the Gen Z group [18] for general product categories. Likewise, in an Asian country study from Saudi Arabia, convenience has a positive impact on the willingness to purchase online [18]. Hence, convenience positively influences the willingness to purchase online medications. However, in the Vietnam context, further research into the relationship between Convenience and the willingness to buy pharmacy products online is needed.

Hypothesis 2: Convenience positively affects the willingness to purchase pharmacy products online.

C. Fear of the Covid-19 pandemic

The fear of the Covid-19 pandemic is believed to positively affect the intention of purchasing medications via the Internet in China [20]. In Viet Nam, there was a surge in pharmacy demand due to the Covid-19 pandemic [21].

The findings indicate that Covid-19 moderates consumer utility awareness, which promotes consumers to purchase online. While this was going on, contrary to the earlier study, the Covid-19 epidemic did not materially affect the internet commerce during that time. Despite this contradicting study, the conflict does not hinder the positive correlation between Covid-19 and online shopping behavior, due to the sheer amount of evidence supporting the latter [22]. Recently, research 2021 of the Vietnamese pharmacy market indicated that the fear of the Covid-19 pandemic favorably links with more frequent online buying for medical products [17].

Other indirect correlations to the relationship between COVID-19 fears and our research goals include Fear of COVID and vaccine uptake [23]; and Self-medication during the COVID-19 pandemic [24] [25] [26] did not study the direct effects of COVID-19 on the online shopping behaviors of medicine users, providing the research with numerous pieces of evidence suggesting that medication purchases increased significantly during the recent pandemic only.

Hypothesis 3: Fear of the Covid-19 pandemic positively affects the willingness to purchase pharmacy products online.

From the factors analysis above, the proposed model is generated in Fig.3 below.

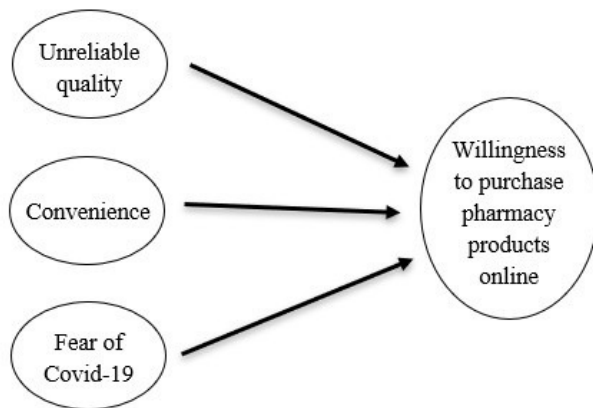


Fig. 3 Proposed research model

III. METHODOLOGY

A. Research context

Vietnam's pharmaceutical industry is one of the fastest-growing sectors in the region. In 2016, the industry was worth USD\$ 3.3 billion which significantly rose by USD\$ 1.3 billion after 4 years [2]. In 2026, this number is predicted to reach USD\$16.1 million [27]. According to [28], the industry observes a 2% growth per year which means a compound annual growth rate (CAGR) of 6% between 2018-2020. Around 250 manufacturing plants, 200 import-export facilities, 4,300 wholesale agents, and over 62,000 retail agents have been added to the pharmaceutical production and commercial system [27]. The statistics illustrate the potential growth and expansion of Vietnam's pharmaceutical industry in the future.

E-pharmacy in Vietnam is predicted to undergo remarkable growth in the near future. In 2017, the value of the E-pharmacy market of the nation accounts for USD\$72.06 million. The industry is forecasted to see a CAGR of 22.85% during the period 2023-2027 due to the demand for online shopping which has been accelerated by the impact of the COVID-19 pandemic [1]. However, in Vietnam, merely 3% of purchases are made via online platforms [2]. The major contribution of pharmacy products is from hospitals, accounting for 73% and the remaining belongs to retail stores. Currently, a number of major pharmacies are operating online purchase platforms, including Pharmacy, Medicare... However, this number is insignificant and not common in this specific market which may create opportunities for this industry to expand in the near future.

B. Data collection

The purpose of the research is to assist Swinburne Pharmacy in determining whether there is any correlation between limitations that negatively affect people from buying pharmacy online and people using e-pharmacy. Surveying, a kind of research methodology, aids in the collection of critical data that was created with Google Forms and distributed

via social media. The survey method would be random, toward Vietnamese people aged above 18, living in two big cities (Hanoi and Ho Chi Minh city). Before the questionnaire, the purpose of the survey, the definition of online pharmacy, confidential policy, instruction, and other points will be written in detail in the opening of the survey. There were two parts to the survey: the online pharmacy questionnaire and the general information. In the first part, the Likert scale was used to evaluate the intention to use an online pharmacy. The second part consists of basic information about the respondents. 93 people agree to participate; however, only eligible 83 responses were used in the study. SPSS 26.0 was used to statistically evaluate the sample data. The descriptive statistic includes demographic factors such as age, gender, monthly disposable income, education level, and frequency usage of online pharmacies.

C. Measurement

This research paper concludes with full reference to both domestic and international studies. Each latent variable was made up of 3 to 4 measurement items with a five-point Likert scale for each questionnaire. Survey respondents were asked to articulate their feeling expressing through the scale. The nominal option is Highly disagreeing – Highly agree, Uncertainty – Certainty. Multiple statistical methods were utilized to analyze the data including correlation analysis, regression analysis, and reliability test. These techniques are frequently used to explain the causal relationship between independent and dependent variables in the fields of behavioral science and technology adoption. The primary statistical tools used in this study to assess the validity and relationships between variables are SPSS 26.0 and Microsoft Excel.

IV. RESULT

A. Reliability and Validity

The survey was conducted based on the number of consumers used to purchase medication online. Cronbach's Alpha coefficient indicated the variables utilized for evaluation are reliable and consistent. Table 2 shows that the lowest level is 0.783 (UQ) and the highest level is 0.804 (Fear of Covid-19). Cronbach's alpha values for all scales are greater than 0.65, indicating that the variables are reliable. Notably, the data for FC is more than 0.8 which is greatly reliable. Cronbach Alpha is accepted to run correlation analysis as the variables >0.6. In addition, a correlational test was performed. As correlation is the initial condition for regression, Pearson correlation is used to test the linear correlation between the dependent and independent variables. A correlational study shows that the Convenience variable has substantial correlational values (0.007), whilst the others do not.

B. Hypotheses development

The regression studies were carried out once the reliability test was established. Regression analysis supports researchers in finding the impact between independent and dependent variables from linear analysis. From the analysis's result, the proposed model can be concluded. Table 5 clearly shows the outcomes and only one proposed hypothesis is supported. From the results of table 5, it is clearly seen that

TABLE 1
MEASUREMENT INSTRUMENT

Latent Variables	Measurement Items	Sources
Intention to purchase online	<ul style="list-style-type: none"> - I have strong intentions to purchase online medication. - I will buy medicines from online pharmacies in the future. - I would like to recommend to the people around me to purchase medicine online. 	[29]
Convenience	<ul style="list-style-type: none"> - Avoiding crowds. - Finding exactly what I want in the least amount of time. - Online medication channels are trustworthy. - Other consumers' evaluations of the product are reliable. 	[30] , [31], [32]
Unreliable quality	<ul style="list-style-type: none"> - I would find it very difficult to evaluate the characteristics of the products accurately. - I would be concerned that the product would not provide the level of benefits advertised on the Web. - There would be many possibilities that the product would not perform as it is supposed to. - Illegal Internet pharmacies may sell prescription medications without a valid prescription 	[33], [30]
Fear of Covid-19 pandemic	<ul style="list-style-type: none"> - Within the social distancing period, the danger of infection from the public is high - Within the social distancing period, going to shops increases the risk of infection significantly 	[34]

convenience has positively affected the eagerness to buy medicine online while other values do not predict the willingness to buy medication online. Also, although willingness is supported by convenience, the value has a very weak coefficient. This means that convenience is not a significant element of the consumers' willingness.

V. DISCUSSION

Three variables were examined in the research, which includes: (1) Unreliable quality, (2) Convenience, and (3) Fear of COVID-19. This section will be dedicated to discussing the results found from the survey in comparison to the hypotheses made earlier.

The base hypothesis of variable (1): Unreliable Quality is that it negatively affects customers' willingness in online medicine purchases. However, the results showed that the data is irrelevant to the hypothesis. Unreliability in drug quality is shown to have no effect on consumers' willingness to purchase. This may not be because people are not aware or do not have any concerns about the origin and the quality of the medicines they purchased, but maybe other factors are interfering with their decision-making process.

40-60% of Vietnamese depend on self-medication. These people are twice as likely to purchase antibiotics [35]. Overall, the awareness of prescription drugs and antibiotic resistance of Vietnamese people is low [36], [37]. However, there is a contradiction between the two studies. While they both agree that Vietnam has low overall awareness of prescription drugs & negative effects of inappropriate usage, [37] pointed out that the awareness level improves significantly with a rise in factors like education level and income. Meanwhile, [36] pointed out that antibiotic usage without

prescription almost doubled in urban areas compared to rural areas (50% and 28% respectively). If the figures in these studies are valid, we can clearly see that though correlated, awareness of the negative effects of inappropriate drug use and actual inappropriate drug usage is not causal. This means, though people are aware of possible side effects, other factors like conveniences and low access to formal public healthcare still nudge Vietnamese people toward self-treatment and description-less-medicine use. Similarly, consumers may not be completely aware of the risks and potential dangers involved with ordering medications online and may not be able to tell the difference between legitimate and unauthorized medicines (4). The same study in Hungary reported that 82.8% of patients surveyed (out of 422 patients) are unaware of the quality of the medicines and supplements bought (4). Because the source and quality of illegal and counterfeit medications are unknown, and because patients frequently use these products without the knowledge or supervision of doctors or pharmacists, they constitute a severe threat to the public's health.

A. Convenience

The Convenience variable (2) positively affects the willingness to purchase pharmaceutical products online in spite of the very weak coefficient, which has been shown in the result of table 3. Another study has also shown that the higher the convenience level, the higher willingness to purchase a product online (Farida 2016). Adding to the result, a study from SmartInsights (2020) states that with so much variety both online and on the high street, customers are seeking something unique to differentiate companies. With 83 percent of customers reporting that convenience is more essential now than it was five years ago, convenience might

be the answer. However, further research is required to analyze the affection of convenience on the willingness to buy medicine online. The reason is that retail pharmacy is a potential sector to grow that indirectly aligns with online medication purchases. In 2016, there were 185 contemporary pharmacy chains represented among Vietnam's 55,300 drug outlets, according to market research firm IQVIA. The overall number of drugstores fell to 44,600 in 2021, while the 1,600 contemporary pharmacy chain outlets saw an uptick. This number is predicted to continuously grow in the future and align with e-pharmacy as a business operation development. Hence, consumers might value the convenience that comes from retail stores more than online ones as the distribution of retail stores is widely distributed. Therefore, the weak coefficient of convenience has been reasoned.

B. Fear of COVID-19

The eventual hypothesis (3): Fear of COVID-19 is concluded to be irrelevant to the willingness of purchasing medication online. The result is different from the hypothesis due to the period of executing the survey. The survey is being executed in May 2022. This is when the nation has loosened its restrictions on social distancing since April 2022 when the fear of Covid-19 might be decreased. Meanwhile, research from the hypothesis developed in 2021 can be less relevant to the current situation in 2022. Therefore, the irrelevant result is justified by the period of survey execution.

It is important to note that although the variable for "Fear of COVID" is irrelevant to the presented hypothesis, the e-pharmacy industry has been absolutely lending important services while the world has been in mourning over the mortality danger posed by the coronavirus pandemic in the last few years. They have emerged as one of the primary beneficiaries during Vietnam's lockdown time. People are increasingly using internet pharmacies to get prescriptions due to the lockdown, travel restrictions, and concern over virus transmission. This means that the Covid-19 pandemic has had a favorable effect on the expansion of online pharmacies both in Vietnam and throughout the world [38].

C. Contribution of this research

The current study adds to those previous studies that the willingness of purchasing medications online is impacted by several factors including convenience value. There are not many research articles that use e-pharmacy as a track to complete a comprehensive research report because the issue of this study is relatively new in the Vietnam environment. This is due to the study on internet shopping that we identified in the research paper market. Our empirical analysis can thus partly serve as a starting point for future studies into the process of ordering items from an online pharmacy.

These outcomes, particularly for pharmaceutical companies, can use this data to keep up with client needs and demands. The proper information is essential for marketers to implement the most effective strategies.

D. Limitations and suggestions for further research

Due to the limited number of responses received from the survey, which causes certain biases when assessing the variables, this research tends to be qualitative in nature. Consequently, the results for the coefficient and correlation test are

different compared to another relevant research. Besides, there is a significant age gap in the data set for the responders. As the majority of the respondents were under 30, the research's findings might not be adequate to look at further client segments. In addition, the context of this research is the Vietnamese market, which results in differences in market status, and demographic and economic factors when compared with other countries. For future research, it is suggested to focus on both qualitative and quantitative research so that the results will be sufficient and validated to be analyzed. Moreover, more demographic, technological, and economic factors should be involved in the research for further understanding of the customer's behavior as well as the market prospect.

VI. CONCLUSION

The flourishing of e-Commerce and the pharmaceutical business in Vietnam are both contributing to the sector's rapid growth. As a result, future success for e-pharmacy is anticipated. To determine the factors that will determine the future performance of e-pharmacies, further study must be done.

The research supports the hypothesis: Convenience positively affects the willingness to purchase pharmacy products online. Despite a weak result in the coefficient test, convenience is a critical factor in determining the propensity to acquire e-pharmaceutical items. However, there are other factors that, while not being confirmed by our research, have been found in previous studies reflecting the variations in market status between countries.

In terms of contribution, this study satisfies the constraints and offers a wealth of secondary data outlining the variables affecting users of e-pharmacies. In order to obtain sufficient data to assess and improve the quality of the study, it is also important to identify the effects of convenience using larger participant groups, such as those based on age, geography, and income.

This research was conducted by a Swinburne undergraduate student team to identify the factors affecting the willingness of purchase intention; further research is needed to be conducted in order to support marketing and advertising. With the assistance of technological innovation, clients may purchase medications more easily and spend less time traveling. While based on the convenience factor, pharmacy stores should consider assisting online 24/24 hour and on-time delivery.

ACKNOWLEDGMENT

Our team would like to express my sincere gratitude to the Chair, organizers of ICRMAT2023, supervisors, other academics, and Swinburne university for their invaluable support in the completion of this research paper. Without the help, this project would not have been possible. The feedback and support provided by the organization have been instrumental in shaping my research and guiding my work. The guidance and mentorship provided by the conference advisors have been incredibly insightful and invaluable. We are deeply grateful for the entire support at ICRMAT2023.

REFERENCES

- [1] R. a. Markets, "Vietnam E Pharmacy Market, By Product Type (Prescription Medicines v/s Over-The-Counter Medicines), By Therapy Area (Vitamins, Dermatology, Cold & Flu, Weight Loss, Others), By Operating Platform (Websites v/s Apps), By Region, Competition Forecast & Oppo," Research and Markets, Vietnam, 2022.
- [2] A. Ryland, "Retail Pharmacy in Vietnam & Introduction to Pharmacy," Pharmacy, Vietnam, 2020.
- [3] D. G. Morrison, "Purchase Intentions and Purchase Behavior," *Journal of Marketing*, vol. 43, pp. 65-74, Spring 1979.
- [4] A. O. a. M. S. A. H. Hamza Ali Al-Shatanawi, "The Importance of Market Research in Implementing Marketing Programs," *International Journal of Academic Research in Economics and Management Sciences*, vol. 3, no. 2, pp. 150-159, 2014.
- [5] R. H. a. E. Sarigöllü, "How Brand Awareness Relates to Market Outcome, Brand Equity, and the Marketing Mix," *Fashion Branding and Consumer Behaviors*, pp. 113-132, 2014.
- [6] M. Seturi, "Brand Awareness And Success In The Market," *Journal of International Scientific Publication*, vol. 11, pp. 424-432, 2017.
- [7] R. A. Fitri and R. Wulandari, "Online Purchase Intention Factors in Indonesian Millennial," *International Review of Management and Marketing*, vol. 10, no. 3, pp. 122-127, 2020.
- [8] C. V. d. B. a. Y. V. Joshi, "New Product Diffusion with Influentials and Imitators," *Marketing Science*, vol. 26, no. 3, pp. 400-421, 2007.
- [9] J. Majerová, "Comprehensive Proposal of Activities of Product Brand Policy in Conditions Specific to Slovak Republic," 2nd International Conference on Economics and Social Science, pp. 3-8, 2014.
- [10] R. K. C. a. D. S. A. Gerard J. Tellis, "In Search of Diversity: The Record of Major Marketing Journals," *Journal of Marketing Research*, vol. 36, no. 1, pp. 120-131, 1999.
- [11] S. Hart, "The Use of the Survey in Industrial Market Research," *Journal of Marketing Management*, vol. 3, no. 1, pp. 25-38, 2010.
- [12] L. Š. M. R. Gabriela Masárová, "The Necessity of Obtaining Information Through Marketing Research in the Field of Pharmaceutical Companies on the Slovak Market," *Procedia Economics and Finance*, vol. 23, pp. 1480-1484, 2015.
- [13] 3. Contributor, "The Relationship Between Reputation, Trust and Sustainable Business," *Triple Pundit*, 2011.
- [14] J. L. B. G. C. S. R. C. Matthew Tingchi Liu, "Perceived benefits, perceived risk, and trust," *Asia Pacific Journal of Marketing and Logistics*, vol. 25, no. 2, pp. 225-248, 2013.
- [15] J. C. L. H. C. Chin-Lung Hsu, "The effects of blogger recommendations on customers' online shopping intentions," *Internet Research*, vol. 23, no. 1, pp. 69-88, 2013.
- [16] N. & N. T. Nguyen, "Các Nhân Tố Ảnh Hưởng Tới Hành Vi Mua Thực Phẩm Tươi Qua Internet: Nghiên Cứu Thực Nghiệm Từ Thị Trường Hà Nội," *Foreign Trade Universit*, 2017.
- [17] B. U. Meher Neger, "Factors Affecting Consumers' Internet Shopping Behavior," *Chinese Business Review*, vol. 19, no. 3, pp. 91-104, 2020.
- [18] A. E. E. S. Sarah S. Al Hamli, "Factors Influencing Consumer Behavior towards Online Shopping in Saudi Arabia Amid COVID-19: Implications for E-Businesses Post Pandemic," *Business Performance*, vol. 16, no. 1, 2022.
- [19] S. Gupta, "Consumer Buying Behavior towards E-Pharmacy," *Dogo Rangang Research Journal*, vol. 10, no. 2347-7180, 2020.
- [20] C.-K. S. Y.-C. C. a. S.-Y. Y. Cheng Liu, "The Impact of the Fear of COVID-19 on Purchase Behavior of Dietary Supplements: Integration of the Theory of Planned Behavior and the Protection Motivation Theory," *Sustainability* 2021, pp. 1-17, 2021.
- [21] Q. Nguyen, "Fear of Post-Covid Syndrome Send People on Drug Buying Speer," *VnExpress*, Hanoi, 2022.
- [22] V. D. T. & H. L. Pham, "A Study on the COVID-19 Awareness Affecting the Consumer Perceived Benefits of Online Shopping in Vietnam," *Cogent Business & Management*, vol. 7, no. 1, 2020.
- [23] M. S. D. B. U. W. S. G. A. S. H. K. A. J. H. M. A. M. F. A. K. A. O. B. I. & K. P. Chutiya, "Are Fear of COVID-19 and Vaccine Hesitancy Associated with COVID-19 Vaccine Uptake? a Population-Based Online Survey in Nigeria," *Vaccines*, vol. 10, no. 8, p. 1271, 2022.
- [24] K. N. S. A. H. L. Q.-A. H. A. R. A. R. A. & S. Z. Rafiq, "Self-Medication in the COVID-19 Pandemic: Survival of the Fittest," *Disaster Medicine and Public Health Preparedness*, pp. 1-5, 2021.
- [25] I. H. M. A. R. S. B. R. M. S. M. & S. M. Ahmed, "Behavioral Preventive Measures and the Use of Medicines and Herbal Products among the Public in Response to Covid-19 in Bangladesh: a cross-sectional study," *PLOS ONE*, vol. 15, no. 12, p. e0243706.
- [26] M. B. R. N. M. & P. M. Makowska, "Self-Medication-Related Behaviors and Poland's COVID-19 Lockdown," *International Journal of Environmental Research and Public Health*, vol. 17, no. 22, p. 8344, 2020.
- [27] T. & S. P. Nguyen, "Vietnam's Growing Pharmaceutical Industry," *Vietnam Briefing*, 2022.
- [28] IQVIA, "IQVIA™ Market Prognosis 2017-2021," IQVIA, 2018.
- [29] G. S. V. B. Jared M. Hansen, "Risk, Trust, and the Interaction of Perceived Ease of Use and Behavioral Control in Predicting Consumers' Use of Social Media for Transactions," *Computers in Human Behavior*, pp. 197-206, 2017.
- [30] E. Y. Ö. M. & A. Ü. D. Yaraş, "Factors affecting consumers' intention to purchase online," *Journal of Internet Applications and Management*, vol. 8, no. 2, pp. 63-74, 2017.
- [31] G.-W. B. Huei-Huang Kuan, "Trust transference in brick and click retailers: An investigation of the before-online-visit phase," *Information & Management*, vol. 44, no. 2, pp. 175-187, 2007.
- [32] S. M. J. a. M. J. R. John B Hertig, "Evaluation of pharmacists' awareness of illegal online pharmacies and perceived impact on safe access to medicines," *The Journal of Medicine Access*.
- [33] J. A. a. B. N. T. Minh Hieu Nguyen, "Factors Affecting the Growth of E-Shopping over the COVID-19 Era in Hanoi, Vietnam," *The Evolution of Consumer Behavior in the Sustainable Business: Evidence from COVID-19*, 2021.
- [34] S. W. a. T. U. Junko Okumura, "Drug utilisation and self-medication in rural communities in Vietnam," *Social Science & Medicine*, vol. 54, no. 12, pp. 1875-1886, 2002.
- [35] N. T. K. C. N. P. H. N. Q. H. N. T. T. N. H. T. L. T. K. T. H. D. P. P. H. N. V. Y. N. V. K. & H. F. W. Do Thi Thuy Nga, "Antibiotic sales in rural and urban pharmacies in northern Vietnam: an observational study," *BMC Pharmacology and Toxicology*, 2014.
- [36] A. M. T. N. a. H. S. T. N. Thuy Van Ha, "Public Awareness about Antibiotic Use and Resistance among Residents in Highland Areas of Vietnam," *BioMed Research International*, vol. 2019, 2019.
- [37] T. Research, "Vietnam E Pharmacy Market By Product Type (Prescription Medicines v/s Over-The-Counter Medicines), By Therapy Area (Vitamins, Dermatology, Cold & Flu, Weight Loss, Others), By Operating Platform (Websites v/s Apps), By Region, Competition Forecast & Oppor," 2022.
- [38] C. V. d. B. a. Y. V. Joshi, "New Product Diffusion with Influentials and Imitators," *Marketing Science*, 2007.

APPENDIX

TABLE 2
CRONBACH ALPHA STATISTIC OF VARIABLES

Factors	N of items	Cronbach's Alpha
Unreliable quality (UQ)	5	.783
Convenience	3	.794
Fear of Covid-19 (FC)	4	.804

TABLE 3
DESCRIPTIVE STATISTIC AND CORRELATION FOR ALL VARIABLES

Variables	Mean	Sig. (2-tailed)
Unreliable quality (UQ)	2.4	.265
Convenience	2.1	.007
Fear of Covid-19 (FC)	2.5	.63

TABLE 4
CORRELATION BETWEEN WILLINGNESS TO PURCHASE ONLINE MEDICATION AND DEMOGRAPHIC OF CONSUMERS USED TO BUY MEDICATION ONLINE.

Variables		Age	Gender	Location	Education level	Salary	Online shopping frequency
Willingness to buy medication online	Sig. (2-tailed)	.252	.775	.000	.238	.970	.872

TABLE 5
RESULT OF DIRECT EFFECT.

	Coefficients	T-value	Sig. (2-tailed)	Outcomes
Unreliable quality => Willingness to buy medication online (H1)	.264	-.940	.356	Unsupported
Convenience => Willingness to buy medication online (H2)	.202	2.506	0.19	Supported
Fear of Covid-19 => Willingness to buy medication online (H3)	.204	1.453	.158	Unsupported

Dependent variable: Willingness to buy medication online.

Vive la différence! The performance effects of vertical pay dispersion in family and nonfamily firms

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Abstract—This study explores the impact of pay dispersion between different ranks (TMT vs. Non-TMT group) on firm short-term financial performance with mediation effect of organizational turnover with the light of Tournament theory and Stewardship theory. This relationship is also examined with the moderating effect of firm control type which is categorized into family firms vs. non-family firms. We used a firm level data set of 1398 samples collected from TEJ database (from 2018 to 2020) to test the proposed model. The results showed that vertical dispersion (2018) negatively impacts organizational turnover (2019) and consequently improve firm financial performance (2020). In addition, the indirect effect (vertical dispersion-organizational turnover-financial performance) is pronounced in family firms rather than in non-family counterparts.

Index Terms—Family firm, performance, organizational turnover, vertical dispersion.

I. INTRODUCTION

Pay dispersion (or pay gap) is defined as the differences in pay levels within a job position rank (horizontal pay dispersion) or inter-rank job positions (vertical pay dispersion) [1]. Studies investigated on the influences of pay dispersion on both individual and firm outcomes [2, 3] has showed mixed findings. Does wide pay disparity across hierarchy tiers within the organization aid in boosting firm financial performance? How does this impact employee behaviours and organizational outcomes? Most of the previous studies indicated that reward allocations or incentives schemes can affect employees' attitude, and behaviour, which results in influencing employees' productivity and organizational outcomes [3]. However, little work done on the influence of inter-rank pay dispersion (vertical pay dispersion), and its impact on organizational outcomes [1, 4, 5]. In addition, most research investigating vertical pay dispersion in relation to firm financial performance other than human resource outcomes (productivity or turnover) [3]. The present paper follows the approach of Lazear and Rosen [10] and adopted by other scholars [1, 5] to investigate the impact of vertical pay dispersion, specifically the differences between top management team (TMT) pay and non-top management team (non-TMT) pay, on organizational effectiveness for human resources management than financial outcomes.

Based on Tournament theory, vertical pay dispersion serves as a mechanism to filter the outperformers while driving-out underperformers from the organization [6]. Tournament theory argues that if vertical pay dispersion is high, intra organization turnover (like promoting to a higher-level position) may increase, but for the overall organizational turnover rate (leaving the company) may decrease.

Drawing on stewardship theory, which is widely used in research of family firms, the effect of vertical pay dispersion on both human resource outcome (turnover rate) and firm financial performance is studied. Besides, we compare the performance variance between family and nonfamily businesses. In addition, a moderated mediation model that explicates the impact of vertical pay dispersion on the firm financial performance with the organizational turnover as a mediator. We use data collected for 1398 Taiwanese publicly firm in three consecutive years since 2008 (when the TMT and Non-TMT pay dispersion was reported) to test the proposed model.

II. HYPOTHESES DEVELOPMENT

A. Vertical Pay dispersion, Organizational Turnover, and Firm Financial Performance

Tournament theory served as a foundation when inquiring performance compensation schemes research which stipulates that wide variations in terms of payment offer substantial incentives to employees, leading to exerting more effort to get wage increments and improve the firm's financial performance [7, 8]. It focuses on upward pay comparisons [7, 9], following the principle of "winners-take-all", that is, when employees vie for a higher position in a zero-sum game, winners are rewarded with higher status and compensations, while losers are left with nothing [10, 11]. Vertical pay dispersion serves as a compensation scheme that filters out the underperformers within the organization [6]. Particularly in managerial positions, talented and qualified individuals have higher motives to stay in the organization to enhance financial performances, as such are strongly related to their performance, while the underperformers tend to seek ways to quit the contest [3]. Therefore, a wide spread of ver-

tical pay dispersion can motivate talented and skilled employees to stay and enjoy the rewards, whereas the underperformers were expected to leave the company.

By implementing this compensation structure, organizations can retain qualified staffs and attract more prospective talents [2]. In addition, the top management teams (TMT) who possess information, expertise, and skills engage in decision-making in terms of both strategic and operational routine activities [12]. By boosting the firm performance, they can have gain more compensation as well as foster their current stances, even upgrade to more prominent and outstanding positions in the organization [10]. Moreover, the lower-ranking employees, in short-term, who have both motivations from the pay awards for higher-ranking positions and the influence from passionate and skilled managers, tend to improve their performance and productivity to seek internal promotion. Thus, we posit that:

Hypothesis 1: Vertical pay dispersion negatively affects organizational turnover.

Hypothesis 2: Organizational turnover mediates the relationship between vertical pay dispersion and firm financial performance.

B. The Moderation Effect of Family vs. Nonfamily Business Type (Firm Control Type)

Family businesses play a significant socio-economic role around the world [13, 14]. Many studies have recognized that firms could be differ in their human resource strategies, such as compensation, turnover, and labour relations corresponding to firm control type with ownership structure [15]. Therefore, it might cause biases if we ignore the business control type, that is, family business vs. non-family business. Based on ownership structure, the board management will determine compensation and pay dispersion among different positions. Drawing on Stewardship theory, the managers in family business will not be selfish and less emphasize their personal interest [16]. They serve as "steward" or "custodian" for the company that turns to closer supervision which favourable associated with firm performance [17]. Therefore, we argue that family-controlled firms are like to serve as context to foster the vertical pay dispersion-firm performance linkage in comparison with nonfamily counterparts. We hypothesize:

Hypothesis 3: Firm control type moderates the relationship between vertical pay dispersion and organizational turnover, such that this relationship is stronger in family business rather than non-family business.

Hypothesis 4: The indirect effect of vertical pay dispersion on firm performance through organizational turnover will differ from firms control types, such that this relationship is stronger in family business rather than non-family business.

III. METHOD

A. Sample and Data Collection

The proposed model was empirically tested with data from publicly traded firms in the Taiwan stock exchange market from 2018 to 2020. The collection involved three steps. First, 1694 listed companies were identified and

tracked between a three-year observation period. Second, we excluded 32 firms from the financial services sectors since they constructed their financial statements applying different methods. We then eliminated 264 firms with insufficient reporting (e.g., remuneration policy, the average salary of the employees, and remuneration of the directors and supervisors). This yielded a final sample of 1398 firms. In which, 73.7% of firms are controlled by family, 27.3% are nonfamily firms. The average year of operation was 33.450 years (SD = 13.705 years). The average year of operation of family firms was 35.460 years and nonfamily firms are 27.820 years. Mean of the pay dispersion ratio of TMT and non-TMT employees in 2018 was 4.638 (SD=4.705), in particular, this ratio of family firms was 4.336 and of 5.488 for the other group. Mean of organizational turnover (2019) was 14.581% (SD=12.697%) (14.732% for family enterprises and 14.155% for nonfamily enterprises).

B. Measures

Independent Variable: This study measured vertical pay dispersion by using a ratio which is calculated by the rate between average TMT total compensation and average non-TMT total compensation in year.

Mediator: Organizational turnover captures the rotation of workers among occupations in organization and the extent of unemployment and employment during a defined period. This variable is calculated by dividing the number of employees retained from the end of year to the end of year+1 is determined with the number of employees at the end of year then time 100%.

Moderator: Firm control type (family vs. nonfamily firms) operationalizes as the types of controlling shareholders as a dichotomous variable. Following previous studies on classifying family business [18], family members control a minimum of 5 percent voting stock is identified as family firms and was labelled as 1, 0 otherwise.

Dependent Variable: Firm financial performance was measured by ROA which was calculated by subtracting the disposal gain/loss from the firm's net income and dividing it with its average total assets [19].

Control variables: family chairman, family conglomerate, firm age, and firm size. We included four control variables based on past research on compensation, HR practices, and firm performance. A family firm's heterogenetic culture is deeply rooted in its tradition, culture, and personal values; thus, two variables, family chairman and family conglomerate, are controlled by operationalizing them as dummy variables. The family chairman variable is labeled as 1 if a family chairman was identified in the board of directors, whereas the family conglomerate variable represents a company's affiliation with the family conglomerate. If the firm is considered as part of the family conglomerate, it is labelled as 1 and 0 elsewhere. We also included firm characteristics in this research, variables such as firm age and size are added as these analyses may affect the relationship of interest (e.g., [7], [20]). Firm age measures the number of years since the business was founded, and firm size calculates the total number of employees at the end of each year after the natural log function.

TABLE I
SUMMARY OF MODERATED MEDIATION MODEL TESTING

	Turnover rate				ROA			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Constant)	21.399***	21.347***	20.821***	19.878***	-1.674	1.188	-1.625	2.473*
Firm size	-0.514*	-0.346	-0.324	-0.262	1.997***	1.914***	1.840***	1.785**
Firm age	-0.019	-0.022	-0.031	-0.031	-0.069***	-0.072**	-0.066***	-0.069***
Family chairman	-2.652**	-2.645**	-2.845**	-2.863**	0.054	-0.378	0.047	-0.374
Family conglomerate	-2.197**	-2.155**	-2.167**	-2.212**	-0.760	-1.118*	-0.799	-1.142*
Independent variable								
Vertical pay dispersion (2018)		-0.195**	-0.186**	-0.078			0.182*	0.152**
Mediator								
Organizational turnover						-0.163***		-0.159***
Moderating variable								
Firm control-type			1.053	2.228*				
Interaction								
Vertical pay dispersion x Control-type				-0.239*				
R ²	0.021	0.026	0.027	0.029	0.102	0.146	0.109	0.151
R ² change	0.021	0.005	0.001	0.002	0.102	0.042	0.007	0.042
F	7.574***	7.442***	6.486***	5.952***	39.520***	47.524***	34.051***	41.124***

Note: N=1398, *p<0.05, **p<0.01, ***p<0.001

C. Analytic approach

We used hierarchical regression analysis and moderation analysis with the support of SPSS 28.0 to test the hypotheses. To test the moderated mediation model, we followed the Hayes PROCESS macro [20] with the bootstrapping of 5000 resamples to obtain bias-corrected bootstrapped with 95% confidence intervals for the conditional indirect effect as a proxy for the robustness of the mediation effects of organizational turnover [20]. The moderation effects of firm control type in the influence of vertical pay dispersion on firm financial performance via organizational turnover, we followed mediated moderation model testing guidelines presented by Preacher, et al. [21].

IV. RESULT

A. Descriptive and correlation analysis

The descriptive statistics analysis results showed that the mean of the pay dispersion ratio of TMT and non-TMT employees in 2018 is 4.638 (SD = 4.705). The mean of organizational turnover (2019) and ROA (2020) are 14.581% (SD = 12.697%) and 8.058% (SD = 9.763%), respectively. The mean of firm control type is 0.738, it indicated that 73.7% of samples are controlled by family. The mean value of family chairman is 0.714, implying that 71.4% of firms have chairman who is family member. The average year of operation is 33.450 years (SD = 13.705 years). The correlation coefficient between vertical pay dispersion in 2018 and organizational turnover in 2019 is -0.093 (p<.01), and ROA in 2020 is 0.171 (p<.01). It indicates that the higher vertical pay dispersion between TMT and non-TMT employees may negatively impact organizational turnover of the following year and positively impact ROA subsequently. The correlation between organizational turnover 2019 and ROA in 2020 is -0.230** (p<.01) which refer to negative impact of organizational turnover and firm financial performance. The above correlation results our expectation that will be supported for further analysis.

B. Hypothesis Testing

Hypothesis 1 proposed that there is negative association between vertical pay dispersion and organizational turnover of the following year. The results presented in Table I shown that after we controlled the control variables, vertical pay dispersion (2018) negatively associated with organizational turnover (2019) (b = -0.195**, p<.01) (Model 1, Model2). Consequently, the Hypothesis 1 is supported.

Hypothesis 2 tested the mediation role of organizational turnover. Model 6 and model 7 showed that ROA (2020) is negatively affected organizational turnover (2019) (b = -0.163, p<.01) and positively affected by vertical pay dispersion (2018) (b = 0.182, p<.05). Model 8 showed that when vertical pay dispersion and organizational turnover together affect ROA, the coefficient value of vertical pay dispersion decreased (b = 0.152, p<.01). We used bootstrapping with re-sampling 5000 to robust this result. Thus, Hypothesis 2 is supported.

Hypothesis 3 tested the moderation role of firm control type, such that the vertical pay dispersion-turnover relationship is accentuated in the company controlled by family rather than the other. Model 4 showed that the moderation role of firm control type is statistically significant with the coefficient of -0.239 (p<.05). The interaction effect of vertical pay gap and firm control type was graphed in Fig. 1. In particular, the negative effect of vertical pay dispersion on turnover is weakened in family firms than non-family firms. Thus, Hypothesis 3 is supported.

Hypothesis 4 tests the moderated mediation effect of control type on the indirect effect of the model. Specifically, the extent of the influence of vertical pay dispersion on firm financial performance through turnover will vary corresponding company's control type. This mentioned indirect effect is stronger in family firm (b = 0.051, boot SE = 0.018, 95% bias-corrected interval CI = [0.024,0.093] which did not contain zero. While the researched indirect effect is not significant in the non-family firms (b=0.012, boot SE=0.015, 95% bias-corrected interval CI= [-0.016,0.049]. Thus, Hypothesis 4 is supported at the significant level of 5%.

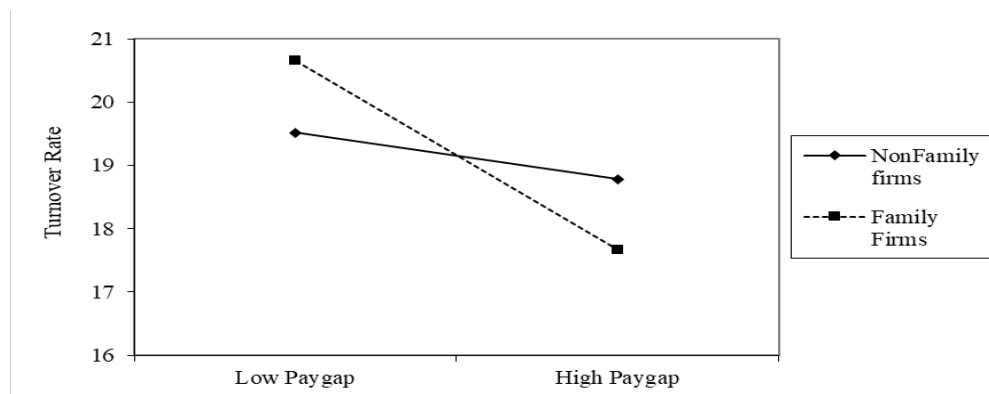


Fig 1. Interaction effect between pay dispersion and firm control-type on organizational turnover.

V. DISCUSSION AND CONCLUSION

Our study examined and confirmed the role of vertical pay dispersion in fostering firm short-term financial performance with mediating effect of organizational turnover. Besides, the moderating role of company control type in the above-mentioned linkage was examined. As predicted, we found that vertical pay dispersion has positive impact on firm financial outcomes through reducing the organizational turnover. This result supports the tournament theory [11, 22] that not only work for within same rank pay dispersion, TMT or CEO level [7, 12] but also for inter-rank pay dispersion. The results also revealed that organizational turnover as the underlying mechanism in which the variance of inter-rank pay affect organizational financial performance. The study also demonstrated that firm control type exert as moderator in the indirect effect relationship of vertical pay dispersion on firm financial performance through organizational turnover was confirmed. More specifically, this relationship is enhanced in family business rather than non-family counterparts. This is one of our significant findings of our study because a number of research ignore this variable, family business vs. Non-family business, in doing research related to human resource practices [15, 23], while this type of company has idiosyncratic feature in human resource practices and management that make it outperforms than other types of setting [24, 25]. Our findings indicates that the association between family business type and vertical pay dispersion is conditional on firm financial performance, such that this association is more robust in family business. Our result is aligned with the findings of Ensley, et al. [26] about the more detrimental impact of horizontal pay gap, within the TMTs pay dispersion, in family business vs. non-family business. Thus, family business serves as a distinctive context for investigating the disparity in compensations structure both horizontal and vertical.

Our study deliberates the managerial implications. Despite pay dispersion is a crucial indicator for social and labour relations. However, relatively little literature focus on contextual factors in vertical pay dispersion across organizations and whether those observed differences have consequences for performance outcomes. Therefore, how to design a compensation scheme that can utilize the pay dispersion between TMT vs. Non-TMT group is a critical means to rebuild social contract at work and plays important role in improving the living standard of low-rank labour and their

families. Consequently, the organizations can retain the talents. In addition, the family firms can consider pay dispersion as a tool to motivate their employees to improve the firm performance.

Our study contains several limitations. First, this studies just investigate the short-term firm performance. Thus, future studies can base on longitudinal data to scrutinize the relationships. Second, this study only investigated the impacts of vertical pay dispersion, future studies to further investigate how difference form of pay dispersion associate to organizational outcomes as well as the impact of the heterogeneity of family business. Third, using data retrieved from the published reports may conceal the psychological perception of relevant individuals that can be a better explanation for the research questions. Finally, this study used data of Taiwanese firms in multiple industries that will limit the generalizability and implication of the findings.

REFERENCES

- [1] B. L. Connelly, K. T. Haynes, L. Tihanyi, D. L. Gamache, and C. E. Devers, "Minding the Gap: Antecedents and Consequences of Top Management-To-Worker Pay Dispersion," vol. 42, no. 4, pp. 862-885, 2016, doi: 10.1177/0149206313503015.
- [2] P. E. Downes and D. Choi, "Employee reactions to pay dispersion: A typology of existing research," Human Resource Management Review, vol. 24, no. 1, pp. 53-66, 2014/03/01/2014, <https://doi.org/10.1016/j.hrmr.2013.08.009>.
- [3] J. D. Shaw, "Pay Dispersion," Annual Review of Organizational Psychology and Organizational Behavior, vol. 1, no. 1, pp. 521-544, 2014/03/21 2014, doi: 10.1146/annurev-orgpsych-031413-091253.
- [4] J. G. Messersmith, K. Y. Kim, and P. C. Patel, "Pulling in different directions? Exploring the relationship between vertical pay dispersion and high-performance work systems," Human Resource Management, vol. 57, no. 1, pp. 127-143, Jan-Feb 2018, doi: 10.1002/hrm.21846.
- [5] F. Keppeler and U. Papenfuss, "Understanding vertical pay dispersion in the public sector: the role of publicness for manager-to-worker pay ratios and interdisciplinary agenda for future research," Public Management Review, 2021, doi: 10.1080/14719037.2021.1942531.
- [6] J. G. Messersmith, J. P. Guthrie, Y.-Y. Ji, and J.-Y. Lee, "Executive turnover: The influence of dispersion and other pay system characteristics," Journal of Applied Psychology, vol. 96, no. 3, pp. 457-469, 2011, doi: 10.1037/a0021654.
- [7] G. Sanchez-Marín and J. S. Baixauli-Soler, "TMT pay dispersion and firm performance: the moderating role of organizational governance effectiveness," Journal of Management & Organization, vol. 21, no. 4, pp. 436-459, 2015, doi: 10.1017/jmo.2014.87.
- [8] J. D. Shaw, N. Gupta, and J. E. Delery, "Pay dispersion and workforce performance: moderating effects of incentives and interdependence," Strategic Management Journal, <https://doi.org/10.1002/smj.235> vol. 23, no. 6, pp. 491-512, 2002/06/01 2002, <https://doi.org/10.1002/smj.235>.
- [9] N. Gupta, S. A. Conroy, and J. E. Delery, "The many faces of pay variation," Human Resource Management Review, vol. 22, no. 2, pp.

- 100-115, 2012/06/01/ 2012, <https://doi.org/10.1016/j.hrmr.2011.12.001>.
- [10] B. E. Becker and M. A. Huselid, "The Incentive Effects of Tournament Compensation Systems," *Administrative Science Quarterly*, vol. 37, no. 2, pp. 336-350, 1992, doi: 10.2307/2393228.
- [11] G. M. M. Brian, C. A. O'Reilly, and J. Wade, "Top Executive Pay: Tournament or Teamwork?," *Journal of Labor Economics*, vol. 11, no. 4, pp. 606-628, 1993. [Online]. Available: <http://www.jstor.org/stable/2535229>.
- [12] P. C. Patel, M. Li, M. del Carmen Triana, and H. D. Park, "Pay dispersion among the top management team and outside directors: Its impact on firm risk and firm performance," vol. 57, no. 1, pp. 177-192, 2018, doi: <https://doi.org/10.1002/hrm.21872>.
- [13] J. J. Chrisman, J. H. Chua, A. W. Pearson, and T. Barnett, "Family Involvement, Family Influence, and Family-Centered Non-Economic Goals in Small Firms," *Entrepreneurship Theory and Practice*, vol. 36, no. 2, pp. 267-293, 2012/03/01 2012, doi: 10.1111/j.1540-6520.2010.00407.x.
- [14] J. H. Chua, J. J. Chrisman, L. P. Steier, and S. B. Rau, "Sources of Heterogeneity in Family Firms: An Introduction," *Entrepreneurship Theory and Practice*, vol. 36, no. 6, pp. 1103-1113, 2012/11/01 2012, doi: 10.1111/j.1540-6520.2012.00540.x.
- [15] J. J. Chrisman, J. H. Chua, and P. J. C. w. p. s. Sharma, "Current trends and future directions in family business management studies: Toward a theory of the family firm," vol. 4, no. 1, pp. 1-63, 2003.
- [16] J. H. Davis, F. D. Schoorman, and L. Donaldson, "Davis, Schoorman, and Donaldson Reply: The Distinctiveness of Agency Theory and Stewardship Theory," *The Academy of Management Review*, vol. 22, no. 3, pp. 611-613, 1997. [Online]. Available: <http://www.jstor.org/stable/259407>.
- [17] K. A. Eddleston and F. W. Kellermanns, "Destructive and productive family relationships: A stewardship theory perspective," *Journal of Business Venturing*, vol. 22, no. 4, pp. 545-565, 2007/07/01/2007, <https://doi.org/10.1016/j.jbusvent.2006.06.004>.
- [18] J. Diéguez-Soto, P. López-Delgado, and A. Rojo-Ramírez, "Identifying and classifying family businesses," *Review of Managerial Science*, vol. 9, no. 3, pp. 603-634, 2015/07/01 2015, doi: 10.1007/s11846-014-0128-6.
- [19] Z. Li, J. Daspit, and L. Marler, "Executive Pay Dispersion: Reconciling the Differing Effects of Pay Inequality and Pay Inequity on Firm Performance," *The International Journal of Human Resource Management*, 05/01 2021, doi: 10.1080/09585192.2021.1925324.
- [20] A. F. Hayes, *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications, 2017.
- [21] K. J. Preacher, D. D. Rucker, and A. F. Hayes, "Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions," *Multivariate Behavioral Research*, vol. 42, no. 1, pp. 185-227, 2007/06/29 2007, doi: 10.1080/00273170701341316.
- [22] E. P. Lazear and S. Rosen, "Rank-Order Tournaments as Optimum Labor Contracts," *Journal of Political Economy*, vol. 89, no. 5, pp. 841-864, 1981. [Online]. Available: <http://www.jstor.org/stable/1830810>.
- [23] P. Rovelli, M. Ferasso, A. De Massis, and S. Kraus, "Thirty years of research in family business journals: Status quo and future directions," *Journal of Family Business Strategy*, p. 100422, 2021/03/31/ 2021, doi: <https://doi.org/10.1016/j.jfbs.2021.100422>.
- [24] J. H. Block, C. O. Fisch, J. Lau, M. Obschonka, and A. Presse, "Who prefers working in family firms? An exploratory study of individuals' organizational preferences across 40 countries," *Journal of Family Business Strategy*, vol. 7, no. 2, pp. 65-74, 2016/06/01/2016, doi: <https://doi.org/10.1016/j.jfbs.2016.04.001>.
- [25] D. Miller, I. Le Breton-Miller, R. H. Lester, and A. A. Cannella, "Are family firms really superior performers?," *Journal of Corporate Finance*, vol. 13, no. 5, pp. 829-858, 2007/12/01/2007, <https://doi.org/10.1016/j.jcorpfin.2007.03.004>.
- [26] M. D. Ensley, A. W. Pearson, and S. R. Sardeshmukh, "The negative consequences of pay dispersion in family and non-family top management teams: an exploratory analysis of new venture, high-growth firms," *Journal of Business Research*, vol. 60, no. 10, pp. 1039-1047, 2007/10/01/2007, <https://doi.org/10.1016/j.jbusres.2006.12.012>.

Role of Higher Education Institutions in Addressing Climate Change Crisis: The Paradox of Core operations and Institutional Social Responsibilities

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Abstract—The paper discusses the paradox of climate change and university education. It assesses the expected role of universities in addressing the climate crisis and some leading frameworks appear in sustainability education literature. The paper also postulates a framework that may be adopted to guide climate change education and actions through universities. In conclusion, using a Carbon Literacy Training as an example, the paper discusses the implantation aspects of the proposed framework.

Index Terms—Carbon literacy, Sustainability, Sustainable Development Goals, Climate Change.

I. INTRODUCTION

According to the Intergovernmental Panel on Climate Change (IPCC), climate change is a change of the state of the climate which is attributed directly or indirectly to human activities that largely contribute to the changes in the composition of the global atmosphere [1]. Given the increasing amount of evidence of adverse effects of climate change (e.g., unforeseen heat waves in Europe and several other weather events in Australia) taking actions on climate change is crucial. According to the carbon budget which estimates the total quantity of CO₂-equivalent emissions that can be allowed in order to maintain a chance of staying within the Paris Agreement target of capping global warming at 1.5C this century, the atmosphere can absorb no more than 400 Gigatonnes (Gt) of CO₂. If we do not take climate actions and continue the status quo at this pace for another 10 years, we will have depleted the carbon budget entirely [2]. Taking serious actions towards reducing carbon emissions is, therefore, an utmost necessity.

Our ecosystems (e.g., rainforests, permafrost) do not work in isolation. Everything is intertwined. The melting of the permafrost will have effects on sea rise, effects on habitat and or species loss [3]. Given the high impact that human activities make on climate change, human activities should be significantly changed in order to tackle climate change. To this end, large institutions, such as universities have a crucial role to play discharging their social responsibility.

Several scholars investigate the role of universities in climate change education [4-6], engaging in climate policy debates [7, 8], empowering individual actions towards climate actions [9] and postulating alternative economic models [10]. According to the Blueprint for SDG (sustainable devel-

opment goals), embedding SDGs into curriculum which is an initiative of UN Global Compact, actions of universities or business school are not *one size fits all* [11, 6]. Therefore, these higher education institutions should be able to develop a framework and guidelines in accordance with their strategic directions.

Fortunately, a great number of frameworks have been proposed to introduce or integrate climate actions through universities [12-15]. The assumptions and the scores of the frameworks, however, appear to be varied. This will make it challenging for universities to develop a framework and guidelines in this endeavour. Moreover, the field of research could use more scholarly conversations on some frameworks and guidelines to explore the key pillars of climate change actions of universities. In consultation with some of the scholarly conversations in the field, the aim of this paper is to spark such debate. After critically examining current frameworks through a literature review, the paper also proposes a way forward for universities who engage in climate change education and actions through all their operations.

Organised into four sections, following the introduction, the next section provides a critical overview of some of the existing frameworks in the field of research. Following the literature review section, the third, discussion section engages in a scholar conversation with a view to highlighting dilemmas and debates corresponding to key assumptions of the frameworks. This section also postulates an approach which can be used to resolve the paradox of core operations and institutional social responsibilities of universities.

II. LITERATURE REVIEW

This section first reviews the paradox of climate change and university education. Secondly, it appraises several frameworks that are discussed in literature with a view to demarcate the trajectory of climate change actions through universities. Following the literature review, the paper postulates a framework that may guide future research and practice of climate change education and actions through universities.

A wide range of climate change knowledge, competences and skills are essential in climate change education [4]. Fostering learning and teaching environment is extremely challenging due to many reasons. Among them, it appears that

despite the widespread conversations, many individuals still do not have a thorough understanding of climate change and its adverse effects. Climate change is seen as a scientific issue, an environmental, a political or a social issue. The occurrence of climate change and the impact of its adverse effects on our personal lives are, at times, seen as geographically and psychologically distant [16, 17]. Although more recent research shows that many individuals now perceive climate change as serious issue [12] and students are keen to take climate change actions [18], the above stated complexities could pose challenges for universities when advancing climate change actions. Further, despite their best effort, climate change is rapid and continuously evolving into a different phase, therefore, university educators may have to respond extremely rapidly to the changing phase [4, 19]. Given the overarching impacts of climate change on business, economy, society, the educators will also have to use multidisciplinary approaches in climate change education [12].

A great variety of frameworks are proposed to engage in climate change educations and actions through university operations [e.g., 12, 13-15]. [Reference 15] argues that any university could have five modalities of climate changes action corresponding to their operations. They are education, knowledge production, service delivery, public debate, and campus operations. Each modality has three characteristics including action (the nature and extent of activity), interaction (interaction between activities) and impact (social impact). Figure 1 depicts the stages of impact of climate change education through universities.

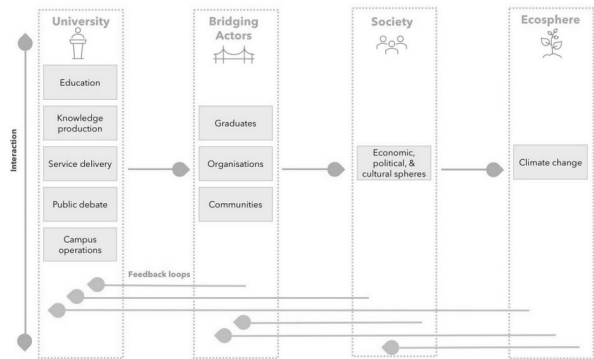


Figure 1: The stages of impact of climate change education through modalities [15, 9].

McCowan’s [15] five modalities clearly demonstrate the spill over effects and the social role that can be played by universities in climate change education and action. The five modalities assume two main layers of university activities. The first layer relates to their primary role of knowledge production and dissemination. This includes research, teaching and taking part in public debates surrounding climate change issues. The second layer is the universities’ role as a business organisation with complex operations that produce large amount of greenhouse gas emissions. Universities are expected to play a leading role in producing cutting edge climate change research providing a sound scientific foundation to the climate change actions. Dissemination of climate change knowledge can occur via research publications, public debates, and curricula. According to Reference [20],

however, universities have been predominantly focused on climate change science education, now, given the unprecedented weather events and other climate disasters we see, it is imperative that universities focus on integrating climate change mitigation education widely, across all disciplines.

Leading researchers in the field [e.g., 13, 20] argue that climate change education should enable every student to go beyond the awareness of climate change. They should make a real impact on the students, their peers, families, as well as other stakeholders such as employers. Illustrating how climate change education could be integrated widely across all disciplines, the researchers postulate below framework (see figure 2) for climate change education in universities.

	Existing structures	New structures
Narrow curricular	Quadrant I Piggybacking Integration of climate change education (CCE) within existing structures by adding CCE to individual sessions of courses or modules.	Quadrant II Specialising Creation of specific climate change modules, courses or degrees such as a MSc in Climate Change.
Broad curricular	Quadrant III Mainstreaming Integration of climate change education within existing structures but with the emphasis on a broader cross-curricular perspective (entire curriculum).	Quadrant IV Connecting (transdisciplinary) Integration of climate change education through new cross-disciplinary offerings such as a course on climate change offered to all student within a university or faculty integrating teaching content from different disciplines.

Figure 2: Framework for climate change education in universities [20, 3437].

As depicted in figure 2, universities can integrate climate change education through existing curriculum delivery structures as well as develop new curriculum delivery structures. They can adopt a narrow focus such as adding or creating new climate change related learning modules. They can also adopt a broad approach to climate education with the emphasis on cross-curriculum perspectives while utilising the existing curriculum delivery structures or create new cross-curriculum structures for climate change education. For example, piggybacking (quadrant 1) can be done by including climate change related perspectives in an existing subject under several themes. For logistics and supply chain subjects, educators could include perspectives such as sustainable sourcing of raw materials and components. For a strategic management /Marketing subject, educators could include perspectives of sustainable lens to critically assess the emissions levels of each strategic decision.

Specialising approach in quadrant II calls for introducing dedicated climate change education modules and degree programs. Some universities have already introduced Bachelors, Majors and Masters in Climate Change. Mainstreaming in quadrant III relates to designing degree programs embedding climate change education as a main theme that transcends across entire curriculum. This requires serious commitment and specific worldview from curriculum designers and educators.

Quadrant IV, connecting, calls for ‘whole of university curricula’ approach to integrate climate change education across several disciplines. For example, business students could be required to take a compulsory subject on climate change that is offered in collaboration with science and soci-

ology departments. On the other hand, a subject could be designed by taking inputs from several disciplines across the university to cover diverse social, political, ecological, environmental and economic perspectives of climate change.

The framework for climate change education in universities proposed by Reference [20] provides clear roadmap or a blueprint for universities to embark on a journey of engaging with climate change education and action. It appears that the framework informs several other blueprints of integrating sustainability and climate change education into university curricula such as the Blueprint for SDG integration Into curriculum, research and partnerships which is an initiative of UN Global Compact [11].

One of the recent initiatives of the United Nations Global Impact, entitled, ‘Blueprint for SDG integration into curriculum, research and partnerships’ (2020) presents good examples of approaches already adopted by business schools as an integral part of ongoing efforts to incorporate the PRME into educational activities. The Blueprint proposes a systematic process to achieve sustainable development goals (including goal no.13: Climate action) by integrating them through university education as shown in figure 3.



Figure 3: Systematic process to achieve SDG integration [11, 23].

The Systematic process to achieve SDG integration adopts strategic decision-making approach to suggest how to achieve SDG integration. The process begins with defining the problem, in other words, identifying gap areas of the existing performance corresponding to SDGs. This includes scanning the external (e.g., expected level in advancing SDGs as outlined in global and local protocols) and internal environment (e.g., existing level of carbon emissions through overall operational activities of a university) of universities to assess where they are, in terms of SDG integration. This will lead to the second step which includes setting or shifting priorities to the underperforming areas of SDG integration, reinforcing good practices, and set new goals where necessary. The set priorities and goals inform the third step which develops a plan of actions for deepening and/or broadening SDG integration. The success of the plan of actions should be continuously monitored. This can be done in the fourth step which ensures the set goal are achieved and areas of continuous improvements are identified.

SDG integration to university curricula have been widely debated. Many opportunities, advantages and barriers have been discussed [e.g., 21, 22, 23]. Annual reports of universities as business organisations are bound by accounting reporting conventions to include Economic, Social and Govern-

nance (ESG) performance. As signatories of Principle for Responsible Management Educations (PRME) universities are required to regularly share information with its stakeholders on the progress made in implementing the Six Principles through a Sharing Information on Progress (SIP) report (PRME 2022) to facilitate dialogue and foster a learning community among signatories.

It is, however, argued that there is no coherence and focus on the current performance matrixes used by universities especially because many of the functions could fall under any of the 17 SDG goals broadly. Towards this end, there has been an important initiative by Garwood et al, [24] to popularise a dashboard for universities to visualise SDG actions for achieving performance reporting and best practice sharing. The dashboard is depicted in figure 4.

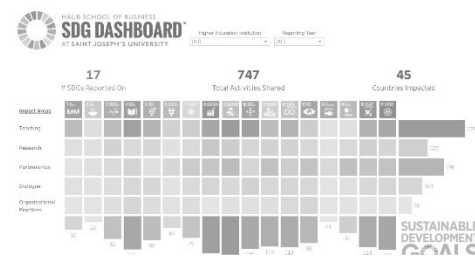


Figure 4: SGD Dashboard [24]. AIM2FLOURISH, 2023, retrieved from <<https://aim2flourish.com/sdg-dashboard>>

As shown in figure 4, the SDG dashboard captures SDG goal performance under 5 impact areas (Teaching, research, partnerships, Dialogue, and organisational practices). This dashboard could be further finetuned to focus on climate change education and actions. SDG goal 13 specifies of climate action whereas, Goal 6 clean water and sanitation, Goal 2 Zero hunger, Goal 7 affordable and clean energy, Goal 11 sustainable cities and communities, Goal 12 responsible consumption and production, Goal 14 Life below water, and Goal 15 life on land, are indirectly related to climate change. Therefore, a dashboard capturing university performance in these goals could enhance best practice among universities locally as well as globally.

Aforementioned frameworks [e.g., 11, 20, 24] can be effectively utilised for climate change education and actions in universities to various degrees, however, they do not clearly capture the variety of pedagogical approaches that may be adopted by universities in climate change education. To this end, Reference [25] claims that especially in business schools, pedagogical approaches of sustainability and climate change education seem to achieve two competing objectives: instrumental and emancipatory educational objectives. The former aims at utilising sustainability and climate change education to achieve business objectives, hence demanding changes in educating conventional business models and behaviour among students is common. The latter aims at leaving space for students’ emancipation or subjectivity. This may be especially required in sustainability and climate change education which can be flourished through pedagogical approaches that aim at enhancing critical thinking and reflexivity among students [26].

One way of viewing the instrumental and emancipatory objectives in sustainability and climate change education is through paradigmatic views that guide business scholars in

designing teaching and learning activities. For example, if the business scholars share the assumptions of critical realism they recognise the reality of natural order, the events and discourses of the social world [27]. They assume that understanding and changing the social world is possible only by identifying the social structures that generate events and discourses [28]. This approach may call for newer and alternative perspectives on business decision making, business models and subsequent pedagogical approaches.

While the aforementioned frameworks guide educators to explore the options of integrating climate change utilising existing as well as programs, it does not recognise the contribution that universities make at climate change policy making levels. Adding a new direction to climate actions through universities, Reference [6] show how the principles of participatory action research can be utilised to enhance university capacities to take climate actions. Their key recommendations include moving beyond changing individual behaviour to respond to climate change to establish norms, procedures, and practices across university, building collectives with key individuals whose voices are to be heard in climate change debates and actions, enabling reciprocal relationships between universities as well as wider societies to influence university governance and wider climate-related policy-making processes. The researchers' conceptual framework which is organised as a capacity map is shown below.

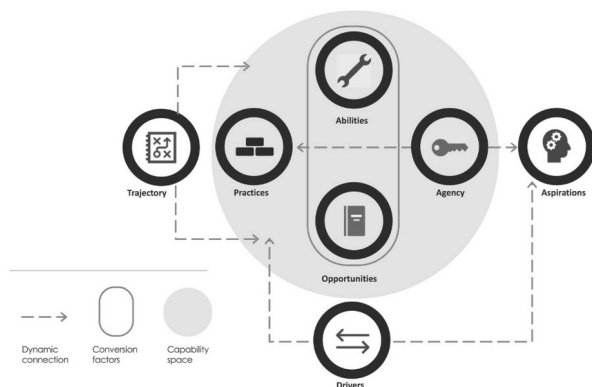


Figure 5. Capacity map to investigate university capabilities in climate change education [6, 103]

According to Reference [6], taking climate change actions through universities consists of four elements; institutional aspirations, practices, abilities and opportunities. Universities should know their aspirations and existing practices towards the advancement of climate actions. After assessing the gap between the aspirations and the existing practices, universities should be able to improve their abilities to take climate actions and exploit more opportunities of climate actions as well. The researchers claim that participatory action research could guide universities through the process. The capacity map, as the researchers claim, recognises climate change as a global as well as a local issue. Therefore, taking climate actions call for paying attention to both synergies and specifics. Unlike some of the university education focused frameworks [e.g., 20], this capacity map recognises a social role universities can play in taking climate actions. However, one of the drawbacks of the capacity map is the

exclusion of wider boundaries of climate actions especially those could create a wider gap between the aspirations and the existing practices of climate change actions of universities.

Reference [29] postulated the Doughnut economic theory which argues that humanity should not collectively overshoot the planetary boundaries that protect the planet's ecosystems. In consultation with the Doughnut economic theory Reference [10] postulates a framework of climate actions through universities including social and planetary boundaries of climate actions. As shown in the figure 6, the framework calls that climate actions of universities should be built on planetary boundaries of climate change, biodiversity loss and resource use. They are considered the baseline requirements that all universities should meet in advancing climate actions.

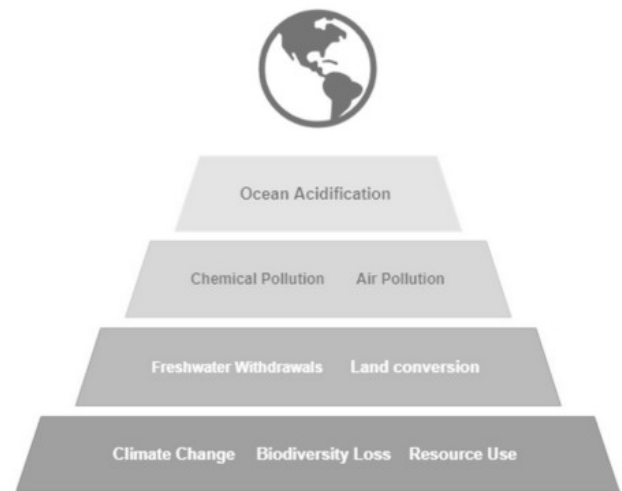


Figure 6: Planetary boundaries of climate change actions through universities [10, 46].

III. DISCUSSION

The paper is a critique of some of the leading frameworks and guidelines of climate change actions and education of universities. Following the literature review, this section engages in a discussion of the frameworks with a view to proposing a way forward for universities who engage in climate change education and actions.

The literature review shows that while some of the frameworks provide guidelines in terms of positioning for climate change education within existing or new education programs [e.g., 20], some other frameworks stress the impact of such education on all the operations of universities [e.g., 6]. On the contrary, more systematic approach which begins with assessing the situation, in other words, assessing the strategic fit in terms of SDG integration are proposed [11]. Adding more fire onto the debate, several other researchers demonstrate how the impact of climate change education goes beyond the universities [e.g., 15], emphasising on focusing on an approach which pays attention to the planetary boundaries and alternative economic models [10, 29].

None of the frameworks, however, include an element of measuring tangible outcomes of climate change education and actions. As detailed in the introduction section, given

the increasing amount of evidence of adverse effects of climate change, depleting carbon budget and the urgency of capping global warming at 1.5C this century, taking actions with measurable impact of reducing carbon emissions is an utmost necessity. Therefore, we argue that climate change education and action through universities should thrive for achieving tangible outcomes for all their stakeholders. The efforts will spill over into wider communities both at local and international level.

Climate change education and actions can be seen from the perspectives of corporate social responsibility (CSR) [30-32]. The notion of CSR is a valuable debate which evolves over the years [33-35]. One leading argument was that for any organisation [35-37], ethical CSR (doing good) is mandatory, however, for a publicly held business organisation, altruistic CSR (doing good works at the possible expense of stockholders) is not legitimate and hence organisations should limit their philanthropy to strategic CSR (doing good also good for business) (Lantos (2001, p. 606). Resolving the debate to a certain extent, Reference [38] proposed the notion of “creating shared value”, which they showed as a link between the competitiveness of a firm and the wider society. Clearly CSR can no longer be separated from a firm’s overall business strategy. If this is the case, what is the nature of business of universities? How should universities engage in climate change education and actions discharging their (corporate) social responsibility?

We argue that universities are positioned in a peculiar position in the context of climate change crisis. Unquestionably, many would agree that the main business of universities is to produce and disseminate knowledge through teaching and research. In responding to the climate change crisis, however, many universities have shifted their strategic business priorities. This is reflected in their mission and vision statements that have been revised including priority areas such as social impact. Given the criticality of climate change crisis, sustainability has emerged as a key strategic priority for firms as well as universities, main global drive being the wide acceptance of United Nation’s sustainable development goals.

We propose that carbon literacy-based education and actions should be an integral element of universities’ business. Carbon literacy means being aware of the impact of everyday activities on the climate; and knowing what steps can be taken to reduce emissions as an individual, a community group, or an organisation, and why it is important that we all take these steps (Carbon Literacy Project, 2021). Hence, carbon literacy goes beyond knowing and includes emotional and behavioural enablers. More importantly, carbon literacy should empower individuals and collectives to measure the amount of carbon they emit through everyday actions and take on carbon reduction actions.

In consultation with the frameworks that we have reviewed earlier in the paper, paying due attention to climate change crisis and urgency of taking actions, we propose a framework to demonstrate the role of universities in addressing climate change crisis. It is expected that the proposed framework will resolve the paradox of core operations and institutional social responsibilities of universities. The framework is depicted below, figure 7.

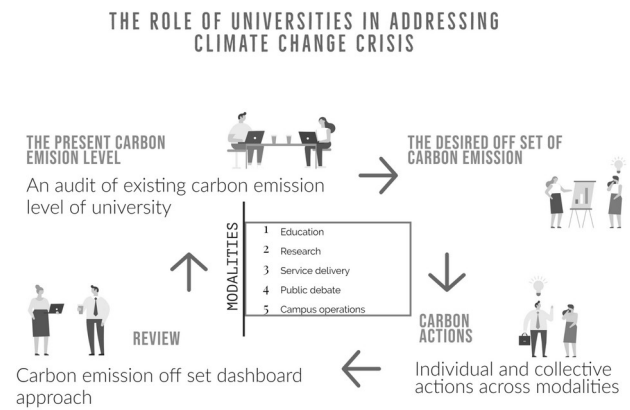


Figure 7: The role of universities in addressing climate change crisis (source: Authors).

The framework proposes a systematic process [11] to perform the desired role of universities addressing climate crisis. The framework adopts strategic decision-making approach to suggest how to achieve a set carbon off set level. The process begins with taking an audit of existing level of carbon emission of a university [6]. This includes scanning the macro level planetary boundaries [10, 29] and internal environment of the university corresponding to five modalities [15]. This will result in findings where a university stands in its carbon emission level. This will also lead to the second step which includes setting or shifting priorities to the underperforming areas of carbon emission off sets, reinforcing good practices, and set new goals where necessary. The third step develops individual and collective plan of actions [13, 20, 25] to reduce carbon emission across the five modalities. The success of the plan of actions should be continuously monitored. As the fourth step, we suggest utilising carbon emission off set dashboard approach [24] to ensure the set goal are achieved and areas of continuous improvements are identified.

IV. CARBON LITERACY TRAINING

Having explored the key frameworks utilised by higher education institutions in embedding climate change education, we identify a major gap in transforming awareness into meaningful, grassroots level actions. Towards this end, we elaborate the key elements of the framework our existing carbon literacy training program (CLP) that is being implemented in Australia as a collaboration between Carbon Literacy Project (CLP), UK and three leading Universities in Australia, Swinburne, Federation University and University of Queensland.

Initially 4 academics from Swinburne and Federation Universities participated in CLP training and got certified as Carbon Literate citizens. These academics pledged in their CLP training that they would deliver CLT in their respective universities. Several discussions took place for a potential collaboration between Swinburne, Federation and Queensland universities. Queensland university had already developed an adapted version of the training materials to suit the Australian higher education context. We were successful in forming this collaboration where trainers from Swinburne and Federation Universities deliver the training and manage the assessment pledges. To be certified as carbon literate,

each participant needs to do several short online modules and four live online sessions of 1.5 hours each and make a pledge in the form of an assessment piece which is sent to CLP project, UK to evaluate and issue certificates. The training enhances the knowledge of climate change science, the impact of climate change on the planetary boundaries and empowers catalysts of taking action on climate change.

So far, about 56 participants have been certified as carbon literate and they have made pledges to reduce approximately 30 tonnes CO₂ through 120 individual and collective actions. This training is focused on academic and professional staff of the Swinburne and Federation Universities initially. It has been suggested that a learning module based on this training is offered to all the students as well. Sustainability managers of the universities are interested in developing a HR training module based on this CLT. One notable achievement of the program is that many academics have pledged to incorporate CLT into their respective subjects. On the other hand, professional staff has pledged to reduce carbon emissions by developing innovative work designs that save significant carbon emissions.

V. CONCLUSION

Engaging in and committing to carbon neutral operations such as green sourcing, green energy and sustainable business practices, many universities have already initiated meaningful actions. However, it has been argued that universities could do much more in the areas of climate change education and actions, especially because universities are strategically positioned in the context of climate change crisis and awareness. They have a key role to play in terms of implementing measurable climate change education programs and actions with a view to energising the advocacy of the institutions through all their operations. It is important to empower existing stakeholders of the universities and specially students to act as advocates of carbon mitigation actions in their workplaces, communities, and family & friendship circles. Together, the university communities could mobilise a large section of grassroot level people taking meaningful action. This could be done through embedding carbon literacy awareness into curricula in such a way that students are motivated to act upon.

Organised as a critique existing scholarly conversations on integrating SDGs and climate change discourse, the paper proposed a framework to demonstrate the role of universities in addressing climate change crisis. Many of the frameworks discussed in the paper are still in theoretical domain. The lack of empirical evidence on the frameworks is a limitation of the paper. A comparative investigation on the effectiveness of the frameworks could enhance the contribution of the paper in the future.

REFERENCES

- [1] IPCC. "Intergovernmental Panel on Climate Change, Special Report, Global Warming of 1.5 °C "; <https://www.ipcc.ch/sr15/chapter/glossary/>.
- [2] IPCC, "Global Warming of 1.5°C," https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_version_stand_alone_LR.pdf, [25 July 2022, 2018].
- [3] Climate Council, "Aim High, Go Fast: why emissions need to plummet this decade," <https://www.climatecouncil.org.au/wp-content/uploads/2021/04/aim-high-go-fast-why-emissions-must-plummet-climate-council-report.pdf>, 2021].
- [4] F. M. Reimers, "The role of universities building an ecosystem of climate change education," *Education and Climate Change*, pp. 1-44: Springer, Cham, 2021.
- [5] M. Kitada, A. Schönborn, A. I. Ölçer *et al.*, "Addressing Climate Change Through Education and Research in Maritime Energy Management: The Case of World Maritime University," *Climate Change, Hazards and Adaptation Options*, pp. 895-909: Springer, 2020.
- [6] C. Nussey, A. A. Frediani, R. Lagi *et al.*, "Building University Capabilities to Respond to Climate Change Through Participatory Action Research: Towards a Comparative Analytical Framework," *Journal of Human Development and Capabilities*, vol. 23, no. 1, pp. 95-115, 2022.
- [7] J. Kranz, M. Schwichow, P. Breitenmoser *et al.*, "The (Un) political perspective on climate change in education—A systematic review," *Sustainability*, vol. 14, no. 7, pp. 4194, 2022.
- [8] N. Healy, and J. Debski, "Fossil fuel divestment: implications for the future of sustainability discourse and action within higher education," *Local Environment*, vol. 22, no. 6, pp. 699-724, 2017.
- [9] A.-R. Abdulai, V. K. Chireh, and R. Tchoukaleyska, "Engaging Diverse Audiences: The Role of Community Radio in Rural Climate Change Knowledge Translation," *Journal of Community Engagement & Scholarship*, vol. 13, no. 3, 2021.
- [10] J. Kraskes, "Universities and the Doughnut Strategy: Comparative analysis of university strategies and the integration of planetary and social boundaries and the general concept of sustainable development," 2022.
- [11] A. Wersun, J. Klatt, F. Azmat *et al.*, "Blueprint for SDG integration into curriculum, research and partnerships," 2020.
- [12] W. Leal Filho, M. Sima, A. Sharifi *et al.*, "Handling climate change education at universities: an overview," *Environmental Sciences Europe*, vol. 33, no. 1, pp. 1-19, 2021.
- [13] P. Molthan-Hill, N. Worsfold, G. J. Nagy *et al.*, "Climate change education for universities: A conceptual framework from an international study," *Journal of Cleaner Production*, vol. 226, pp. 1092-1101, 2019.
- [14] W. Leal Filho, and S. L. Hemstock, "Climate change education: An overview of international trends and the need for action," *Climate change and the role of education*, pp. 1-17, 2019.
- [15] T. McCowan, "The impact of universities on climate change: A theoretical framework," <https://discovery.ucl.ac.uk/id/eprint/10108599/1/Working%20paper%20C%20final.pdf>, 2020].
- [16] S. Alvi, and U. Khayyam, "Mitigating and adapting to climate change: attitudinal and behavioural challenges in South Asia," *International Journal of Climate Change Strategies and Management*, 2020.
- [17] C. Perera, P. Auger, and J. Klein, "Green consumption practices among young environmentalists: A practice theory perspective," *Journal of business ethics*, vol. 152, no. 3, pp. 843-864, 2018.
- [18] D. Rousell, and A. Cutter-Mackenzie-Knowles, "A systematic review of climate change education: Giving children and young people a 'voice' and a 'hand' in redressing climate change," *Children's Geographies*, vol. 18, no. 2, pp. 191-208, 2020.
- [19] M. García-Feijoo, A. Eizaguirre, and A. Rica-Aspiunza, "Systematic review of sustainable-development-goal deployment in business schools," *Sustainability*, vol. 12, no. 1, pp. 440, 2020.
- [20] P. Molthan-Hill, L. Blaj-Ward, M. F. Mbah *et al.*, "Climate change education at universities: Relevance and strategies for every discipline," *Handbook of Climate Change Mitigation and Adaptation*, pp. 3395-3457: Springer, 2022.
- [21] B. Hansen, P. Stiling, and W. F. Uy, "Innovations and challenges in SDG integration and reporting in higher education: a case study from the University of South Florida," *International Journal of Sustainability in Higher Education*, 2021.
- [22] W. Leal Filho, C. Shiel, A. Paço *et al.*, "Sustainable Development Goals and sustainability teaching at universities: Falling behind or getting ahead of the pack?," *Journal of Cleaner Production*, vol. 232, pp. 285-294, 2019.
- [23] K. Alm, T. H. Beery, D. Eiblmeier *et al.*, "Students' learning sustainability—implicit, explicit or non-existent: a case study approach on students' key competencies addressing the SDGs in HEI program," *International Journal of Sustainability in Higher Education*, 2022.
- [24] K. C. Garwood, D. Steingard, and M. Balducci, "Dynamic Collaborative Visualization of the United Nations Sustainable Development Goals (SDGs): Creating an SDG Dashboard for Reporting and Best Practice Sharing," pp. 294-300.
- [25] P. Andersson, "Business as un-usual through dislocatory moments—change for sustainability and scope for subjectivity in classroom practice

- tice," *Environmental Education Research*, vol. 24, no. 5, pp. 648-662, 2018.
- [26] C. Perera, and C. Hewege, "Integrating sustainability education into international marketing curricula," *International Journal of Sustainability in Higher Education*, vol. 17, no. 1, pp. 123-148, 2016.
- [27] S. A. Carlsson, "Critical Realism in IS Research," *Encyclopedia of Information Science and Technology, First Edition*, pp. 611-616: IGI Global, 2005.
- [28] R. Bhaskar, *Reclaiming reality: A critical introduction to contemporary philosophy*: Routledge, 2010.
- [29] K. Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*, UK: Chelsea Green Publishing, 2017.
- [30] D. C. Poff, "The complexity of the modern university and the emergence of issues related to corporate social responsibility," *University Corporate Social Responsibility and University Governance*, pp. 3-28: Springer, 2022.
- [31] J. C. Lapadat, "Preparing Future Citizens: Global Warming, the Social Good, and the Critical Role of University Teaching," *University Corporate Social Responsibility and University Governance*, pp. 183-202: Springer, 2022.
- [32] A. C. Michalos, "Corporate Social Responsibility in Universities and Sustainable Development," *University Corporate Social Responsibility and University Governance*, pp. 75-104: Springer, 2022.
- [33] A. B. Carroll, "A three-dimensional conceptual model of corporate performance," *Academy of management review*, vol. 4, no. 4, pp. 497-505, 1979.
- [34] R. E. Freeman, *Strategic management: A stakeholder approach*: Cambridge university press, 2010.
- [35] G. P. Lantos, "The boundaries of strategic corporate social responsibility," *Journal of consumer marketing*, 2001.
- [36] G. P. Lantos, "The ethicality of altruistic corporate social responsibility," *Journal of consumer marketing*, vol. 19, no. 3, pp. 205-232, 2002.
- [37] B. W. Husted, and J. de Jesus Salazar, "Taking Friedman seriously: Maximizing profits and social performance," *Journal of Management studies*, vol. 43, no. 1, pp. 75-91, 2006.
- [38] M. E. Porter, and M. R. Kramer, "The big idea: creating shared value," *CFA Digest*, vol. 41, pp. 12-13, 2011.

Relating Human Value Philosophy To Vedic Philosophies With Special Focus On The Concepts Of Body, Self (I) And Intellect As The Ultimate Tool In The Hands Of Human Beings

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Abstract—The *Vedic* philosophy talks of the five types of body or layers for human being physical layer or body or *annmaya kosh*, mental layer or mind or *manomaya kosh*, energy layer or body or *pranamaya kosh*, spiritual layer or body or *adhyatm/gyanmaya kosh* & blissful layer or body or *anandmaya kosh*. The human value philosophy conceptualises every human being a unique combination of body & self or 'I'. Majority of philosophers agree that every human being as combination of food heap & mental impressions. Authors here relate the two philosophies and develop a connecting bridge. Further authors propagate a new concept of tangibility & intangibility of human being. Intellect or *budhi* is viewed as a prime component of the mental layer or body or *manomaya kosh*. Others being identity or ego or *ahankara*, memory or *smriti* & mind stuff or *cit*. Authors here explore the positivity & negativity of intellect based on its usage. Finally, this usage of intellect propels the type of character or *charitra* and finds its destination in actions or *karma*.

Index Terms—Physical layer, mental layer or mind, energy body, spiritual body, blissful body, Spirituality, self or 'I', Yoga philosophy, human values.

I. INTRODUCTION

"We are not human beings having a spiritual experience. We are spiritual beings having a human experience." – Pierre Teilhard de Chardin

The wise words above became the base of knowledge dissemination. If we recall the pyramid of hierarchy [7] as given by Abraham Maslow, we tend to realise the importance of self-realization. Thus imparting the spiritual knowledge is the greatest help extended to any individual.

Let us view it differently. If someone is able to eradicate your needs / wants / desires for a moment your sufferings are also eradicated momentarily. If someone is able to eradicate your needs / wants / desires for a day / week / month / year your sufferings are also eradicated that said period. More needs / wants / desires more sufferings. Thus it can be concluded that there exists a direct proportionality relationship between them. Now, if someone is able to eradicate your needs / wants / desires forever your sufferings are also eradicated forever. This is called the level of self-realization. To conclude it can be said that the greatest help to humans is to educate them spiritually and make them aware about their existence in the universe. [14]

The main objective of this paper is to analyse 'human being' and their connection with other entities. This analysis is further channelized towards the intellect or 'budhi'. After that we make a bridge connecting intellect to *karma* and define *charitra*.

II. PROPOSED WORK(LITERATURE REVIEW)

First we discuss the concept of human being as per the yoga philosophy, followed by the human values philosophy. Next we will create a bridge between them.

Simultaneously we will define and apply the concept of intellect or *budhi* and create an actionable model of character or *charitra* & efforts or *karma*.

A. Vedic Philosophy

The biggest fallacy about yoga philosophy, one among the *pshad darshan*, is what we witness today everywhere, being practiced by number of peoples taught by a teacher or a group similar to physical exercises. These are actually postures or *asans*. Since it is a part of *yoga* so we have started calling *yogasan*. In fact, *yogasan* means the physical posture facilitating *yoga* practice.

Then what is *yoga*? Yoga means addition or summation or unification. It is the process / philosophy of uniting human self with entire universe or existence.

As per the *yoga* philosophy the human being is the outcome of two seedling planted, one biologically (through two human of opposite genders mating) and other spiritually (by the creator). Further the *Vedic* philosophy describes the five types of bodies or layers comprising a human being. These layers / body are:

- a. Physical body/ layer or *annmaya kosh*.
- b. Mental body/ layer or *manomaya kosh*.
- c. Energy body/ layer or *pranamaya kosh*.
- d. Spiritual body/ layer or *gyanmay/adhyatm kosh*.
- e. Blissful body/ layer or *anandmaya kosh*.

Each body / layer has its own specifications & functions. Let us analyse them one by one. [13]

Physical body/ layer or *annmaya kosh* means storage of food what a human being consumes. There is a significant difference in the body of a human being at birth and subsequent stages. Physical body/ layer is divided into three sub

categories. First is the prime organ brain or *mastishk*. Brain is said to be the CPU of the human being. Second is the *gyanendriyaan* or sensory organs. They are six in numbers of which five are pre dominant and one is hidden. The pre-dominant senses are seeing (through eyes), hear (through ears), taste (through tongue), smell (through nose) and feel (through touch or skin). One is hidden or dormant that is ability to predict or foretell. Sometimes being referred as the sixth sense. These sensory organs are analogous to the input devices which feed in the information to the brain or *mastishk*, the CPU of human being. Third is the *karmendriyan* or action organs through which we perform certain actions. These include hands (to do some work), legs (to displace the body from one place to another place), mouth (to speak), elimination (digestion & excretory organs) & procreation (reproductive organs through which you can multiply). [13]

The input is sensed by the sensory organ(s), sent to the brain for processing. After the process is over the instructions are given to the action organ(s) for the intended actions. Clearly this layer is tangible.

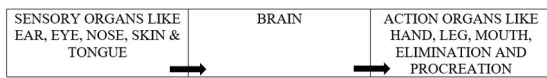


Figure 1 : The flow of information(to brain) and instructions(to action organs)

(Source: Own creation)

Next is the mental body/ layer or *manomaya kosha*. This layer is further divided into four parts. Identity or *ahankara*, memory or *smriti*, intellect or *budhi* & mind stuff or *cit*. The first two have been discussed in detail in our earlier papers. Identity or ego or *ahankara* is a criterion on the basis of which we love to be presented or recognised. This criterion can be the name, caste, race, religion, faith, association, nationality or anything else [6]. The entanglement at a lower level of identity creates chaos, confusion, struggle & conflicts. [4]. as we move towards higher level of identity chaos, confusion, struggle & conflicts subside. Memory or *smriti* has been categorized in various ways. But what makes it more important is its hybrid nature of tangibility & intangibility. Every cell of the human body is a powerhouse of memory storage and carries its own database. The short term memory and long term memory is stored as well in the parts of the brain. This makes the entire mental body hybrid in nature [12].

Intellect or *budhi* is like a double edged sharp knife. The application makes it decisive. Say the case of knife if used by a surgeon saves life, if used by a criminal takes life. The application decides the character and following actions are *karma* [12].

Mind stuff or *cit* is memoryless mental body [11]. Memoryless does not mean loss of memory but signifies the application is not prejudiced or preconditioned by the way of memory. *Pshad* (six) *darshan* defines various *cit* [3] [5]. They are:

- Mudh cit* or donkey minded or stupid/idiotic.
- Kshipt cit* or monkey minded.
- Vikshipt cit* or butterfly minded.
- Ekagra cit* or focussed minded.
- Nirudh cit* or restrict minded.

This layer runs throughout the physical body in a way embedded in it so that they both can engulf remaining three layers.

Followed by the mental body/layer is the energy body or *pranamay kosha*. The word *pranamay* comes from *pranvayu* or O_2 which we inhale. It is responsible for breaking the oxygen we inhale, water / drinks we intake & food we consume to subatomic particles and finally the energy which fuels & propels our mind and body [10].

Next is spiritual body/ layer or *gyanmay/ adhyatm kosha*. The energy body outcome needs to be flown smoothly throughout the body to keep the physical as well as mental layer in the proper condition. There are energy channels (*nadis* or pulse) energy centres (*chakras*) or energy junctions. Human circulatory system tells us about the blood circulation. Clearly haemoglobin carries oxygen to all parts of the body [1]. Along with blood and oxygen two more things flow, they are energy (in form of vibration/pulse) & perception (in form of impressions). These mental impressions are the outcome of the society we live, heritage we get, culture, traditions we follow, food we eat, language we speak etc. [8].

Almost all the ailments (physical, mental, social) are due to malfunctioning of energy body and spiritual body (including psychosomatic diseases). There are three main *nadis* or energy channels *ida nadi*, *pingala nadi* & *sushumna nadi*. *Ida nadi* & *Pingala nadi* runs along with the spine starting from left bottom side & right bottom side respectively. *Sushumna nadi* runs in the centre starting from tip of the spinal cord. There are supposed to be 72000 *nadis* approximately in a human body. Energy starts flowing from bottom to top and the individual characteristics depends on the channel of flow and the last point of flow. Say if your energy flows through *ida nadi* better way the individual is supposed to exhibit female traits more irrespective of biological gender. Converse is true for *pingala nadi*. *Sushumna nadi* is the balanced or unprejudiced or neutral. [13]

These *nadis* meet at junctions or *chakras*. There is a sum total of 114 *chakras* (112 in our body & 2 outside the body). All the *chakras* cannot be activated. 4 *chakras* in our body & 2 outside the body cannot be activated thus making the figure to 108. This figure 108 has a great significance in *sanatan dharma*. [13]

Finally, we have blissful body/ layer or *anandmay kosha*. This is the highest point you can attain. There are yogic & meditative practices through which we can activate *chakras* and smoothen the energy flow. [13]

B. Human Values Philosophy

Human values philosophy talks of every human being a unique combination of a body and self or 'I'. There should be co-existence within as well as in the external expression [7]. Co-existence stresses the importance of each unit in the entire existence including external & internal space. CPU or the brain takes the input from the sensory organ(s), processes (under the impact of the self), and issues final directions to the action organ(s). [2].

$$\text{Human Being} = \text{Body} + \text{Self} \quad (I)$$

III. IMPLEMENTATION (PHILOSOPHY BRIDGING)

Arriving at the tangibility & intangibility the figure clears the things:

PHYSICAL BODY	MENTAL BODY	ENERGY BODY	SPIRITUAL BODY	BLISSFUL BODY	V
PURELY TANGIBLE	HYBRID	HYBRID	PURELY INTANGIBLE	PURELY INTANGIBLE	E
TANGIBLE	TANGIBLE + INTANGIBLE	TANGIBLE + INTANGIBLE	INTANGIBLE	INTANGIBLE	D
					I
					C
					H V
					U A
					M L
					A U
					N E

Fig. 2: Bridging the philosophies.

(Source: Own creation)

So the tangible parts of the mental body & the energy body are added to the physical body whereas the intangible parts of the mental body & the energy body are added to the spiritual body & the blissful body. Thus we get two entities, former is said as body & later is said as self or 'I'. [9][17].

IV. THE ACTIONABLE MODEL (THEORETICAL CONTRIBUTION FROM THE AUTHOR(S).)

The actionable model in learning is defined as a form of inductive reasoning where new knowledge is generated based on keen observations. In the earlier sections we have observed that the application of the intellect or *budhi* is quiet decisive. We can recall the example where we analogue the *budhi* as a sharp double edged knife. The character is defined as a gap in one's words & actions [16]. A constructive application of the intellect leads to a good character or *charitra* which in turn propels good actions or *karma*. On the contrary a destructive application of the intellect leads to a bad / ambiguous character or *charitra* which in turn propels bad actions or *karma*. [15]

The intellect or *budhi* which is a part of mental layer of hybrid nature mainly relates to the human self or 'I'. As per the human value philosophy the governing of the human self or 'I' is the critical point. If it is governed by the acceptance (peer pressure or *dabaav*, influence or *prabhaav*, scarcity or *abhaav* & sensations or *samvedanaaen*) we will observe the exploitative application of the *budhi* hence bad / ambiguous character & bad / ambiguous actions or *karma* in the external as well as internal expressions. If it is governed by the natural acceptance, we will observe the harmonious application of the *budhi* hence decent character & good actions or *karma* in the external as well as internal expressions. To sum up, the sketch will be a handy tool.

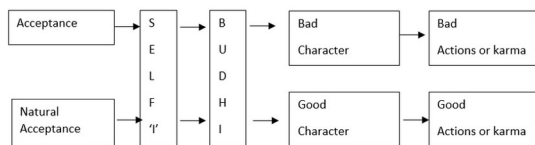


Fig. 3: The Actionable Model

(Source: Own creation)

V. RELATIONSHIP EXISTING AMONG THE FIVE TYPES OF BODIES OR LAYERS

As discussed above the five layers namely the physical, mental, energy, spiritual and blissful are in fact deeply connected. This interrelatedness varies from philosophy to philosophy which is the entire objective of writing this paper. Here we are exploring the same for the two philosophies Vedic (Yogic) and human value, the scope of the present paper. Let us begin with the Vedic (Yogic) philosophy and then we will be covering human values philosophy.

Let us suppose that we have five envelopes of different sizes say mini, medium, normal, ultra & mega. They represent the five layers blissful, spiritual, energy, mental & physical respectively. The blissful layer is the ultimate energy which in turn keeps us charged throughout the life and we are activated. A slightly varied opinion may term it as karmic layer / soul etc. etc. When we dematerialize, no matter naturally or by death this karmic layer escapes and is supposed to attain the liberation from birth – death cycle or re-enter the cycle depending on the karmas. Now what we keep it in the next bigger envelope, which is spiritual layer.

Spiritual layer channelizes the energy flow in our body. Say for example we have a battery which stores the electrical energy but we do not know how to use it. So it is useless for us. Same way we have intrinsic energy as well as we acquired energy from external sources through food, air, water, sunlight but we do not know how to use it. Recall in your early days when you were not able to speak and you suffered some or other ailment. Grandma's prescription was to apply cow ghee / mustard oil with garlic / astofoetida or anything else in navel or other physical body parts. They are junctions of our nadis / channels. The network runs across the body. The interesting thing is that modern medical science is still unable to map this network. Navel is connected to manipurka chakra which is supposed to be the largest junction in our body where almost all major / minor nadis meet. So when we apply grandma's prescription there the neutralising agents reach every part of the body giving immediate relief to the child / adult. We apply glue to the front surface of this envelope and keep it inside next bigger envelope, which is energy layer.

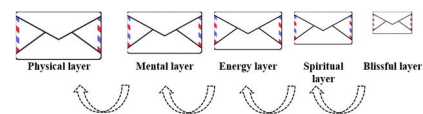


Fig. 4 Interrelation of various layers

Every time we are applying glue symbolically exhibiting the bondage between the layers. Next comes the energy layer whose main function is to extract the energy from what we consume as food, water, air / oxygen, sunlight etc. There is the entire mechanism within our body to carry out this process. Internal organs carry out the function. It strikes the analogy of the battery inverter assembly in charging mode, solar PV converting sunlight to energy etc. The things are getting clearer now. Energy layer transforms the input energy spiritual layer channelizes this energy. We repeat the process of applying glue on front of it and keep it in the next bigger envelope. Next layer is mental layer which is embedded into the physical layer as well as extends outside in form

of aura from few inches to few feet, depending on the conditions. There are techniques through which we can photograph one's aura. Intellect or buddhi is one part of this layer. Others are identity / ahankaar, memory / smriti and mind stuff / chit. Intellect is like a sharp blade / knife which may be used for construction or destruction depending on who uses it and how the individual is governed. A knife can be used to save life by a surgeon, cook food by a cook & kill a person by a criminal. Surgeon / cook are governed largely by natural acceptance whereas cook lacks that. Sometimes you may like/dislike a person depending on aura. Same process is carried out of applying glue on the front of this envelope and keep it inside the last and biggest envelope which is the physical layer. This layer comprises of sensory organs (eye, ear, nose, tongue & skin) ; action organs (hand, leg, mouth ,digestive / elimination & procreation/reproduction) ; other organs not coming under any other layer. We close this envelope and write human being over it. This is what one philosophy says.

Human value philosophy divides it into two parts body & self (I). All the tangible parts of each layer (if any) is clubbed together and said as body. Whereas all the intangible part of each layer (if any) are clubbed together and said self (I).

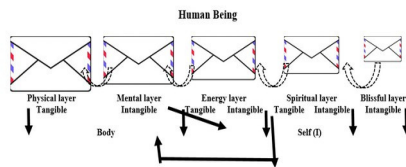


Fig. 5 Concept of Human being.

When dematerialization happens, all the layers except karmic is destroyed, symbolically the glue on all the envelope washes out leaving unglued smallest envelope behind.

VI. INTERDEPENDENCY OF BODY, SELF & INTELLECT

It is discussed above that as per the human value philosophy self or I is the major driving force and the human body is simply a gadget. Thus governing of self is the most important thing which triggers the body. Intellect being intangible and comes under self is major force behind driving the body. If your self / I / intellect is governed by natural acceptance the energies will be channelized towards construction, if not else will follow. If the layers are taken care of say good food, good thoughts, good lifestyle the self is in a bliss state hence governs the body the way positive karmas / actions follow.

VII. MANAGEMENT PERSPECTIVE OF THE STUDY

Looking the study from the management's perspective it gives us number of learnings. Intellect or buddhi, which is a vital component of mental body and being intangible in nature contributes to self or I. So intellect plays a vital role in driving the physical gadget or body. How the body performs depends on the intellect. It is a double edged blade can give positive actions or negative actions be it a society or workplace. This tells us the importance of organisational culture & it's indoctrination.

Competency is the portion of self governed naturally. A highly competent personality is developed through naturally governed self (indirectly intellect). A highly competent personality can guarantee you ethical environment & hence organisational leadership.

When the switching happens it can be termed as organisational dematerialisation as you are moving to other culture which needs indoctrination again.

Today the competency means flexibility, resilience, adaptability apart from the domain expertise. How fast you indoctrinate the new culture determines the competency. A high competency means a better work life balance.

VIII. CONCLUSION & FUTURE SCOPE OF WORK

The above discussion reveals that as long as we continue the exploitative application of our intellect we cannot have a good character & good karma. There are yogic and meditative practices to ensure it. Indian philosophy says that the four layers of the body are destructible but one karmic layer remains intact and carries you to the next cycle or moksha. So it is important to make sure that our good deeds are in abundant so that we can be liberated from the birth death cycle.

In future we can explore the ways to avoid the exploitative application of mind or mann of course the intellect or budhi. Having right understanding about identity, right usage of memory to facilitate memoryless actions, ways to proper energy layer functioning, ensuring holistic wellness can be some of the points for future exploration.

IX. LIMITATIONS OF THE STUDY

Major limitations of the study are listed as under:

- Partial emphasis on the Yog philosophy. All the eight dimensions of the philosophy could not be illustrated in detail.
- Partial emphasis on Sankhya philosophy. Concepts like mahabhut and tanmatras are not discussed.
- Nyay, Vaisheshika and Mimamsa philosophies are holistically discussed.
- Western, Buddhist and Sino philosophies are excluded to keep the paper within the limits.

REFERENCES

- [1] Acharya Y.T. (2006) Charak Samhita with Ayurveda [Online] Available at : <https://www.bibliomed.org/fulltextpdf.php?mno=170946> (Accessed : 10 August 2021)
- [2] AICTE (2021) SIP UHV I Teaching Material [Online] Available at: <http://www.fdp-si.aicte-india.org/download.php#1> (Accessed: 7 August 2021).
- [3] Amin, Hetal & Sharma, Rohit (2014). Concepts of Manas (mind): An Insight from Vaiseshika Darshana and Ayurveda, British Journal of Medical and Health Research, 1(1), pp. 1-12.
- [4] Amin, Hetal, Sharma, Rohit, Vyas, Hitesh & Vyas, Mahesh. (2015). Concept of Manas in Samkhya Darshana. Indian journal of history of science. 50(1). pp. 125-130. [Online] Available at: https://insa.nic.in/writereaddata/UpLoadedFiles/IJHS/Vol50_2015_1_Art08.pdf (Accessed: 12 July 2021).
- [5] Amin, Hetal & Sharma, Rohit (2016). Concept of Manas in Mimāṃsā Darśana, Yog-Mimamsa, 48(1), pp. 4-8.
- [6] Blum, Milton L. & Naylor, James C. (1968). Industrial Psychology: Its Theoretical and Social Foundations. (3rd edition). New York: Harper and Row.
- [7] Deshpande, Archana (2015) Industrial Psychology. SUN India Publishers.

- [8] Deshpande, Archana (2016) *Industrial Sociology*. SUN India Publishers.
- [9] Gaur, R.R, Sangal, Rajeev & Bagaria, G.P. (2010). *A Foundation Course in Human Values and Professional Ethics*. New Delhi: Excel Books. ISBN: 978-81-7446-781-2.
- [10] IGNOU: School of Social Sciences (2015). *Fundamentals of Mental Health: Concept of mind*, Indira Gandhi National Open University, pp. 14-26, ISBN-978-81-266-6715-4.
- [11] Krishnappa, D T, Sridhar, M K, & Nagendra, H R (2020). Concept of mind in Indian philosophy, Western philosophy, and psychology, *Yog-Mimansa*, 52(1), pp. 25-28.
- [12] Sadh guru (2015) *The Four Parts of Mind – Harnessing the True Power of the Mind* [Online]. Available at: <https://isha.sadhguru.org/yoga/yoga-articles-mind-stress/parts-of-mind/> (Accessed: 7 August 2021).
- [13] Sadh guru (2020) *Death An Inside Story*, 1 Ed., Penguin Ananda.
- [14] Sadh guru, Subramaniam. A (2019), *Adiyogi The Source of Yoga*, Harper Collins. DOI: <http://dx.doi.org/10.15439/2021KM12>
- [15] Shivgotra, Rachin & Gupta, Rahul Kumar (2019). Literary review of Manas in Ayurveda, *Journal of Ayurveda and Medical Sciences*, 2019, 4(2), pp 118-120, ISSN 2456-3110.
- [16] Soni, Jayandra (2020). The Concept of Manas in Jaina Philosophy, *Journal of Indian Philosophy* 48: pp. 315–328.
- [17] Tripathi, A.N. (2021). *Human Values* (3rd. edition). New Age International.

Technology Threat Avoidance Factors Affecting Cybersecurity Professionals' Willingness to Share Information

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Abstract—Through the Cybersecurity Information Sharing Act of 2015, a DHS information-sharing program was mandated to protect U.S. businesses and critical infrastructure and mitigate cyberattacks. The present study examined cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats via that program. The technology threat avoidance theory (TTAT) served as the study's theoretical framework. This research examined to what extent technology threat avoidance factors affect cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats. Threat avoidance factors consisted of perceived susceptibility, perceived severity, perceived threat, prevention effectiveness, prevention cost, and self-efficacy. This cross-sectional study used partial least squares-structural equation modeling to analyze data collected from 137 cybersecurity professionals with a minimum of five years of cybersecurity experience. The data analysis indicated that perceived susceptibility and perceived severity significantly predicted participants' perceptions of cybersecurity threats, and perceived threat explained 44% of the variance in avoidance motivation. Prevention effectiveness, prevention cost, and self-efficacy were not significant predictors of avoidance motivations and the willingness to participate in the DHS's information-sharing program. These results indicate that more research is necessary to understand the factors influencing information sharing among cybersecurity professionals working in U.S. organizations.

Index Terms—cybersecurity, TTAT, PLS-SEM, Dept. of Homeland Security, information sharing.

I. INTRODUCTION

Cybersecurity has become a topic of national interest for countries worldwide [26], [29], [31]. In the United States, the Cybersecurity Information Sharing Act of 2015 (CIS) sought to facilitate cyber threat information sharing between the U.S. federal government and the private sector through the Department of Homeland Security (DHS). The DHS implemented an information-sharing program to bolster collaborative security efforts between the public and private sectors and mitigate threats to critical infrastructure from persistent cyberattacks. Unfortunately, companies in the private sector have been slow to participate in the DHS program ([13], [17], [25]. Federal cybersecurity initiatives help clarify government regulations on cybersecurity, and scholars have noted the benefits of federal government support, information sharing, and collaboration in the fight against cybercrime [32], [35]. The proposed study will examine how technology avoidance threat factors influence cybersecurity professionals' willingness to share information through the DHS program.

A. Information Sharing

Information sharing. In the context of the proposed study, information sharing refers to the exchange of cybersecurity threat and mitigation data through the DHS program established by the Cybersecurity Information Sharing Act of 2015. Information sharing is defined in the literature as the set of organizational activities aimed at exchanging information with others proactively and on request to address a business or regulatory requirement, aid the needs of another, or resolve mutual problems [13]. The sharing involves technical and manual platforms accessed through formal and informal relationships and systems [13].

II. LITERATURE REVIEW

The present study will examine the factors affecting cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats. Liang and Xue's [19] technology threat avoidance theory (TTAT) will be used as a conceptual framework to support the proposed study. The premise of the TTAT is that individuals, such as cybersecurity professionals, are influenced by motivations to safeguard against technology threats. The TTAT model's leading independent variables are perceived threat, protect effectiveness, safeguard cost, and self-efficacy. The TTAT model also includes perceived susceptibility and severity as independent variables influencing perceived threat. Together, the independent variables influence a user's avoidance motivation, which, in turn, affects avoidance behavior.

Many scholars have used the TTAT to examine cybersecurity-related behaviors [3], [4], [5], [8], [15]. The TTAT model effectively determines whether specific threat avoidance factors influence cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats through inter-organizational collaboration. Figure 1 presents the study's conceptual model based on the TTAT.

The United States is transiting from a society of nearly 4 billion Internet-connected users to a new age of automation, big data, and the Internet of things [14]. Threats posed by cyberattacks cannot be ignored, and virtual walls cannot be built to keep bad actors out [18]. In the 21st century, cybersecurity plans must address iPhone or Android devices that have become virtual repositories of sensitive personal and business information [7]. Personal smart devices contain client and personal contact lists and correspondence, graphic

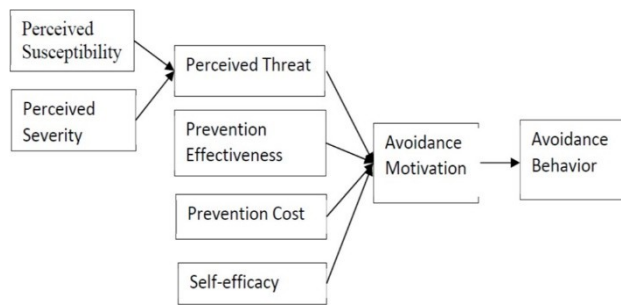


Figure 1 – The Study's Conception Framework. Note. From "Understanding Security Behaviors in Personal Computer Usage: A Threat Avoidance Perspective," by H. Liang & Y. Xue, 2010, *Journal of the Association for Information Systems*, 11(7), p. 402 (<https://doi.org/10.17705/1jais.00232>). Copyright Association for Information Systems.

images, photographs, health data, financial data, and intellectual property [7]. Personally identifiable information, proprietary data, and intellectual property must be protected from data breaches through defined cybersecurity programs [7].

Cybersecurity risks have been identified as one of the most serious national security and economic challenges facing the United States, and it appears to be misunderstood by policy actors [30]. The Internet represents an environment where large volumes of data are collected, stored, and readily transmitted, resulting in more significant social privacy implications and an increasing need for protective measures [9]. Cybersecurity involves protecting digital devices and the ability to communicate securely on the Internet and preventing unauthorized access or operating disruptions [23].

Security practitioners face various asymmetrical cyber threats [24]. These advanced persistent threats (APT) and financially motivated cyberattacks fall into ten categories identified as distributed denial of service (DDoS), session hijacking/man-in-the-middle, phishing/spear-phishing, drive-by, structured query language (SQL) injection, cross-site scripting (XSS), password, eavesdropping, birthday, and malware which are used in furtherance of financial gain [24]. Cybercrime uses computers as an instrument, target, or warehouse to further criminal activity such as identity theft, child exploitation, fraud, extortion, gambling, and hacking [24], [25].

A. Cybersecurity Threat Prevention

Many security professionals apply a perimeter defense strategy for cybersecurity by building a wall around the network for protection, relying on firewalls, conducting virus scanning, and deploying intrusion protection [5]. Organizations assume that everything inside the perimeter is secure and trusted when sophisticated threat actors defeat vulnerable perimeter defenses and security processes [5]. Applying the zero-trust security model ensures that all network resources are accessed securely and strictly on a need-to-know basis. All network traffic is subject to inspection and logging [5].

Prevention of cyberattacks, vulnerabilities, and technology failures that can lead to disruptions of operations and services is built around an organization's security structure and strategy[21]. Often protective methods rely on solid

leadership, collaborative relationships between the private sector and federal government, and shared responsibilities for defensive and responsive actions [27]. Costs play a significant role in security and resiliency development and implementation in many cases. In 2018, the price per lost or stolen record through a cyberattack was approximately \$148 [12]. Viewing that cost at scale, the magnitude of a cyber-system breach cost Yahoo roughly \$440 billion, making preventive strategies essential [12].

III. RESEARCH DESIGN AND METHODOLOGY

The research design for the present study was a quantitative, non-experimental, cross-sectional design using partial least squares-structural equation modeling (PLS-SEM). The research model contained the six constructs of the TTAT (i.e., perceived susceptibility, perceived severity, perceived threat, prevention effectiveness, prevention cost, and self-efficacy). Avoidance behavior serves as a dependent variable. The research design analyzed each TTAT construct to determine the predictive significance of these factors when considering information security leaders' behavioral intentions to share cyber threat information to implement safeguard measures. The overarching research question asked: To what extent do technology threat avoidance factors affect cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats? Potential participants included full-time cybersecurity professionals working in the United States.

The present study uses a modified version of the TTAT (Liang & Xue, 2010). Liang and Xue (2010) designed the TTAT to measure security behaviors related to personal computer usage. The modified version of the TTAT used in the present study will examine perceptions and behaviors associated with information sharing to reduce cybersecurity threats. Permission to use and modify the instrument was obtained from Liang and Xue before the data collection began.

The modified survey used consists of 49 questions. Five questions collect demographic data on age, gender, and work experiences. The remaining 44 items measure the independent variables of perceived susceptibility (5 questions), perceived severity (10 questions), perceived threats (5 questions), prevention effectiveness (6 questions), prevention cost (3 questions), and self-efficacy (10 questions) and the dependent variable of avoidance behavior (5 questions). All items on the TTAT survey instrument will be measured using a 7-point Likert-type scale. All but one of the variables are calculated using a scale that ranges from 1 (Strongly disagree) to 7 (Strongly agree). The one exception is perceived severity, measured on a 7-point Likert type scale ranging from 1 (Extremely innocuous) to 7 (Extremely devastating).

IV. RESULTS

This study used the technology threat avoidance theory (TTAT) to identify the most significant factors influencing cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats. After evaluating the model constructs to ensure an acceptable fit,

A PLS-SEM path analysis was conducted. Figure 2 presents the path analysis for the PLS-SEM model. The strength and significance of each path coefficient are presented with the significance values shown in parentheses. Green arrows represent significant relationships between model constructs ($p < 0.05$), whereas red arrows indicate non-significant relationships ($p > 0.05$). Perceived susceptibility and perceived severity were significantly and positively associated with perceived threat, explaining 67% of the variance in perceived threat ($R^2 = 0.669$). Additionally, perceived threat was a significant predictor, explaining 44% of the variance in avoidance motivation ($R^2 = 0.441$). None of the other variable relationships within the model were significant.

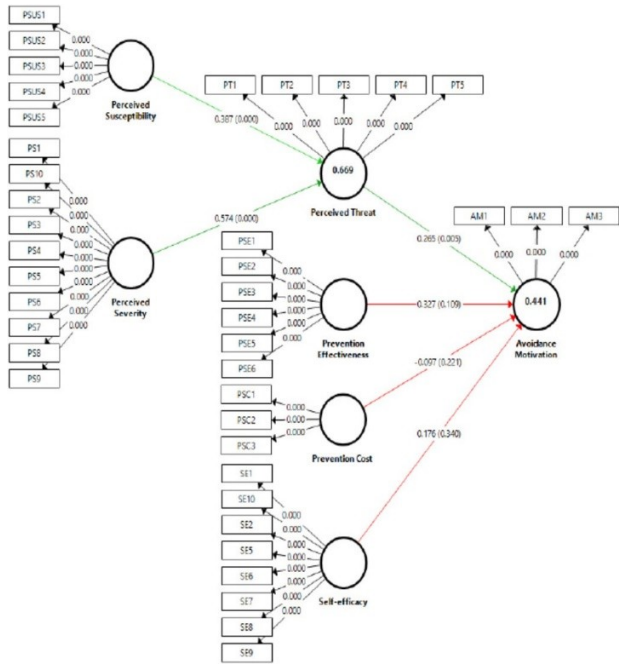


Figure 2 - Path Analysis Model.

Table 1 reports the hypothesis testing results of the path analysis in table format. The path coefficients represent the strength and direction of the variable relationships used to test the study's hypotheses, and the p-values indicate the significance of the statistical relationships. Significance values below 0.05 indicate that the relationship is significant and the null hypothesis should be rejected, while p-values above 0.05 indicate that the null hypothesis cannot be rejected.

In summary, a PLS-SEM path analysis was used to analyze data collected from $N = 137$ cybersecurity professionals in the United States. The study's purpose was to use the TTAT to identify the most significant factors influencing cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats. The presented results demonstrate how technology threat avoidance factors affected cybersecurity professionals' willingness to avoid cybersecurity threats through information sharing. The findings indicated that cybersecurity professionals' perceptions of attack susceptibility and severity were significantly related to their perceived threat levels. Additionally, perceived threat was a significant predictor of avoidance motivation. Prevention effectiveness, prevention cost, and self-efficacy were not significant predictors of avoidance motivations.

TABLE 1 - NOTE. PS = PERCEIVED SEVERITY, PSUS = PERCEIVED SUSCEPTIBILITY, PT = PERCEIVED THREAT, PSE = PREVENTION EFFECTIVENESS, PSC = PREVENTION COST, SE = SELF-EFFICACY, AND AM = AVOIDANCE MOTIVATION.

Results of the Hypothesis Testing

Paths	Path Coefficients	T Statistics	P values	Null Hypothesis Results
PS → PT	0.574	7.053	0.000	Rejected
PSUS → PT	0.387	4.714	0.000	Rejected
PT → AM	0.265	2.802	0.005	Rejected
PSC → AM	-0.097	1.226	0.221	Not Rejected
PSE → AM	0.327	1.605	0.109	Not Rejected
SE → AM	0.176	0.956	0.340	Not Rejected

V. CONCLUSION

A. Discussion of the Findings

The study addressed the specific problem of the lack of information regarding how perceived susceptibility, perceived severity, perceived threat, prevention effectiveness, prevention cost, and self-efficacy influence information sharing and collaborative protection behaviors among cybersecurity professionals responsible for securing organizational data. When evaluating the full TTAT model, the results of the PLS-SEM path analysis revealed that prevention cost, prevention effectiveness, and self-efficacy were not significantly related to cybersecurity professionals' willingness to collaborate and share information regarding cybersecurity threats. Instead, participants were motivated to act based on their perceived threat level, which was influenced by threat severity (magnitude) and susceptibility (vulnerability). Liang and Xue [20] and Carpenter et al. [6] reported significant relationships between perceived threat and avoidance motivation. However, the remainder of the model was not explanatory in the context of cybersecurity professionals' willingness to share information via the DHS.

B. Limitations of the Study

The scope of this research was limited to the study of U.S. cybersecurity professionals' technology threat avoidance and information-sharing perceptions and behaviors. The study's main design limitation was that it only collected quantitative data. This decision meant that the data only addressed the TTAT variables, and descriptive narrative data was not included in the study. Using quantitative data to examine the relationships between variables is standard practice. Still, the results will not reflect the details of specific cybersecurity incidents or the participants' reflections [28], [33]. The research design did not assess the different types and sizes of organizations, which also limited the findings. Cybersecurity professionals at differently sized U.S. organizations might approach cybersecurity and participation in the DHS information-sharing program differently [13], [16], [2], [11]. However, the study's goal was not to compare different company types or sizes when evaluating the variable relationships.

C. Implications for Practice

From a theoretical perspective, this study supported the TTAT as a research model that explains some avoidance motivations related to information sharing and I.T. threats [20]. From a practical perspective, cybersecurity professionals, information security leaders, organizations, and policy-makers can use the study's findings to enhance the governance and risk management of cyber and information security programs. The findings partially explain how users respond to I.T. threats [19]. The study contributed to information and cybersecurity and provided a deeper understanding of the human factors influencing an individual's threat avoidance motivation [6]. The study also highlighted aspects of the TTAT that may not relate to information sharing and cybersecurity.

Information sharing has become a very important aspect of threat mitigation for U.S. organizations. The emphasis on information has evolved from the occasional voluntary participation in industry-based information-sharing alliances toward more policy-driven participation in collaborative information-sharing between organizations. U.S. government organizations are implementing policies mandating cyber threat reporting and information sharing for critical infrastructure and publicly traded organizations. The results and conclusions of the study provide insight to Congress and the DHS Cybersecurity & Infrastructure Security Agency on cybersecurity professionals' information sharing and threat prevention motivations.

D. Recommendations for Further Research

It is important to understand technology users' and cybersecurity professionals' technology threat avoidance motivations and behaviors from scholarly and practical perspectives. The current study addressed the lack of knowledge regarding how perceived threat susceptibility, perceived threat severity, prevention effectiveness, prevention cost, and self-efficacy influence information sharing and collaborative protection behaviors. These factors have been shown to affect threat avoidance motivations and behaviors [3], [4], [15], [19]. However, the present study's findings were mixed, and additional research is needed to further explore the TTAT's applicability in cybersecurity and information-sharing contexts.

Cybersecurity is a global issue, and research should be conducted to determine technology threat avoidance information sharing from an international perspective [1], [22], [31]. The data were collected through a web-based survey, increasing the potential for self-selection, desirability, and acquiescence bias. Future studies should include design factors that help reduce those potential biases. Additionally, researchers should use qualitative methods to obtain descriptive narrative data from participants using the TTAT framework to identify potential latent variables that were not examined in this study. Combining quantitative and qualitative data collection methods could provide a more comprehensive picture of cybersecurity professionals' technology threat avoidance behaviors [10], [28], [33], [22].

The study addressed a knowledge gap regarding perceived threat susceptibility, perceived threat severity, prevention effectiveness, cost, and self-efficacy in U.S. cyber-

security professionals' information-sharing and collaborative protection behaviors. These factors have been shown to affect threat avoidance motivations and behaviors in some settings [3], [4], [15], [19]. This population's information-sharing was a critical issue because of low participation in the DHS's information-sharing program.

In summary, this study addressed the general problem of the lack of inter-organizational collaboration on cybersecurity threats between private firms and the U.S. federal government by exploring cybersecurity professionals' perceptions of cybersecurity threats and attitudes toward information sharing. By studying these factors, the present study revealed that cybersecurity professionals' willingness to share cyber threat information was significantly influenced by perceived threat (e.g., susceptibility and severity). These findings can be used to improve threat avoidance through information sharing. The study contributes to the threat avoidance literature and the U.S. government's efforts to strengthen national cybersecurity through information sharing.

REFERENCES

- [1] N. Akhtar, "Latest trends in cybersecurity after the Solar Wind hacking attack." Foundation University Journal of Engineering and Applied Science, 1(2), 14-24, 2020. <https://doi.org/10.33897/fujeas.v1i2.347> [Accessed Sept. 10, 2022]
- [2] M. Amanowicz, Towards building national cybersecurity awareness. International Journal of Electronics and Telecommunications, 66(2), 321-326, 2020. <https://doi.org/10.24425/ijet.2020.131881> [Accessed Oct. 11, 2022]
- [3] F. Aribake and Z. Aji, Assessment on phishing avoidance behavior among Internet banking users in Nigeria: A conceptual model. Journal of Information System and Technology Management, 5(16), 1-14, 2020. <https://doi.org/10.35631/JISTM.516001> [Accessed Oct. 11, 2022]
- [4] K. Asante-Offei, and W. Yaokumah. Cyber- identity theft and fintech services: Technology threat avoidance perspective. Journal of Information Technology Research, 14(3), Article 1, 2021. <https://doi.org/10.4018/JITR.2021070101> [Accessed Oct. 11, 2022]
- [5] J. Baker and K. Waldron. "5G and zero trust networks." 2020. <https://www.jstor.org/stable/resrep27016> [Accessed Aug. 11, 2022].
- [6] D. Carpenter, D. Young, P. Barrett, and A. McLeod, Refining technology threat avoidance theory. Communications of the Association for Information Systems, 44, Article 22., 2019. <https://doi.org/10.17705/1CAIS.04422>
- [7] M. Caveltty, C. Mauer, and F. Krishna-Hensel, F., Power and security in the information age: Investigating the role of the state in cyberspace, 2016. New York, NY: Routledge
- [8] H. Chen and W. Li, Mobile device users' privacy security assurance behavior: A technology threat avoidance perspective. Information and Computer Security, 25(3), 330-344, 2017. <https://doi.org/10.1108/ICS-04-2016-0027>
- [9] M. Chertoff, Exploding data: Reclaiming our cyber security in the digital age, 2018. New York, NY: Atlantic Monthly Press [Accessed Aug. 4, 2022].
- [10] J.W. Creswel and J.D. Creswell, Research design: Qualitative, quantitative, and mixed methods approaches, 2017. Sage Publications.
- [11] P. Datta, Hannibal at the gates: Cyberwarfare & the Solarwinds sunburst hack. Journal of Information Technology Teaching Cases, 2021. <https://doi.org/10.1177%2F2043886921993126>
- [12] H. Hammouchi, O. Cherqi, G. Mezzour, M. Ghogho, and M. Koutbi, "Digging deeper into data breaches: An exploratory data analysis of hacking breaches over time." Procedia Computer Science. 151. 1004-1009, 2019. 10.1016/j.procs. 2019.04.141, [Accessed Sept. 4, 2022].
- [13] J. Jaffer, Carrots and sticks in cyberspace: addressing critical issues in the Cybersecurity Information Sharing Act of 2015, 2016. SCL Rev., 67, 585. [Accessed Aug. 4, 2022].
- [14] C. James. "Cybersecurity: Threats challenges opportunities", 2016, <https://www.bing.com/search?q=cybersecurity+threats%2c+challenges+opportunities&q=NW&pq=cybersecurity+threats>

- %2c+challenges+oppor&sk=NWU1
&sc=339&cvid=0529FF8B243C428F8074A83D428EC0E8&FORM=QBRE&sp=2&ghc=1 [Accessed July 20, 2021]
- [16] A. Jibril, M. Kwarteng, R. Botchway, J. Bode, and M. Chovancova, "The impact of online identity theft on customers' willingness to engage in e-banking transaction in Ghana: A technology threat avoidance theory. *Cogent Business & Management*," 7(1), Article 1832825, 2020. <https://doi.org/10.1080/23311975.2020.1832825>
 - [17] D. Johnson, "The federal government has big plans for the Automated Indicator Sharing program, but agency officials and members of Congress continue to express frustration at the sluggish pace of enrollment", 2017, <https://fcw.com/security/2017/11/enrollment-for-threat-sharing-program-continues-to-lag/227957/> [Accessed Feb. 5, 2020].
 - [18] D. Johnson, "How info sharing can get unstuck", 2018. <https://fcw.com/security/2018/11/how-info-sharing-can-get-unstuck/199096/> [Accessed Feb. 5, 2020].
 - [19] S. Landau, *Listening in: Cybersecurity in an insecure age*, 2017. New Haven, CT: Yale University Press
 - [20] H. Liang and Y. Xue, Avoidance of information technology threats: A theoretical perspective. *Management Information Systems Quarterly*, 33(1), 71-90, 2009. <http://dx.doi.org/10.2307/20650279> [Accessed Oct. 4, 2022].
 - [21] H. Liang and Y. Xue, Understanding security behaviors in personal computer usage: A threat avoidance perspective. *Journal of the Association for Information Systems*, 11(7), 394-413, 2010. <http://dx.doi.org/10.17705/1jais.00232> [Accessed Aug. 12, 2022].
 - [22] I. Mandritsa, I. Tebueva, V. Peleshenko, V. Petrenko, O. Mandritsa, I. Solovyova, A. Fensel, and M. Mecella, "Defining a cybersecurity strategy of an organization: criteria, objectives and functions", 2018, <http://ceur-ws.org> [Accessed July 20, 2021].
 - [23] M. Mark, "An Analysis of Factors Influencing Phishing Threat Avoidance Behavior: A Quantitative Study", Capella University ProQuest Dissertations Publishing, 2021. 28320611. <https://www.proquest.com/dissertations-theses/analysis-factors-influencing-phishing-threat/docview/2506645080/se-2?accountid=44888>
 - [24] R. Meeuwisse, *Cybersecurity for beginners*, 2017. London, United Kingdom: Cyber Simplicity Ltd
 - [25] J. Melnick, "Top 10 most common types of cyber-attacks" 2018. <https://blog.netwrix.com/2018/05/15/top-10-most-common-types-of-cyber-attacks/> [Accessed Aug. 4, 2022].
 - [26] S. R. Muller, "An Intersection of Information Security Policies and I.A. Awareness, While Factoring in End-User Behavior: A NIST Cybersecurity Framework Perspective on "Identify", 2020. *Proceedings of International Conference on Research in Management and Technovation, ICRMAT 2020 Vol (24). Annals of Computer Science and Information Systems* ISSN 2300-5963
 - [27] S.R. Muller, and D.N. Burrell, "Social Cybersecurity and Human Behavior", 2022. *International Journal of Hyperconnectivity and the Internet of Things (IJHIoT)*, 6(1). Hershey, PA: IGI Global
 - [28] S.R. Muller, and M. Lind, "Factors in information assurance professionals' intentions to adhere to information security policies", 2020. *International Journal of Systems and Software Security and Protection*, 11(1). Hershey, PA: IGI Global
 - [29] S. Rahi, Research design and methods: A systematic review of research paradigms, sampling issues, and instruments development. *International Journal of Economics & Management Sciences*, 6(2), Article 10000403, 2017. <http://dx.doi.org/10.4172/2162-6359.1000403>
 - [30] G. Sharkov, Assessing the maturity of national cybersecurity and resilience. *Connections: The Quarterly Journal*, 19(4), 5-24, 2020. [Accessed Aug. 4, 2022]. <https://doi.org/10.11610/Connections.19.4.01>
 - [31] P. Singer and A. Friedman, *Cybersecurity and cyberwar: What everyone needs to know?* New York, NY: Oxford University, 2014.
 - [32] M. Tvaronavičienė, T. Plėta, S. Casa and J. Latvys, Cyber security management of critical energy infrastructure in national cybersecurity strategies: Cases of USA, UK, France, Estonia, and Lithuania. *Insights into Regional Development*, 2(4), 802-813, 2020. [http://doi.org/10.9770/IRD.2020.2.4\(6\)](http://doi.org/10.9770/IRD.2020.2.4(6))
 - [33] N. Yang, T. Singh, A. Johnston, A replication study of user motivation in protecting information security using protection motivation theory and self-determination theory. *AIS Transactions on Replication Research*, 6(10), 2020. <https://doi.org/10.17705/1atrr.00053>
 - [34] N. Zeng, Y. Liu, P. Gong, M. Hertogh, and M. König, Do right PLS and do PLS right: A critical review of PLS-SEM application in construction management research. *Frontiers of Engineering Management*, 2021. <https://doi.org/10.1007/s42524-021-0153-5>
 - [35] A. Zibak and A. Simpson, "Cyber threat information sharing: Perceived benefits and barriers, August 2019. *Proceedings of the 14th international conference on availability, reliability, and security* (pp. 1-9).

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Integrating E-learning in Metaverse for Sustainable Development of Higher Education and Training

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Abstract—Today, the development of information technology in the context of the industrial revolution 4.0 has changed the face of education rapidly and raised many new problems in this context. Along with that, the process of globalization has also given birth many non-traditional education methods. These types of education have transcended space, time, and types of boundaries. The article mentions the role and importance of metaverse in the global trend of higher education development through e-learning in the process of implementing cross-border education in universities all over the world. The article uses an interdisciplinary approach: education, science, and technology... to build a metaversity model in metaverse to develop training at universities in a sustainable way.

Index Terms—metaverse, metaversity, e-learning, borderless education.

I. INTRODUCTION

Entering the 21st century, in the context of the industrial revolution 4.0, higher education has been applying information and communication technology to serve higher education. This is reflected in the digital transformation taking place in training institutions around the world. According to Susan Grajek and Betsy Reinitz [13], transfer process at universities around the world by 2020 indicates that 13% of colleges and universities are engaged in digital transformation, 32% are developing a digital transformation strategy and 38% of other higher education institutions are exploring digital transformation, only 17% of educational institutions do not have time to enter the process.

Along with that, the process of globalization has given birth to many non-traditional educational methods. New generations demand different delivery methods and curricular content. Flexibility and personalized offerings have become a common denominator in all sectors [11]. These types of education have transcended space, time, and types of boundaries. Many non-traditional educational models, such as virtual education..., were born, have been making it possible for new education providers to carry out educational work more smoothly than ever before. The emergence of the market for higher education services in the globalization trend is increasing [4]. Many university programs cross borders from universities through the internet and other means of distance education to learners worldwide. One of the new trends is distance education through "virtual univer-

sities" that can form and develop. A form of transition from an real university to a Metaverse university is the Hybrid university (Augmentation model – replicates everything and enables access anytime and form anywhere – using IT to virtualize the real environment as a means of broadening access [5]). IT has become a driving force in the formation of a global academic environment, and it also contributes to the connection, dissemination, and exchange of all achievements between universities, research institutes, production facilities and corporate groups around the world. There are many types of universities that apply information technology in training. However, main form of deployment is via the internet with e-learning. Currently, some popular forms of training by e-learning are: Technology - Based Training; Computer - Based Training; Web-Based Training; Online Learning/Training; Distance Learning. Nowadays, training model in the Metaverse - Metaversity environment has been formed a in the world.

II. DEFINITION

A. Metaverse

Neal Stephenson coined the term "metaverse" for the first time in his popular novel "Snow Crash" in 1992; and then Facebook rebranded as Meta and declared the metaverse to be Silicon Valley's "next big thing" in 2021 [1].

The Metaverse is the post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality. It is based on the convergence of technologies that enable multisensory interactions with virtual environments, digital objects and people such as virtual reality (VR) and augmented reality (AR). Hence, the Metaverse is an interconnected web of social, networked immersive environments in persistent multiuser platforms. It enables seamless embodied user communication in real-time and dynamic interactions with digital artifacts. Its first iteration was a web of virtual worlds where avatars were able to teleport among them. The contemporary iteration of the Metaverse features social, immersive VR platforms compatible with massive multiplayer online video games, open game worlds and AR collaborative spaces [12].

This work is partly supported by the research project No. DHFPT/2022/08 granted by FPT University.

B. Metaversity

A university inside the Metaverse [4]. It is a concept based on combining Metaverse and University. It is a Metaverse community-based education platform focused on empowering individuals with the skills and knowledge needed to teach and learn, as well as activities related to education and training. In addition, metaversity also helps training institutions and educators... generate income on the web3 in the Metaverse environment. The application of Metaverse in training implementation has been forming a "market" for cross-border education and a sustainable creative industry. Multimedia and interactive display in Metaversity is a new display method that gives learners a variety of experiences, excitement, and fun besides receiving one-way information. They can actively interact with each other, collaborate, and expand to learn more information and knowledge in all relevant fields in the metaverse [1].

The Deputy Minister of Information and Communications affirmed during the conference "The future of the internet", over the past 20 years, Vietnam's internet has developed strongly with a usage rate of 70.3%, becoming an essential need, and the foundation for the development of the digital economy and digital society. This is a great potential when digital transformation in higher education and virtual university application in Metaversity. If metaverse is applied in Vietnamese education, it will be a huge change, bringing practical benefits to learners, lecturers, and administrators, helping to access necessary information for managing and teaching and learning anywhere, anytime with good experiences in metaversity. The university will be better managed, more transparent, more economical and the quality of education will be improved. For examples: Greenwich Vietnam, also recently launched a new campus on Metavert (<https://meta.horizonland.app/>) [4]. It was only integrated into Metavert at first for enrollment and communication purposes. However, this has made a worthwhile contribution to increasing its reputation with the Greenwich Vietnam into community and give learners a good experience in Metavert's ecosystem. The implementation of integrated teaching and learning on metaverse will be expanded and create a large educational ecosystem of Metaversity. With a virtual classroom supported by applications in Metaverse, participating learners can conduct learning and research at their own pace with mentor in the metaverse space; or even there is no mentor at all, simply learners participate in metaversity to experience, interact and create new content... There are virtual classrooms that contain a variety of ready-made learning materials that students can use. Students can follow up without the help of the instructor/ mentor. E-lecturer in this virtual classroom model replaces the lecturer to help learners based on pre-programmed situations and AI learned during e-learning operation.

Learners can have fun and experience with excitement in class instead of just passively studying in physics class. Integrating the interactive display of course content into the Metaverse environment is a new way of applying technology that changes the way a classroom is run. There are many ways to participate in learning on Metaverse. It can be combined

with a traditional classroom at a training facility with the metaverse. It can be combined with a traditional classroom at a training facility with the metaverse. Learners have the feeling that they are really in the classroom with the best experience for learning and developing the necessary skills. It provides the ability to visualize complex phenomena and gather information in the clearest and most complete way. In the metaversity environment, the learner themselves who will decide how and with whom to study... However, to maintain the quality of metaversity, it is necessary to apply the same process management and quality management philosophies to ensure a good training system, a good trainer system and a good digital content system. Metaversity creates an open higher education system with open input, open training, open assessment from many sides, and many perspectives.

III. METAVERSITY MODEL

Metaversity is a digitally built university using VR in the metaverse; a digital university campus is both in sync with and out of sync with the real world. Live Classes were taught by a qualified lecturer. And his lecture can be recorded and deployed to the content library in Metaversity for students to visit and experience for themselves later. Metaversity facilities make physical space "flat" (geographically), meaning that learners and teachers will interact in a virtual classroom environment in metaversity, even though they may be far apart. Smart devices are installed in the classroom to digitize the physical version of the classroom and exist in the Metaverse space as an extension and enhancement of the learner's experience [3]. In the near future, Metaverse as a large society, combined with many technology businesses, also creates conditions for students to participate in virtual reality experiences and have the opportunity to access high technology. On the basis of this research, the paper proposes the following Metaversity model:

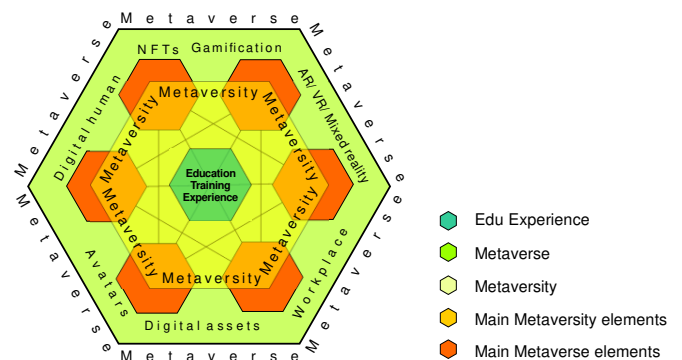


Fig.1. Metaversity model

Metaversity is the result of integrating an entire university into Metaverse: Human (lecturers, administrators, students...); curriculums and teaching, learning materials; teaching methods; assets, facilities... All elements in the real world are digitized and operated in the Metaversity environment to provide the best teaching and learning experience (administrators, lecturers, students...)

A. Learning and teaching ecosystem

Metaversity (learning and teaching ecosystem in the metaverse) emerges and creates a social space for people to learn and share experiences in productive ways: Well-designed immersive environment with interactive way of visualization makes learning sessions focused and engaging with stronger and more memorable visuals. They can be created in the metaverse, both passive learning (the teacher conveys knowledge) and comprehension through reading (the learner read) is replaced by truly experiential learning. Learners can grab, manipulate, and walk around learning objects; they can be immersed in historical events; among many other opportunities.

In education and training, the learning-by-doing process is the best way to learn to accumulate knowledge and form skills, even if it is a large and complex project. As a result, learners are “embedded” in an immersive metaverse while they also use external peripherals to further enhance the learning experience. Overall, the metaverse is a very safe place for learners to “just be themselves” so that they actively learn at their own pace, making mistakes and making mistakes again, until the learning goal is accomplished. Moreover, learning from mistakes is also a good way to master skills. If learners do this in the real world, it will often be very expensive or impossible to do.

B. Metaverse also removes spatial barriers

No matter where learners are, they can enter the immersive world for any learning purpose. Usually, they are spatially sustainable. The learners and teachers from all over the world can interact and work as a team in the metaverse based on a conceptual model just like the real world (both in space and time).

The most compelling feature of the metaverse is that learners can interact with each other and with the instructor, no matter where they are located. Immersive Metaverse enables social and community learning experiences. Today, according to the International Telecommunication Union, 369 million young people do not have access to the Internet, resulting in exclusion, fewer educational resources and limited opportunities for children and young people to access the Internet. UNESCO also reports that 260 million children between the ages of 5 and 16 are out of school. Metaverse will be a connected ecosystem that brings opportunities and access to quality education for all. It acts as an educational bridge in a very effective way. Universities need to work with customers, governments,... to bridge the digital divide in society, and promote educational programs like Connect To Learn, which help achieve the goals and Global Sustainable Development Goals at the same time. The transition from offline “classroom” to “Metaverse”, this is truly a journey to democratize education [1].

Due to the better interaction in the spatial and social structure of the metaverse, lecturer are also more likely to make requests to enhance work. A properly designed Metaversity environment will allow for the creation of entirely new ways of teaching and learning. Instructors can use role-

playing techniques with avatars to present real-life situations. Learners can perform assignments easily because the 3D environment in the metaverse allows to simulate reality accurately [8]. From there, metaversity will build a skill database of learners (collecting different skills and storing them in a standardized skills database).

Learners can chat interactively and lively. In addition to video lectures, hosting live chats can be a good way to engage the learning community and make the learning process a lot more dynamic. A good learning management system will provide ways to interact with students in a virtual classroom. Interactions can be made via video, audio systems or can be live chat based on text input in the interactive screen. Thereby, it is possible to connect everyone in the virtual classroom together to enhance the student's learning experience [9].

Incorporate instant feedback in Metaversity. Everyone feels encouraged to explore with instant feedback on how well they are doing. This can be done in virtual classrooms by taking advantage of one of the most popular features of a learning management system: automated assessment. These automated assessments will map to the e-lecturer's expressions and actions so that students can see the results of their activities in the virtual classroom.

Metaverse helps deploy e-learning training anytime, anywhere, imparting knowledge on demand, providing quick feedback [9]. Learners can access the courses anywhere such as at the office, at home, at public Internet spots, 24 hours a day, 7 days a week. Join their virtual classroom on metaverse to meet the e-lecturer anytime they log-in to the virtual classroom.

Metaverse makes Virtual Classrooms more accessible to learners. Learners will no longer have to wait until class time to ask their lecturer questions: in a virtual classroom, they can be easily contacted to solve any problems while they are practicing [3]. Virtual classrooms with ready-made databases, role-playing-like organization...

Metaverse makes e-learning deployment more flexible. Students can choose from online instructor or self-interactive courses, adjust their learning pace according to their ability, and can enhance their knowledge through online libraries and supporting of e-lecturer [2].

C. Applying Metaverse

Applying Metaverse can focus on two main contents: in educational management and in teaching, learning, testing and evaluation: (1) In educational management, including digitizing management information, creating new system of large interconnected databases, application of AI technologies, blockchain, data analysis,... to manage, operate, forecast, support decision making quickly and accurately; (2) In teaching, learning, testing and evaluation, including digital materials (e-textbooks, electronic lectures, e-learning lecture warehouses, multiple-choice question banks), digital libraries, laboratories,... virtual experience, deploy online training system, build virtual universities (cyber universities).

To build e-learning in the Metaverse environment, it will be necessary to convert traditional classrooms to digitize – visual/audio digital exercises for 24/7 learning and interaction. Learners and their mentors will automatically rely on the digital data to design a training program that is suitable for their ability and level. Lectures will be based primarily on supportive interactions and intensive teaching based on digitized fundamentals. Metaverse supports content innovation, teaching and learning methods, testing, and evaluation. Support effective implementation of synchronous solutions (including digital data e-learning lectures, electronic lesson design software, simulation software and teaching software). IoT, big data, artificial intelligence and machine learning AV/VR, security, blockchain, chatbots, Increased Accessibility... build and form a unified training ecosystem to connect hardware with software into smart, energy-efficient products and easily expand the system and Metaverse space. Grasping this trend of new digital technologies, universities can convert lectures into videos, play and learn (Gamification) to virtual reality (VR) and AR applications.

The simplest way is to use AR to add explanatory information about the images in the real space of the classroom, or simply on each image section of the reference book or a part of the classroom space with virtual classroom space in Metaverse. The Integrated Hybrid Classroom (combine online and offline at the same time) can even use AR to render 3D (digital versions) of models. Universities will not need to build large classrooms / lecture halls with a capacity of thousands of students. Instead, the university just builds presentations that can be created and saved in a virtual environment using digital technology or can be uploaded to Metaverse, setting up an online classroom directly in Metaverse... Learners can easily enter the classroom, access the lecture content data, and can download each part to learn (based on compliance with copyright law).

A lecturer's workflow in Metaverse could be: (1) first creating original immersive content that can be hosted in metaversity; (2) then this content will be assigned to a blockchain such as NFT and ensure that the blockchain used by the NFT is the same as used by the metaverse; (3) publish content in metaversity, assign rights and avail of viewing, using, modification and possible resale of the content [1]. Metaverse allows content creators with blockchain technology to turn into assets (cryptocurrency). These digital assets can be used in the real world through rendering devices or traded under NFT as is the case with cryptocurrencies.

Even learners become content creators and can leverage their "property". A student might create a product as part of a project assignment. Once converted and become part of the blockchain, that "creative" product will allow students to monetize the creation of digital assets. Thereby, learners can use their metaverse to communicate, connect, play some games, exhibit important solutions, co-create business projects, etc. Metaverse has gradually improved in terms of platform, scale, security, and partnerships to achieve one result: a dramatically enhanced learning experience that improves learning outcomes and the teaching experience.

D. Disadvantages of e-learning on Metaverse

In addition to the outstanding potential of being applied in the future, e-learning on Metaverse also has some disadvantages. Some common problems such as: emotional and spatial issues that make an impression on learners; Direct interaction with learners is limited due to limitations of technology. Need to be connected to high-speed internet (5G) and connect to many network-connected devices to learn. If there is a problem with the equipment or the transmission network, learning will be interrupted; Haven't created a lively space like a traditional classroom.

Besides, Metaverse also requires computing power, and needs a large human resource of engineers, designers, and administrators to keep Metaverse up and working. Metaverse will need a large-scale technology infrastructure, from computing power to compute, 3D visualization to content for financial and trading systems. Going forward, Metaverse is still a technology built by many organizations. In addition, it is necessary to develop policies related to learning materials such as intellectual property, copyright; related to the quality of teaching in the network environment such as network information security [10]; related to personal information protection, information security in the network environment; and regulations related to the conditions for organization of online teaching and learning, quality accreditation, legality, and recognition of learning results...

IV. CONCLUSION

In short, the digital era has now created very favorable opportunities to improve training quality and develop sustainably. Metaverse and gamification is one of the new trends in the context of the industrial revolution 4.0, helping to enhance the learner's experience while improving the quality of training. It helps us a lot in training management, in all stages of the teaching and learning process: from preparing lesson outlines, designing programs, lectures, implementing subjects, exchanging and interacting with people learning, grading and exhibition, communication activities... can all be integrated with multimedia in metaverse. By integrating multimedia, technology in the teaching and learning process will enable rich and vivid content transmissions in real or virtual contexts. VR or AR can help to enhance the interpretation of complex ideas, explore human knowledge, increase interaction opportunities, provide user experiences... Vietnam is on the road of Industrialization, Modernization, deep international integration in all areas of life, including education and training... The research and deployment of e-learning applications in the metaverse environment will help Vietnamese education develop quickly and sustainably.

ACKNOWLEDGMENT

I would like to express my appreciation to Mr. Nguyen Nhut Tan, director of Greenwich Vietnam, for his support during the planning and development of this research work.

I would also like to thank the staff of the Horizon Land for help and sharing information about Metaverse.

REFERENCES

- [1] Anand R., Katarina N., Matilda L., Mischa D., "Metaverse education: from university to metaversity", viewed 10th August 2022, <<https://www.ericsson.com/en/blog/2022/8/metaverse-education-from-university-to-metaversity>>.
- [2] Bilyalova A., Salimova D., Zelenina T. "Digital Transformation in Education. In: Antipova T. (eds) Integrated Science in Digital Age", ICIS 2019, Lecture Notes in Networks and Systems, vol 78. Springer, Cham. https://doi.org/10.1007/978-3-030-22493-6_24, 2020.
- [3] C. Suárez-Guerrero, C. Lloret-Catalá, S. Mengual-Andrés, Teachers' Perceptions of the Digital Transformation of the Classroom through the Use of Tablets: A Study in Spain, Comunicar, Media Education Research Journal, Volume 24, Issue 2. DOI: 10.3916/C49-2016-08, 2016.
- [4] Greenwich Vietnam in Metaverse, 2022, <https://meta.horizonland.app/>
- [5] Jay Liebowitz, *Digital Transformation for the University of the Future*, Digital Transformation: Accelerating Organizational Intelligence. 2023, World Scientific Publishing Co. Pte.Ltd.
- [6] Martin Carnoy. *Globalization, educational trends and the open society*. OSI Education Conference 2005: "Education and Open Society: A Critical Look at New Perspectives and Demands". Stanford University, School of Education, 2005.
- [7] Mystakidis, Stylianos. "Metaverse Encyclopedia", 2. 486-497. 10.3390/encyclopedia2010031, 2022.
- [8] Nguyễn Đức Sơn, "Nghệ thuật thiết kế tương tác & giao diện người dùng", Nxb Mỹ thuật, ISBN: 978 604 78 8549 7, 2018.
- [9] Nguyễn Đức Sơn, "Ứng dụng thiết kế web 3D VR nhằm tăng cường trải nghiệm người dùng", Hội thảo quốc tế về sáng tác nghệ thuật và thiết kế (IADW 2019), ISBN 978 604 68 5469 2, pp. 132 – 138, 2019.
- [10] Nehla Ghouaïel, Samir Garbaya, Jean-Marc Cieutat, Jean-Pierre Jessel, "Mobile Augmented Reality in Museums: Towards Enhancing Visitor's Learning Experience", The International Journal of Virtual Reality, 2016, 17(01): pp. 21-31.
- [11] Rodríguez-Abitia, G.; Bribiesca-Correa, G. Assessing Digital Transformation in Universities. Future Internet 2021, 13, 52. <https://doi.org/10.3390/fi13020052>.
- [12] Roger James Hamilton, "What is a Metaversity? Genius Group is changing the face of Education with Tech", LDN Staffer, viewed 15th August 2022, <<https://www.londondaily.news/what-is-a-metaversity-genius-group-is-changing-the-face-of-education-with-tech/>>.
- [13] Susan Grajek, Betsy Reinitz, "A Digital Transformation Pathway for Universities", 2023 World Scientific Publishing Company https://doi.org/10.1142/9789811254154_0001.

Building A New “Hospital Governance” Model Based on The Made in Vietnam Lean Management Philosophy Through The Practice of The Covid-19 Pandemic

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Abstract—Research and propose a new model of “Hospital governance” based on The Made in Vietnam lean management philosophy a model is written based on recent research on practical activities in Vietnamese hospitals. The studied model has been effectively applied in some hospitals in Vietnam and provides the application process and some conditions for successful implementation. The model can be extended to domestic and international hospitals, including developed and developing countries.

Index Terms—Hospital management, Tam The, The Made in Vietnam lean management philosophy.

JEL Classification—M1, I18.

I. INTRODUCTION

The hospital governance model in European countries was built including three different levels, each with its distinct characteristics, interacting with each other in the decision-making process, ensuring functional management, and tasks governance structure. [1]. The model is considered by the World Health Organization as a standard model for countries around the world to apply when transitioning to an autonomous mechanism to meet practical requirements. The transformation of hospital governance models in Asian countries began after being motivated by successes in Europe and was associated with reforms in health policy, especially the policy of broad Autonomy of medical institutions' public health departments [2].

In Vietnam, we applied the three-level hospital governance model as the World Health Organization recommended, piloting a broad autonomy and self-responsibility mechanism at four hospitals: Bach Mai, Cho Ray, Viet Duc Friendship, and K hospital. Bach Mai and K hospitals are two hospitals that have been operating under a new model

since 2020. After two years of application, the results of the pilot process of the model revealed many problems such as brain drain, mass layoff, or employee dissatisfaction with the hospital's strategies and methods of implementation in implementing the application. Besides the old problems that have not been completely solved such as hospital overload, medical waste, hospital hygiene, hospital revenue... and finally, they all asked to stop the pilot application, new problems arose during the experimental period. The point of comprehensive autonomy and self-responsibility mechanism of hospitals recently has raised questions about the appropriateness of sustainable management that is being applied.

Stemming from these practical issues, the research was carried out to (1) review the model and activities of hospital governance in public hospitals in Vietnam today, (2) research the shortcomings and shortcomings of hospital governance activities in hospitals in Vietnam today, and (3) propose a new hospital governance model suitable to Vietnamese culture, social, economic and human characteristics based on the theory of lean management Made in Vietnam.

II. THEORETICAL BASIS

A. The Made in Vietnam lean management philosophy

The Made in Vietnam lean management philosophy is a management thinking that creates profits (added value) for an organization (enterprise) by using human intelligence (intelligence of the organization) to minimize waste costs. This thinking is explained through the following formula system [3]:

Profit = Revenue – Cost (1).

In there: Costs = Actual costs + Waste (2).

¹Author contact

Waste = Tangible waste + Intangible waste (3).

(Source: Minh, 2015 [3])

Waste costs exist in two forms: tangible waste costs and intangible waste costs.

B. "Tam the"

"Tam the" the foundation of the Made in Vietnam lean management, is defined by the formula:

Tâm Thế = Thấu 1 + Thấu 2 + Ý (4) (Vietnamese term).

Tam The = Deep Understanding 1 + Deep Understanding 2 + Consciousness.

(Source: Minh, 2015 [3])

Accordingly, the attitude is two through one mind; the mentality is not born naturally; it must be formed through education through three main areas: family (from birth), and continuing to foster at school. (agency, organization) when going to school to work and in society (when working and communicating daily) [3]. "Tam the" is at the heart of the Made in Vietnam lean management philosophy and is a central and critical factor in the successful implementation of poor management.

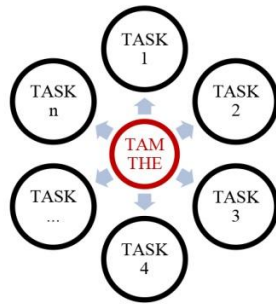


Figure 1. "Tam the" fundamental elements of the Made in Vietnam lean management philosophy

(Source: Minh, 2015 [3])

C. Lean application in hospital

Applying lean management in health was first studied by the authors: Heinbuch (1995)[6], Jacobs & Palfrey (1995)[7], and Whitson (1997)[8] proved appropriate when apply. Mark Graban (2011) when applying the lean governance model to healthcare and healthcare services, has shown that the application of lean governance and its tools will bring success and success. improve operational efficiency in hospitals [9].

Graban when applying lean management to inventory management for patient care activities of hospital departments and wards in the Netherlands and Denmark [9], Richard, Antonio, Hans. (2011) [1] Research in the UK and some European countries have shown that lean management seems to have no end, more and more hospitals in Europe decide to apply it.

Made in Vietnam lean management has been studied and applied in the medical examination department of Bach Mai hospital, which has cut 30-55% of the total time spent in the medical examination department. Recently, research on the management of tangible factors at the Department of Medical Examination, Viet Duc Friendship Hospital (Nguyen Dang Minh and Nguyen Tien Thanh 2020 [11]) over the past 2 years has proven effective and fundamentally changed the image of

the clinic. medical examination, no more crowded scenes. In addition, during the Covid-19 pandemic, Viet Duc Friendship Hospital still operated safely when many other hospitals had to close down.

III. METHODOLOGICAL APPROACH

A. Research process

The study uses a combination of survey methods, in-depth interviews, and practical observation of daily activities at 04 special-class hospitals, 18 central-level hospitals, and first-class hospitals. The data is analyzed as a basis for proposing a governance model. The research procedure and data collection method are depicted in the figure below with the steps below:

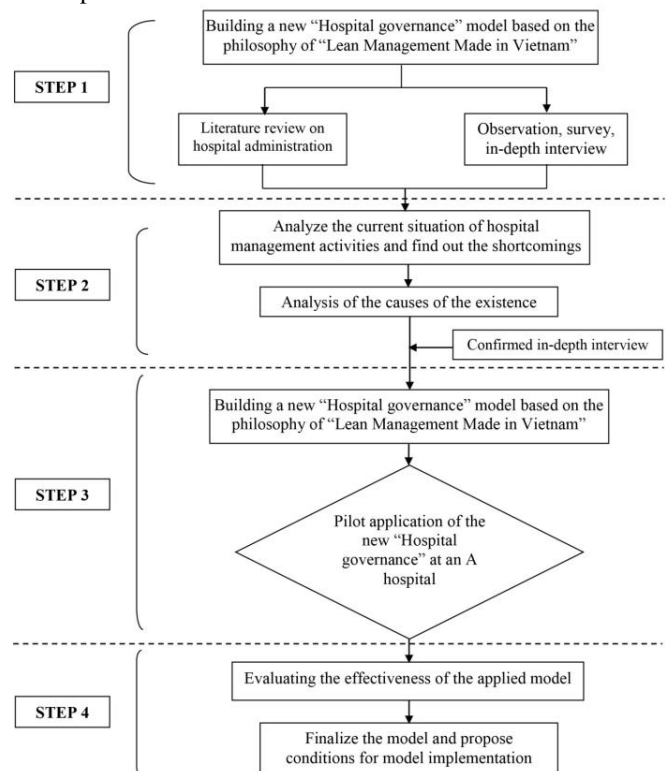


Figure 2. Research process

(Source: The research team proposes and implements)

B. Data collection methods

The research team collected data (primary and secondary) through the synthesis of research documents, practical observations, surveys, and in-depth interviews (done in two rounds).

- Secondary data collection method:

The study collects secondary data to synthesize.

- Primary data collection method: Primary data used in the study was collected using three methods: **Observe**, **Survey by questionnaire**, and **In-depth interview**.

During the study, the discussion was done twice:

The first time: Performed in step 1 of the research process, leaders, department managers, and hospital wards were interviewed using representative sampling.

Research on the medical examination and treatment process found that 78.5% of the surveyed people rated the medical examination and treatment process at the hospital as unorganized and optimal as the leading cause of the above seven types of waste. Also, from the point of view of Made in Vietnam lean management, the layout of clinical, subclinical, and laboratory departments in the medical examination and treatment process is not optimal (82.6% of survey respondents rated it) as one of the causes of the unnecessary increase. According to the survey results in Figure 6, two content is not good: the medical examination and treatment process is waiting for the conclusion of a specialist doctor (72.5%) and moving to the examination rooms and rooms testing (62.1%).

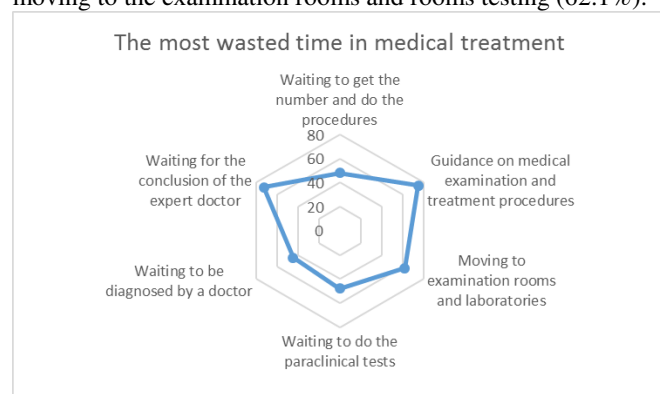


Figure 6. The most time wasted in medical examination and treatment

(Source: Analytical research team)

C. Problems in hospital governance

After the Survey, the research team conducted in-depth interviews with medical professionals, managers, and heads of specialized departments in the hospital who are directly involved in medical examination and treatment daily. Management activities from the department level to the whole hospital. Table 2 below summarizes the general opinions of experts about the inadequacies in the governance model of public hospitals in Vietnam today.

TABLE 2: RESULTS OF IN-DEPTH INTERVIEWS WITH EXPERTS IN THE HOSPITAL

Interview	n	Unreasonable detected
Member of the Management Board of a public hospital	10	The current organizational structure has not yet defined the position, role, and function of the Hospital Management Board, especially in decision-making
		The staff structure of the hospital management board is still too inclined towards medical expertise, and management expertise has not paid attention
		The mechanism for consulting and proposing health policies of the Board of Management to higher levels is fragile and is not given due attention
		The role of stakeholders in establishing the hospital management board structure has not been considered
Member of the Board of Directors of a public hospital	10	The way of management development strategy depends a lot on expertise, personality, and leadership capacity in different periods
		Current hospital governance activities are administratively rigid and inflexible like a social service unit
		Patient medical data that is still closed is considered a separate property that has not been linked between hospitals for sharing and use

		Current hospital governance activities are administratively rigid and inflexible like a social service unit
Heads and deputy heads of specialized departments in the hospital	30	The current way of operating requires medical professionals to be both specialists and managers, so it is difficult to do both well
		Many regulations and processes are framed without openness for hospitals to research and apply novelty actively
		Monitoring and evaluation still use people; people in the hospital will not ensure objectivity and fairness
		Human resource management is still administratively heavy, and expertise usually has not oriented the development roadmap for each employee

The results of this practical study are similar to those of Dale, H., and Krishna, H. of "Asia Pacific Observatory on Health Systems and Policies" published in 2015 when researching 07 regional countries Asia Pacific region including Vietnam for ten years (2003-2013) [2].

D. Causes of current hospital governance model problems

According to the in-depth interviews, hospital managers at all levels agree that public hospitals in Vietnam face a problem of efficiency in hospital governance. The results of Autonomy over the past time have shown that most hospitals cannot continue usefully self-manage without the support of the state budget. Through in-depth interviews, the research team uses the 5-Whys tool to analyze the causes and find the root cause of the problem. This is the method introduced by Sakichi Toyoda in the 1930s and used widely in the Toyota group until now [13].

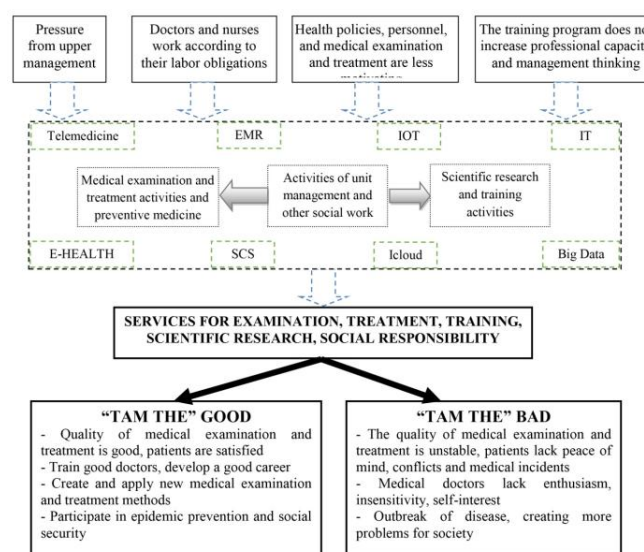


Figure 7. Current issues and results of hospital governance in Vietnam

(Source: Synthetic research group)

After analyzing the causes of current hospital management problems such as:

- Pressure from superiors (state management principles, administrative orders).
- Doctors and nurses work according to their labor obligations (have not yet created the mentality to participate in activities at the hospital).

- Policies on health, personnel, and medical examination and treatment are less motivating (state management for units with partial Autonomy).
- The training program does not increase professional capacity and management thinking.

E. Proposing a new model of “Hospital governance”
 + Building a model based on the philosophy of “Lean Management Made in Vietnam.”

From the current situation of the hospital's management activities analyzed above, the research team uses the Made in Vietnam lean management philosophy, which has been successfully applied in many recognized domestic and foreign enterprises [4]. The research team proposes using a new “Hospital governance” model, as shown in Figure 8 below.

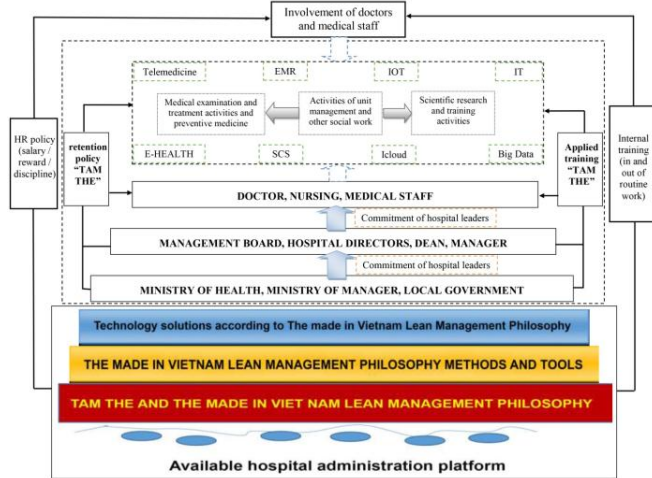


Figure 8: New model of “Hospital governance”

(Source: The research team analyzes and proposes)

The new model is a constructive model that constantly creates and improves added values for Vietnamese public hospitals. Hospital governance activities under the new model are illustrated in Figure 9 below:

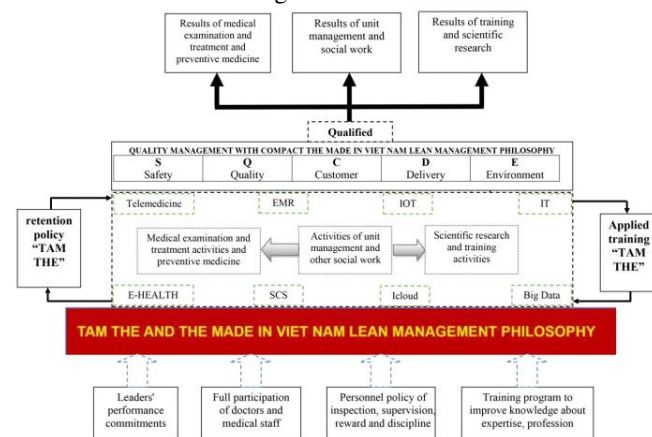


Figure 9: Hospital governance activities in the new model

(Source: The research team analyzes and proposes)

SQCDE (Safety, Quality, Customer, Delivery, Environment) based on the Made in Vietnam lean management method and tool with the “Tam the” platform will improve the

management and value platforms. Hospital culture treatment available [12].

The new hospital management model based on the Made in Vietnam lean management philosophy will ensure all operations are created according to the: $Y = \text{Tam the } X (A1; A2; A3; A4)$. In there:

- A1 is the commitment to support of hospital leaders.
- A2 is the driving force for the full participation of doctors and nurses in the hospital.
- A3 is the personnel policy, inspection, supervision, reward, and discipline in the hospital.
- A4 is a training program fostering knowledge for all doctors and nurses in the hospital.

+ Model verification results

The proposed model was discussed and verified again with medical experts and practitioners (members of the Board of Management of the Public Hospital; the Board of Directors of the public hospital, and deputy heads of specialized departments in the field of medicine) Hospital). The test results are listed in the table below:

TABLE 3. PRACTICAL VERIFICATION OF THE NEW “HOSPITAL GOVERNANCE” MODEL

Medical professionals, administrators	n	Comments on the model
Member of the Management Board of a public hospital	5	<ul style="list-style-type: none"> - The professional's position is worthy compared to the manager's position when making hospital management decisions - The medical examination and treatment process quality standards are built, measured, and monitored to ensure standards will limit incidents - Ensure the rights, roles, and responsibilities of relevant parties in the process of governance and decision-making
Member of the Board of Directors of a public hospital	5	<ul style="list-style-type: none"> - Activities of medical examination and treatment, preventive medicine, training, and scientific research are flexible, easy to adapt to changes, and can be fully autonomous - The hospital operates safely against epidemics, ensuring the goal of both fighting the epidemic and providing medical examination and treatment to meet social needs - Developing a hospital culture, motivating creativity, innovation and creating a sustainable brand independent of individuals - People (medical doctors) are the center of medical equipment, technology, science, and technology that will enhance operational efficiency and service quality to meet the requirements and changes of society - Doctors and nurses feel secure with their work and life for a long-term commitment

+ Pilot application of a new “Hospital governance” model based on the philosophy of “Lean Management Made in Vietnam.”

The new model of “Hospital governance” based on The Made in Vietnam lean management philosophy has been deployed and applied at Hospital A (central line) in Hanoi city according to the following process:

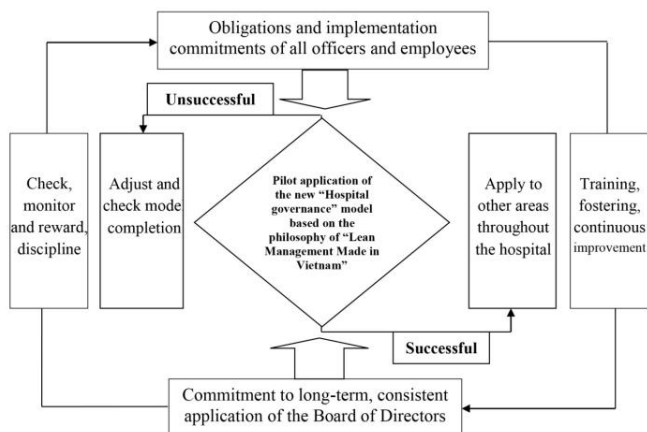


Figure 10. The process of applying the new “Hospital governance” model
(Source: The research team analyzes and proposes)

After six months of pilot application at the emergency department of Hospital A, it has brought about remarkable results, and the measurement results are shown in the table below:

TABLE 4. EFFECTIVENESS OF PILOTING THE APPLICATION OF THE NEW “HOSPITAL GOVERNANCE” MODEL AT A HOSPITAL

Criteria	before long	After applying	Improve
Time from emergency to clinical transfer	118,3 minute	69,8 minute	41%
Operating time for emergency patients	134,4 minute	87,6 minute	35%
Time to the hospital until a cerebral vascular intervention	55,2 minute	48 minute	14%
The total time the patient was in the emergency room	112 minute	65 minute	42%
Satisfaction rate when going to the emergency room of patients	45%	76%	31%

Based on the pilot results of applying the new “Hospital governance” model based on the “Lean Management Made in Vietnam” philosophy after six months of application, Hospital A has summarized and submitted it to the governing body. The Ministry of Health healthcare allows application in other departments and rooms of the whole hospital.

+ Conditions for successful application of the new “Hospital governance” model

Leaders at all levels in the health system need to clearly define the philosophy of healthcare development with the spirit of national pride (Made in Vietnam) throughout, and at the same time make a firm commitment and determination to implement it in the long term until the end does not change according to term thinking.

Hospital leaders are committed to supporting doctors and medical staff to be autonomous in medical examination and treatment activities, creative in research and innovation through the full support policy for doctors and staff healthcare does its job.

With the support of hospital leaders and doctors and nurses' central position, medical staff needs to be seriously involved, and responsible for always being proactive and creative in cutting waste costs and improving operational efficiency in health care services quality.

Both medical leaders and medical staff are committed to continuous improvement flexibility in their work, always ensuring the conditions to maintain “Tam the” to improve efficiency, quality, safety, and effectiveness results in meeting requirements and adapting to new social changes.

V. CONCLUSION

The Made in Vietnam lean management philosophy has proven effective in businesses (manufacturing, services) and organizations in Vietnam. The research has created a new model of “Hospital governance” based on The Made in Vietnam lean management philosophy and proven practical results; the new model will eliminate irrationalities in hospital management today. The study has pointed out the components of the model, the implementation process, and the necessary conditions to implement the model into practice in the Vietnamese health sector. When applied, the model helps to improve operational efficiency and the quality of medical examination and treatment services to be safe and effective, meet requirements, and adapt to changes in society (such as the Covid-19 pandemic) for both developed and well-developing countries.

REFERENCES

- [1] B. S. Richard, D. Antonio, F. W. D. Hans, “Mapping new governance models for public hospitals”, *Governing Public Hospitals - Reform strategies and the movement towards institutional Autonomy*, Observatory Studies Series No. 25. London. ISBN: 9789289002554 (ebook), 2011, pp 55 - 74.
- [2] WHO, *World health statistics 2020: monitoring health for the SDGs, sustainable development goals*. Geneva, 2020.
- [3] C. Yingyao, “Public Hospital Autonomy in China: Review and Outlook”, *Int J Health Plann Mgmt*, 29, pp. 141–159, 2014.
- [4] N. D. Minh, *Lean Management in Vietnam – The Road to Success* (1st ed.), VNU Publishing House, Hanoi (in Vietnamese), 2015.
- [5] N. D. Minh, “A New Decision Making Model Based on the Made in Vietnam Lean Management Philosophy” *Economics and Sociology* 11, no. 1, pp. 44–66, 2018, doi:10.14254/2071-789x.2018/11-1/3.
- [6] E. S. Heinbuch, “A case of successful technology transfer to health care: Total quality materials management and just-in-time”, *Journal of Management in Medicine*, 9(2), pp. 48 – 56, 1995.
- [7] S. M. Jacobs, and S. Pelfrey, “Applying Just-In-Time Philosophy to Healthcare”, *Journal of Nursing Administration*, 25(1), pp. 47-51, 1995.
- [8] D. Whitson, “Applying Just-In-Time systems in health care”, *IIE Solutions*, 29(8), pp. 33–38, 1997.
- [9] M. Graban, *Lean Hospital*, Based on the print edition (ISBN 9781138431591), New York, 2011.
- [10] R. Priolo, *Meet a champion of Catalonia's lean healthcare movement*, Link: <https://planet-lean.com/lean-healthcare-catalonia-rosa-simon/> [truy cập 29/9/2022], 2016.
- [11] N. Đ. Minh, & N. T. Thanh, “Tangible Elements Management Solutions to Improve the Quality of Medical Examination and Treatment Services of Examination Department, Vietnam - Germany Friendship Hospital”. *Industry and Trade magazine*, 2, pp. 182-188, 2020 (in Vietnamese).
- [12] N. Đ. Minh, & N. T. V. Ha, “Made in Vietnam - Lean Management Model for Sustainable Development of Vietnamese Enterprises”. *Procedia CIRP* 40, pp. 602-607, 2016, doi:10.1016/j.procir.2016.01.141.
- [13] T. Ohno, “Foreword by Norman Bodek”, *Toyota production system: beyond large-scale production*. Portland, Or: Productivity Press. ISBN 0915299143, 1988.

Face Recognition Technology Using the Fusion of Local Descriptors

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Abstract—Local phase quantization (LPQ) descriptor, first introduced by Ojansivu and Heikkila (2008), has successfully been applied in face recognition systems. In this paper, we combine local intensity area descriptor (LIAD), which was first introduced by Tran (2017), with LPQ descriptor to develop robust face recognition systems using LPQ descriptor. Face images were first encoded by LIAD as a noise and dimensionality reduction step. After that, the resulting images were presented through LPQ as a feature extraction step. A nearest neighbor method with chi-square measure is used in classification. Two famous datasets (the ORL Database of Faces and FERET) were used in experiments. The results confirmed that our proposed approach reached mean recognition accuracies that are 0.17% ÷ 7.7% better compared to five conventional descriptors (LBP, LDP, LDN, LTP, and LPQ).

Index Terms—face recognition, fusion of descriptors, local intensity area descriptor, local phase quantization descriptor

I. INTRODUCTION

Face recognition is among the few biometric recognition systems that produces a high level of accuracy and requires simple, straightforward implementation [1]. People can recognize thousands of faces based on distinctive facial features with a brief glance, even faces that they have not seen in a long time or those altered by the impacts of age, accidents, disguise, etc. For this reason, research into distinctive facial feature has garnered a high amount of attention by scholars across multiple disciplines over centuries [1, 2].

In the recent years, face recognition systems using deep learning methods have generated impressive results. However, deep learning methods usually require a large database and a high number of parameters, and as a result, a longer period for training and recognition [3]. Research papers [3, 4] introduced several face recognition methods based on local descriptors with results comparable to those obtained by deep learning methods, albeit with a much shorter implementation time.

Various recently developed descriptors can be placed in two classes: dense descriptors and sparse descriptors. For first type, local features were extracted from pixels of the input image. For second type, local patches of the points of interest are sampled and their invariant features are described [5]. There are several popular dense descriptors as local binary patterns (LBP) [6], local ternary patterns (LTP) [7], local directional pattern (LDP) [8, 9], and local phase quantization (LPQ) [10, 11]. For sparse descriptors, scale invariant feature transform (SIFT) [12], accelerated robust features (SURF) [13], and histogram of oriented gradients (HOG) [14] are among the most well-known. In face recog-

nition systems, dense descriptors had been more widely applied compared to sparse descriptors.

Tran and his colleagues have recently proposed the use of a local descriptor for face recognition and called it a Local Intensity Area Descriptor (LIAD for short) [15]. LIAD is not only very effective with photographs which have controlled conditions and poses; it also works well with images that are prone to noise. So, we apply it to increase the accuracy of face recognition systems using LPQ method through several stages: face images were initially displayed by LIAD as a pre-processing step; the resulting images were subsequently displayed through LPQ as a feature extraction step. This approach was demonstrated as producing superior accuracy by comparing with five other methods, including: LBP, LDP, LTP, and LPQ. Two databases (ORL Database of Faces [16] and FERET [17]) were used for experiments.

II. RELATED WORK

A. Local Intensity Area Descriptor

In recent study [15], Tran and his colleagues proposed a new texture analysis method based on intensity values of local pixels, in which each individual pixel of the image is replaced by a specific value calculated by applying trapezoidal numerical integration formula [18] to the values of eight neighboring pixels (Fig. 1). The proposed method is called Local intensity area descriptor (LIAD). The results of LIAD (basic LIAD) rounded to the nearest lower integers are called LIAD_{down}. Inversely, LIAD_{up} are results of LIAD rounded to the nearest higher integers. Mathematically, the trapezoidal numerical integration formula is written as:

$$F = \int_{y_0}^{y_n} f(x)dx \approx \frac{h}{2} [y_0 + 2y_1 + 2y_2 + \dots + 2y_{n-1} + y_n], \quad (1)$$

where $[b_1, b_2]$ is partitioned into n subintervals of equal length. $h = (b_2 - b_1)/n$. $y_0 = f(b_1)$, $y_n = f(b_2)$, and $y_i = f(x_i)$.

In [15], y_0, y_1 , and y_i are values of pixels and the user decides the value of h . The LIAD is represented by three formulas as follows:

$$LIAD(x_c, y_c) = \frac{h}{2} (g_0 + 2g_1 + 2g_2 + \dots + 2g_6 + g_7), \quad (2)$$

$$LIAD_{down}(x_c, y_c) = \text{floor} \left(\frac{h}{2} (g_0 + 2g_1 + 2g_2 + \dots + 2g_6 + g_7) \right), \quad (3)$$

$$LIAD_{up}(x_c, y_c) = \text{ceil} \left(\frac{h}{2} (g_0 + 2g_1 + 2g_2 + \dots + 2g_6 + g_7) \right), \quad (4)$$

where (x_c, y_c) denotes the central pixel and g_i ($i = 0, \dots, 7$) are the values of eight pixels. The results are rounded down (LIADdown) and up (LIADup) to an integer.

Fig. 1 illustrates the coding of pixels using LIAD, LIADup and LIADdown with h set at 0.1. The original and encoded images using LIADup and LIADdown with h set at 0.05 and 0.1. The original images and LIAD-images are shown in Fig. 2.

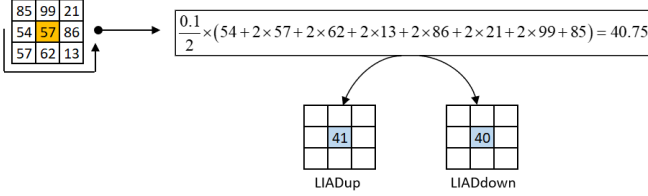


Fig. 1. Example of LIADup and LIADdown with $h = 0.1$.



Fig. 2. The original images and LIAD-images.

B. Local phase quantization descriptor

Ojansivu and Heikkila introduced the LPQ descriptor for texture description [10, 11]. Lately, it was widely applied in many facial recognition systems and proven to be a robust descriptor [19-22]. Fig. 3 presents LPQ-images.

a) Fourier transform phase

A discrete model of digital image for spastically shift-invariant blurring of an ideal image $u(z)$ is denoted as:

$$t(z) = u(z) * v(z) + n(z), \quad (5)$$

where z is a vector of coordinates $[x, y]^T$, $t(z)$ is an observed image, $v(z)$ is the point spread function (PSF) of the system, $n(z)$ is an additive noise function, and $*$ denotes 2-D convolution.

The PSF of a LPQ feature model is the centrally symmetric and the additive noise is ignored, so Formula 5 is expressed as:

$$t(z) = u(z) * v(z) \quad (6)$$

Formula 6 is computed in the Fourier domain as follows:

$$T(s) = U(s) * V(s), \quad (7)$$

where $T(s)$, $U(s)$, and $V(s)$ are the discrete Fourier transforms (DFT) of the observed image $t(z)$, the ideal image $u(z)$, and the point spread function $v(z)$. Formula 7 can be separated into the magnitude and phase parts, which can be expressed as follows:

$$|T(s)| = |U(s)| \cdot |V(s)|, \quad (8)$$

$$\angle T(s) = \angle U(s) + \angle V(s).$$

In LPQ, the PSF $v(z)$ is considered centrally symmetric, namely, $v(z) = v(-z)$. The phase of it is a two-valued function as follows:

$$\angle V(s) = \begin{cases} 0 & \text{if } V(s) \geq 0 \\ \pi & \text{if } V(s) < 0 \end{cases} \quad (9)$$

As mentioned above, the LPQ method is designed by using the blur invariance property of the Fourier phase spectrum. A short-term Fourier transform (STFT) is applied to extract the local phase information, which is described as follows:

$$U(s, z) = \sum_{y \in N_z} u(z - y) e^{-j2\pi s^T y}, \quad (10)$$

where N_z is a local neighborhood at each pixel position z .

In the LPQ method, only four complex coefficients are considered, including: $s_1 = [k, 0]^T$, $s_2 = [0, k]^T$, $s_3 = [k, k]^T$, and $s_4 = [k, -k]^T$, where k is a scalar frequency that satisfies $V(s) > 0$. For each pixel position, the resulting vector is as follows:

$$U_z = [U(s_1, z), U(s_2, z), U(s_3, z), U(s_4, z)], \quad (11)$$

$$T_z = [\text{Re}\{U_z\}, \text{Im}\{U_z\}]^T.$$

where $\text{Re}\{\cdot\}$ is the real portion and $\text{Im}\{\cdot\}$ is the imaginary portion.

b) Local phase quantization

The local phase quantization is processed in two steps:

Step 1: The phase information in the Fourier coefficients at pixel z is represented as binary values based on the signs of the real and imaginary portions of each component in T_z (with or without the decorrelation process).

$$q_j(z) = \begin{cases} 1, & g_j(z) \geq 0 \\ 0, & \text{otherwise} \end{cases}, \quad (12)$$

where $g_j(z)$ is the j -th component of the vector T_z .

Step 2: the LPQ pattern of pixel z is encoded by converting into a decimal number as follows:

$$f_{LPQ}(z) = \sum_{j=1}^8 q_j(z) 2^{j-1} \quad (13)$$

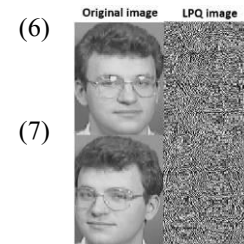


Fig. 3. Original images and LPQ-images.

III. PROPOSED APPROACH

First, we encode face images by the LIAD method to reduce noise and dimensionality. After that, the obtained images are extracted features using the LPQ method. The classification uses a nearest neighbor method with chi-square measure [15]. Fig. 4 presents this approach.

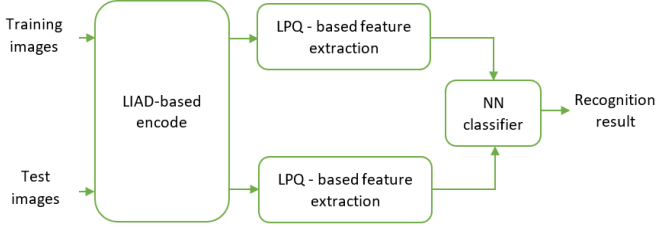


Fig. 4. Flowchart of the proposed approach.

IV. EXPERIMENTAL RESULTS AND DISCUSSION

A. Datasets and Settings

a) FERET database

FERET database consists of 14051 grayscale images of 1196 individuals. It contains subsets: *fa* (training set), *fb*, *fc*, *dup I* and, *dup II*. *fa* and *fb* sets are images taken under the same illumination conditions. *fc* set contains images taken with different lighting conditions. *dup I* and *dup II* sets are taken on different day (aging variations).



Fig. 5. Example images of FERET data set. The first row is the images of *fa* set. The images of *fb* set are shown in the second row. Third row is the images of *fc* set. Last rows are the images of *dup I* and *dup II* sets.

In this study, the training data is the *fa* set and the testing data is the others. The experimental images (150 × 130 pixels) were cropped from the original images. To extract features of each image, a single histogram was concatenated from 10 × 10 block histograms. After this step, each image had been represented by a histogram. Sample images of it are introduced in Fig. 5.

b) ORL database

The ORL Database of Faces (ORL for short) has 400 8-bit images of 40 persons and resolution as 92 × 112 pixels (see Fig. 6). The database was split into training and test sets (see Table I).

TABLE I. SIX TRAINING SETS AND SIX CORRESPONDING TEST SETS

Training set	Test set
[1,2,3,4,5]	[6,7,8,9,10]
[2,3,4,5,6]	[1,7,8,9,10]
[3,4,5,6,7]	[1,2,8,9,10]
[4,5,6,7,8]	[1,2,3,9,10]
[5,6,7,8,9]	[1,2,3,4,10]
[6,7,8,9,10]	[1,2,3,4,5]



Fig. 6. Example images of three individuals in ORL dataset.

c) Experimental settings

The nearest-neighbor method with Chi-square measure is applied in classification [15]. For the LDP method, the value of parameter *k* is set at 3. The threshold *t* of LTP is set as 1. The parameter *h* is set at 0.12 for LIAD.

The accuracy (ACC) of each method is computed as the ratio of the correctly labeled images (N) to the whole pool of testing images (T). Mathematically, this can be expressed as:

$$ACC(\%) = \frac{N}{T} \times 100. \quad (14)$$

B. Experiments

Table II presents the experimental results of the conventional methods and the proposed approach on FERET database. The two last columns in Table II show the results of our approach using LIADup and LIADdown. Table III displays the mean rate of the conventional methods and the proposed approach on ORL database. The results of our approach are presented on two last columns. The best performances have been bolded in Tables II and III.

As shown in the first five columns (2 to 6) of Table II, the recognition rate of LTP on *fb* set were the highest, 91.38%. The recognition rate of LBP on *fc* set achieved the highest, 54.63%. The recognition rate of three methods: LTP, LDP, and LDN, on *dup I* set obtained the highest accuracy level: 55.95%. The recognition rates of LDP on *dup II* set were the highest: 45.29%. Comparing the results of classification obtained by all methods in Table II, the highest recognition accuracy belongs to our method (except LDP for subset *dup II*). The findings also showed that the LIADup + LPQ average recognition accuracy reached 62.76%, which was 5.72%, 7.09%, 7.70%, 7.69% and 5.28% higher than that of the LBP, LTP, LDP, LDN, and LPQ methods, respectively. The result is similar to LIADdown + LPQ. The average accuracy of the method, 62.44%, was 5.4%, 6.77%,

7.38%, 7.37%, and 4.96% higher than that of the LBP, LTP, LDP, LDN, and LPQ methods, respectively.

TABLE II. EXPERIMENTAL RESULTS OF METHODS ON THE FERET DATASET

Set	LBP	LTP	LDP	LDN	LPQ	PM1 + LPQ	PM2 + LPQ
fb	90.71	91.38	86.02	89.45	90.71	92.88	92.97
fc	54.63	43.29	32.98	38.14	47.93	57.73	57.21
dup I	52.90	55.95	55.95	55.95	56.23	59.83	59.41
dup II	29.91	32.05	45.29	36.75	35.04	40.59	40.17
Mean	57.04	55.67	55.06	55.07	57.48	62.76	62.44

PM1, PM2 are LIADup and LIADdown, respectively.

TABLE III. EXPERIMENTAL RESULTS OF METHODS ON THE ORL DATASET

LBP	LTP	LDP	LDN	LPQ	PM1 + LPQ	PM2 + LPQ
97.16	96.91	93.66	96.08	98.08	98.25	98.25

Table III indicates the mean recognition accuracies of the methods in ORL dataset. The highest accuracy belongs to LIADup + LPQ and LIADdown + LPQ, at 98.25%. The next highest accuracy is achieved by using LPQ, which yields 98.08% recognition rate. LDP produces the poorest recognition rate, at 93.66%.

By juxtaposing the results achieved through the proposed method with five other methods on FERET database, it is apparent that our method has significantly improved the recognition rates (see Table II). However, the level of improvement is more modest on ORL database. This can be attributed to a higher level of variance in facial expressions, angles in the ORL database. As a result, LIAD method does not work well with this particular type of image. The LIAD method's strength lies in its capacity to reduce noise and the variance in the distinctive feature of the same individual which can improve accuracy when used in conjunction with LPQ methods.

Through analyzing the results of the proposed method, it is apparent that there is a slight difference in the results of LIADup + LPQ and LIADdown + LPQ. However, this variance is negligible and users can opt for one of the two methods (LIADup + LPQ and LIADdown + LPQ) for face recognition systems.

Empirical evidence has indicated that parameter h should be set at a value in the $0.08 \div 0.14$ range for consistent recognition rates.

The above analyses have indicated a superior accuracy of our method compared to other methods on two given databases.

V. CONCLUSION

We implemented and validated a combination of LIAD and LPQ methods to boost the efficacy of LPQ-based face recognition systems. The face images are first presented by LIAD. After that, then LIAD-images are extracted LPQ-features. The experiments were conducted on FERET and ORL datasets. The classification is implemented using a nearest neighbor method with chi-square statistics as a

measure. For FERET dataset, the best average rate of the proposed approach reached 62.76% whereas the corresponding average rate of other descriptors (LBP, LDP, LDN, LTP, and LPQ) are only 57.04%, 55.06%, 55.07%, 55.67%, and 57.48%, respectively. For ORL dataset, the average accuracy of our method achieved 98.25% whereas the five methods gave 97.16%, 93.66%, 96.08%, 96.91%, and 98.08%, respectively. These demonstrated the efficiency of the proposed approach and we recommend using it in face recognition systems.

REFERENCES

- [1] M. O. Oloyede, G. P. Hancke, and H. C. Myburgh, "A review on face recognition systems: recent approaches and challenges," *Multimedia Tools and Applications*, vol. 79, no. 37, pp. 27891-27922, 2020.
- [2] C. K. Tran, C. D. Tseng, L. Chang, and T. F. Lee, "Face recognition under varying lighting conditions: improving the recognition accuracy for local descriptors based on weber-face followed by difference of Gaussians," *Journal of the Chinese Institute of Engineers*, vol. 42, no. 7, pp. 593-601, 2019.
- [3] J. Sun, Y. Lv, C. Tang, H. Sima, and X. Wu, "Face Recognition Based on Local Gradient Number Pattern and Fuzzy Convex-Concave Partition," *IEEE Access*, vol. 8, pp. 35777-35791, 2020.
- [4] X. Wei, H. Wang, B. Scotney, and H. Wan, "Selective multi-descriptor fusion for face identification," *International Journal of Machine Learning and Cybernetics*, vol. 10, no. 12, pp. 3417-3429, 2019.
- [5] F. Liu, Z. Tang, and J. Tang, "WLBP: Weber local binary pattern for local image description," *Neurocomputing*, vol. 120, pp. 325-335, 2013.
- [6] T. Ojala, M. Pietikäinen, and D. Harwood, "A comparative study of texture measures with classification based on feature distributions," *Pattern Recognition*, vol. 29, no. 1, pp. 51-59, 1996.
- [7] T. Xiaoyang and B. Triggs, "Enhanced Local Texture Feature Sets for Face Recognition Under Difficult Lighting Conditions," *Image Processing, IEEE Transactions on*, vol. 19, no. 6, pp. 1635-1650, 2010.
- [8] T. Jabid, M. H. Kabir, and C. Oksam, "Facial expression recognition using Local Directional Pattern (LDP)," in *Image Processing (ICIP), 2010 17th IEEE International Conference on*, 2010, pp. 1605-1608.
- [9] C. K. Tran, T. F. Lee, and P. J. Chao, "Improving face recognition performance using similarity feature-based selection and classification algorithm," *Journal of Information Hiding and Multimedia Signal Processing*, vol. 6, no. 1, 2015.
- [10] T. Ahonen, E. Rahtu, V. Ojansivu, and J. Heikkilä, "Recognition of Blurred Faces Using Local Phase Quantization," in *International Conference on Pattern Recognition*, 2008, pp. 1-4.
- [11] V. Ojansivu and J. Heikkilä, "Blur Insensitive Texture Classification Using Local Phase Quantization," in *Image and Signal Processing*, vol. 5099, A. Elmoataz, O. Lezoray, F. Nouboud, and D. Mammass, Eds. (Lecture Notes in Computer Science: Springer Berlin Heidelberg, 2008, pp. 236-243.
- [12] D. G. Lowe, "Distinctive Image Features from Scale-Invariant Keypoints," *Int. J. Comput. Vision*, vol. 60, no. 2, pp. 91-110, 2004.
- [13] H. Bay, A. Ess, T. Tuytelaars, and L. V. Gool, "Speeded-Up Robust Features (SURF)," *Computer Vision and Image Understanding*, vol. 110, no. 3, pp. 346-359, 2008.
- [14] N. Dalal and B. Triggs, "Histograms of oriented gradients for human detection," in *Computer Vision and Pattern Recognition, 2005. CVPR 2005. IEEE Computer Society Conference on*, 2005, vol. 1, pp. 886-893 vol. 1.
- [15] C. K. Tran et al., "Local intensity area descriptor for facial recognition in ideal and noise conditions," *Journal of Electronic Imaging*, vol. 26, no. 2, pp. 023011-1 - 023011-10, 2017.
- [16] A. T. L. Cambridge. The Database of Faces [Online]. Available: <http://www.cl.cam.ac.uk/research/dtg/attarchive/facedatabase.html>
- [17] P. J. Phillips, H. Moon, S. A. Rizvi, and P. J. Rauss, "The FERET Evaluation Methodology for Face Recognition Algorithms," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 22, no. 10, pp. 1090-1104, 2000.
- [18] E. Kreyszig, *Advanced Engineering Mathematics*, 10 ed. John Wiley & Sons, 2010, p. 1264.
- [19] F. Jafari and H. Rashidy Kanan, "Disguised Face Recognition by Using Local Phase Quantization and Singular Value Decomposition,"

- (in en), *Journal of Computer & Robotics*, vol. 9, no. 1, pp. 51-60, 2016.
- [20] J. Jiao and Z. Deng, "Deep combining of local phase quantization and histogram of oriented gradients for indoor positioning based on smartphone camera," *International Journal of Distributed Sensor Networks*, vol. 13, no. 1, 2017.
- [21] L. Nanni, S. Brahnam, and A. Lumini, "Local phase quantization descriptor for improving shape retrieval/classification," *Pattern Recognition Letters*, vol. 33, no. 16, pp. 2254-2260, 2012.
- [22] C. K. Tran, T. H. Ngo, C. N. Nguyen, and L. A. Nguyen, "SVM-Based Face Recognition through Difference of Gaussians and Local Phase Quantization," *International Journal of Computer Theory and Engineering*, vol. 13, no. 1, pp. 1-8, 2021.

Alliance Orientation and University's Performances: The Moderating Roles of Organizational Characteristics

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Abstract—This study attempts to discuss the moderating roles of three prominent organizational characteristics shaped by the contemporary economy with the intervention of technology 4.0 and globalization namely international cooperation, results-oriented culture, and ICT capability for innovation performance and market performance of universities. The study proposes that international cooperation, results-oriented culture, and ICT capability are moderating variables in the effect of sub-components of alliance orientation (i.e. alliance scanning, alliance coordination, alliance learning) on innovation performance and market performance. The study also discuss the relevance of the model for the context of higher education in Vietnam. With the proposed model, the study suggests useful managerial implications for managing and improving performances of universities.

Index Terms—International cooperation, results-oriented culture, ICT capability, innovation performance, market performance.

I. INTRODUCTION

With the improved quality of life, focus on education has been accentuated at both individual level and national level. In response to this market demand, higher education institutions have been increasingly established and extended, and accordingly intensified competition in the field. To strategically develop and prosper in the fiercely competitive market, universities start to look for progressive practices and strategies. Developing alliance or cooperation with enterprises has been identified as one strategy for both leveraging capabilities of universities and grasping, exploiting opportunities. Evidence has shown that the extent of alliance orientation of universities is a catalyst for better performances for innovations as well as market. Nevertheless, for performances of universities, several influential factors may involve that can moderate the strengths and robustness of the effects because a wide range of factors are present in the contexts of business management. While some factors may exert minimum impacts, some other factors may be dominantly relevant to the operations of business, including performance achieving processes. An identification of the influential moderating factors is vital as it helps universities to properly and effectively manage the contexts so as to create an optimal environments as well as conditions for performances. In the contexts of alliance between universities and enterprises, there has been little research on moderating factors in the relationship between university-enterprise cooperation and perfor-

mances of universities. Specifically, previously-studied moderators for the relationship include changes-oriented environments [1], environments with technological uncertainties or market uncertainties [2], time, long term relationships [3], and specific cooperation characteristics such as aspects of cooperation. Apart from factors pertaining to cooperative environments, factors of characteristics of universities have also proved to moderate for university's performances. Precisely, contributions of universities, breadth of collaboration, and intellectual capability have been proved to be moderators for innovation performance of universities [4]. Besides these factors, to date, other factors of university's characteristics, particularly factors pertaining to the contemporary business world with globalization and impact of Technology 4.0 have not been researched for university's performance.

In the contemporary economy with preeminent trends of globalization, high demands for big data analyses, and Technology 4.0, typical characteristics of this economical environment may exert moderating influences on the relationship between alliance orientation and university performances. Intervention of those economic characteristics enables organizations in general and universities in particular to have numerous opportunities for cooperation with other overseas organizations, place more focus on outcomes in doing business, and have solid capability of using technologies. These three eminent characteristics of enterprises and universities in the present economy embodied through international cooperation, results-oriented culture, and information and communication technology capability may help enterprises and universities to achieve high performances in doing business [1]. Evidence has shown that in the contemporary economic situation, due to competition intensity, organizations increasingly have international cooperation with foreign organizations, executing an organizational culture with a focus on results achievement, and striving for leveraging information and communication technology capability which benefit their performances. Regrettably, they have not received much attention from research. Precisely, to date, no study has been found to comprehensively evaluate the effects of these factors on university's performances. Therefore, this research is carried out to address the moderating effects of university's characteristics including the level of international cooperation, results-oriented culture, and ICT capability in the effect of alliance orientation on innovation performance and market performance of universities. With

This research is funded by Vietnam National University, Hanoi (VNU) under project number QG.19.46

the proposed research model, the study expects to provide valuable managerial implications for managers at universities in Vietnam.

II. THEORETICAL BACKGROUND

A. International cooperation

International cooperation refers to firm's involvement into cooperative activities with international partners. There exists ample evidence that cooperation of firms with international organizations leads to positive firm performances. According to Chen, through cooperation with international organizations, firms can learn international management skills and optimization of resource allocations. This is agreed by Xie and Liu such that firms can better access to resources and assets, increasing revenues and improving management skills. It is revealed that resources pertaining to technological and marketing knowledge are relevant to firm's cooperation with international organizations. Lou & Tung reckoned that by cooperating with global players who have transferred technological and organizational skills, Chinese companies gained many benefits for development and competition in markets.

In the context of education, international cooperation of higher education institutions with foreign partners has been proved conducive to positive outcomes. It is shown that international cooperation is an integral part of modern university education and it has large influences on academic processes. Through cooperation with institutions in foreign or neighboring countries, universities may overcome problems such as outdated curricula and skills of teachers.

B. Results-oriented culture

Results-oriented culture is a sub-form of organizational culture [5]. As a specific type of organizational culture, it shares the common feature of organizational culture that entails a deep structure of organizations rooted in the values, beliefs, and assumptions held by organizational members. Results-oriented culture has been deemed equated to performance culture, and is known as a driver for performance improvement [5]. According to Spekle and Verbeeten [5], there is not a robust definition of results-oriented culture, but it entails a culture in which managers are expected to take responsibility for results that are actually valued by society. This conceptualization of results-oriented culture is in line with the recognition of the concept found in the reports of OECD [6], [7]. In such a culture, companies place much emphasis on the benefits incurred from actions, rather than a focus on processes. The results-oriented culture is known to be opposite to traditional bureaucratic or administrator model which emphasizes compliance to pre-set rules while placing less values for outcomes of the efforts. In a results-oriented culture, members are acutely aware of terminal outcomes such as costs, deadlines, and quality [8].

Results-oriented culture has been sparingly studied with relevant determinants as well as resultant factors. Spekle & Verbeeten [5] reckoned that while results-oriented culture is significantly conducive to organizational performance, new public management practices (i.e. monitoring, incentives, strategic decision making, attention-focusing), goal clarity,

rules and procedures, and organizational decentralization are associated to results-oriented culture. To date, little research has been detected about the moderating influence of results-oriented culture on the phenomena pertaining to organizational performance, particularly in the context of higher education.

C. Information and communication technology capability

Information and communication technology capability (ICT) entails the extent to which a firm is capable of utilizing information and communication technologies to improve its overall business processes. According to Wales et al., information and communication technology capability is conceptualized with three aspects including ICT internal use, ICT collaboration, and ICT communication. ICT capability of firm reflects the flow of information inside and outside the firm. Prior study showed that the use of more communication mechanisms had positive effects in collaborative projects. ICT tools include the World Wide Web and email that have facilitated migration of minds and supported collaboration.

While alliance orientation of universities is possibly relevant to innovative performance, this effect may be more pronounced with universities that have strong international cooperation with foreign partners. With international cooperation, universities have ample exposures to opportunities for innovations since foreign organizations offer valuable resources as well as inputs for innovations that can be rare or not available in domestic contexts. Moreover, by cooperating with international partners, universities may acquire advanced and updated knowledge from foreign contexts, particularly developed economies, which allows them to improve their capabilities for performing innovative tasks. Working with international organizations helps focal organization to gain R&D resources. Kotabe indicated that interactions with international partners allow organizations to improve innovative capacity as a result of exploiting a wide range of globally available resources that can be unrepresented in domestic contexts. Thus, the study proposes:

H1: International cooperation positively moderates the relationship between alliance orientation and innovation performance, such that the effect of alliance orientation on innovation performance will be higher if university's international cooperation is high; whereas, the effect of alliance orientation on innovation performance is lower if university's international cooperation is low.

Alliance orientation of universities can be linked to innovation performance thanks to useful and novelty resources triggered through alliance processes and from enterprises. In universities with an organizational culture that is highly oriented to results or outcomes, the effect can be more robust as by orienting to results, universities may strive harder for begetting more innovative outcomes. This is because employees are likely to experience pressure for producing innovative outputs. Moreover, under a results-oriented culture, universities have motivations to produce innovative results since innovative outcomes function as positive results that are favoured by universities. In organizations with a results-oriented culture, innovative outputs are often valued and encouraged by managers through recognition and rewards sys-

tems. In contrast, an environment with less emphasis on results, known as a low results-oriented culture, alliance orientation of universities has less effect on innovation performance because universities are not persistent in pursuing innovative outcomes. Therefore, the study proposes:

H2: Results-oriented culture positively moderates the relationship between alliance orientation and innovation performance, such that the effect of alliance orientation on innovation performance will be higher if university's results-oriented culture is high; whereas, the effect of alliance orientation on innovation performance is lower if university's results-oriented culture is low.

With a strong information and communication technology capability, alliance orientation of universities has more effect on innovation performance. First, ICT capability enables universities to be more effective in contacting, interacting with external partners. Effectiveness in interacting with partners allows universities to learn novelty practices from partners which are good for innovative performances. In addition, with ICT capability, universities have better capability of internal communication, which facilitates communication processes for innovative tasks, hence improving innovative performances for organizations. Research has disclosed that good ICT capability facilitates orchestration of resources for organizations including resources for innovative processes, which helps to result in positive innovation performances. Therefore, the study proposes:

H3: ICT capability positively moderates the relationship between alliance orientation and innovation performance, such that the effect of alliance orientation on innovation performance will be higher if university's ICT capability is high; whereas, the effect of alliance orientation on innovation performance is lower if university's ICT capability is low.

International cooperation may moderate the impact of alliance orientation of universities on market performance for three reasons. First, universities with a high level of international cooperation likely acquire opportunities for market performance because of good reputation acquired from partnerships with international organizations that is favored by students and parents in domestic contexts. Prior studies have indicated that international cooperation of universities is also one factor that can attract students to enter. Second, cooperation with international organizations also enables universities to attain advanced and progressive practices like new materials, updated technologies, and teaching methodology which help to satisfy students and so sustaining market performance of universities. Third, while orientation to cooperation with enterprises can result in market performance, with a high level of cooperation with international organizations, universities can gain more beneficial relations and networks which serve as resources for their competitiveness in market places. Therefore, the study proposes:

H4: International cooperation positively moderates the relationship between alliance orientation and market performance, such that the effect of alliance orientation on market performance will be higher if university's international cooperation is high; whereas, the effect of alliance orientation on market performance is lower if university's international cooperation is low.

Alliance orientation of university catalyzes market performance, and this influence likely becomes more prominent in the contexts with results-oriented culture. This is because with the ceaseless focus on attaining results, universities tend to strive more for market outcomes. Research has revealed that when organizations channel their efforts to obtaining results for the tasks or goals pursued, the market outcomes as one type of favorable outcomes become more paramount. Second, with a solid culture orienting to achieving results, universities can be more strategic in their collaboration operations, inclusive of choosing partners, managing activities with partners, and learning progressive, advanced practices from partners for gaining and sustaining a competitive advantage, therefore enhancing their effectiveness in achieving market performances. In other words, their capabilities for competition can be solidified. Finally, in universities with a strong results-oriented culture, employees have more favorable conditions for calibrating or leveraging their capabilities and motivations for pursuing outcomes, including market-related outputs. As a result, market performance of universities becomes higher. Hence, the study proposes:

H5: Results-oriented culture positively moderates the relationship between alliance orientation and market performance, such that the effect of alliance orientation on market performance will be higher if university's results-oriented culture is high; whereas, the effect of alliance orientation on market performance is lower if university's results-oriented culture is low.

ICT capability may serve as a factor moderating the influence of alliance orientation on market performance for two reasons. First, with competent ICT capability, universities are more likely to connect with external partners. By networking with a wide range of partners, universities can obtain more opportunities for competitive performances in market. Second, capability of information and communication technology enables universities to integrate inputs from stakeholders more effectively, and this effective integration amplifies innovative performance. Third, ICT capability facilitates knowledge sharing processes from both external partners to universities and amongst departments inside universities which are conducive to better attainment of knowledge as well as innovative processes. As such, innovation performance of universities can be improved. So, the study proposes:

H6: ICT capability positively moderates the relationship between alliance orientation and market performance, such that the effect of alliance orientation on market performance will be higher if university's ICT capability is high; whereas, the effect of alliance orientation on market performance is lower if university's ICT capability is low.

D. Discussion

While an increasing number of studies have been detected about the impact of alliance orientation on performances of partners, and in the meantime much research evidence have been found to address the linkage between university-enterprise alliance orientation on university's performances, little research, particularly empirical studies, has explored the moderating effects of international cooperation, results-oriented culture, and ICT capability in the influence of alliance

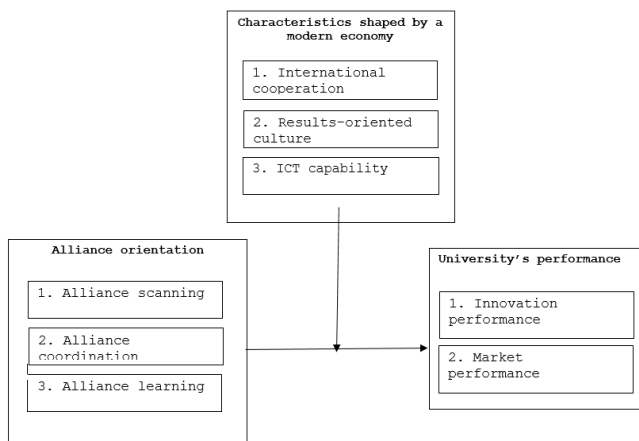


Fig. 1 The proposed research model

orientation on performances of universities. With the relevant literature discussed, this study proposes that alliance orientation is relevant to university's innovation performance and market performance, and this relationship may be positively moderated by international cooperation, results-oriented culture, and ICT capability.

Traditionally, Vietnam has a centrally-focused economy and has recently transited to a market-oriented economy. Remarkably, Vietnam's participation in World Trade Organization in 2007 amplified international cooperation and opportunities for calibrating capabilities. With these typical characteristics, Vietnam is an ideal context to examine the relevance of international cooperation, results-oriented culture, and ICT capability to performances of organizations like universities. Nevertheless, though Vietnam is an interesting context to learn about university-enterprise alliance with the viably present impetus for international cooperation, an increasing orientation to results-related performances, and an enhanced capability for communication, with the modest level of economic development of the country, the magnitude of the moderating influences of the target factors is expected to be more pronounced in comparison with in other developed economies. The reasoning can be resorted to the fact that universities in a developed country like USA or a European country enjoyed ample opportunities for a focus on international cooperation, results-orientation, and competent ICT capability for a certain period of time.

III. CONCLUSION

This study has significant theoretical contributions. Foremost, this is the very new study to evaluate the moderating influences of international cooperation, results-oriented culture, and ICT capability in the effect of alliance orientation components on innovation performance, market performance. While these internal capabilities of universities are stressed for pursuits among organizations, higher education institutions included, in the contemporary economy with an intense competition and intervention of technology 4.0, they have not been studied as moderators for performances of organizations. The study's attempt contributes to open up a research line to attend to moderating roles of prominent capabilities of universities in understanding performances and effectiveness of universities. The extent and degree of university's orientation to cooperation with enterprises may be relevant to innovation and market performance; therefore, managers should be aware of the importance of alliance scanning, alliance coordination, and alliance learning. Organizations should be attentive to management of these dimensions so that they can achieve innovation as well as market performances.

REFERENCES

- [1] Huang, M., & Chen, D. (2017). How can academic innovation performance in university-industry collaboration be improved? *Technological Forecasting & Social Change*, 123, 210-215.
- [2] Kandemir, D., Yaprak, A., & Cavusgil, S. T. (2006). Alliance orientation: Conceptualization, measurement, and impact on market performance. *Journal of Academy of Marketing Science*, 34(3), 324 - 340
- [3] Hemmert, M., Bstieler, L., & Okamuro, H. (2014). Bridging the cultural divide: Trust formation in university-industry research collaborations in the US, Japan, and South Korea. *Technovation*, 34, 605-616.
- [4] Lin, J. Y. (2017). Balancing industry collaboration and academic innovation: The contingent role of collaboration-specific attributes. *Technological Forecasting & Social Change*, 123, 216-228.
- [5] Spek, R., & Verbeeten, F. (2011). Management control systems, results oriented culture, and performance: Evidence from Dutch municipalities. *SSRN Electronic Journal*. Doi: 10.2139/ssrn.1908703.
- [6] OECD. (1997). In search of results: Performance management practices. PUMA.
- [7] OECD. (2002). Implementing the vision: Addressing challenges to results-oriented management and budgeting.
- [8] OECD. (1994). Performance management in government: Performance measurement and results-oriented management. PUMA occasional papers 3.

News coverage of genetically modified organism in Vietnam

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Abstract—As developing countries are often science receivers, they are more vulnerable to potential threats of science innovations primarily produced in Western countries. It is, therefore, vital for media in the Global South to inform and prepare their citizens and policy makers in making rational decisions about new science developments, especially contested issues. Yet, news coverage of global science controversies – e.g. genetic modification, nanotechnology, stem cell, human cloning, artificial intelligence – have often been found to be weak and problematic in developing regions. Based on a content analysis of Vietnamese news about genetically modified organism (GMO), one of the scientific controversies with huge implications for sustainable development in the developing countries, this paper finds that such reporting tends to be modest and superficial. It seldom provides thematic and detailed analysis of GMO risks and benefits with a strong evaluative and analytical dimension. Further, GMO events and issues are often positively framed with a benefit favour in accordance with the government's pro-GMO stance. For science journalism to reach its profession, a professional attitude should be encouraged in tandem with a strong support from the newsroom managers, scientific community, and policy makers. Training is further necessary for journalists to overcome challenges and obstacles to improve the quality of news about GMO and science in Vietnam.

Index Terms—GMO, framing, controversy, news coverage, science journalism.

I. INTRODUCTION

The innovative genetic modification, which was developed in 1970s, is a process in which a selected individual living material is transferred from one organism into another, particularly among nonrelated general [1]. Although there is hardly any evidence about the negative effects of genetic engineering on human health and natural environment, over the last decades, global public have taken a divergent viewpoint towards GM products and their influential forces to socio-economic sustainable development [2]–[4]. While GMO were widely accepted in the US and several parts of Asia, in some countries, particularly the EU, the debate turned out to rally and march for GMO restrictive regulation or legal activism and contest against international GMO commercial trading [4], [5]. The political, legal and cultural differences among countries across the globe make GMO one of the prolonged scientific controversies of the late twentieth and the early twenty-first centuries, which over the extent and effect involves various stakeholders, e.g. scientific community, farmers, customers, biotechnology corporations, governmental institutions, non-governmental groups and environmental activists.

While GMO is integrating into every aspect of our daily life, studies reveal that the public often lack understanding of and experience with GM technology. They rarely gain GMO-related knowledge from academic platforms, such as education or scientific journals, but merely from the media [6]. Therefore, it is significantly vital for news media to interpret and deliver GMO updates as well its long-term consequences to the public. For developing countries, a strong base on critical science journalism would be more crucial as these countries merely adopt science and technology from the more advanced countries rather than producing end of S&T. Any false choice of either excessive reliance on GMO as a panacea for all eco-agricultural issues, or aggressive opposition to GM foods and crops for its unintended limitations can be at the expense for development.

Yet knowledge about the media role in GMO management are often Western dominated. Many parts of developing countries like China, Philippines and Vietnam which are directly involved in GM technological chain, are almost absent in the international GMO debates [7]. The dearth of understanding of how media in developing countries representation of GMO proposes a gap for a throughout understanding of the GMO controversy and its potential influence on policy maker and citizen in a developing country context. This study, thus, employs Vietnam as a case in point to explore to which extent science journalism in a particular developing country fulfils the roles it upholds for developmental goals. By exploring which salient topics, frames and sources are employed by the local newspapers to frame public understanding of GM technology, the paper would contribute to the literature on how global science controversies change their status across cultures and contexts.

II. AN OVERVIEW OF GMO REPORTING IN DEVELOPING COUNTRIES

Since the first GM plant was commercialised in 1990s, GM technology has remained a highly controversial topic in social sphere. The widespread public debate on GMO social, economic, ethical and political implications has prompted many researchers into examining media coverage, public perception and regulation of GMO [8]–[10]. It is well documented that scholars in the US and Western Europe gave a considerable attention to media coverage of GMO during the last twenty years [10]–[15]. On the other hand, there were far and few studies on the Asia, Africa, Latin America and other parts of Europe [16]–[18], despite the critical role that media play for their national strategy towards this new and complex technology. Despite the limited understanding of media reporting GMO in developing countries, several in-

This work is partially excluded from the author's PhD thesis

sights about the media representation of GMO in the South could be gathered from this thin literature.

First, developing countries often see an insufficient media effort to inform public about GMO [19]–[21]. For instance, a substantial research in Africa reveals the media failure to provide public with good information for their GMO debate and decision making [19], [20]. Most of publications about GMO in Kenya were only found during the public discussion of Kenyan ban on GMO food and Seralini report in 2012 [22]. Similarly, despite biotechnological agriculture has direct impact on farmers, GMO was not a favourite topic in the Nigerian media [23]. The low number of daily news coverage, according to Omeje (2019), was because of unprofessionalism in science journalism in Nigeria. Due to their lack of journalistic skills and supplementary materials to cover science controversy, journalists in Nigeria tended to ignore GMO stories. In Zambia, only four newspaper articles voiced up the GMO issue throughout 2000 even though the country's rejection to GM-maize aid from the US caused intensive social controversies about GM safety [24]. In China, despite the evolution of GMO debate, especially among the netizen, the topic was not a prominent issue in mainstream media [25], [26]. During the period of 2002–2011, the two leading elite Chinese press, People's Daily and Guangming Daily, published less than eight articles about GMO per year [18]. Vermeer and Ho (2004) ascribed the absence of GMO in the news to the governmental influence on Chinese media. It is therefore over 80% respondents of their 1000-participant survey lacked knowledge or misunderstood of transgenic products while only 20% urban consumers showed a limited awareness of GM foods and crops.

Similar observation was found in Philippine newspapers with a small number of articles covering GMO. Particularly, most of the news about GM foods and golden rice were published in the national elite dailies while regional and local newspapers paid scant interest to the issue [28]. The volume of GMO news occasionally peaked in concurrence with remarkable events which attracted high public attention, such as the approval of commercial bt maize crops, the official allowance of planting GM seeds on private peasant's land. Yet the flashpoint period was unable to sustain intensity, GMO still received modest media attention compared to other politic and economic topics [29]. Apart Philippines, GM foods and crops have not yet been critical concerns in other parts of Southeast Asia (Asoro 2012). Mainstream media in Cambodia, Vietnam, Malaysia, Indonesia demonstrated a minimal attention to genetic engineering and biotechnological products. Even Thailand, which had highest interest to the topic, the media published less than 25 articles about GMO each year of the period 1999 – 2011 (Asoro 2012). It suggests that during the first decade of the 2000s, when GM technology was officially exported from the more advanced biotechnology countries to the developing countries, it was not a prominent issue in the media agenda.

Second, the literature also shows a polarity in the media attitude towards applications of genetic engineering [13], [31]. For example, in several highly authoritarian Asian states which favoured GMO, such as Philippines, China, Vietnam, newspapers largely supported GM food and plant.

Mainstream media in these countries often framed GMO as an effective tool for national development with the domination of governmental source (Navarro and Villena 2004, Navarro and Hautea 2011, Asoro 2012, Du and Rachul 2012). On the other hand, across African continent, while Kenyan news reporting was found to contain more benefit than risk frames [35], Nigerian and Ghanaian newspapers were overwhelmingly negative of genetic engineering and its products [21], [36]. Rodriguez and Lee (2016) suggested that the domination of hazard content potentially leads to or reinforce public uncritical opposition to GMO research and products. Indeed, the bias media coverage had influential impact on policy making process, i.e. increasing the Ghanaian public unwilling to support GM research fund and fostering Zambia government refuse GM maize aid [7], [37].

III. GMO IN VIETNAM – PROSPECTS AND CHALLENGES

Vietnamese government has identified science and technology, with particular preference to GM technology, as a leading force for agricultural sustainable development. As a result of these the state's support, Vietnam is now one of the nineteen biotech mega countries with 0.1 million hectares of bt maize [38]. Further, Vietnam imports a wide range of GMO products, particularly GM soya and cotton [39]. In spite of setting GMO as a focal point for development, the government is aware of its potential consequences by releasing strict legal framework to ensure GM commercialism taken safely and legally [39].

In contrast to the state's initial effort, GMO was still a silent issue in the public sphere. Vu et al. (2004) find that Vietnamese citizen have very poor understanding of and limited interest in GMO knowledge. Despite of the current existence of GM plants in the farm, GM cotton in textile industry and GM foods in the supermarkets, consumers are not aware of GM available products in their daily life. GM seeds, crops and foods are unfamiliar for most of the wider public. In 2010, Vietnamese Ministry of Agriculture and Rural Development (MARD) officially approved Monsanto, the US-original agrochemical bio-agricultural corporation – known as the manufacturer of Agent Orange used in the Vietnam War¹ that causes four hundred thousand deaths, millions of dioxin victims and more than sixty thousand square kilometres of contaminated land in Vietnam – to take trial bt maize crops in Hung Yen Province (Le and Navarro 2011). Monsanto's return was welcomed regardless its dark past in Vietnam as well as the public concern on GMO's long-term impacts. Several anti-GMO activists' opposing voices were raised but too sporadic to attract widespread attention. Most of time, the media introduce GMO as a significant tool to foster the national economy, modernise Vietnam and make the country a leading economy in the Asia [41]. Along with mainstream newspapers, the government undertook communication strategy to promote public understanding of biotechnology for the “development of human society in general and to the development of agriculture in particular” (Decision No.11/2006). Several workshops were organised by MARD to seek ways to improve public awareness of GMO benefits [42]. The state general support along with

¹ Or *Vietnamese People's resistance War Against America* - the official term used by Vietnam

media discourse of GMO's promising benefits appear to set public naïve perception towards GM technology. Thus, it demands for more comprehensive studies exploring the role of media in reporting GM technology as well seeking for potential initiatives to improve the GM coverage and provide public with definite information and expand their active participation in controversial science policy. As there are limited published reports about Vietnamese news representation of GMO, it is important to uncover the media practice in Vietnam in informing the country of the benefits and risks of utilising GMO to meet the country development demand. Aiming to address this gap, this paper explores whether Vietnamese media serve the public well with their GMO reporting and guidance. The key research question is: *How are the socio-economic and ethical risks and benefits of Genetically Modified Organism properly represented in Vietnamese news media?* which are developed in two sub-questions:

- *How prevalent are GMO issues and events in Vietnamese news media?*
- *How are GMO event and issues framed in Vietnamese news media?*

IV. METHODS

In order to answer the research question, thematic content analysis was employed to identify, quantify and analyse the presence, meanings and relationships among patterns in news story about GMO.

Sampling. To assess the coverage of GMO in Vietnamese media, we employed Google News database to search for GMO articles from 1/1/2017 to 31/12/2018, using simple Boolean keywords: “biến đổi gen” (genetically modified organism), “chỉnh gen” (genome editing), “chuyển gen” (genetic transformation), and GMO (acronym of genetically modified organism). Regardless of limitations, as there is no Vietnamese database equivalent to LexisNexis, ProQuest or EBSCO, Google News is considered as the most appropriate search engine for our news collection. Furthermore, Google search, which has several advantages compared to traditional news archive, such as wire news inclusion, original version of news stories storage, would also provide more comprehensive samples than particular newspapers which are unable to represent the national media [43].

Notably, as most Vietnamese print news stories are reposted on their digital platforms, stories collected from the digital search engine could stand for not only online but also print media throughout the country. In general, using Google News and keyword searching technique, the study collected 439 stories about GMO. After deducting duplicated articles, our research came up with a total number of 401 pieces for the full analysis.

Coding procedure. Each news article was treated as one unit of analysis. A coding instrument was developed by adopting fundamental variables, such as themes, frames, sources from previous studies [8], [44], [45]. The key variables indicating news narration elements are explained in the Table 1.

Coding reliability: Along with the author as the prime coder, a second coder, who has a BA in journalism, was hired for the coding. In order to reach an acceptable agree-

TABLE I
CODING VARIABLES

Categories	Definition
Primary themes	The central subject matter in the story – include “new research”, “impacts and implications”, “policy and legislation”, “trade and industry applications”, “public perception” and “others”
Frames	The most salient aspects of the subject presented in the text – were adopted from previous research on news coverage of controversial science and technology (Bauer et al. 1995, Durant et al. 1998, Nisbet and Lewenstein 2002) to include “scientific progress”, “economic prospects”, “policy”, “ethical concern”, “disaster”, “localisation” (local outlook on global AI issues) and “others”
Genres	The journalistic storytelling formats/styles of the article, include “straight news”, “features”, “opinion/editorial”, “interview”, “photo gallery”, and “others”
Temporal nature	Whether the story is <i>episodic</i> (mainly reporting the what, where and when of a specific case, a particular event or moment, an announcement) or <i>thematic</i> (an analytical focus on the how and why of a broader issue about GMO in society)
GMO controversies	The central conflict or debate (if any) conveyed in the article, includes “purely scientific”, “political”, “economic”, “social”, “ethical”, “medical” or “general/multi-faceted” and “no controversy”
Number of sources	The number of sources cited in the article, includes “no source”, “single source”, “two sources” or “more than two sources”
First source's identity	When the news item has at least one source, the first cited source was coded according to the role with which they appear in the story. Categories include “experts and research institutions”, “lay people”, “politicians and government officials”, “industry and business sources”, “newswire”, “NGOs” or “others”
Second source's identity	When the news item has at two or more than two sources, the second cited source was coded according to the role with which they appear in the story. Categories include “experts and research institutions”, “lay people”, “politicians and government officials”, “industry and business sources”, “newswire”, “NGOs” or “others”
Presence of GMO risks and benefits	Whether the story mentions the actual or potential harm, danger, damage and other negative outcomes of GMO (risks) or GMO's actual and potential advantages and positive impacts (benefits) – has four categories: “neither risk nor benefit”, “only risk mentioned”, “only benefit” or “both risk and benefit”
Types of GMO risks and benefits	The specific realm in which a risk or benefit is projected to happen – include “economic”, “social”, “ethical”, “health and medical”, “environmental” or “multiple” and “others”
Intensity of GMO risks and benefits	Intensity was coded in a 5-Likert scale, ranging from 1=very low (benefits/risks are downplayed and referenced as insignificant) to 5=very high (benefits/risks are unavoidable and overwhelming)
Specificity of GMO risks and benefits	Specificity was coded in a 5-Likert scale, ranging from 1=not at all specific (benefits/risks are mentioned but not discussed) to 5=very specific (benefits/risks mentioned and discussed with specific examples or cases in particular situations)
Overall stance towards GMO	This refers whether the article favours, opposes or maintains a “neutral” position towards the GMO event/issue being covered

ment level for a manual content analysis, according to Bryman (2012), coders need to independently code a randomly selected 10% of the sample until the Krippendorff's alpha for every variable reaches at least 75%. In our study, the

lowest alpha values was 83% (for the variable indicating intensity of benefit). All data were analysed in SPSS.

V. PRELIMINARY FINDINGS

A. A modest and superficial coverage of GMO

Overall results from the content analysis show that during the period 2017 and 2018, Vietnamese journalists did write about genetically modified organism. However, the number of GMO articles in the two examined years was not high. Of the total 401 articles, 169 pieces were published in 2017 and 232 stories were published in 2018, dispersing across 81 news sites. On average, the 81 newspapers in the sample published 16.7 articles in the two years. The lacked information about the intensity of S&T news during the analysed period makes it unable for any quantitative comparison between GMO news and general S&T news. Yet compared to the media coverage of artificial intelligence in the same period, it is apparent that the volume of GMO stories was much smaller, two times less than AI (1228 stories) [46]. *Nong nghiep, Dan tri, Tuoi tre, VTV, Suc khoe doi song* were a few newspapers that gave substantial attention to GMO issue, which each published more than ten articles during the studied period while most of the remaining newspapers produced under three (data not shown). Among the most extensive coverage to the issues of GMO, *Nong nghiep*, the specialist newspaper for agricultural development published by MARD had the highest number of publications (35 articles), followed by the science- and education-focused online newspaper *Dan tri* (27 articles) and the general daily broadsheet *Tuoi tre* (26 articles), respectively.

Alongside the modest coverage is another issue: the superficial GMO reporting. This is manifested in several key aspects. First, there was a high proportion of straight news found in the study. As shown in Table II, compared to other in-depth formats, i.e. feature, opinion, interview, GMO was more often covered in the form of short and brief news, accounting for more than half of the total samples (51.6%). Unsurprisingly, longform/mega story, which provides a large amount of content, often with multimedia elements, was not used to cover GMO. Opinion/ Editorial, which is commonly known as one of the most-read and influential section to public opinion and action, as well as policy making process in a newspaper, was also uncommon in Vietnamese media coverage of GMO [47]. The fact that only 1% (N=4) of the two-year sample presented the newspaper's viewpoints on GMO innovations and policies suggests that the issue was not seen as one of paramount social significance or urgency. A Fisher exact test was then run, showing that there was not significantly statistical difference between the science focused and non-science focused newspapers in terms of GMO news formats ($p > 0.05$).

Second, the superiority of straight forms to other in-depth genres suggests that Vietnamese news coverage of GMO was largely episodic. Two-thirds of sampled stories were event-based, focusing on what happening around GM technology, such as a genome editing discovery, a new licenced GM seed, an approved GMO policy, a possible association between biotech tobacco and cancer. Particularly, both general newspapers and science-focused newspapers, which are

TABLE II
TYPES AND GENRES OF ARTICLES BY NEWS OUTLETS

	Total (n=401)	Gen. newspaper (n=327)	Sci. newspaper (n=74)
Genres of articles by type of news outlets			
<i>(Fisher exact test, * $p > 0.05$)</i>			
Straight news	51.6	52.0	50.0
Feature	25.4	25.7	24.3
Opinion/ Editorial	1.0	0.9	1.4
Interview	2.5	2.8	1.4
Photo gallery	2.2	2.8	0.0
Others	17.2	15.9	23.0
Type of coverage by type of news outlets			
<i>($\chi^2=0.03$, *$p > 0.05$)</i>			
Short-term/event-oriented	65.8	66.1	64.8
Long-term/issued-oriented	34.2	33.9	35.1

supposed to provide public with in-depth science reporting, emphasised single event or individual case rather than applying a wide and deep angle to GMO and bringing the public to the comprehensive context of GM debate. A chi-square test of independence also shows there was no statistically significant difference between the two categories' tendency to frame their stories ($\chi^2(1, N=401)=0.03$, $p > 0.05$).

Third, as a result of the event-orientation, there is a lack of critical analysis about GMO. The media tended either excessively celebrate the benefits or exaggerate the risks of GMO. Easy-to-digest content that could promptly attract public attention were preferred to analytical and investigative coverage through in-depth journalistic forms, such as features, commentaries and the likes. Only a few articles were found to position GMO events and issues in Vietnamese social, economic and political context or to inform public with comprehensive scientific evidence about GMO's advantages and disadvantages. Yet these stories were not extensive and profound enough to provide the public with comprehensive information about how and why of such benefits and risks. Reviewed articles rarely presented GMO events and issues with an efficient evaluation of the scientific rigour behind them. Only a minority of sampled stories explained the research aim and object (0.5%), analysing methodological strength and weakness (3.7%), grasping the findings with limitations or flaws (6/2%) or judging the weight of evidence, ethical norms and value, ect. (data not shown).

B. Tendency to depict GMO as scientific progress and promising industry

As Vietnamese news media is highly inclined to the government's support for GMO development, GMO was dominantly depicted as a promising science achievement for the agricultural industry. Our dataset reveals an almost absence in the media coverage of GMO controversies with more than two-thirds of the article reporting GMO without any conflict (67.8% - data not shown). Further, as seen in Table 3, there was a heavy prominence of themes that highlight the positives of "GMO trading and industry" (31.9%), and "GMO scientific process and achievements" (23.9%). These news articles often focused on the practical application of GM in

TABLE III
THE MAJOR THEMES AND FRAMES PRESENTED IN VIETNAMESE NEWS ABOUT GMO

	Total (n=401)	Gen. newspaper (n=327)	Sci. newspaper (n=74)
Themes ($\chi^2=9.64$, $*p > .05$)			
New research	23.9	22.0	32.4
Impacts and implications	7.5	8.3	4.1
Policy and legislation	8.0	8.6	5.4
Trade and industry applications	31.9	30.6	37.8
Public perception	12.5	14.1	5.4
Others	16.2	16.5	14.9
Frames (Fisher exact test, $*p > 0.05$)			
Scientific progress	22.7	21.1	29.7
Economic prospect	27.2	25.4	35.1
Policy	7.5	8.0	5.4
Ethical concern	3.5	4.3	0.0
Disaster	15.7	17.1	9.5
Public accountability	3.0	3.4	1.4
Localisation	3.7	3.7	4.1
Others	16.7	17.1	14.9

trading and industry as well as the effort of government and industrial agency to accelerate the GMO commercialism. Journalists also favour to the latest research breakthrough from outside the border, e.g. GM mammals for academic experiment² the genome editing baby³ or research project using gene modified technique to boost production of commercial hens⁴. The preference of GMO developments outreached the stories about “public perception” (12.5%) and “policy and legislation” (8%). Furthermore, the theme concerning both positive and negative consequences of GMO, “impacts and implications”, was rarely found in our content analysis.

In order to test the newspaper’s different approach to GMO, a chi-square test of independence between the science-focused and general newspapers was run. Table III shows there was no statistically significant difference between types of newspapers and the major science themes in the news story ($\chi^2 (5, N=401) = 9.64$, $p > .05$). Both science-focused press, such as *Nong nghiep* and *Dan Viet* and general daily such as *Tuoi tre* and *Vnexpress* were more likely to cover generic research and economic issues, such as golden rice contains vitamins, anti-herbicide resistant plant increases yield, GM plants are able to survive drought, imported and exported bt maize and cotton, the expanse of GM cultivation in Vietnam. On the other hand, they were less interested in GMO dilemmatic application and implication, policy and regulation as well as public reaction towards GMO products. However, general newspapers tended to give more emphasis on public involvement in biotechnology debates. 14.1% of articles published in general newspaper focusing on public perception of GMO while only 5.4% of

those in the science-focused publication presenting public awareness of and reaction to GMO debate.

The media tendentiously presenting GMO as a promising scientific achievement for industry was also reflected in the dominance of framing devices that accent elements of scientific progress and economic development. Approximately half of the article reported GMO within “economic prospect” and “scientific progress” frames (Table III). Many articles that were framed by “scientific progress” primarily celebrated GMO research and development program, priming audience to understand GM technology as a great human achievement. It was usually used in stories presenting potential economic, social and environmental benefits associated with new GM discoveries. The salience of GMO cutting-edge in the media is perhaps unsurprising given GMO’s prominent status in the national agronomic development scheme. Despite the prevalence of reported benefits, GMO was occasionally seen as an existing or possible threat to human, with 15.7% of stories were framed as “disaster”. In these cases, however, news outlets rarely provided detailed explanation and evidence to support their concerns on GMO consequences. Further, they hardly went beyond the limitations of laboratory to analyse the GMO’s influence on social interests and ethical values as well as the public involvement and participation in the establishment and management of a GMO regulation. Table III illustrates only 3% and 3.5% of total samples was indexed to the frame “public accountability” and “ethical concern”, respectively.

TABLE IV
SOURCES CITED IN VIETNAMESE NEWS ABOUT GMO

Source	First source ^a (n=315)	Second source ^b (n=182)
Expert and research institution	46.8	38.4
Lay community	11.4	15.4
Politician and governmental organisation	21.0	26.4
Industry and business	7.6	8.9
News wire	7.6	5.0
NGOs	4.1	6.0
Others	1.9	0.0

a. The first agent/agency was cited in the story

b. The second agent/agency was cited in the story

The media favour of scientific progress was further supported by the prevalence of expertise news sources. As seen in Table IV, nearly half of articles quoted “expert and research institutions” as their first source, whereas about one third quoted a biotechnologist or biotechnological organisation as their second source of information. The vast majority of these expertise sources were crop breeders, scientists and research institutes, both from inside and outside Vietnam. *Nong nghiep* and *Dan tri* – the two science and agriculture-oriented newspapers – had the highest number of academic sources among the total 81 online news sites. On the other hand, despite the heavy reliance on “trading and industry” theme and “economic prospect” frame, “industry and business” sources were not popular in the media coverage of GMO. As seen in Table IV, only 7.6% and 8.9% of first source and second source were actors who represented industrial or commercial corporations. Given that GMO is a sophisticated issue that is unfamiliar to most journalists,

² <https://suckhoedoisong.vn/dong-vat-chuyen-gen-dung-cho-nghien-cuu-khoa-hoc-va-chua-benh-n149873.html>

³ <https://vietnamnet.vn/vn/suc-khoe/cap-song-sinh-bien-doi-gen-ha-kien-khue-tuyen-bo-van-con-dua-tre-thu-3-491585.html>

⁴ <https://laodongthudo.vn/ga-bien-doi-gen-co-the-de-trung-tu-cac-giong-khac-nhau-49026.html>

they were more likely to base their arguments on scholarly knowledge and perspective of the subject.

Apart from experts, news stories about GMO were also relied on governmental official and agencies as source of information. “Politician” and “governmental organisation” were the second most popular first source found in the content analysis. All included, 21% and 26.4% of first and second source found in the study were ministers, directors or managers in charge of science and technology in Vietnam (Table IV). VTV, the online newspaper managed by Vietnamese National Television was the leading newspaper quoting state source for their news coverage of GMO (data now shown). Notably, non-elites, especially original citizens, who are often muted in the mainstream media, were also acknowledged in the Vietnamese news coverage of GMO. *Nong nghiep* was the newspaper often presenting how local farmers perceive and react to GMO. The growing attention to lay public may be a signal for a shift of Vietnamese media to promote the citizen’s active engagement in science controversy. It contributes to empowering the public voice in science forum. Citing lay community as news source also reflects the media transformation to a greater diversity and democracy in news production. However, it is observed from the data that citizen’s quotations dominantly favour to GM crops, as a result of the state and media’s positive stance on GM progress. Farmers were often asked to praise bt maize for productivity and cost-efficiency, especially as compared to traditional corn. In general, science experts and politicians appear the most influential source of GMO information.

C. A preference of GMO benefits to risks

As a result of media favour to GMO scientific progress and its contribution to economic development, our content analysis finds a general emphasis on benefits gained from GMO. As shown in Table V, approximately two thirds (64.6%) of sampled articles presented GMO benefits whereas fewer stories, taking about half (47.1%) of total sample, were associated with GMO risks.

Notably, the most common benefit and risk were both related to “health and medical issues”. Table V reveals that 44% of articles mentioned prospects and 44.4% articles mentioning threats focused on GM implications to human health and medical treatment. While the GM benefits often referred to nutritional value of food and gene therapy for medical treatment, concerns over GMO were often surroundings potential harm to human health such as the GMO food potential to trigger allergy or contribute to the development of cancer. The second frequently presented advantages was biotechnology utility for economic development (40.4%): cost-efficiency, quality improvement, soil protection, greenhouse gas reduction and higher yield. For example, an article with headline “Bt maize ploddingly increases cultivating area”⁵ stated that genetically modified corn was transforming the local economy in both macro and micro levels. In term of micro-advantage, GM crop potentially decreased labour cost and increased yield productivity whereas at the macro level, it could drop the pressure of imported corn for animal feed. Both expert and lay person were cited

TABLE V
RISK AND BENEFIT PRESENTED IN VIETNAMESE NEWS ABOUT GMO

	Percentage
Risk and benefit presence	
<i>(Based on the entire sample, n=401)</i>	
Benefit only	37.9
Both risk and benefit	26.7
Neither risk nor benefit	15.0
Only risk	20.4
Type of risks	
<i>(Based on number of articles mentioning risks, n=189)</i>	
Economic risks	1.1
Ethical risks	15.9
Health and medical risks	44.4
Environmental risks	0.5
Multiple risks	37.0
Others	1.1
Type of benefits	
<i>(Based on number of articles mentioning benefit, n=259)</i>	
Economic benefits	40.2
Social benefits	0.4
Ethical benefits	0.4
Health and medical benefits	44.0
Environmental benefits	1.5
Multiple benefits	12.4
Others	1.2
The overall stance towards AI	
<i>(Based on number of articles having explicit attitude, n = 335)</i>	
Opposed	31.0
Neutral	20.0
Favoured	49.0

to reinforce the media promotion to GM economic benefit. In contrast to the general advocate to GM economic benefits (40.2%), only 1.1% of the articles mentioning risk referenced to economic consequences. The finding suggests a highly consistent attitude towards the GMO as an important contribution to Vietnamese economic development. There was little mentioning of the common controversy around the potential impact of GMO on local agronomy, such as the farmer’s increasing dependence on seed monopoly companies, the economic loss caused by superweeds and superpests. Along with the infrequent coverage of economic risks, GM’s impact on environment was not presented in the media, with only one story mentioning environmental cost as a central risk issue. On the other hand, news media raised more scepticism about “multi-risks” (37%) and “ethical risk” (15.9%). A substantial focus was on the moral aspects emerged from the genome editing scandal in China.

In order to identifying the association between risk and benefit and the primary articles’ theme, a chi-square test of independence was run and found a significant difference between the presence of risk/ benefit and the primary theme of each article ($X^2 (15, N=401)=221.40, p<0.001$). On the whole, news media tended to frame GM scientific achievements and GM commercialism with more benefit. Discussions over the ongoing applications and implications of GMO, the legislative management of GMO as well as public engagement in GMO process were primarily associated with both side of positive and negative discourse (Table VI).

⁵ <https://danviet.vn/ngo-bien-doi-gen-i-ach-tang-dien-tich-7777892057.htm>

TABLE VI
THE INTENSITY AND SPECIFICITY OF RISK AND BENEFIT

	Risk and benefit presence			
	Both risk and benefit	Only risk	Neither risk nor benefit	Only benefit
Scientific process and achievement	21.5	6.1	8.3	41.4
Applications and implications	15.9	9.8	0.0	3.3
Policy and legislation	37.5	13.4	3.3	4.6
Trading and industry	17.2	35.4	20.0	42.8
Public perception	29.9	14.6	6.7	1.3
Other or unclear	0.9	20.7	61.7	6.6
$\chi^2 = 221.40, p < 0.001$				

In terms of specificity and intensity of risk and benefit, the overall observation is that they ranged from moderate to high. As shown in Table VI, both intensity and specificity of GM risk in the media were slightly lower than benefit ($M = 3.12$ vs $M = 3.42$ for intensity; and $M = 3.46$ vs $M = 3.95$ for specificity). While the intensity of benefit was moderate ($M = 3.42$), the specificity of benefit was high ($M = 3.95$). Science reporters often detailed GMO benefits with specific data about GM increased crops and productivity. Several case studies were also introduced to augment the supportive argument. For instance, in an article promoting GM maize cultivation⁶, GMO was celebrated as a critical source of agricultural development, a remarkable change that was greatly welcomed by all farmers.

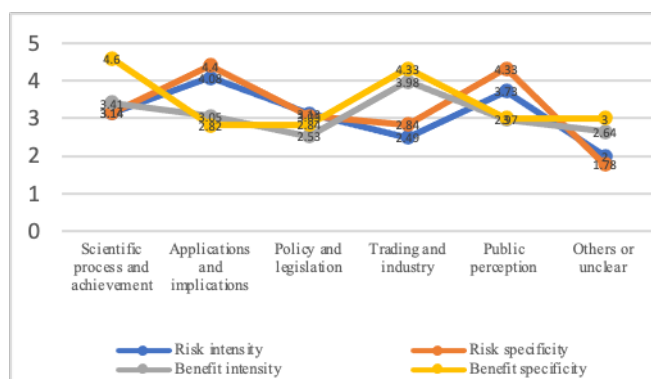


Fig 1. Graphical representation of mean differences in AI risk and benefit intensity and specificity across themes

As a result of the benefit preference, the study finds a more positive to negative attitude of journalists towards GMO. Nearly half of 335 stories that reflect their explicit attitude towards GMO was on side of GMO innovative research and product (49%) while 31% tended to reject GMO development. 20% of that gave a more balance and neutral viewpoint to the genomic technology and its applications (Table V).

VI. FURTHER DISCUSSION AND CONCLUDING MARKS

This paper aims to provide a preliminary outlook into how the debate over GMO was covered by Vietnamese on-

line newspapers. It sought to examine the tendency, dynamics and frames dominated the GMO coverage by quantifying and analysing newspaper content related to the GM events and issues.

While research has given a significant attention to the media representation of GMO, there was limited examination into the case of Vietnam. Yet the sparse literature shows a minimal coverage of GMO in the Vietnamese news media. Although our analysis examines the news content in a limited period, data support the initial insight about the low position of GMO in the media. Placing the modest coverage of GMO in the Vietnam's political and social context which often lack concern and resource for R&D, as well as the current troubling economic status of news industry, it is unsurprising to find the backseat of GMO in Vietnamese newsrooms. Further explanation should be considered is the inadequate attention of Vietnamese news editors to science in general, not only to mention GMO issues [46]. In fact, despite the ideal belief of S&T's critical role for national development, science journalism rarely receive a proper status in most of daily newsroom in the Global South as it was something hard to sell rather than political, investigative or even sport journalism [48].

In addition to the low coverage, news about GMO was primarily event-based, often directed by notable events outside the national border. Compared to the persistent debate over GM risks and benefits in the European, American and Japanese media [9], [31], [45], [49], GMO controversy was a fringe issue in Vietnamese news. Alike most parts of developing world, such as China where GM was not a prominent issue in the media [25], news about GMO only peaks concurrently with remarkable events or sensational issues which attract high public attention. The flashpoint of GMO in the news consolidates the assumption about how a science issue becomes a media story [50]. It also reflects the fact that media and the public are hardly interested in a specific issue for a long period [51]. The media only focus on a certain subject when it receives heavy political attention. For instance, studies on how biotechnology and stem cell research in the US gain, sustain or forfeit media attention found that policy contexts do influence media representation of these scientific controversies [45], [52]. Although GM technology and stem cell success were soon acknowledged in the scientific community, the issues remained silent in the mainstream media until they became wider political controversies. Furthermore, the US news media only developed increased interest in these topics when they can be framed as overt conflicts rather than scientific and technical developments. Through the viewpoint of issue attention cycle, it could be suggested that GMO has not been an issue of Vietnamese media interest yet because it was not a political issue that attracted a high public attention. Although it causes small perturbation in the social sphere, GMO remained within the control of the Vietnamese state. It was primarily framed as new scientific research. Furthermore, as political elites tended to shape GMO as economic growth and international competitiveness, the authoritarian news system was more likely to frame GMO as the key force for national development. The ethical concern which often arises with the realisation of scientific cost and enhance more media atten-

⁶ <http://kinhtedothi.vn/ngo-bien-doi-gen-giong-cay-chu-luc-tren-vung-dat-bai-299653.html>

tion to GMO were also less common than other frames in the Vietnamese news media.

Existing literature find a polarity in the media attitudes towards GM application in medical system and agricultural production [13], [31]. Our data, in some ways, support this finding with topic about GMO food was more likely associated with risk. However, opposing to the general media criticism towards GM agricultural products in the Europe, media coverage of GMO plant and seed in Vietnam was more likely associated with benefit. The incline to advantage of GMO plan and seed possibly origins from the governmental support to economic prospect that GM plants could bring to Vietnamese agriculture sector. As discussed somewhere above, Vietnamese MARD has organised workshops and communication campaigns to promote local peasants' support to GM planting [42]. Thus, the news media, which is often consistent with the state viewpoint, merely frames GM plants as motivation for national development.

In contrast to the general positive attitude to GM food, our data about GM application in medical treatment finds slight differences to existing literature. While GM technology research and application for improved human health treatment received high media support in the Western media, it was more likely discussed within both risk and benefit in Vietnam. Further research should take this point to explain for how of such difference.

There are a number of limitations in our research that future studies should take consideration. First, the paper only examined articles published in 2017 and 2018, which is unable to represent the trend of GMO coverage across the recent years. Especially, the lacked data collection during and in the post-Covid period, when there has been an awake of science journalism across the globe [53], makes it too ambitious for this paper to evaluate the possible change of how GMO has been covered in Vietnamese news media. An extend of sample collection would offer a more comprehensive overview of GMO debate in the Vietnamese contemporary context. Second, most of the frames were adopted from Bauer et al. (1995), Durant et al. (1998), Nisbet and Lenwestein (2002) may be relatively outdated and irrelevant to media culture in the Globe South. Finally, as a content analysis, this study cannot and does not aim to explore the narration and metaphor used to depict GMO. In-depth interview with science reporters would benefit the study with more insights about the science news production. Discussions with scientists and other interest groups, such as GMO company or biotechnology activists may give a diversified view about how science news travels through different levels of news representation. It would be potential for a better understanding of how and why science media in developing countries fail to accomplish its critical role that it should hold for development goals.

REFERENCES

- [1] O. E. Okafor and P. I. Okafor, "Membership of cooperative society and adoption of agricultural technology in Awka North LGA of Anambra State, Nigeria," *J. Agric. Biodivers. Res.*, vol. 6, pp. 1–11, 2017.
- [2] Pew Research Centre, "Public and Scientists' Views on Science and Society," US, 2015.
- [3] C. Funk, A. Tyson, B. Kennedy, C. Johnson, and S. Research, "Biotechnology Research Viewed With Caution Globally, but Most Support Gene Editing for Babies To Treat Disease," 2020.
- [4] Y. Ruan, J. Yang, and J. Jin, "One issue, different stories: The construction of GMO issues on Chinese, American and British mainstream media portals," *Cult. Sci.*, vol. 2, no. 4, pp. 255–275, Dec. 2019.
- [5] I. Sheldon, "Regulation of biotechnology: Will we ever 'freely' trade GMOs?," *Eur. Rev. Agric. Econ.*, vol. 29, pp. 155–176, Mar. 2002.
- [6] D. A. Scheufele and D. Tewksbury, "Framing, Agenda Setting, and Priming: The Evolution of Three Media Effects Models," *J. Commun.*, vol. 57, pp. 9–20, 2007.
- [7] L. Rodriguez and S. Lee, "What Can Be Gleaned From News Coverage to Improve Science Reporting and Enhance Public Literacy About Agricultural Biotechnology in Ghana?," *J. Agric. Food Inf.*, vol. 17, no. 2–3, pp. 91–109, Jul. 2016.
- [8] J. Durant, M. W. Bauer, and G. Gaskell, *Biotechnology in the public sphere: A European Sourcebook*. London: Science Museum, 1998.
- [9] M. Bauer and G. Gaskell, *Biotechnology: The Making of a Global Controversy*, 1st ed. Cambridge University Press - The Science Museum, London, 2002.
- [10] M. Kohring and J. Matthes, "The face(t)s of biotech in the nineties: how the German press framed modern biotechnology," *Public Underst. Sci.*, vol. 11, pp. 143–154, May 2002.
- [11] O. Kehagia and P. Chrysoschou, "The reporting of food hazards by the media: The case of Greece," *Soc. Sci. J.*, vol. 44, pp. 721–733, Dec. 2007.
- [12] G. Cook, P. T. Robbins, and E. Pieri, "Words of Mass Destruction: British Newspaper Coverage of the Genetically Modified Food Debate, Expert and Non-expert Reactions," *Public Underst. Sci.*, vol. 15, pp. 5–19, 2006.
- [13] L. Marks, N. Kalaitzandonakes, L. Wilkins, and L. Zakharova, "Mass media framing of biotechnology news," *Public Underst. Sci.*, vol. 16, pp. 183–203, Apr. 2007.
- [14] C. Crawley, "Localized Debates of Agricultural Biotechnology in Community Newspapers: A Quantitative Content Analysis of Media Frames and Sources," *Sci. Commun.*, vol. 28, no. 3, pp. 314–346, Mar. 2007.
- [15] M. Augoustinos, S. Crabb, and R. Shepherd, "Genetically modified food in the news: Media representations of the GM debate in the UK," *Public Underst. Sci.*, vol. 19, pp. 98–114, Jan. 2010.
- [16] M. Chong, J. Shanahan, D. Brossard, and N. Ngo, "Elite Asian Newspaper Coverage of Agricultural Biotechnology," in *International Communication Association Conference*, 2004.
- [17] S. M. Outram, "Science communication in Sub-Saharan Africa: The case of GMOs," *J. Int. Dev.*, vol. 22, pp. 341–352, 2010.
- [18] L. Du and C. Rachul, "Chinese newspaper coverage of genetically modified organisms," *BMC Public Health*, vol. 12, no. 236, 2012.
- [19] M. Karembu et al., "Dimensions of Radio Coverage and Content Generation of Agricultural Biotechnology News in Kenya," 2011. [Online]. Available: <https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/47085/133460.pdf?sequence=1&isAllowed=y>.
- [20] T. A. Lore, "An analysis of the coverage of genetically modified crops by mainstream Kenyan print media: the case of the Daily Nation, the standard and Taifa Leo, 2007-2009," University of Nairobi, Kenya, 2011.
- [21] C. Omeje, "Media coverage and framing of genetically modified crops: A case study of science journalism in Nigeria," Stellenbosch University, 2019.
- [22] C. M. Ligami, "Print Media Coverage of the Ban on Importation of Genetically Modified Foods in Kenya: a Content Analysis of Daily Nation and the East African," University of Nairobi, 2016.
- [23] R. Olajide and P. Fawole, "Coverage and content analysis of biotechnology and genetically modified organisms in four selected Nigerian daily newspapers," *Trop. Agric. Res. Ext.*, vol. 16, p. 81, Jul. 2015.
- [24] B. Fackson, "Can beggars be choosers?," *Panos London*, 2002. [Online]. Available: <http://panoslondon.panosnetwork.org/features/can-beggars-be-choosers/>. [Accessed: 10-Oct-2020].
- [25] N. Wen and R. Wei, "Examining Effects of Informational Use of Social Media Platforms and Social Capital on Civic Engagement Regarding Genetically Modified Foods in China," *Int. J. Commun.*, vol. 12, 2018.
- [26] Y. Li, C. Luo, and A. Chen, "The evolution of online discussions about GMOs in China over the past decade: Changes, causes and characteristics," *Cult. Sci.*, vol. 2, no. 4, pp. 311–325, 2019.
- [27] E. B. Vermeer and P. Ho, "Food Safety Concerns and Biotechnology: Consumers' Attitudes to Genetically Modified Products in Urban China," *AgBioForum*, vol. 7, no. 4, pp. 158–175, 2004.

- [28] S. Mula, "Finding Golden Rice in the GMO arena: The framing of Golden Rice and agricultural biotechnology in Philippine newspapers," in *SAAS - Agricultural Communications Section*, 2007.
- [29] J. A. Panopio and M. J. Navarro, "Philippines: Drama and Communication Behind Asia's First Commercialized Bt Corn," in *Communication Challenges and Convergence in Crop Biotechnology*, R. A. Hautea, Ed. Los Baños, Philippines: International Service for the Acquisition of Agri-biotech Applications (ISAAA): Ithaca, New York and SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), 2011.
- [30] R. L. S. Asoro, "The effects of press freedom and biotech policy on Southeast Asian newspapers' coverage of genetically modified crops," Iowa State University, 2012.
- [31] M. Bauer, "Controversial medical and agri-food biotechnology: A cultivation analysis," *Public Underst. Sci.*, vol. 11, pp. 93–111, May 2002.
- [32] M. Navarro and M. Villena, "Media monitoring of agri-biotechnology in the Philippines: understanding the biotech debate," *Philipp. Agric. Sci.*, vol. 87, pp. 439–451, 2004.
- [33] M. J. Navarro and R. A. Hautea, "Communication Challenges and Convergence in Crop Biotechnology," Los Baños, Philippines, 2011.
- [34] R. L. S. Asoro, "The effects of press freedom and biotech policy on Southeast Asian newspapers' coverage of genetically modified crops," Iowa State University, USA, 2012.
- [35] C. DeRosier, I. Sulemana, H. S. J. Jr, Corinne Valdivia, W. Folk, and R. D. Smith, "A comparative analysis of media reporting of perceived risks and benefits of genetically modified crops and foods in Kenyan and international newspapers," *Public Underst. Sci.*, vol. 24, no. 5, pp. 563–581, 2015.
- [36] R. Zamith, J. Pinto, and M. E. Villar, "Constructing Climate Change in the Americas: An Analysis of News Coverage in U.S. and South American Newspapers," *Sci. Commun.*, vol. 35, no. 3, pp. 334–357, 2012.
- [37] L. E. Mumba, "Food Aid Crisis and Communication about GM Foods: Experience from Southern Africa," in *The public, the media and agricultural biotechnology*, D. Brossard, J. Shanahan, and T. C. Nesbitt, Eds. The United Kingdom: Biddles Ltd, Kings Lynn, 2007, pp. 338–364.
- [38] ISAAA, "Executive Summary Biotech Crops Drive Socio-Economic Development and Sustainable Environment in the New Frontier," 2019.
- [39] M. T. Pham, M. Francic, and B. Petlock, "Vietnam Agricultural Biotechnology Annual," 2018.
- [40] D. Q. Vu, H. T. Chu, and T. T. Doan, "Current Status of Biosafety Regulations for GMOs in Vietnam," Jakarta, 2004.
- [41] H. T. Le and M. J. Navarro, "Vietnam Paving the Way for Greater Awareness and Understanding of Biotechnology," in *Communication Challenges and Convergence in Crop Biotechnology*, M. J. Navarro and R. A. Hautea, Eds. Los Baños, Philippines: The International Service for the Acquisition of Agri-biotech Applications (ISAAA) and SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), 2011.
- [42] Hoang Anh, "Vietnam aims to raise public awareness of GMOs," 26-Sep-2014. [Online]. Available: <https://www.vir.com.vn/vietnam-aims-to-raise-public-awareness-of-gmos-30586.html>. [Accessed: 10-Oct-2020].
- [43] D. A. Weaver and B. Bimber, "Finding News Stories: A Comparison of Searches Using LexisNexis and Google News," *J. Media Commun. Q.*, vol. 85, no. 3, pp. 515–530, 2008.
- [44] M. Bauer, A. Ragnarsdottir, Asdis Rudolfsdottir, and J. Durant, "Science and Technology in the British Press, 1946-1990 – A systematic content analysis of the press," London, 1995.
- [45] M. C. Nisbet and B. V. Lewenstein, "Biotechnology and the American Media: The Policy Process and the Elite Press, 1970 to 1999," *Sci. Commun.*, vol. 23, no. 4, pp. 359–391, Jun. 2002.
- [46] M. Tran, "Science journalism for development in the Vietnam: A multi-facet investigation of issues and challenges and its implications for Global South," Bournemouth University, 2021.
- [47] T. A. van Dijk, "Opinions and Ideologies in Editorials," in *The 4th International Symposium of Critical Discourse Analysis*, 1995.
- [48] A. Nguyen and M. Tran, "Science journalism for development in the Global South: A systematic literature review of issues and challenges," *Public Underst. Sci.*, p. 096366251987544, 2019.
- [49] A. Hibino and M. Nagata, "Biotechnology in the Japanese media: Comparative analysis of newspaper articles on genetic engineering in Japan and Europe," *Asian J. Soc. Psychol.*, vol. 9, pp. 12–13, 2006.
- [50] F. Neresini, "And Man Descended from the Sheep: The Public Debate on Cloning in the Italian Press," *Public Underst. Sci.*, vol. 9, pp. 359–382, Oct. 2000.
- [51] T.-J. Shih, R. Wijaya, and D. Brossard, "Media Coverage of Public Health Epidemics: Linking Framing and Issue Attention Cycle Toward an Integrated Theory of Print News Coverage of Epidemics," *Mass Commun. Soc.*, vol. 11, pp. 141–160, 2008.
- [52] M. C. Nisbet and M. Huge, "Attention Cycles and Frames in the Plant Biotechnology Debate: Managing Power and Participation through the Press/Policy Connection," *Harvard Int. J. Press.*, vol. 11, no. 2, pp. 3–40, Apr. 2006.
- [53] P. van Niekerk and P. de Villiers, "Battling misinformation: The rise of science journalism during Covid-19," 2020. [Online]. Available: <https://whatsnewinpublishing.com/battling-misinformation-the-rise-of-science-journalism-during-covid-19/>. [Accessed: 12-Feb-2021].

Developing influencer selection criteria for brand influencer marketing with Generation Z in the Vietnamese context

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Abstract—The concern of influencer marketing has dramatically increased in the last decades. Many scholars have been conducted focusing on the module of impacting influencer marketing, however, rarely focusing on the insight of the problem. With the generational transition going on, gen Z is now becoming one of the major targets for any enterprises to attract their own consumer. However, not many brands can fully utilize the effect of influencer marketing it brings as this generation is hard to predict their own behaviors. A survey of 115 respondents has been taken throughout every region of Vietnam. The result indicates that there are six factors given by Gen Z that significantly and positively affect the attitude towards influencers. Interestingness plays a vital role. The attitude towards influencers has an effect on the attitude towards the brand. In addition, this research proposes a based module for further research on influencer marketing in Vietnamese context.

Index Terms—influencer marketing, influencer, consumer's perception, social media, brand.

I. INTRODUCTION

People spend more time on social media than ever; since 2012, the daily time spent on social networking worldwide has been increasing steadily and taking the average of 147 minutes per day [1]. This development relates in part with the growth of influencer marketing in which influencers are paid an amount of financial assets or similar, to promote products on behalf of the brands and the preference of consumers for viral growth [2] [3]. In reverse, with the explosion of social networking sites, influencers have more platforms to showcase their talents as well as share the content they want to convey. Followers, thanks to these platforms, engage more with the contents to expect influencers to share deeper about their personal life and the recommendation of the latest trend [4] [5].

Social media influencers are changing the role model of being an influencer or simply an individual with a certain number of followers. Over the past few years, the transition as a user to influencer has become more facile than ever on social networking sites. Influencers aren't just celebrities; they're people who are approachable to their followers on social media sites [6] [7]. Influencers may bring a fresh sense of brand awareness and evoke the brand image for follower's preferences which may promoting their purchase intention [8].

Gen Z today is exposed to social media and social commerce in general [9]. In Vietnam, this generation places a high value on online entertainment sites and video sources such as Instagram, Facebook, and YouTube [10]. This is also the driving force for influencers to build an image for themselves and this is gradually changing the way followers

perceive influencers. However, because the number of influencers is considered to increase dramatically and become an occupation [11]; the trend of interactive experiences transforms when followers gradually fussy in choosing influential people to follow. Followers are not only interested in aspects such as appearance and speech, but they are especially interested in their personal interests to influencers [4]. The knowledge brought by influencers is also noticed by followers as they not only find quality content but also find useful knowledge and learn something from influencers. Generation Z grew up in Vietnam amid its present age of rapid and vigorous economic growth. Therefore, they are fastidious with services and goods. Environmental concerns, gender equality, and social responsibility are all taken into consideration [12]. Because they are constantly keen to try new things, Gen Z is open to testing new brands, even if they currently utilize ones they are acquainted with. This generation's skepticism and improvisation are to blame for their lack of brand loyalty [12].

This research article was written to highlight aspects that followers concern when giving their attention to a particular influencer. By quantitative measurement, the study will be conducted on the sample set is Generation Z and stretching across the three regions in Vietnam. Corresponding the independent variances, the characteristics of influencers that was developed will be taken as the basis to assess the positive/rejective attitude of followers towards the performance of influencers. The obtained insights then are to apply to create a KOLs or influencers model that can achieve the desired results or the right message brands want to deliver.

II. THEORETICAL BACKGROUND

A. Literature review

1) Social Media Influencer (KOL)

According to Campell and Farrell's [13] classification of SMIs based on the number of followers: (1) well-known celebrities (the rich and famous with more than 1 million followers); (2) mega-influencers (celebrities with millions or more of followers); (3) macro-influencers (the ideal with 100,000 to 1 million followers); (4) micro-influencers (the rising star with 10,000 to 100,000 followers); and (5) nano-influencers (newcomers with 0 to 10,000 followers). A person's popularity and influence are reflected in the number of followers they have. However, this does not necessarily mean that the more followers a person has, the better. SMIs with more followers are better at promoting a variety of

products, while those with fewer followers are better at promoting exclusive products [2].

Moreover, past research has found that the two most important elements that help SMIs get follower are personality qualities and content. Meanwhile, with high level of genuineness, attractiveness, and intimacy, SMEs are more likely to obtain followers [14] [15] [16]. Furthermore, individuals whose posts are educational, visually pleasing, and entertaining are more likely to gain followers [17] [4] [15].

2) *Expertise*

Expertise is the communicator's capacity to effectively state a point in a particular field of knowledge. An individual's familiarity, comprehension, and experience in a particular field of knowledge are all components of expertise. Professionals are people with deep understanding and deep arguments about a certain area. And have more understanding than common ground. For those looking for accurate information or the information they need, the choice of the "expertise" factor is also one of the factors affecting the user's tracking. Every influencer has a purpose, and so does a brand. Figuring out how interested followers are in the accuracy of the information an influencer provides will also influence users' decisions.

3) *Trustworthiness*

Giffin [18] defined the level of trustworthiness of a source as "recipients' perception of a source is truthful, sincere or accurate". It is a person's belief in something, someone, or a belief in a certain brand. Reliability in an information system or something formed over a long period of time. The trustworthiness of a social media influencer is also one of the reasons that users follow them on social networking sites. Studying the interest of followers to the trustworthiness of an influencer will determine the building of a person's personal brand on social networks.

4) *Likability*

Likeability is the fondness a person has towards another person because of their physical appearance, conduct, or other characteristics [19]. Likeability has been shown to improve persuasion [21], making it an effective method for self-presentation and persuasion [18]. Likeability is significant since it is regarded to have a beneficial impact on the product when conveyed from the influencer [19]. Likeability has also been connected to advertising efficacy [21] [22]. When they are likeable, social media influencers are more convincing [23]. When managing their human brands, social media influencers must take likeability into account.

5) *Interestingness*

Interestingness of content can be seen as the attraction people feel when reading the content posted on social media; it is the perceived enjoyment, pleasure, and entertainment derived from the content [25]. Researchers discovered that one of the principal factors of an individual's social media is for enjoyment, and interesting content can satisfy their entertainment needs [25] sharing interesting information on social media is a useful tactic for attracting users' attention. Previous studies have shown that interesting content is beneficial to content marketing to achieve good results [26].

6) *Attractiveness*

The pilot study identified attractiveness as a common trait, which is corroborated by marketing endorser selection

literature [27]. Additionally, the marketing literature has paid a lot of attention to endorser attractiveness [27] [28] [29]. As defined in this study, attractiveness relates to the social media influencers' physical attractiveness. Previously, attractiveness was regarded as an essential attribute that influenced advertisement and product assessments [30] [28] [31]. The lack of consistency in the findings of studies assessing attractiveness highlights the need for additional research. App reference has been shown in some studies to give more positive qualities to people who are attractive than to people who are not [32, 31]. It has been demonstrated that attractiveness has an effect on a person's popularity, ability to persuade others, and attitude [33].

7) *Similarity*

The degree of likeness between an influencer and a follower, also known as similarity, fit, or congruence, is an important factor in influencer selection [34] [23]. Choi and Rifon [35] argue that consumers' relationships with the endorser should not be disregarded, despite the fact that most marketing literature has focused on the endorser-product association. Endorsers are believed to represent referents that impact consumers' opinions and actions, and hence likely inspire consumers to embrace companies to acquire influencer imparted meanings [36].

8) *Attitude toward a brand*

Attitude is measured as the most distinctive concept in social psychology literature and in information economics perspective. It is the most investigated issue in consumer behavior research [37]. Furthermore, diverse types of approaches are used to study the attitude in order to obtain broad knowledge regarding attitude, intention and behavior. Fishbein and Ajzen [38] define attitudes as "learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object". The definition presumed that attitude can be learned or acquired. In addition, this definition assists marketers because it supports that attitude is learned or acquired neither innate nor instinctive, even if it is learned so can be influenced by marketing activities or messages. Attitude can be associated with one object (a brand) or the whole group (company) in marketing perspective. Attitude towards the brand is defined as "a predisposition to respond in a favorable or unfavorable manner to a particular brand after the advertising stimulus has been shown to the individual" [39]. Furthermore "Attitude towards a brand" is consumer propensity to assess the brand, on the basis of previous experiences, available information and environment influences.

9) *Attitude toward the influencer*

Although there is no well-defined construct for attitude toward the influencer, it is essential to comprehend how consumers feel about social media influencers. According to cognitive social psychologists, attitude regarding something should be reflected in appropriate behaviors [40]. Based on the source attractiveness model [19], the attractiveness, likeability, and similarity of the social media influencers may have an impact on communication effectiveness, including the formation of positive attitudes.

10) *Influencers' marketing and the practices of Influencers*

Marketing and media are mutually dependent. Media relies on advertising revenue for commercial viability, while advertisers have traditionally relied on media to address their potential consumers [41]. To deliver an audience, media organizations create interesting, engaging content and one type of content that has been broadly popular with audiences is social media influencers. It was called influencer marketing, which is a marketing approach in which businesses spend in well-known influencers to generate and/or promote branded content for their followers in an order to raise brand awareness and entice them to make a purchase [15] [42].

The rising of social media in recent years has contributed a lot to many changes in business in general and in marketing in particular. Consumers nowadays tend to use social media as their reference to look for the source of product information [4]. Therefore, influencer marketing is rising as a new marketing strategy for many companies which can provide more opportunities to approach a vast audience [43]. Influencer marketing refers to a marketing strategy of brands in which influencers on social platforms are used to promote positive responses of their followers towards the brands by sharing posts with content relating to the brands on their personal accounts on such platforms [44] [45] [15]. Influencers in such marketing strategies play an important role that directly contributes to the effectiveness of this strategy. Therefore, selecting a suitable influencer for the brand is an important step for every business to take into consideration before deploying any influencer marketing strategies. Despite the different criteria for each brand based on their brand's characteristics, there are still some common criteria for every brand to consider when choosing their influencers. For instance, honest and no spurious commercial intention has been proved to be a general expectation of audiences for their influencers when participating in any influencer marketing campaign [46] [47].

In an era of media surplus, where audiences are saturated with so much to choose from, the premium on distinctiveness and visibility grows. Additionally, people actively and freely seek out the materials they are most interested in, which is where the "demand" for self-branding arises. As a result, internet media is a very consumer-focused sector. Social media has occupied an important position as a communication tool. The fact that this information is instant and low-cost to access has influenced and shaped consumers' decisions and purchase habits [46]. As digital influencers' popularity is rapidly increasing with the ease of low-cost information access, social value is an important factor associated with their popularity. Most individual customers lack the ability to co-create or co-opt a brand's story. Online influencers, on the other hand, do have this kind of power; these unusual users of social media actively produce user-generated content that is widely viewed.

At a basic level, the brand represents the identity of a commodity (a product, service, or firm), and its main function is to convey a certain level of quality. But to reach the target audience (at an optimal frequency) with its message, the brand owners (or advertisers) have to pay media organi-

zations for the advertising. When a celebrity, or a human brand, is introduced into the picture, the dynamics change slightly. A human brand is defined here as 'any well-known persona who is the subject of marketing communications efforts' [49].

Marketers no longer have complete control over how their brands are communicated. Interactivity and digital platforms are the two main disruptors of traditional marketing communication channels [5]. Globally, people have started to use social media such as Facebook, Twitter, Instagram, and LinkedIn to share their experiences. A consumer sharing a brand's television advertisement on YouTube could cause it to go viral; additionally, feedback can be shared by other customers without the firm's control. Influential users with a massive following can also use their own media to influence this audience (e.g., the Kardashians sister). As the result, social influencers as brand ambassadors for goods and services have emerged as the new opinion leaders [50]. In practice, there isn't any such research related to the common criteria of influencer for influencer marketing strategy that is available in the market. Therefore, further research about this topic will be collected and analyzed in this research.

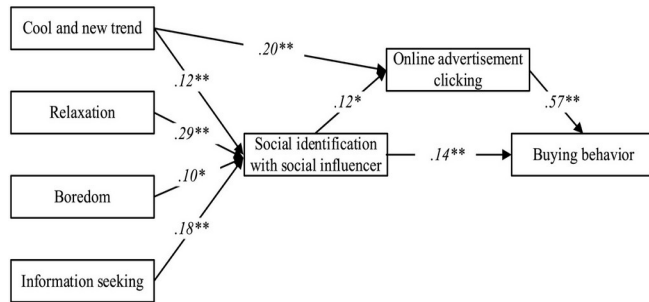
This suggests that self-branding makes most sense if celebrities can lend their names profitably to major brands. Sports stars, for instance, can earn many times more from their endorsement fees than from prize money. This is because major sporting events command a large audience. While not all celebrities have an equal amount of marketing pull, the more successful have talent and personal agents to help convert their fame into lucrative endorsement deals.

B. *Previous models of KOL*

Parallel to the flourishing development of influencer marketing and its impacts on consumers, there are numerous research that have been conducted to investigate this topic. However, previous research about influencer is more focusing on the impacts of influencer marketing rather than creating a model with important factors that might impact the effectiveness of influencer in particular and influencer marketing in general, especially in Vietnam. These previous models of influencers in foreign and international market have framed the model of this study.

As stated by Croes & Bartel [51], although research has shown that social influencers are more successful endorsers than traditional celebrity endorsers, no study has examined the motives that young adults have for following these digital superstars. It is so critical to comprehend why individuals choose to follow a social influencer. Croes & Bartel's model [51] investigated the reasons young adults follow social influencers and how those reasons might relate to how young adults identify with those social influencers. The authors looked at the connection between young adults' identification, online advertising clicks, and purchasing habits and the motivations for following social influencers. Information sharing, information seeking, cool and new trends, relaxing entertainment, companionship, and boredom/habitual pass time are the six reasons young adults follow social influencers [51]. Smock et al.'s earlier research on the motivations of Facebook users is supported by these recent findings [52]. Additionally, UGT's motivations, information, enter-

tainment, and escape from daily life by Katz et al. included following social influencers as well [53]. More specifically, this result demonstrates that following social influencers is separate motivated by information sharing and information seeking. In addition, the paper emphasized the significance of educational background. Compared to community college students, university students valued the motivations of boredom/habitual pastime and information seeking more. Individuals who follow influencers for practical knowledge often have specific interests and seek specialized information that is relevant to them, according to research [54].



Note. * $p < .05$, ** $p < .01$

Figure 1: Croes and Bartels model of young adults' motivations for following social influencers

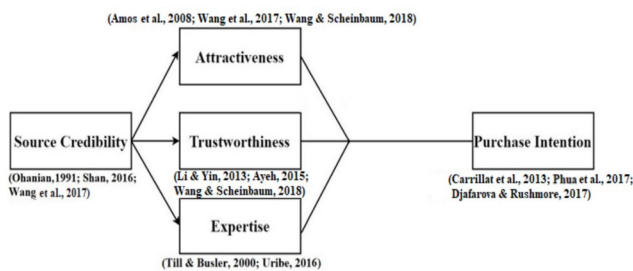


Figure 2: Ohanian model of source of credibility Model

Ohanian [33] also proposed a Source of Credibility model which provides evidence that reliable sources are more persuasive than less reliable sources. Influencer marketing approach, which relies on influencer endorsements, is based on the influencers' trustworthiness, which means that the more trustworthy the influencer is, the more credible the items are [55].

Furthermore, in 2020, Taillon et al. [56] has researched about the moderating role of closeness. In Taillon's model, there are 3 important characteristics of influencer that has significantly impacted consumer perception of influencer marketing including attractiveness, likability, and similarity [56].

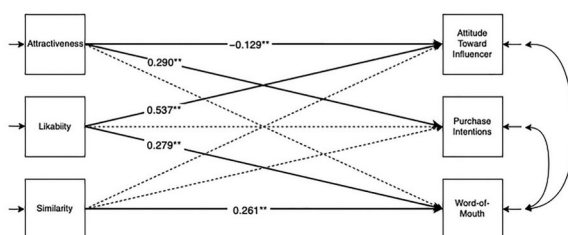


Figure 3: Taillon, Mueller, Kowalczyk and Jones - the moderating role of closeness

C. Hypothesis development and research model

With existing studies, and previous models, this study is focusing on researching the impacts of influencers' characteristics on the followers' attitude towards influencers. Moreover, also based on that followers' attitude to evaluate the effectiveness of influencer marketing in brand when using this marketing strategy. The scope of this research is the Vietnam market with the focus on gen Z (people who were born from 1997 to 2012).

According to previous model developed by Taillon et al. in 2020, attractiveness has been proved to have a significant, distinctive, and positive impact on follower's attitude [56]. In addition, as stated in multiple studies, for instance the study of Petroschius and Crocker in 1989 or the model of Ohanian in 1991, the popularity of influencers and influencers' persuasive impact and attitude is supported by their attractiveness [57] [33]. Furthermore, in the study of Amos in 2018 [29], the authors have been identified the significant impact of attractiveness on advertising effectiveness. Therefore, this study proposed the following:

Hypothesis 1: Attractiveness of Influencers has a positive effect on followers' attitude.

Trustworthiness as mentioned previously, is a person's belief in something, someone, or a belief in a certain brand. Trustworthiness has been listed in Bremner's study in 2011 as the top five traits supporting for leader's decision [58]. This result of Bremner's study has shown a linkage between trustworthiness and the influence on their followers of each person. Moreover, as shown in the model of Ohanian about source of credibility, trustworthiness is considered as the component of source of credibility, it is also proved to have a vital role in the perception of an ad endorsed by influencers [33] [59]. The trustworthiness, for instance, presented through the source of their content, the information they provide on their social media. In fact, there are multiple failure influencer and failure influencer marketing campaign due to the problem of trustworthiness. The case of Tiffany Mitchell – a popular lifestyle blogger from American in 2019 has met with the fierce opposition from her followers due to the untrustworthy content she posted on her Instagram about her accident. This wave of protest of Mitchell's scandal has significantly impacted on her associated brand which is SmartWater and this brand after that has announced not to sign any contract with female blogger. It can be seen from this example that trustworthiness plays an important role, or even a decisive factor that decide the attitude of followers toward an influencer and brand's influencer marketing. Therefore:

Hypothesis 2: Trustworthiness of Influencers has a positive effect on followers' attitude.

In fact, influencer's expertise not only affect the follower's attitude but also impact on follower's behaviors. As stated in the study of Veirman in 2017, influencer's expertise in certain subjects is considered the criteria for follower to value influencer's advice [2]. Moreover, in recent study, the trend of using influencer in marketing campaigns would prefer by brand rather than using celebrities. One of the key factors that making this trend in brand's marketing is that influencer's expertise and proximity which lead to higher credible, therefore, have greater influence on both follower's

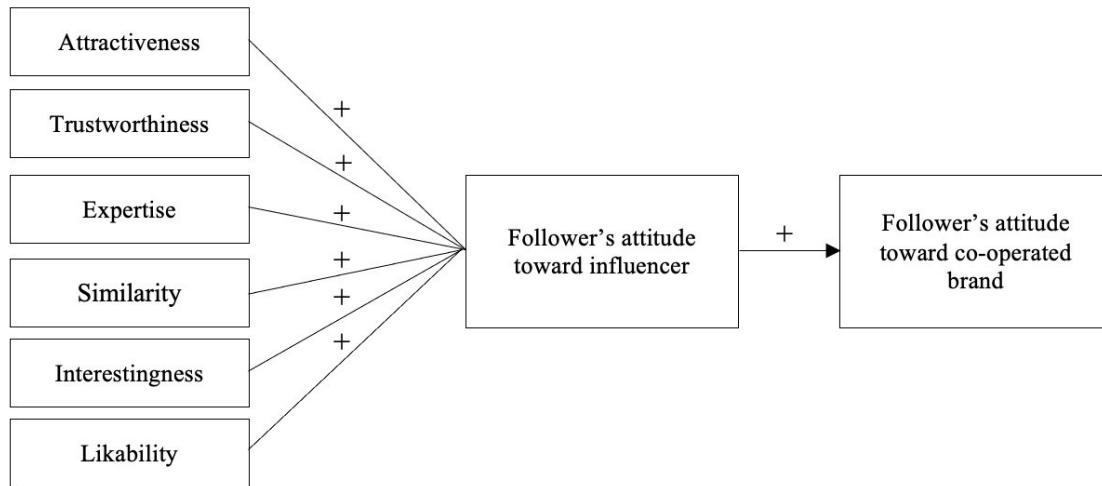


Figure 4: Proposed research model

attitude and behavior [60] [4]. In addition, according to the study of Schouten et al. in 2019, to build strong perceptions of credibility in followers, influencer needs high level of expertise [61]. Thus:

Hypothesis 3: The expertise of influencers has a positive effect on followers' attitude.

The degree of similarity between an influencer and a follower, also known as similarity, fit, or congruence, is an important factor in influencer selection [34] [23]. Normally, followers tend to identify themselves to the influencer in the most popular way which has many things in common with influencers or consider the influencer as their model and having the desire to be like the influencer [62] [63]. In both ways, followers tend to find the influencer who have high level of similar to themselves. Therefore, similarity can be considered the vital factor that affect followers' attitude. Hence:

Hypothesis 4: The similarity between influencers and followers has a positive impact on followers' attitude.

Previous research has found that conducting interesting activities on social media can make users pleased, thereby contributing to the development of a strong preference or sentiment for a brand and eliciting an emotional attachment between users and the brand [64]. As stated by Sokolova, Kefi in 2020, interestingness is one of the key factors that make influencers decide to continue following the update from influencer's account or not [65]. Therefore, it can be stated that the interestingness has significantly impacted on follower's attitude. Hence:

Hypothesis 5: An influencer's interestingness has a positive effect on followers' attitude.

Likeability has been proved to have positive effects on the product when transferred from the influencer [19]. Additionally, it has been demonstrated that likability improves advertising effectiveness [21, 22]. When they are likeable, social media influencers are more persuasive [23]. When managing their human brands, social media influencers must take likeability into account. In addition, as shown in the model of Taillon, likability has significantly positive impact on follower's attitude. Hence, this study proposed the following:

Hypothesis 6: The likability of influencers has a positive effect on followers' attitude.

Based on the factors that make users follow an influencer on social networking sites, the study explores the influence of KOLs on user attitudes affecting brands. These days, the use of KOLs to promote media is not new, but to choose a person who fits the brand's criteria, style, and orientation, this article also solves those problems. With the study of factors, aspects, affecting the user's decision, then it will be applied to study the user's attitude through KOL to the brand.

Hypothesis 7: The influencer has a positive effect on the attitude toward the brand.

III. RESEARCHING METHOD

A. Sample

The survey was conducted with the participation of 115 respondents. Due to the scope and the requirement of this study, the number of samples proposed must clearly indicate the representative of gen Z within the project scope of Vietnam. Therefore, respondents must come from all three major regions of Vietnam including the South, the Central, the North. To guarantee that the sample is representative of the market and not biased towards any one target group, quotas will be applied to gender. 43% of those surveyed are men. Female responses make up 54% of the total, with others accounting for 3%. Also, if responses are not between the ages of 9 and 25, they will be screened.

B. Data collection procedure

By adopting scales from multiple academic scholars, the original questionnaire of this study was created in English with 3 main parts. For the first part, the questions focus on collecting demographic information of respondents with 2 screening questions about the age range (must be gen Z with the range from 9 to 25 years old) and having experience with influencer marketing before. The items of the demographic information section were measured by nominal scale. The second part was created based on multiple scales from previous study to measure the influencer's characteris-

tics and impacts on the attitude of followers towards influencers. Likert scale with five points 1- totally disagree, 2- disagree, 3- moderate, 4- agree, and 5- totally agree was implemented in this part for measuring the impact between study's variables. In the final part, the queries were created to measure the effectiveness of influencer marketing on the operation of cooperated brands by asking respondents to select the most agreeable answer in the likert scale from 1- totally disagree to 5- totally agree.

With the concentration of this study researching gen Z in Vietnam, the original questionnaire in English was translated into Vietnamese for convenience and misunderstanding avoidance. Multiple translator tools and advice from experts has been applied for the translation to ensure the quality of the study's questionnaire.

Before officially collecting the survey, a pilot test was implemented to ensure the effectiveness of the questionnaire. The pilot was conducted with the participation of 10 respondents that adapt to all screening criteria. After the pilot testing, the questionnaire was transferred into google form for convenience, increasing the number of respondents, and diversifying the respondent's location. The form was published in multiple groups on social platforms by the link <https://bom.so/KRGdV5>.

As stated by Setia [66], the sample size ratio 1:4 which is 1 control ratio to 4 cases can ensure statistical power. Therefore, in this study, with totally 28 questions, the minimum sample size that needs to be ensured is 112 [66].

C. Measure

To measure attractiveness, 3 items including good looking, attractive, and sexy developed by Ohanian in 1990 were adopted. For the other 2 independent variables which are trustworthiness and expertise, scales developed by Ohanian in 1990 were also used. An example item of the scale measuring trustworthiness is feeling confident in his/her favorite influencer's skills. For expertise, an example of the adopted scale's item is that the influencer possesses specialized knowledge. To measure likability, 4 items of the scale developed by Whittler et al. in 1991 were adopted which are warm, likable, sincere, and friendly. Similarity is measured by using the scale developed by Reichelt, Sievert, and Jacob in 2013. An example of this scale is the influencer's identity is similar to him/her. The final independent variable of influencer's characteristics which is interesting is measured by adopting the scale of Wei and Lu in 2013. An example of this scale is interest in my favorite influencer's posts. The four items scale of Hoolbrook and Batra in 1987 was adopted to measure the attitude towards influencers. React favorably is an example item of Hoolbrook and Batra's scale. To measure the influencer marketing activities on the attitude of this influencer's followers on cooperated brands, the 3 items scale developed by Priester and Petty in 2003 would be adopted.

IV. RESULTS

A. Descriptive statistics

As can be seen, this study has the participation of both males and females with nearly equal percentages. The sur-

TABLE I. THE RELIABILITY OF VARIABLES

Characteristics	Frequency	Percent (%)
Gender		
Male	52	45.2%
Female	63	52.8%
Locations		
North	67	58.3%
Center	28	24.3%
South	20	17.4%
Average time spend on social platform		
Below 1 hour	5	4.3%
From 1 hour to below 3 hours	36	31.3%
From 3 hours to below 5 hours	46	40%
From 5 hours to below 8 hours	17	14.8%
From 8 hours and above	11	9.6%
Social platforms currently using		
Facebook	108	93.9%
Instagram	86	74.8%
Tik Tok	82	71.3%
YouTube	101	87.8%
Others	18	15.1%

vey also conducted through all of Vietnam's regions, therefore, avoiding the biases that might happen due to the culture of different regions. Moreover, the data collection also shows that Vietnamese tend to spend an average of 3 to 5 hours on social platforms. These statistics prove the potentiality of influencer marketing in Vietnam. The most popular social platform in Vietnam is Facebook, followed by YouTube and Instagram.

B. Reliability and validity

As claimed by Ahmed and Ishtiaq [67], when evaluating whether research is good or not, the data collection must assure the two important and fundamental domains which are reliability and validity [65]. Therefore, multiple analysis tools have been conducted to test the reliability and validity of this study's data collection.

For reliability testing, Cronbach's Alpha has been calculated. The results show that all variables of this study have Cronbach's Alpha higher than 0.8. The highest value of Cronbach's Alpha belongs to similarity with the value of 0.920, whereas the lowest value belongs to trustworthiness with the value of 0.832. These high values of Cronbach's Alpha have proved the high level of this study's reliability.

Through the validity testing by the exploration of exploratory factor analysis (EFA), the results show that KMO

TABLE II. THE RELIABILITY OF VARIABLES

Variables	N of Items	Cronbach's Alpha
<i>Characteristics of influencer</i>		
Attractiveness	3	0.841
Trustworthiness	3	0.832
Expertise	3	0.840
Similarity	3	0.920
Interestingness	3	0.906
Likability	4	0.909
<i>Followers' attitude towards influencer</i>		
Attitude towards influencer	4	0.916
<i>Followers' attitude to co-operated brand</i>		
Attitude towards brand	3	0.835

values are 0.919 (higher than 0.5), all variables accounting for 75,2% (higher than the cut off 50%). This result has assured the validity of this study.

For conducting hypothesis testing through calculating regression in the next section, correlation matrix has been used. The results show that all variables have significant correlation together at the 0.01 level.

TABLE III. CORRELATION MATRIX

Variables	1	2	3	4	5	6	7	8
1.FATI								
2.IA	.652**							
3.IT	.632**	.585**						
4.IE	.616**	.600**	.684**					
5.IS	.484**	.351**	.379**	.448**				
6.II	.685**	.598**	.668**	.634**	.499**			
7.IL	.590**	.567**	.567**	.626**	.418**	.579**		
8.FATB	.556**	.315**	.315**	.348**	.188**	.483**	.262**	

Note. FATI: Follower's attitude towards influencer; IA: Influencer's attractiveness; IT: Influencer's trustworthiness; IE: Influencer's expertise; IS: Influencer's similarity; II: Influencer's interestingness; IL: Influencer's likability; FATB: Follower's attitude towards co-operated brand.

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed).

C. Hypothesis testing

After conducting the Cronbach' Alpha, EFA and correlation for reliability and validity testing, we move on to the next stage of hypothesis testing in which single regression has been used. The table below shows the result of regression analysis in which all the proposed hypotheses are supported.

TABLE IV. RESULT OF DIRECT EFFECT

Direct effects	Coefficients	T-values	Sig.	Outcomes
Attractiveness → Attitude towards influencer (H1)	0.652	9.153	.000	Supported
Trustworthiness → Attitude towards influencer (H2)	0.632	8.678	.000	Supported
Expertise → Attitude towards influencer (H3)	0.616	8.307	.000	Supported
Similarity → Attitude towards influencer (H4)	0.484	5.876	.000	Supported
Interestingness → Attitude towards influencer (H5)	0.685	9.985	.000	Supported
Likability → Attitude towards influencer (H6)	0.590	7.773	.000	Supported
Influencer marketing → Followers' attitude towards co-operated brand (H7)	0.556	7.107	.000	Supported

According to the figures shown in the above table, all of the characteristics of influences including attractiveness, trustworthiness, expertise, similarity, interestingness, likability have significantly and positively affected the attitude towards influencers. Of the six factors, interest with the T-value of 9.985 has the largest impact on attitude towards influencers. Conversely, similarity has the smallest effect on attitude towards influencers. As for the H7, influencer marketing has a significant positive impact on attitude towards co-operated brands of influencer.

D. One-way Anova and T-test testing

Because of the typical regional differences feature of Vietnam, we want to see the differentiation of each region to influencer marketing. By analyzing the one-way Anova testing, we can test the difference impact between three groups of regions including the North, the Central and the South on two variables Attitude towards influencer and Attitude towards brand. With the Sig. of 0.133 > 0.05 in variables Attitude towards influencer and the Sig. of 0.165 > 0.05 in variables Attitude towards brand, there is no statistically significant difference in the attitude level of the respondents of different region groups. Thus, the regional differences in Vietnam do not affect the effectiveness of influencer marketing.

After conducting the one-way Anova testing, we move on to utilize an independent sample t-test to analyze two groups

of gender. The table below shows the result of t-test analysis.

TABLE V. INDEPENDENT SAMPLES TEST

Variables	F	Sig.
Attitude towards influencer	.197	.658
Attitude towards brand	.016	.900

With the Sig. of 0.658 and 0.900, gender does not affect the attitude of respondents on influencer and brand.

V. DISCUSSION AND CONCLUSION

The data table above has shown that the top three factors that most influence a user's decision to follow a KOL are Interestingness, Attractiveness and Trustworthiness. To be able to build an image or a model of KOL, it is necessary to have the above factors to attract users. The most important factor is still the interestingness of the production content, ideas, and messages you want to convey. This finding is completely consistent with the characteristics of generation Z and the context that they are living. According to recent study conducted by Prakash et al., generation Z is a strenuous contributor and consumer of several social contents on social platform [68]. Every day, they approach to thousand online information from several sources created by several people. Therefore, to be outstanding and capturing generation Z attention, the content of each social post will be the most importance factors that every content creator must be aware. Moreover, in recent study posted on American Study of Audiology has shown that, generation Z is nowadays losing its patient with thousand contents on social media. They are now more interested on the short content with attractive idea or attractive visual [69]. This is what also founded in this study when appearance is the next important factors affecting the user's decision. Finally, trustworthiness, the level of trust a KOL may need if that KOL is someone who specializes in reviewing products on the market so that users and followers have an objective view of the product. However, it is not necessary that you have all of the top three factors above to become a successful KOL, those three factors are what user care about when following someone on social networks. An example of not needing all three elements is Thong Soai Ca, a KOL on the TikTok platform who does not have a beautiful appearance, but he has humorous and entertaining content, so there were times when this KOL was very popular on social platforms.

A. Implications

1) Theoretical implications

This research has two main theoretical implications. Firstly, this research has provided the insight of influencer marketing to have a deeper understanding with the issue for brands when doing this kind of marketing activities. Secondly, this study enriches the database of scholars by providing a based module which has been identified from empirical evidence of respondents in Vietnam.

The results of this study provide the impacts and necessities of influencer characteristics in the consumer's attitude towards the influencer, thus, enhancing the efficiency of in-

fluencer marketing for the brands. With the contribution of attractiveness, trustworthiness, expertise, similarity, interestingness, likability, it can evoke the efficiency of influencer marketing for the brands. It also indicates that interest is the most significant factor influencing the consumer's perception on influencer and similarity is the least factor.

Currently, research in Vietnam do not focus much on the insight of influencer marketing rather than the impact of it. This leads to the requirement of proposing a based module to build on further modules development. By the given module, we aim to become the reference source for other scholars and brands to have further discussions and applications. Otherwise, this research clearly clarifies the factors that affect the consumer's attitude towards influencers. From this, brands can suggest the suitable strategies to utilize influencer marketing effectively.

2) Managerial implications

Consistent to the hypothesis development, this study has provided a deep insight of influencer marketing and consumer perception. The significant consistency between influencer's characteristics and follower's attitude towards influencer, and broader is follower's attitude towards co-operated brands has provided a guidance of influencer marketing for influencers and brands in general.

Foremost, from the perspective of an influencer, recognizing the important factors that can help influencers to build up a better marketing plan on their social media sites. For instance, knowing that something is interesting significantly affects a follower's attitude and it's one of the most important factors for capturing an audience's attention. The influencer should pay more attention to build up a detailed and consistent content plan for their social site in which they focus on sharing contents which are varied, personalized, humorous, and avoiding sensitive content. Moreover, after the pandemic of Covid19, people, especially for generation Z are now facing numerous problems relating to mental health, therefore, they now tends to find the content that empathy for this difficult time after Covid19. Otherwise, attractiveness is also an important characteristic that influencers must ensure. The attractiveness can be understood broader than just good looking or sexy, the influencer should maintain their appearance in the most sympathetic status which is clean and tidy. Furthermore, besides implicating the influencer his/her marketing plan on social media sites, this study also provides a preference for influencers to choose the suitable brands which are consistent to their image and characteristics. One of the key highlights that can be taken from this study parallel to the characteristic of generation Z that has been mentioned previously, short content are now much more preferred. This conclusion doesn't mean that long content are now complete died but rather to have a viral long-content post, the content must be distinguished, target hot topic and creating with an attractive visualize.

Secondly, from the perspective of brand, the manager of each brand can be based on the variables of this study which are the influencer's specific characteristics to build their brand criteria when choosing co-operated influencers. For instance, with a fashion brand that focuses on providing sporty clothes, the co-operated influencer of this brand must have the attractiveness of healthy, dynamic, and fit; the in-

interestingness of frequently using healthy diet, effective workout exercises, etc. This study provides guidance for brands to have better and more effective influencer marketing.

In Vietnam context, the number of influencers is increasing day by day due to the potential and the benefits that this job can bring to them. However, not many influencers become successful and actually gain benefits from this job due to the characteristics of this red ocean market. Moreover, from the side of brands, also because of the huge number of influencers, it is hard to find a suitable collaborated influencer to collab. As find out in this study, 6 independent variables include attractiveness, interestingness, expertise, trustworthiness, similarity, likability are the 6 top common factors that affect attitude towards both brand and influencer of followers. The study suggests developing an app that allow to connect influencer with brand. The category and the criteria to assess influencer will be based on the result of this study, which is the 6 top factors attractiveness, interestingness, expertise, trustworthiness, similarity, likability.

B. Limitations and recommendations

1) Limitations

One of the limitations that this article has is that the characteristics are not yet diverse. It is necessary to add, according to the trend, stronger influencing factors, such as personalization. Synthesizing from many available models to be able to develop a more complete chart and model to help those who aspire to be KOL can find an easier path. Another limitation is that the survey needs to be more diverse. Although the number of surveys is spread evenly across three regions of Vietnam, making the survey more general and accurate, the number is not large enough to have a larger impact to the reader.

2) Recommendations

There have been many directions for further development of this study.

The following research paper needs to collect a lot of data, more characteristics must be added in. Not only that, but this research article is also mainly aimed at the level of user interest up to one KOL. To make the article more certain, it is necessary to study more aspects when KOL is a brand representative to assess the extent of followers to a particular brand.

This study only stops at a relative level, not exactly, the next research needs to improve the problem of collecting surveys in Gen Z and Gen Y age groups to assess the difference between each age group. That way, a KOL or a brand can build a marketing strategy to the right target audience.

As partly show in the previous studies researching about influencers and influencer marketing, the 6 mentioned independent variables include attractiveness, interestingness, expertise, likability, similarity, trustworthiness also have direct impacted on followers' attitude toward brand. Therefore, for further researching, this linkage should be focused and researched more.

REFERENCES

- [1] Statista, "Statista," 21 March 2021. [Online]. Available: <https://www.statista.com/statistics/433871/daily-social-media-usage-worldwide/>. [Accessed 7 June 2022].
- [2] M. De Veirman, V. Cauberghe, L. Hudders, "Marketing through Instagram influencers: the impact of number of followers and product divergence on brand attitude," *Journal of Retailing and Consumer Services*, vol. 36, no. 5, pp. 798-828, 2017. DOI: 10.1080/02650487.2017.1348035.
- [3] Z. Karagür, J. Becker, K. Klein and A. Edeling, "How, why, and when disclosure type matters for influencer marketing," *International Journal of Research in Marketing*, vol. 39, no. 2, pp. 313-335, 2022. DOI: 10.1016/j.ijresmar.2021.09.006.
- [4] C. Stubb, A.-G. Nyström, J. Colliander, "Influencer marketing: The impact of dis-closing sponsorship compensation justification on sponsored content effectiveness," *Journal of Communication Management*, vol. 23, no. 2, pp. 109-122, 2019. DOI: 10.1108/jcom-11-2018-0119.
- [5] A. Audrezet, G. de Kerviler and J. Guidry Moulard, "Authenticity under threat: When social media influencers need to go beyond self-presentation," *Journal of Business Research*, vol. 117, pp. 557-569, 2020. DOI: 10.1016/j.jbusres.2018.07.008.
- [6] Laura L. Lemon, Marica G. Hoy, "#Sponsored #Ad: Agency Perspective on Influencer Marketing Campaigns," *Journal of Current Issues & Research in Advertising*, vol. 40, no. 3, pp. 258-274, 2018. DOI: 10.1080/10641734.2018.1521113.
- [7] Yi Bu, Joy Parkinson, Park Thaichon, "Influencer marketing: Homophily, customer value co-creation behaviour and purchase intention," *Journal of Retailing and Consumer Services*, vol. 66, 2022. DOI: 10.1016/j.jretconser.2021.102904.
- [8] J. Lee and B. Watkins, "YouTube vloggers' influence on consumer luxury brand perceptions and intentions," *Journal of Business Research*, vol. 69, no. 12, pp. 5753-5760, 2016. DOI: 10.1016/j.jbusres.2016.04.171.
- [9] C. Kastenholz, "Gen Z And The Rise Of Social Commerce," *Forbes*, 17 May 2021. [Online]. Available: <https://www.forbes.com/sites/forbesagencycouncil/2021/05/17/gen-z-and-the-rise-of-social-commerce/?sh=135cd60d251d>. [Accessed 7 June 2022].
- [10] PwC, "Thế hệ Z đã sẵn sàng cho kỷ nguyên số?," 16 May 2022. [Online]. Available: <https://www.pwc.com/vn/vn/publications/2021/pwc-vietnam-digital-readiness-genz-vn.pdf>. [Accessed 29 October 2022].
- [11] Samantha Kay, Rory Mulcahy, Joy Parkinson, "When less is more: the impact of macro and micro social media influencers' disclosure," *Journal of Marketing Management*, vol. 36, no. 3-4, pp. 248-278, 2020. DOI: 10.1080/0267257x.2020.1718740.
- [12] Nielsen, "How to engage with Generation Z in Vietnam," October 2018. [Online]. Available: <https://www.nielsen.com/insights/2018/how-to-engage-with-generation-z-in-vietnam/>. [Accessed 29 October 2022].
- [13] C. Campbell and J. Farrell, "More than meets the eye: The functional components underlying influencer marketing," *Business Horizons*, vol. 63, no. 4, pp. 469-479, 2020. DOI: 10.1016/j.bushor.2020.03.003.
- [14] A. Audrezet, G. de Kerviler and J. Guidry Moulard, "Authenticity under threat: When social media influencers need to go beyond self-presentation," *Journal of Business Research*, vol. 117, pp. 557-569, 2020. DOI: 10.1016/j.jbusres.2018.07.008.
- [15] C. Lou and S. Yuan, "Influencer Marketing: How Message Value and Credibility Affect Consumer Trust of Branded Content on Social Media," *Journal of Interactive Advertising*, vol. 19, no. 1, pp. 58-73, 2019. DOI: 10.1080/15252019.2018.1533501.
- [16] C. Ki, L. Cuevas, S. Chong and H. Lim, "Influencer marketing: Social media influencers as human brands attaching to followers and yielding positive marketing results by fulfilling needs," *Journal of Retailing and Consumer Services*, vol. 55, p. 102133, 2020. DOI: 10.1016/j.jretconser.2020.102133.
- [17] C. Ki and Y. Kim, "The mechanism by which social media influencers persuade consumers: The role of consumers' desire to mimic," *Psychology & Marketing*, vol. 36, no. 10, pp. 905-922, 2019. DOI: 10.1002/mar.21244.
- [18] K. Giffin, "The contribution of studies of source credibility to a theory of interpersonal trust in the communication process," *Psychological Bulletin*, vol. 68, no. 2, pp. 104-120, 1967. DOI: 10.1037/h0024833.
- [19] D. Albarracin and S. Shavitt, "Attitudes and Attitude Change," *Annual Review of Psychology*, vol. 69, no. 1, pp. 299-327, 2018. DOI: 10.1146/annurev-psych-122216-011911.
- [20] R. B. Cialdini, *Influence: Science and Practice*. Boston, Pearson Education.
- [21] M. Reinhard, M. Messner and S. Sporer, "Explicit Persuasive Intent and Its Impact on Success at Persuasion—The Determining Roles of Attractiveness and Likeableness," *Journal of Consumer Psychology*, vol. 16, no. 3, pp. 249-259, 2006. DOI: 10.1207/s15327663jcp1603_7.

- [22] M. Reinhard and M. Messner, "The effects of source likeability and need for cognition on advertising effectiveness under explicit persuasion," *Journal of Consumer Behaviour*, vol. 8, no. 4, pp. 179-191, 2009. Available: 10.1002/cb.282.
- [23] S. Kapitan and D. Silvera, "From digital media influencers to celebrity endorsers: attributions drive endorser effectiveness", *Marketing Letters*, vol. 27, no. 3, pp. 553-567, 2015. Available: 10.1007/s11002-015-9363-0.
- [24] S. Jin and J. Phua, "Following Celebrities' Tweets About Brands: The Impact of Twitter-Based Electronic Word-of-Mouth on Consumers' Source Credibility Perception, Buying Intention, and Social Identification With Celebrities," *Journal of Advertising*, vol. 43, no. 2, pp. 181-195, 2014. DOI: 10.1080/00913367.2013.827606.
- [25] C. Lee and L. Ma, "News sharing in social media: The effect of gratifications and prior experience," *Computers in Human Behavior*, vol. 28, no. 2, pp. 331-339, 2012. DOI: 10.1016/j.chb.2011.10.002.
- [26] S. Rieh, "Judgment of information quality and cognitive authority in the Web," *Journal of the American Society for Information Science and Technology*, vol. 53, no. 2, pp. 145-161, 2002. DOI: 10.1002/asi.10017.
- [27] L. Kahle and P. Homer, "Physical Attractiveness of the Celebrity Endorser: A Social Adaptation Perspective," *Journal of Consumer Research*, vol. 11, no. 4, p. 954, 1985. DOI: 10.1086/209029.
- [28] M. Baker and G. Churchill, "The Impact of Physically Attractive Models on Advertising Evaluations," *Journal of Marketing Research*, vol. 14, no. 4, p. 538, 1977. DOI: 10.2307/3151194.
- [29] C. Amos, G. Holmes and D. Strutton, "Exploring the relationship between celebrity endorser effects and advertising effectiveness," *International Journal of Advertising*, vol. 27, no. 2, pp. 209-234, 2008. DOI: 10.1080/02650487.2008.11073052.
- [30] M. Yu and P. Park, "The Effect of Comparative Advertising by Product Involvement and Endorser", *Advertising Research*, vol. 104, p. 5, 2015. Available: 10.16914/ar.2015.104.5.
- [31] B. Till and M. Busler, "The Match-Up Hypothesis: Physical Attractiveness, Expertise, and the Role of Fit on Brand Attitude, Purchase Intent and Brand Beliefs", *Journal of Advertising*, vol. 29, no. 3, pp. 1-13, 2000. Available: 10.1080/00913367.2000.10673613.
- [32] W. Joseph, "The Credibility of Physically Attractive Communicators: A Review", *Journal of Advertising*, vol. 11, no. 3, pp. 15-24, 1982. Available: 10.1080/00913367.1982.10672807.
- [33] W. Sun, W. Gao and R. Geng, "The Impact of the Interactivity of Internet Celebrity Anchors on Consumers' Purchase Intention", *Frontiers in Psychology*, vol. 12, 2021. DOI: 10.3389/fpsyg.2021.757059.
- [34] L. Bergkvist and K. Zhou, "Celebrity endorsements: a literature review and research agenda", *International Journal of Advertising*, vol. 35, no. 4, pp. 642-663, 2016. Available: 10.1080/02650487.2015.1137537.
- [35] S. Choi and N. Rifon, "It Is a Match: The Impact of Congruence between Celebrity Image and Consumer Ideal Self on Endorsement Effectiveness," *Psychology & Marketing*, vol. 29, no. 9, pp. 639-650, 2012. DOI: 10.1002/mar.20550.
- [36] J. Escalas and J. Bettman, "Self-Construct, Reference Groups, and Brand Meaning," *Journal of Consumer Research*, vol. 32, no. 3, pp. 378-389, 2005. DOI: 10.1086/497549.
- [37] S. O'Donohoe and A. Kelly, "Advertising and Promotion: An Integrated Marketing Communications Approach," *International Journal of Advertising*, vol. 29, no. 3, pp. 501-504, 2010. DOI: 10.2501/s0265048710201282.
- [38] R. Hill, M. Fishbein and I. Ajzen, "Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research," *Contemporary Sociology*, vol. 6, no. 2, p. 244, 1977. DOI: 10.2307/2065853.
- [39] Phelps and M. Hoy, "The Aad-Ab-PI relationship in children: The impact of brand familiarity and measurement timing," *Psychology and Marketing*, vol. 13, no. 1, pp. 77-105, 1996. DOI: 10.1002/(sici)1520-6793(199601)13:1<77::aid-mar5>3.0.co;2-m.
- [40] S. Brown and D. Stayman, "Antecedents and Consequences of Attitude Toward the Ad: A Meta-Analysis," *Journal of Consumer Research*, vol. 19, no. 1, p. 34, 1992. DOI: 10.1086/209284.
- [41] S. Khamis, L. Ang and R. Welling, "Self-branding, 'micro-celebrity' and the rise of Social Media Influencers," *Celebrity Studies*, vol. 8, no. 2, pp. 191-208, 2016. DOI: 10.1080/19392397.2016.1218292.
- [42] Scott, D.M, "The new rules of marketing and PR: how to use social media, online video, mobile applications, blogs, news releases and viral marketing to reach buyers directly," *Choice Reviews Online*, vol. 51, no. 08, pp. 51-4544-51-4544, 2014. DOI: 10.5860/choice.51-4544.
- [43] C. Campbell and L. Marks, "Good native advertising isn't a secret," *Business Horizons*, vol. 58, no. 6, pp. 599-606, 2015. DOI: 10.1016/j.bushor.2015.06.003.
- [44] N. Evans, J. Phua, J. Lim and H. Jun, "Disclosing Instagram Influencer Advertising: The Effects of Disclosure Language on Advertising Recognition, Attitudes, and Behavioral Intent," *Journal of Interactive Advertising*, vol. 17, no. 2, pp. 138-149, 2017. DOI: 10.1080/15252019.2017.1366885.
- [45] Giles, D.C & Edwards, L, "Twenty-First century celebrity: fame in digital culture", *Information, Communication & Society*, vol. 23, no. 1, pp. 157-160, 2019. DOI: 10.1080/1369118x.2019.1682633.
- [46] K. Lee and D. Koo, "Effects of attribute and valence of e-WOM on message adoption: Moderating roles of subjective knowledge and regulatory focus," *Computers in Human Behavior*, vol. 28, no. 5, pp. 1974-1984, 2012. DOI: 10.1016/j.chb.2012.05.018.
- [47] S. Wang, G. Kao and W. Ngamsiriudom, "Consumers' attitude of endorser credibility, brand and intention with respect to celebrity endorsement of the airline sector," *Journal of Air Transport Management*, vol. 60, pp. 10-17, 2017. DOI: 10.1016/j.jairtraman.2016.12.007.
- [48] Z. Serman and J. Sims, "How social media influencers affect consumers purchase habit?," *AIS Electronic Library (AISel)*. [Online]. DOI: <https://aisel.aisnet.org/ukais2020/10/>.
- [49] M. Thomson, "Human Brands: Investigating Antecedents to Consumers' Strong Attachments to Celebrities," *Journal of Marketing*, vol. 70, no. 3, pp. 104-119, 2006. DOI: 10.1509/jmkg.70.3.104.
- [50] H. Lin, P. Bruning and H. Swarna, "Using online opinion leaders to promote the hedonic and utilitarian value of products and services," *Business Horizons*, vol. 61, no. 3, pp. 431-442, 2018. Available: 10.1016/j.bushor.2018.01.010.
- [51] E. Croes and J. Bartels, "Young adults' motivations for following social influencers and their relationship to identification and buying behavior," *Computers in Human Behavior*, vol. 124, p. 106910, 2021. DOI: 10.1016/j.chb.2021.106910.
- [52] R. Winer, "New Communications Approaches in Marketing: Issues and Research Directions," *Journal of Interactive Marketing*, vol. 23, no. 2, pp. 108-117, 2009. DOI: 10.1016/j.intmar.2009.02.004.
- [53] A. Smock, N. Ellison, C. Lampe and D. Wohn, "Facebook as a toolkit: A uses and gratification approach to unbundling feature use," *Computers in Human Behavior*, vol. 27, no. 6, pp. 2322-2329, 2011. DOI: 10.1016/j.chb.2011.07.011.
- [54] Katz, E, Blumler, J.G, Gurevitch, M 1974, 'The uses and gratifications approach to mass communication', *Sage Pubs*, Beverly Hills, California.
- [55] J. Chae, "Explaining Females' Envy Toward Social Media Influencers," *Media Psychology*, vol. 21, no. 2, pp. 246-262, 2017. DOI: 10.1080/15213269.2017.1328312.
- [56] C. Chen and Y. Lin, "What drives live-stream usage intention? The perspectives of flow, entertainment, social interaction, and endorsement," *Telematics and Informatics*, vol. 35, no. 1, pp. 293-303, 2018. DOI: 10.1016/j.tele.2017.12.003.
- [57] B. Taillon, S. Mueller, C. Kowalczyk and D. Jones, "Understanding the relationships between social media influencers and their followers: the moderating role of closeness," *Journal of Product & Brand Management*, vol. 29, no. 6, pp. 767-782, 2020. DOI: 10.1108/jpbm-03-2019-2292.
- [58] S. Petroschius and K. Crocker, "An empirical analysis of spokesperson characteristics on advertisement and product evaluations," *Journal of the Academy of Marketing Science*, vol. 17, no. 3, pp. 217-225, 1989. DOI: 10.1007/bf02729813.
- [59] Bremner 2011. The Influence of Follower Behaviour on Leaders' Trust in Followers. *Faculty of Graduate and Postdoctoral Studies*.
- [60] Liljander, J. Gummerus and M. Söderlund, "Young consumers' responses to suspected covert and overt blog marketing," *Internet Research*, vol. 25, no. 4, pp. 610-632, 2015. DOI: 10.1108/intr-02-2014-0041.eee
- [61] E. Djafarova and T. Bowes, "'Instagram made Me buy it': Generation Z impulse purchases in fashion industry," *Journal of Retailing and Consumer Services*, vol. 59, p. 102345, 2021. DOI: 10.1016/j.jretconser.2020.102345.
- [62] A. Schouten, L. Janssen and M. Verspaget, "Celebrity vs. Influencer endorsements in advertising: the role of identification, credibility, and Product-Endorser fit," *International Journal of Advertising*, vol. 39, no. 2, pp. 258-281, 2019. DOI: 10.1080/02650487.2019.1634898.
- [63] C. Hoffner and M. Buchanan, "Young Adults' Wishful Identification With Television Characters: The Role of Perceived Similarity and Character Attributes," *Media Psychology*, vol. 7, no. 4, pp. 325-351, 2005. DOI: 10.1207/s1532785xmep0704_2.
- [64] Gräve, J.F. 2017. "Exploring the perception of influencers vs. traditional celebrities: Are social media stars a new type of endorser?," *In*

Proceedings of the 8th International Conference on Social Media & Society, p. 36.

- [65] Sheth, S, Kim, J, "Social media marketing: The effect of information sharing, entertainment, emotional connection and peer pressure on the attitude and purchase intentions," *GSTF Journal on Business Review*, vol. 5, pp. 62–70. DOI: 10.5176/2010-4804_5.1.409
- [66] M. Setia, "Methodology Series Module 2: Case-control Studies," *Indian Journal of Dermatology*, vol. 61, no. 2, pp. 14, 2016. DOI: 10.4103/0019-5154.177773.
- [67] I. Ahmed, S. Ishtiaq, "Reliability and validity Importance in Medical Research," *Journal of the Pakistan Medical Association*. vol. 71, no. 10, 2021. DOI:10.47391/JPMA.06-861.
- [68] Prakash Yadav, G. and Rai, J., "The generation Z and their social media usage: A review and a research outline," *Global Journal of Enterprise Information System*, vol. 9, no. 2, p. 110, 2017 DOI: 10.18311/gjeis/2017/15748.
- [69] AliciaMayle, "Generation Z: Patients and professionals," *The American Academy of Audiology*, 29-Jun-2022. [Online]. Available: <https://www.audiology.org/generation-z-patients-and-professionals/>. [Accessed: 06-Mar-2023].

Workplace incivility and its demographic characteristics: a cross-cultural comparison between Chinese and Vietnamese working

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Abstract—Workplace incivility (WI) is defined as low-intensity negative behaviors in the workplace. While this topic is common in a Western context, a lack of research has been conducted in the Asian context, particularly in China and Vietnam. The purpose of this research is to investigate a cross-cultural study about WI, with an aim to focus on the linkage between demographic variables and WI. The research sample comprised 598 voluntary working adults in China and Vietnam. The data were calculated using Descriptive statistics and paired t-tests in SPSS. As a result, Chinese and Vietnamese experienced the same WI. In addition, males experienced more WI than females. This research is a pioneer cross-cultural study about WI in the Asian context and investigates the influence of demographic variables on WI in Chinese and Vietnamese working adults. This study also expresses some solutions to eliminate this issue in the workplace.

Index Terms—Workplace incivility, Demographic characteristics, Cross-cultural countries.

I. INTRODUCTION

While the well-known topic of negative workplace attitudes and behaviors (e.g., abusive leaders, workplace bullying, and work-family conflict) has been researched popularly, WI has only been studied recently [1]. In detail, WI is regarded as "a low type of destructive behavior that disrupts the standards norms of the organization" [2]. These uncivil behaviors in the workplace include gossiping about colleagues in an unprofessional way, directly or indirectly, criticizing or interrupting others, and insulting comments about someone [3]. The level of WI has been rising significantly, which affects an organization's working productivity [4][5]. WI has been popular in Asian countries, including China [6] [7]. A rise in uncivil behaviors makes Chinese organizations decrease working efficiency and employee morale. Thus, it motivates Chinese supervisors to find solutions to this problem at work. In addition, although no previous WI research has been conducted in Vietnam, negative workplace behavior was identified in this country [8][9].

The majority of WI studies have been conducted in the Western context, especially in the USA and European countries. In contrast, the Asian context, which suggests the high-intensity increase of uncivil behavior in the workplace, has little academic attention [2]. When national culture is confirmed to affect an individual's attitudes and behaviors, the results from the Western context are difficult to adapt to the Asian context because of the differences in social, cultural, and political factors. Western countries follow an indi-

vidualist culture, while most Asian countries towards collectivist culture [10]. In detail, individualism emphasizes the value of a person, so the coordination between members of society is modest when their self-determination is focused on themselves. In contrast, collectivism values the role of harmonious relationships in society [10]. In a collectivist society, an individual is ready to sacrifice his/her benefit for the community's benefit. This issue is even more severe in communist countries (e.g., China and Vietnam), which officially emphasizes the role of the socialist party in the society. Therefore, the concept of WI can differ between Western and Asian contexts. In detail, what is regarded as usual in the Western workplace would be seen as incivility in Asian counterparts and vice versa. This argument is supported by anonymized, which confirmed a positive correlation between the relationship among members and negative attitudes in Vietnamese workplaces. Loh et al. (2021) highlighted that WI is less negatively impacted by Singaporeans than Australians.

For the above reasons, it is necessary to have more research about WI in the Asian context, especially when cross-cultural uncivil behaviors literature is modest [11] [12]. Further, while the prior literature mainly focuses on the effect of WI on organizational factors (e.g., job satisfaction, commitment, performance, etc.), the link between WI and socio-demographic factors (e.g., gender, age, managerial experience, and working experience) is questionable. A few researchers added demographic variables in statistics; however, the scholars mainly label them as dependent factors; therefore, their role as an independent factor to incivility is under question (Cortina et al., 2001). To fulfill the above gap, cross-cultural data from working adults in China and Vietnam aims to explore socio-demographic factors' influence on WI, which solves the scarcity of research about WI in the Asian context.

In detail, this study aims to compare the WI between China and Vietnam. Moreover, we explore the relationship between age, gender, education, managerial experience, working experience, and WI in Vietnamese and Chinese working adults. Understanding the influence of demographic factors on WI will fill the gap in negative behaviors literature in the Asian context. Moreover, the findings will allow practitioners to have policies to reduce its harmful consequences for organizations and working adults.

H1. Chinese working adults would experience the same incivility behaviors as Vietnamese ones.

H2. Women would experience more incivility behaviors than men in Vietnamese and Chinese workplaces.

H3. Younger working adults would experience more incivility behaviors than older ones in Vietnamese and Chinese workplaces.

H4. Subordinates would experience more incivility behaviors than supervisors in Vietnamese and Chinese workplaces.

H5. Individuals with more working experience can reduce the frequency of incivility behaviors than those with less working experience in Vietnamese and Chinese workplaces.

II. METHOD

To avoid common method bias, we collected data at two different times, with a time gap of six months. In time 1, we collected data from voluntary Vietnamese working adults who have been working in three main cities: Hanoi (the capital in the North), Vinh (in the Middle), and Ho Chi Minh (in the South). The additional information about informed consent and guideline for fulfilling items were included in the questionnaire. As a result, 500 surveys were collected, and we removed 241 invalid surveys. Thus, 259 surveys (51.8%) were used in the analysis. In time 2, we collected data from voluntary Chinese working adults working in three main cities: Beijing (the capital), Shanghai, and Chongqing. A total of 705 questionnaires were received, and 339 valid questionnaires were used, with a response rate of 48%.

The detailed demographic information is displayed below in Table 1. The demographic information was coded for further data analysis, as follows: Age (Above 30 = 1 and Below 30 = 2), Gender (Male = 1 and Female = 2), Managerial ranks (Employee = 1 and Supervisor = 2), and Working experience (Below 10 years = 1 and Above 10 years = 2).

This research used SPSS to calculate the data. In detail, descriptive statistics and paired t-tests were conducted to explore the difference in WI in the nation, age, gender, working experience, and managerial level.

III. RESULTS

To examine the data's validity, Kaiser–Meyer–Oklin (KMO), exploratory factor analysis (EFA), Cronbach's Alpha, and total variance were analyzed in this study. Kaiser (1974) states that KMO must exceed 0.5 for further analysis. As a result, KMO in this study was 0.875, which passed the preliminary analysis. The detailed analysis is displayed in Appendix 1. In the next step, all items had a factor loading ranging from 0.840 to 0.866, which fulfills the minimum value of 0.4 for valid EFA (Nunnally, 1978). Further, Cronbach's Alpha was 0.904, which exceeded the requirement of 0.7. All items with eigenvalues higher than one were 72.62% of the total variance. Altogether, all statistics reach the standard condition, confirming the data's validity. The detailed characteristic is displayed in Appendix 2.

The first hypothesis compares the WI level between Chinese and Vietnamese working adults. As can be seen from table 2, although the score of China ($M = 1.411$) was less

TABLE I
DEMOGRAPHIC INFORMATION OF THE VIETNAMESE AND CHINESE SAMPLE (N = 598)

	Frequency	Percentage
Vietnam		
Gender		
Male = 1	108	41.6
Female = 2	151	58.4
Age		
Above 30 = 1	138	53.2
Below 30 = 2	121	46.8
Managerial ranks		
Employee = 1	226	87.2
Supervisor = 2	33	12.8
Working experience		
Below 10 years = 1	164	63.3
Above 10 years = 2	95	36.7
Total	259	100
China		
Gender		
Male = 1	80	23.5
Female = 2	259	76.5
Age		
Above 30	50	14.7
Below 30	289	85.3
Managerial ranks		
Employee = 1	280	82.5
Supervisor = 2	59	17.5
Working experience		
Below 10 years = 1	288	84.9
Above 10 years = 2	51	15.1
Total	339	100

than Vietnam ($M = 1.488$), the difference is insignificant ($p = 0.376 > 0.05$). Therefore, hypothesis 1 is accepted, which confirms our prediction about the same level of WI in Vietnam and China.

TABLE II
COMPARISON OF WI BETWEEN CHINESE AND VIETNAMESE

Measure	Mean		t(df = 598)	p
	Chinese (n = 339)	Vietnamese (n = 259)		
WI	1.411	1.499	0.885	0.376

The second hypothesis compares the WI level between Chinese and Vietnamese men and women. As can be seen from table 3, the score of women ($M = 1.356$) was less than men ($M = 1.638$) in Vietnamese and Chinese workplaces, and the difference is significant ($p = 0.002 < 0.05$). Therefore, hypothesis 2 is rejected. The third hypothesis aims to compare the level of WI between Chinese and Vietnamese younger and older working adults. Table 3 shows a difference between the two types of working adults, but this is insignificant ($p = 0.823 > 0.05$). Therefore, hypothesis 3 is rejected. The fourth hypothesis compares the WI level between employees and supervisors in Vietnamese and Chinese workplaces. Table 3 shows a difference in the organizational hier-

archy's WI, but this is insignificant ($p=0.823>0.05$). Therefore, hypothesis 4 is rejected. The fifth hypothesis aims to compare the level of WI between higher experienced adults and lower ones in Vietnamese and Chinese workplaces. Table 3 shows a difference between the two types of working adults, but this is insignificant ($p=0.199>0.05$). Therefore, hypothesis 5 is rejected.

The first hypothesis compares the WI level between Chinese and Vietnamese working adults. As can be seen from table 2, although the score of China ($M= 1.411$) was less than Vietnam ($M=1.488$), the difference is insignificant ($p=0.376>0.05$). Therefore, hypothesis 1 is accepted, which confirms our prediction about the same level of WI in Vietnam and China.

TABLE III
WI IN GENDER, AGE, MANAGERIAL RANKS, AND WORKING EXPERIENCES DIFFER

No	Variables	Number	Mean	SD	t(df = 598)	p
1	Gender					
	Male	188	1.638	1.119	330.7	0.002*
	Female	410	1.356	1.007		
2	Age					
	Above 30	427	1.451	1.017	285.2	0.823
	Below 30	171	1.429	1.134		
3	Managerial ranks					
	Employee	506	1.424	1.052	127.0	0.267
	Supervisor	92	1.557	1.043		
4	Working experiences					
	Below ten years	452	1.404	1.022	223.6	0.199
	Above 30 years	146	1.533	1.108		

* $p < .05$ (two-tailed)

Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive."

Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.

IV. DISCUSSION AND IMPLICATIONS

This is the first cross-cultural study investigating WI in the Asian context, particularly in China and Vietnam. This study also supplemented the incomplete knowledge on WI and explored the influence of demographic factors on working adults' incivility behaviors. While we evaluated five hypotheses in this study, only the first one was accepted. In detail, the frequency of WI is not different between China and Vietnam, which suggests that the same cultural, political, and social characteristics can lead to the same uncivil behaviors in the workplace. This result provided several preliminary information concerning the cross-cultural empirical experiences of WI in collectivist cultures. Further, gender was

regarded as an essential factor in predicting the degree of WI in workplaces, and males experienced more frequencies of uncivil behaviors than females in Vietnam and China. This finding was contrasted with Western studies (Cortina et al., 2001) but in line with previous Asia literature (Lim and Lee, 2011). Therefore, this result accreted the WI's theory between the Asian and Western contexts.

For the rest of the demographic variables, they confirmed an insignificant difference in incivility behaviors between the categories of age, managerial ranks, and working experiences. This study broadened the limited theory about WI in the Asian context and identified the influence of national characteristics on workplaces' uncivil behaviors. These results also showed a remarkable contribution to organizations and supervisors in Vietnam and China. In detail, we suggest that supervisors should find ways to reduce uncivil behaviors in the workplace for male employees in two societies. One solution is to build a code of conduct to limit uncivil behaviors in the workforce. As Confucianism is a core traditional culture in China and Vietnam, supervisors can adapt to use critical values in this philosophy, such as respect, dignity, and harmony, to define the proper behaviors in the workplace. Individuals with positive behaviors might receive a tangible reward and vice versa.

The second solution is to recruit new employees with good behaviors and attitudes, which can eliminate WI from the beginning. However, it raises a question about how to select candidates who have positive attitudes and behaviors. The recruitment process would be the answer when organizations can use role-playing exercises that put candidates into conflict situations to determine their reactions. These individuals who have positive attitudes will deal with difficulties politely.

V. CONCLUSION

To sum up, this research provides empirical findings on the influences of demographic variables on WI in Vietnamese and Chinese contexts. The result confirms a significant association between gender and WI, with males experiencing higher uncivil behaviors than females. If WI still happens in the workplace, it will affect the organization's performance and stability in the future. Therefore, we have established several solutions to eliminate this issue. Finally, this study is expected to open the scope of WI in the Asian context, particularly in Vietnam and China.

REFERENCES

- [1] Schilpzand, D. Pater, A. Erez, "Workplace incivility: a review of the literature and agenda for future research", *Journal of Organizational Behavior*, vol. 37, no. 6, 2016, pp.64-80.
- [2] M. Alias, A. Ojo, N. Ameruddin, "Workplace incivility: the impact on the Malaysian public service department", *European Journal of Training and Development*, vol. 46, no. 3/4, 2020, pp.356-372.
- [3] M. Cortina, J. Magley, H. Williams, D. Langhout, "Incivility at the workplace: incidence and impact", *Journal of Occupational Health Psychology*, vol.6, no.1, 2001, pp.64-80.
- [4] B. Estes, J. Wang, "Integrative literature review: Workplace incivility: Impacts on individual and organizational performance", *Human Resource Development Review*, vol.7, no.2, 2008, pp.218-240.
- [5] H. Wang, T. Chen, "Relationships among workplace incivility, work engagement and job performance", *Journal of Hospitality and Tourism Insights*, vol.3, no.4, 2020, pp.415-429.
- [6] J. Guo, Y. Qiu, Y. Gan, "Workplace incivility and work engagement: The chain mediating effects of perceived insider status, affective

- organizational commitment and organizational identification”, *Current Psychology*, 2020, pp.1-12.
- [7] M. Sliter, K. Sliter, S. Jex, “The employee as a punching bag: the effect of multiple sources of incivility on employee withdrawal behavior and sales performance”, *Journal of Organizational Behavior*, vol.33, no.1, 2012, pp.121-139.
- [8] T. Nguyen, T. Teo, L. Grover, P. Nguyen, “Respect, bullying, and public sector work outcomes in Vietnam”, *Public Management Review*, vol.21, no.6, 2019, pp.863-889.
- [9] T. Nguyen, T. Teo, L. Grover, P. Nguyen, “Psychological safety climate and workplace bullying in Vietnam’s public sector”, *Public Management Review*, vol.19, no.10, 2017, pp.1415-1436.
- [10] G. Hofstede, *Culture’s Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*, 2nd ed. Sage Publications, Thousand Oaks, CA, 2011.
- [11] Y. Chen, Z. Wang, Y. Peng, J. Geimer, O. Sharp, S. Jex, S, “The multidimensionality of workplace incivility: Cross-cultural evidence”, *International Journal of Stress Management*, vol.26, no.4, 2019, pp.356.
- [12] M. Loh, B. Thorsteinsson, M. Loi, “Workplace incivility and work outcomes: Cross-cultural comparison between Australian and Singaporean employees”, *Asia Pacific Journal of Human Resources*, vol.59 no.2, 2021, pp.305-329.

Factors Affecting The Decision On The Use Of Electronic Wallet By People In Danang City

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Abstract—The trend of non-cash payments is increasing in popularity; yet, the limited number of e-wallet users in Danang City is due to numerous barriers. This study intends to identify the elements that affect people's behavioral intentions to use e-wallet in Danang. The research employed both qualitative and quantitative methodologies. For qualitative study, we utilized grounded theory, which is comprised of seventy prior studies; for quantitative research, 204 respondents in Danang City, who are users of the e-wallet program, responded to the structured questionnaire. Perceived simplicity, perceived usefulness, perceived security, social impact, attitude, and enabling conditions are all put to the test. Intentions to use an electronic wallet are heavily influenced by five factors: simplicity of use, security, usefulness, social impact, and enabling conditions. The study explores potential variables that influence e-wallet usage intentions and presents an integrated framework for this aspect. Thus, it becomes a reliable resource for future research. The findings of this study will help e-wallet providers increase e-wallet usage.

Index Terms—e-wallet, digital wallet, intention to use, online payment, cashless transaction.

I. INTRODUCTION

Along with the evolution and development of technology, the need for cashless transactions and online payments has increased at the speed of light [1]. Many facets of life are affected by the rapid development of e-Commerce in recent years, particularly the improvement in how individuals manage themselves financially and non-financially in numerous transactions [2]. In order to give the best service possible, businesses continue to develop and collaborate in response to the expansion of technology and smartphone usage. One of the services offered, namely the digital wallet (e-wallet) application [3]. It was speculated that the proliferation of mobile phone services could pave the way for the development of the next generation of new payment services, providing expansion possibilities for the market's players. Mobile subscribers have surpassed fixed subscribers in a large number of countries. In 2017, mobile commerce accounted for 48% of global e-commerce sales; by 2022, it is expected to account for 70%, or \$4.6 trillion. [4]. Unsurprisingly, developing countries have emerged as the largest market for digital payment services. The World Bank reports that 90%

of daily transactions in many developed countries are now completed without the use of currency. At least half of urban Vietnamese households will adopt electronic payment methods by 2020. In 2021, Vietnam will have the third-highest rate of mobile payment use in Asia, at 29.1 percent. Vietnam has 13 million functional e-wallet accounts by the end of the first quarter of 2020, with a total wallet balance of about 1.36 trillion dongs and as many as 225 million transactions. [5].

E-wallets have taken center stage in Vietnam's burgeoning financial industry. As is well-known, Covid-19 can be easily transmitted if droplets are dropped on inanimate things near an infected person and then are touched by other people [6]. Physical currency can serve as a vector for the virus if it is contacted by an infected individual. Therefore, the WHO recommended the use of digital currency whenever practicable [7]. The COVID-19 epidemic makes it impossible for individuals to access products and services in the conventional manner. Urban centers have been encouraging cashless transactions, and QR codes assist companies in accepting cashless payments [8].

In addition to payment methods like as card banking, Internet banking, mobile payment, etc., e-wallets are progressively making a comeback to become a vital tool for consumers [9]. There is a policy in place in Vietnam that will limit cash transactions to less than 10% of the total market by 2020[10]. This means that at least 70% of businesses including those providing water service, selling electronics, and providing telecommunications services will accept cashless payments from customers. Furthermore, by 2020, at least half of all Vietnamese households are projected to make daily transactions using electronic payments [11]. Over 918.8 million mobile phone payment transactions were conducted as of the end of October 2020, with a total value of over 9.6 trillion VND (an increase of 123.9% in volume and 125.4% in value compared to the same time in 2019). Nearly 374 million online payment transactions worth over 22.2 trillion VND were conducted (an increase of 8.3% in volume and 25.5% in value compared to the same period in 2019).

Based on the preceding research and our own views, the use of electronic wallets remains problematic. The majority of Vietnamese consumers still choose to pay in cash due to their purchasing and selling practices, fear of fraud, and inability to link a bank account to a wallet. Numerous e-wallets are currently available on the market, but the number of wallets associated with retail chains is still limited, creating a situation in which customers must download numerous applications that are extremely inconvenient. Users anticipate the eventual consolidation of payment, lending, and investment services into a single mobile application. Currently, users are required to have at least one bank account linked to their e-wallet in order to add funds to their e-wallet, which restricts their use, used because many people lack a bank account with internet banking access [12]. In 2021, however, up to 69% of Vietnam's population will not have access to financial services or a bank account, and approximately 26% of transactions will be conducted in cash, while the Internet penetration rate of Vietnamese people will reach up to 66% [13]. Our research will investigate the elements that influence the behavior of Danang city residents who use electronic wallets. The results then contribute to the promotion of e-wallets in Danang.

II. LITERATURE REVIEW

A. E-Wallet

A sort of Fintech (Financial Technology) that employs Internet-based media as an alternative payment mechanism is the e-wallet, sometimes known as an electronic wallet. Electronic wallets (or "e-wallets") have the potential to revolutionize the way people interact with cash by eliminating the need to carry large amounts of cash around, shortening the time it takes to calculate transactions and speeding up payments, making transactions more secure, decreasing the likelihood of loss due to theft, and protecting the privacy of sensitive user data. E-wallets have made plastic credit and debit cards obsolete. [14].

To be able to completely examine the elements influencing Danang residents' inclination to use e-wallets, we reviewed a total of 70 publications and researched which six factors are pertinent to the case study in Danang. This study uses two theoretical models, UTAUT and TAM, as the foundation for research on the adoption of new technologies, as these two models have been utilized to design the majority of recommended studies. In example, the UTAUT model is commonly used to assess the desire to utilize e-wallet. The seven criteria are perceived usefulness, perceived ease of use, perceived safety, conducive circumstances, social influence, and attitude.

B. Perceived usefulness

Perceived usefulness is "the extent to which a person believes that using a certain system would enhance his or her job performance" [15]. Perceived usefulness, when discussing e-wallets, refers to the extent to which consumers believe that making use of an e-wallet will facilitate and facilitate transactions with regards to swiftness, low cost, and convenience[16]. Moreover, because the e-wallet would record all transactions, it will be relatively simple for indi-

viduals to track their spending and budget more effectively [17]. The TAM framework postulates that perceived usefulness predicts the direct association between behavioral intention and technological use. [18]. Perceived utility is the TAM element that has the greatest influence on behavioral intention [15]. In addition, numerous prior studies have demonstrated that perceived usefulness constructs have a positive and important effect on the user's intention to use an e-wallet [1], [19] – [21]. According to the research [19], the e-wallet payment service system provides significantly more utility than cash payments, such as paying a real minimal amount and completing a transaction quickly. The utility of e-wallet services includes facilitating transactions and transfers for consumers. Consequently, the greater the awareness, the greater the desire to utilize e-wallet services. Consequently, the first hypothesis is advanced:

H1: Perceived usefulness positively affects users' intention to use e-wallet.

C. Perceived ease of use

A user's perception of a system's ease of use is the extent to which that user anticipates having little difficulty learning and making full use of the system [15]. Another definition is a system that requires little to no formal education to operate effectively[16]. A person will utilize an e-wallet application more frequently if he or she considers it easy or not too difficult to use [22]. The greater the perceived simplicity of a transaction, the more frequently consumers use the application service [19]. This is consistent with the findings of studies [23] and [24], which indicate that a person's smartphone usage increases if his smartphone application includes additional capabilities. According to earlier studies [1], [19], [22], and [25], perceived ease of use has a positive and statistically significant effect on the user's propensity to use an e-wallet. However, research [26] indicates that the perception of ease of use has no substantial effect on the user's intention. Nonetheless, the mechanisms involved in e-wallet services require a certain amount of expertise, knowledge, and effort; hence, perceived ease of use might play a crucial part in assessing customers' intents to utilize this payment platform [27]. The second proposed hypothesis is:

H2: Perceived ease of use positively affects users' intention to use e-wallet.

D. Perceived security

Perceived security means being aware of the protection against the risk involved in digital transactions, particularly the loss of sensitive data that results in monetary losses [28]. Threats to security, such as denial of service, illegal access, theft, and fraud, exist for users of the e-payment system [29]. The more rapidly e-commerce develops, the more organizations and clients are concerned about security problems; security is one of the primary reasons why individuals attempt to avoid e-payment activities [2]. Customers' continued use of an e-wallet is influenced by an increase in their perception of security [30], [31]. The greater the behavioral desire to embrace an electronic wallet, the smaller the perceived risk [32]. Previous research indicates that perceived security has a substantial effect on the intention to use an e-wallet [27, 31, 33, and 35]. While some authors find no strong correlation between perceived security and intention

to use [36–38], this is not the consensus. Consequently, the third hypothesis is presented to explore this aspect in greater detail:

H3: Perceived security positively affects users' intention to use e-wallet.

E. Facilitating conditions

Facilitating conditions are the extent to which a managerial and technological infrastructure exists to enable the system's utilization [39]. Using mobile banking requires resources such as smartphones, the Internet, and mobile Internet services; clients cannot use mobile banking without these resources [40]. Technically speaking, e-wallet applications are smartphone software that cannot work without an Internet connection. Several prior studies demonstrate that conducive settings have a considerable and direct effect on intention to use [27, 32, 36, 41–44]. According to the study [45], conducive conditions also had the greatest impact on other parameters and user intent. In addition, training users how to safely and successfully use e-wallet and the availability of customer service when users encounter issues have a significant impact on their purpose [40]. Nonetheless, a number of studies have concluded that the link between enabling situations and behavioral intentions is insignificant [25, 46, 47]. Consequently, hypothesis H4 is formulated to examine the association between facilitating conditions and the intent to use an e-wallet:

H4: Facilitating conditions positively affect users' intention to use e-wallet.

F. Social influence

Social impact (SI) can be understood as the degree to which a person believes that others believe they should use a new technology [39]. Social influence refers to the phenomenon in which individuals modify their conduct in response to the influence of others [48]. Social influence mentions the extent to which clients are influenced to use a particular technology by influential people in their life, such as colleague, life partner, friends and family [25]. Numerous academics are drawn to the very applicable concept of social influence analysis. By analyzing the mode of influence spread and the mode of influence among users, we can answer social influence-related questions such as "Who can be affected?" and "Who can influence whom?" [48]. Social impact has a substantial effect on clients' intent to use e-wallet [39]. In the case of young customers, social influence is viewed as the most influential factor in the acceptance of new technologies such as e-wallets [43]. Social influence (SI) has been shown to have a positive effect on the adoption of new technologies, specifically e-wallets [9], [36], [39], [45], and [49]. Other research [40, 46] have indicated, however, that social influence has little effect on the intention to use an electronic wallet. In light of the foregoing dispute, the following idea can be proposed:

H5: Social influence positively affects users' intention to use e-wallet.

G. Attitude

Attitude is described as a person's optimistic or pessimistic toward a specific conduct [50]. Fundamental to the utilization of mobile payment systems is one's attitude [49].

It plays an important role in the individual's intention to perform the underlying behavior, particularly during the initial stages of technology adoption [45]. Numerous investigations on non-cash payment supported the correlation between attitude and behavioral purpose [49, [51], and [53]. Although some theories characterize the role of attitude in terms of attitude, the UTAUT model removes this variable [45]. The following hypothesis is conceivable:

H6: Attitude positively affects users' intention to use e-wallet.

H. Research model

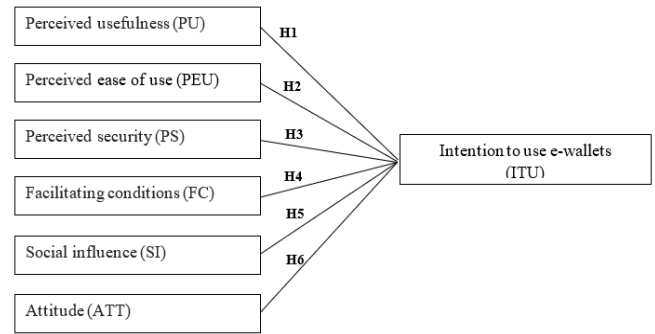


Fig. 1. Proposed research model.

III. METHODOLOGY

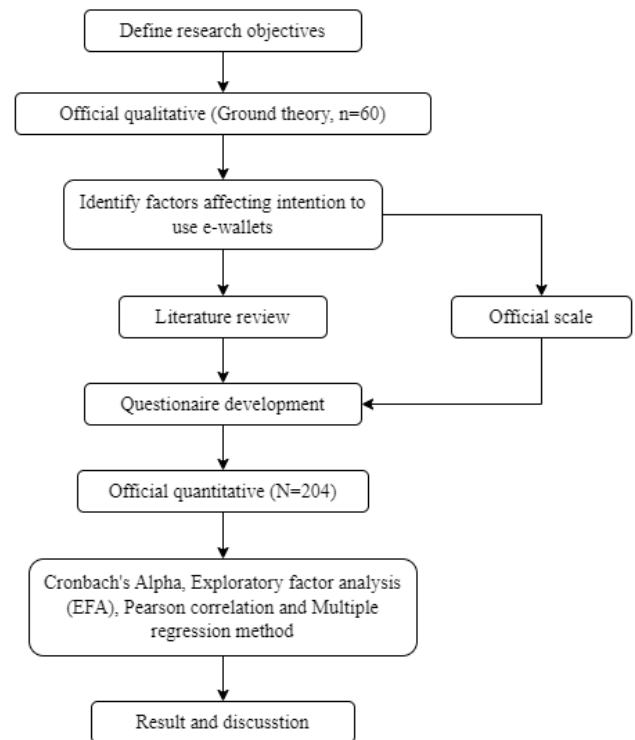


Fig. 2. Research process

A. Research method

This study's objective is to determine the elements influencing the behavior and intent to use e-wallets. The following research methodology will be employed:

TABLE I. OFFICIAL SCALE

Factor	Code	Statement	Source
Perceived usefulness (PU)	PU1	E-wallets are very useful in my daily life.	[27]
	PU2	To increase my chances of achieving my goal, I use a digital wallet.	
	PU3	To finish things faster, I use an e-wallet.	
	PU4	To increase my productivity, I use an e-wallet.	
Perceived ease of use (PEU)	PEU1	In my opinion, exploring the way to use the digital wallet is very easy.	[27]
	PEU2	My interaction with the e-wallet is obvious and comprehensible.	
	PEU3	I would find the e-wallet easy to use.	
	PEU4	It would be easy for me to be an expert at using the e-wallet.	[39]
Perceived security (PS)	PS1	The risk of an unauthorized party meddling in the e-wallet payment process is low.	[34]
	PS2	When using e-wallets, the risk of revealing usage information (e.g., personal information, names of receivers) is low.	
	PS3	When using e-wallets, the risk of revealing transaction information (e.g., bank account numbers, debit card numbers) is low.	
	PS4	I rely that electronic wallet service providers always have a plan to deal with the risk of leaking sensitive information.	[54]
Facilitating conditions (FC)	FC1	I have essential resources (e.g., smartphone, Internet connection) to use e-wallets for payment.	[39]
	FC2	Other technologies I use (e.g., credit card, Internet banking) are compatible with e-wallets.	
	FC3	I can get assistance from other people when I have trouble in using an e-wallet.	
	FC4	E-wallet service providers have provided me with complete and clear instructions on how to use the system.	
Social influence (SI)	SI1	People close to me suppose that I should use an e-wallet.	[49]
	SI2	I do not use an e-wallet because people around tell me that I should not use it.	
	SI3	Around me, people who do not use e-wallets have less credibility than those who use e-wallets.	[39]
	SI4	My decision to use an e-wallet is influenced by people who are important to me.	[49]
Attitude (ATT)	ATT1	It is a wise idea when using digital payment.	[45]
	ATT2	Mobile wallet is advantageous in every domain of transactions.	[49]
	ATT3	Using an e-wallet is an interesting and good experience.	
	ATT4	E-wallet provides convenience and comfort.	
Intention to use (ITU)	ITU1	In the future, I will continue to use e-wallets.	[27]
	ITU2	I will always use e-wallets in my daily transactions.	
	ITU3	I plan to continue to use the electronic wallet regularly.	
	ITU4	If the cost and time of using an e-wallet are reasonable for me, I will continue to use it.	[25]

In the first phase of this study, qualitative research techniques are employed to obtain an overview of documents pertaining to e-wallet behavior and intention. We reviewed 70 articles and journals from platforms such as PubMed, Google Scholar, etc. to explore the elements influencing acquisition behavior and intention to use e-wallet. These data will be analyzed, compiled, and aggregated to determine the underlying factors influencing e-wallet adoption intent.

In the subsequent phase, we used a quantitative approach and conducted an online survey using a Google form ques-

tionnaire on the Danang citizen focus group. The survey included demographic questionnaires and research-related questions measured on the five points Likert scale. We contacted potential respondents in Danang who use electronic wallets. As targets, only users with e-wallet usage were selected and asked to complete the questionnaire. SPSS software will be used to perform descriptive statistical analysis on the collected data. From there, we can evaluate the situation and propose strategies to raise the number of e-wallet users.

B. Research method

This study's participants are Danang residents who utilize the e-wallet payment system. Google Form will be used to distribute online questionnaires for data collection. The quantitative method is the primary method of the research, and non-probability sampling will be used for sampling.

The study employs the EFA and Multiple Regression analysis methods, so the minimum sample size is determined using EFA. According to [55], the minimum number of observations should be at least five times the number of variables to be analyzed. In this study, the authors employ 27 measurement questions; consequently, the minimum sample size based on the above formula will be $27 \times 5 = 135$ samples.

IV. RESULT

A. Descriptive information about respondents

We distributed a Google form to residents of Danang city. We collected 225 responses from participants of various ages and occupations. However, after sorting the responses,

we were left with 204 valid responses. Below is a table of descriptive statistics.

B. Checking the Trustworthiness of the Scale (using Cronbach's Alpha)

Variables with Cronbach's alpha coefficients more than 0.6 and correlation coefficients more than 0.4 were identified by the results. The subsequent EFA analysis employs variables.

C. An EFA is an Exploratory Factor Analysis

We investigate the EFA factor using the Principal component method and the Varimax rotation for a total of 24 independent variables. Barlett test derived with Sig. = 0.000, which is less than 0.005 in this investigation. The KMO coefficient of 0.839 exceeds 0.5. For Eigen Values > 1, the total variance retrieved was 83.265% greater than 50%, indicating that 83.265% of the data variances could be explained. This shows that the observed variables are sufficiently correlated for EFA analysis. Finally, 24 independent factors were categorized into the six groups below. The findings of the analysis indicate that the variables do not

TABLE II. DESCRIPTIVE STATISTICS OF DEMOGRAPHIC FACTORS

		Frequency	Percentage (%)
Gender	Male	96	47.1
	Female	108	52.9
	Total	204	100.0
Age	Under 18 years old	5	2.5
	From 18 years old to 24 years old	136	66.7
	From 25 years old to 39 years old	39	19.1
	From 40 years old to 54 years old	17	8.3
	Above 54 years old	7	3.4
	Total	204	100.0
Occupation	Student	122	59.8
	State employees	20	9.8
	Worker	29	14.2
	Business man	20	9.8
	Pension recipient	5	2.5
	Unemployment	5	2.5
	Other	3	1.5
	Total	204	100.0
Average Monthly Income (VND)	Under 3 million	94	46.1
	From 3 million to 5 million	27	13.2
	From 5 million to 8 million	33	16.2
	From 8 million to 10 million	21	10.3
	From 10 million to 15 million	16	7.8
	From 15 million to 20 million	4	2.0
	From 20 million to 25 million	4	2.0
	Above 25 million	5	2.5
Smart phone	Total	204	100
	Android	97	47.5
	IOS	100	49
	Window mobile	7	3.4
	Total	204	100.0

TABLE III. CRONBACH'S ALPHA COEFFICIENTS OF THE SCALES: A SUMMARY TABLE

No	Items	N of Items	N of Items Satisfying	Cronbach's Alpha (α)
1	PU	4	4	0.959
2	PEU	4	4	0.923
3	PS	4	4	0.955
4	FC	4	4	0.883
5	SI	4	4	0.930
6	ATT	4	4	0.924
7	ITU	4	4	0.683

TABLE IV. EFA ANALYSIS OUTCOMES BASED ON MULTIPLE INDEPENDENT OBSERVATIONAL METRICS

Item	Factors loading					
	1	2	3	4	5	6
PU3	0.937					
PU4	0.936					
PU2	0.934					
PU1	0.927					
PS4		0.947				
PS1		0.938				
PS3		0.922				
PS2		0.921				
PEU4			0.921			
PEU2			0.897			
PEU3			0.895			
PEU1			0.887			
SI3				0.912		
SI2				0.905		
SI4				0.885		
SI1				0.884		
ATT1					0.906	
ATT2					0.869	
ATT3					0.867	
ATT4					0.857	
FC4						0.882
FC3						0.878
FC2						0.856
FC1						0.807
Those conditions are met by the coefficients.						
Cronbach's Alpha	0.959	0.955	0.923	0.930	0.924	0.883
Eigenvalue	4.886	3.853	3.66	3.118	2.719	1.748
Cumulative %	83.265					
KMO	0.839					
Barlett's Test	Sig. = 0.000					

cross over into other groupings of variables. All factor loadings are found to be more than 0.5. The cumulative index exceeded 50%, indicating that the Exploratory Factor Analysis is adequate. KMO and Bartlett's Test Table: 0.5 KMO=0.839 < 1; accordingly, six components accounted for 83.265% of the observed variation in variables. On the

investigation data set, the authors executed factor evaluation. Bartlett's Test = 0.000 < 0.05, given that factor analysis is suitable.

D. Correlation matrix

In this investigation, a Pearson correlation analysis was performed. Table 6 displays the outcome of the correlation

TABLE V. RESULTS OF THE DEPENDENT VARIABLES EFA ANALYSIS

ITU1	0.714
ITU2	0.790
ITU3	0.71
ITU4	0.645
The coefficients satisfy the conditions	
Cronbach's Alpha	0.683
Eigenvalue	2.053
Cumulative %	51.332%
KMO	0.624
Barlett's Test	Sig. = 0.000

TABLE VI. INTER-VARIABLE CORRELATION

		ITU	PU	PS	PEU	SI	ATT	FC
ITU	Pearson Correlation	1	0.322**	0.333**	0.378**	0.343**	0.130	0.217**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.063	0.002
	N	204	204	204	204	204	204	204
PU	Pearson Correlation	0.322**	1	0.001	-0.093	-0.064	-0.214**	0.060
	Sig. (2-tailed)	0.000		0.986	0.187	0.363	0.002	0.391
	N	204	204	204	204	204	204	204
PS	Pearson Correlation	0.333**	0.001	1	-0.003	0.117	0.101	-0.084
	Sig. (2-tailed)	0.000	0.986		0.969	0.095	0.150	0.230
	N	204	204	204	204	204	204	204
PEU	Pearson Correlation	0.378**	-0.093	-0.003	1	0.022	-0.203**	-0.056
	Sig. (2-tailed)	0.000	0.187	0.969		0.751	0.004	0.430
	N	204	204	204	204	204	204	204
SI	Pearson Correlation	0.343**	-0.064	0.117	0.022	1	0.239**	0.037
	Sig. (2-tailed)	0.000	0.363	0.095	0.751		0.001	0.602
	N	204	204	204	204	204	204	204
ATT	Pearson Correlation	0.130	-0.214**	0.101	-0.203**	0.239**	1	-0.040
	Sig. (2-tailed)	0.063	0.002	0.150	0.004	0.001		0.570
	N	204	204	204	204	204	204	204
FC	Pearson Correlation	0.217**	0.060	-0.084	-0.056	0.037	-0.040	1
	Sig. (2-tailed)	0.002	0.391	0.230	0.430	0.602	0.570	
	N	204	204	204	204	204	204	204

** Correlation is significant at the 0.01 level (2-tailed).

analysis. The significance level between the independent variables PU, PS, PEU, SI, and FC and the dependent variable ITU is less than 0.05, indicating that there is a linear association between independent variables and the independent variable. The correlation between FC and ITU is the smallest ($r = 0.217$), whilst the association between PEU and ITU is the largest ($r = 0.378$). The ATT variable will be eliminated from the upcoming analysis because no linear relationships exist between ATT and ITU (the significance level for ATT and ITU = $0.063 > 0.05$).

E. Multiple Regression Analysis

It can be seen that the regression model is appropriate for the data set because the F statistic, which was calculated using an ANOVA test, was 46,420 and was statistically significant at the $p = 0.000$ 0.05 level. In the absence of first-order autocorrelation, the Durbin-Watson coefficient = 1.491 is greater than 1 and less than 3, indicating that there is no autocorrelation. All VIF coefficients of independent variables are less than 2, so multicollinearity disappears.

The dependent variable has been predicted using regression analysis and five independent variables. It has been stated that the independent variable has a considerable con-

TABLE VII. TO CALCULATE THE MODEL'S ALPHA COEFFICIENT USING THE ENTER METHOD, WE NEED TO

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.066	0.202		0.328	0.743		
	PU	0.209	0.028	0.366	7.535	0.000	0.984	1.016
	PS	0.183	0.028	0.317	6.510	0.000	0.978	1.022
	PEU	0.288	0.033	0.419	8.642	0.000	0.988	1.012
	SI	0.202	0.032	0.311	6.382	0.000	0.979	1.021
	FC	0.170	0.035	0.234	4.809	0.000	0.984	1.016

a Dependent Variable: ITU; Adjusted R Square = 0.528; F (ANOVA) = 46.420; Sig.(ANOVA) = 0.000; Durbin – Watson = 1.491.

sequence on the dependent variable if the p-value is lower than 0.05. According to the table VII analysis results, all five independent variables are significant predictors of the outcome variable, which is the using e-wallets intention. Adjusted R square equals 0.528 denoting five proposed explanatory variables that explain 52.8% of the outcome variable, the remaining 47.2% is caused by external variables and random variation.

The standardized regression equation:

$$ITU = 0.419*PEU + 0.366*PU + 0.317*PS + 0.311*SI + 0.234*FC.$$

F. The Model's Conformity Checking Procedure

According to the histogram, the mean is close to 0 and the standard deviation is close to 1, hence the residual distribution is approximately normal. In the P-P plot, the percentiles of the residual distribution are nearly concentrated along a diagonal, indicating that the assumption of a normal distribution for the residuals is not broken. Regarding the scatterplot, the normalized residuals distribute symmetrically around the zero line and change significantly within the ± 3 range, confirming the linearity assumption. The first hypothesis explores the relation between perceived usefulness and the using an e-wallet intent. With the estimated result = 0.366 and $p = 0.000$ 0.05, H1 is acceptable. The second hypothesis specifies the connection between perceived ease of use and the using an e-wallet intention. With the predicted result = 0.419, $p = 0.000$ 0.05, H2 is acceptable. The third hypothesis reveals the influence of perceived security on the intention of users to use an e-wallet. With the predicted result = 0.317, $p = 0.000$ 0.05, H3 is acceptable. The fourth hypothesis examines the link among facilitating conditions and the intention of e-wallet users. With the projected result = 0.234, $p = 0.000$ 0.05, H4 is acceptable. The fifth hypothesis examines the effect of social influence on the intention to use e-wallets. With the projected result = 0.311, $p = 0.000$ 0.05, H5 is accepted. The sixth hypothesis explore the result of attitude on the intention of e-wallet users. H6 is eliminated because $p = 0.063 > 0.05$ in the Pearson correlation analysis. Therefore, significant correlation between attitude and e-wallet adoption intent does not exist.

V. CONCLUSION AND DISCUSSION

A. Conclusion

E-wallets are no longer a novel form of payment in Danang; however, the amount of people who literally use them is low. In this study, the authors investigated five of the six variables that may impact the using e-wallets intention. E-wallet providers should prioritize perceived usability, perceived utility, perceived security, social influence, and enabling conditions. From this analysis, we can identify and explain the elements that affect the of Danang city residents' using e-wallets behavior. In contrast, the study is constrained by time constraints and a little sample size in order to pave the way for future research.

B. Discussion

In the conclusion, we addressed the elements that affect using e-wallet intention and the survey-based criteria in the study paper to demonstrate the extent to which it influences the using e-wallet intention. Here are some research-based suggestions for promoting the e-wallets usage in Danang. First, the e-wallets using desire is substantially affected by perceived ease of use. It specifies that e-wallet providers should develop user-favorable mobile applications to increase consumer confidence in utilizing them for payment [56]. An additional online training package for the apps could be given so that users can view a description or receive the necessary assistance to utilize the system [45]. Appropriate resources made available to consumers for the usage of mobile applications facilitate the system's operation and boost their desire to use the applications [45]. In addition, service providers can devote more expeditious to instructing users in order to help them familiarize with e-wallet systems [57]. Second, because perceived utility is a component that influences the e-wallets using desire, e-wallet development businesses should push developers to create a system that exceeds customers' expectations and is based on their experience [45]. In addition to concentrating on the system's functionality, they should also furnish value to its use [58]. In addition, their marketing communications should emphasize the utility of mobile payment to attract more customers [56]. Thirdly, because using an e-wallet intention is influenced by perceived security, e-wallet developers must ensure that e-wallets are safe for users and continuously upgrade the system to make it more secure [59]. In addition, users should pay strong consideration to terms and

rules prior to using because network security is currently rather sophisticated. Consumers' accounts can be violated at any time, particularly in the Vietnamese context, where the issue of electronic security is continually disregarded [45]. Fourthly, the impact of social influence on the using an e-wallet intention suggests that e-wallet providers should assign resources and attempts toward a more efficient application to encourage consumers' behavioral intents. Mobile services providers should promote and stimulate the use of their products through famous people such as celebrities and role models with large fan bases, so that customers would believe their endorsements and begin utilizing such systems [45]. In addition, e-wallet providers can encourage interpersonal word-of-mouth communication by reinforcing their usage of social media in order to accelerate customer adoption of e-wallet applications [60]. Lastly, users of e-wallets paid attention to conditions that facilitated transactions. Organizations interested in the development of the e-wallet should invest in organizational and technical infrastructure to increase the e-efficiency wallet's and productivity [42, 53]. The services of e-wallets become more appealing if customer care is able to promptly and effectively resolve client issues [40]. Additionally, the compatibility of e-wallet applications with other mobile applications or other technologies widely used by customers must be considered [59].

C. Limitation

Although the research has recognized the elements that affect the use intent of e-wallets, there are still some limitations that must be noted. Initially, the study was founded on primary data acquired from 204 participants via an online survey. The sample size is not large, and the study sample is comprised of varied demographic groupings, which may have a disproportionate effect on the study's findings. In addition, the study is limited to Danang city, making it impossible to extrapolate the findings to other locations in Vietnam. Moreover, this research paper is limited to analyzing the influence of six major aspects chosen from previous research, ignoring other important aspects and factors affecting the using an e-wallet intention, such as habit, enjoyment, hedonic motivation, etc. Further research can expand the scope of future research, sample size, and research space, improve the research process, and standardize appropriate scales for a better understanding of the e-wallet's intended behavior.

REFERENCES

- [1] H. L. T. Lan, H. T. Thi Van, and H. T. T. Phuong, "Factors Influencing the Intention to Choose E-Wallet in Shopping Online: Case Study of Ha Noi Citizens," in *Management for Sustainable and Inclusive Development in a Transforming Asia*, H. Shioji, D. R. Adhikari, F. Yoshino, and T. Hayashi, Eds. Singapore: Springer Singapore, 2021, pp. 311–326. doi: 10.1007/978-981-15-8195-3_18.
- [2] F. Nizam, H. J. Hwang, and N. Valaei, "Measuring the Effectiveness of E-Wallet in Malaysia," in *Big Data, Cloud Computing, Data Science & Engineering*, vol. 786, R. Lee, Ed. Cham: Springer International Publishing, 2019, pp. 59–69. doi: 10.1007/978-3-319-96803-2_5.
- [3] W. I. Mahwadha, "Behavioral intention of young consumers towards E-Wallet adoption: an empirical study among Indonesian users," *Russian Journal of Agricultural and Socio-Economic Sciences*, vol. 85, no. 1, 2019.
- [4] Bansal, Bruno, Denecker, and Niederkorn, "Global payments trends: Expansive growth, targeted opportunities | McKinsey," 2017. <https://www.mckinsey.com/industries/financial-services/our-insights/global-payments-expansive-growth-targeted-opportunities> (accessed Dec. 03, 2021).
- [5] "Vietnam | Data." <https://data.worldbank.org/country/vietnam?view=chart> (accessed Dec. 04, 2021).
- [6] A. Ather, B. Patel, N. B. Ruparel, A. Diogenes, and K. M. Hargreaves, "Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care," *Journal of Endodontics*, vol. 46, no. 5, pp. 584–595, May 2020, doi: 10.1016/j.joen.2020.03.008.
- [7] D. Brown, "Can cash carry coronavirus? World Health Organization says use digital payments when possible," *USA TODAY*, 2020. <https://www.usatoday.com/story/money/2020/03/06/coronavirus-covid-19-concerns-over-using-cash/4973975002/> (accessed Dec. 03, 2021).
- [8] "Toàn cảnh ngành Ví điện tử (E-wallet) tại Việt Nam 2021," *Tomorrow Marketers*, Sep. 16, 2021. <https://blog.tomorrowmarketers.org/toan-canhh-nganh-vi-dien-tu-e-wallet-viet-nam-2021/> (accessed Nov. 20, 2021).
- [9] Đào T. T. H., "Mô hình chấp nhận sử dụng ví điện tử trong thanh toán của khách hàng cá nhân – trường hợp tại TP. Đà Nẵng," Nhà xuất bản Đà Nẵng, Working Paper, 2019. Accessed: Nov. 14, 2021. [Online]. Available: <http://thuvien.vku.udn.vn/handle/123456789/997>
- [10] "Quyết định 2545/QĐ-TTg Đề án phát triển thanh toán không dùng tiền mặt 2016–2020," 2016. <https://thuvienphapluat.vn/van-ban/Tien-te-Ngan-hang/Quyết-dinh-2545-QĐ-TTg-Đề-an-phát-triển-thanh-toan-khong-dùng-tiền-mat-2016-2020-336430.aspx> (accessed Dec. 03, 2021).
- [11] H. Hoang, "The Cashless Economy in Vietnam - The Situation and Policy Implications," *Journal of Reviews on Global Economics*, vol. 9, pp. 216–223, Jun. 2020, doi: 10.6000/1929-7092.2020.09.20.
- [12] "Sự tăng trưởng của ví điện tử trong tiêu dùng Việt Nam," 2019. <http://consosukien.vn/su-tang-truong-cua-vi-dien-tu-trong-tieu-dung-viet-nam.htm?fbclid=IwAR3Lg2KLUDjB3T8paQFceFHjWK4rPhB4amgAr1IJEomwXN06wrcVrcIkvD0> (accessed Dec. 03, 2021).
- [13] Lan Huang, "Việt Nam xếp thứ 2 thế giới về số người dân chưa tiếp cận dịch vụ ngân hàng," 2021. <https://laodong.vn/kinh-te/viet-nam-xep-thu-2-the-gioi-ve-so-nguoi-dan-chua-tiep-can-dich-vu-ngan-hang-927446.lao> (accessed Dec. 03, 2021).
- [14] L.-Y. Leong, T.-S. Hew, G. W.-H. Tan, and K.-B. Ooi, "Predicting the determinants of the NFC-enabled mobile credit card acceptance: A neural networks approach," *Expert Systems with Applications*, vol. 40, no. 14, pp. 5604–5620, 2013.
- [15] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, vol. 13, no. 3, p. 319, Sep. 1989, doi: 10.2307/249008.
- [16] Junadi and Sfenrianto, "A Model of Factors Influencing Consumer's Intention To Use E-payment System in Indonesia," *Procedia Computer Science*, vol. 59, pp. 214–220, 2015, doi: 10.1016/j.procs.2015.07.557.
- [17] N. Ramya, D. Sivasakthi, and M. Nandhini, "Cashless transaction: Modes, advantages and disadvantages," *International Journal of Applied Research*, vol. 3, no. 1, pp. 122–125, 2017.
- [18] N. Park, M. Rhoads, J. Hou, and K. M. Lee, "Understanding the acceptance of teleconferencing systems among employees: An extension of the technology acceptance model," *Computers in Human Behavior*, vol. 39, pp. 118–127, Oct. 2014, doi: 10.1016/j.chb.2014.05.048.
- [19] A. S. Kustono, A. Y. A. Nanggala, and I. Mas'ud, "Determinants of the Use of E-Wallet for Transaction Payment among College Students," *JEBAV*, vol. 23, no. 1, Jul. 2020, doi: 10.14414/jebav.v23i1.2245.
- [20] P. C. Lai, "The Literature Review Of Technology Adoption Models And Theories For The Novelty Technology," *JISTEM J.Inf.Syst. Technol. Manag.*, vol. 14, pp. 21–38, Apr. 2017, doi: 10.4301/S1807-17752017000100002.
- [21] F. Muñoz-Leiva, S. Climent-Climent, and F. Liébana-Cabanillas, "Determinants of intention to use the mobile banking apps: An extension of the classic TAM model," *Spanish Journal of Marketing - ESIC*, vol. 21, no. 1, pp. 25–38, Feb. 2017, doi: 10.1016/j.sjme.2016.12.001.
- [22] A. T. To and T. H. M. Trinh, "Understanding behavioral intention to use mobile wallets in vietnam: Extending the tam model with trust and enjoyment," *Cogent Business & Management*, vol. 8, no. 1, p. 1891661, Jan. 2021, doi: 10.1080/23311975.2021.1891661.
- [23] Y. Wang, Q. Zhao, and D. Zheng, "Bottlenecks in production networks: An overview," *J. Syst. Sci. Syst. Eng.*, vol. 14, no. 3, pp. 347–363, Sep. 2005, doi: 10.1007/s11518-006-0198-3.

- [24] S. Liao, J.-C. Hong, M.-H. Wen, Y.-C. Pan, and Y.-Wu, "Applying Technology Acceptance Model (TAM) to explore Users' Behavioral Intention to Adopt a Performance Assessment System for E-book Production," *EURASIA J Math Sci Tech Ed*, vol. 14, no. 10, p. em1601, Jul. 2018, doi: 10.29333/ejmste/93575.
- [25] M. Yang, A. A. Mamun, M. Mohiuddin, N. C. Nawi, and N. R. Zainol, "Cashless Transactions: A Study on Intention and Adoption of e-Wallets," *Sustainability*, vol. 13, no. 2, p. 831, Jan. 2021, doi: 10.3390/su13020831.
- [26] İ. Daştan and C. Gürler, "Factors Affecting the Adoption of Mobile Payment Systems: An Empirical Analysis," *emaj*, vol. 6, no. 1, pp. 17–24, Feb. 2016, doi: 10.5195/EMAJ.2016.95.
- [27] V. Soodan and A. Rana, "Modeling Customers' Intention to Use E-Wallet in a Developing Nation: Extending UTAUT2 With Security, Privacy and Savings," *JECO*, vol. 18, no. 1, pp. 89–114, Jan. 2020, doi: 10.4018/JECO.2020010105.
- [28] K.-B. Ooi and G. W.-H. Tan, "Mobile technology acceptance model: An investigation using mobile users to explore smartphone credit card," *Expert Systems with Applications*, vol. 59, pp. 33–46, Oct. 2016, doi: 10.1016/j.eswa.2016.04.015.
- [29] S. M. K and D. S. R., "The Study of E-Commerce Security Issues and Solutions," *International Journal of Engineering Research & Technology*, vol. 4, no. 27, Apr. 2018, Accessed: Nov. 16, 2021. [Online]. Available: <https://www.ijert.org/research/the-study-of-e-commerce-security-issues-and-solutions-IJERTCONV4IS27016.pdf>, <https://www.ijert.org/the-study-of-e-commerce-security-issues-and-solutions>
- [30] A. Kumar, A. Adlakha, and K. Mukherjee, "The effect of perceived security and grievance redressal on continuance intention to use M-wallets in a developing country," *IJBM*, vol. 36, no. 7, pp. 1170–1189, Sep. 2018, doi: 10.1108/IJBM-04-2017-0077.
- [31] N. N. D. Phuong, L. T. Luan, V. V. Dong, and N. L. N. Khanh, "Examining Customers' Continuance Intentions towards E-wallet Usage: The Emergence of Mobile Payment Acceptance in Vietnam," *The Journal of Asian Finance, Economics and Business*, vol. 7, no. 9, pp. 505–516, 2020, doi: 10.13106/jafeb.2020.vol7.no9.505.
- [32] K. Madan and R. Yadav, "Behavioural intention to adopt mobile wallet: a developing country perspective," *JIBR*, vol. 8, no. 3, pp. 227–244, Aug. 2016, doi: 10.1108/JIBR-10-2015-0112.
- [33] M. Karim, A. Haque, M. Ulfy, M. Hossain, and M. Anis, "Factors Influencing the Use of E-wallet as a Payment Method among Malaysian Young Adults," *IJBM*, vol. 3, no. 2, pp. 1–12, Mar. 2020, doi: 10.37227/ijbm-2020-2-21/.
- [34] F. Liébana-Cabanillas, V. Marinkovic, I. Ramos de Luna, and Z. Kalinic, "Predicting the determinants of mobile payment acceptance: A hybrid SEM-neural network approach," *Technological Forecasting and Social Change*, vol. 129, pp. 117–130, Apr. 2018, doi: 10.1016/j.techfore.2017.12.015.
- [35] D. S. Soegoto and M. P. Tampubolon, "E-Wallet as a Payment Instrument in the Millennial Era," *IOP Conf. Ser.: Mater. Sci. Eng.*, vol. 879, p. 012139, Aug. 2020, doi: 10.1088/1757-899X/879/1/012139.
- [36] N. Abdullah, F. Redzuan, and N. A. Daud, "E-wallet: factors influencing user acceptance towards cashless society in Malaysia among public universities," *Indonesian Journal of Electrical Engineering and Computer Science*, vol. 20, no. 1, Art. no. 1, Oct. 2020, doi: 10.11591/ijeecs.v20.i1.pp67-74.
- [37] A. Taufan and R. Yuwono, "Analysis of Factors That Affect Intention to Use e-Wallet through the Technology Acceptance Model Approach (Case Study: GO-PAY)," *International Journal of Science and Research*, vol. 8, no. 7, pp. 413–419, Aug. 2019, doi: 10.21275/ART2020219.
- [38] S. Undale, A. Kulkarni, and H. Patil, "Perceived eWallet security: impact of COVID-19 pandemic," *XJM*, vol. 18, no. 1, pp. 89–104, Mar. 2021, doi: 10.1108/XJM-07-2020-0022.
- [39] Venkatesh, Morris, Davis, and Davis, "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly*, vol. 27, no. 3, p. 425, 2003, doi: 10.2307/30036540.
- [40] A. M. Baabdullah, A. A. Alalwan, N. P. Rana, H. Kizgin, and P. Patil, "Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model," *International Journal of Information Management*, vol. 44, pp. 38–52, Feb. 2019, doi: 10.1016/j.ijinfomgt.2018.09.002.
- [41] S. Khanra, A. Dhir, P. Kaur, and R. P. Joseph, "Factors influencing the adoption postponement of mobile payment services in the hospitality sector during a pandemic," *Journal of Hospitality and Tourism Management*, vol. 46, pp. 26–39, Mar. 2021, doi: 10.1016/j.jhtm.2020.11.004.
- [42] E. Laywillia, J. Singh, and B. Yin-Fah, "Drivers of Intention to Adopt Mobile Wallet: A Quantitative Study Among Females in Jakarta," *International Journal of Research in Business and Social Science (2147-4478)*, vol. 10, pp. 804–820, Nov. 2020, doi: 10.6007/IJARBS/v10-i11/8061.
- [43] K. Tan *et al.*, "E-Wallet Acceptance among Undergraduates in Malaysia," Jun. 2020.
- [44] M. Widodo, M. I. Irawan, and R. Ambarwati Sukmono, "Extending UTAUT2 to Explore Digital Wallet Adoption in Indonesia," in *2019 International Conference on Information and Communications Technology (ICOIACT)*, Yogyakarta, Indonesia, Jul. 2019, pp. 878–883, doi: 10.1109/ICOIACT46704.2019.8938415.
- [45] P. Patil, K. Tamilmani, N. P. Rana, and V. Raghavan, "Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal," *International Journal of Information Management*, vol. 54, p. 102144, Oct. 2020, doi: 10.1016/j.ijinfomgt.2020.102144.
- [46] P. Intarot and C. Beikhaimook, "Influencing Factor in E-Wallet Acceptant and Use," *Int. j. bus. adm. stud*, vol. 4, no. 4, pp. 167–175, 2018, doi: 10.20469/ijbas.4.10004-4.
- [47] S. Megadewandanu, Suyoto, and Pranowo, "Exploring mobile wallet adoption in Indonesia using UTAUT2: An approach from consumer perspective," in *2016 2nd International Conference on Science and Technology-Computer (ICST)*, Yogyakarta, Indonesia, Oct. 2016, pp. 11–16, doi: 10.1109/ICSTC.2016.7877340.
- [48] S. Peng, A. Yang, L. Cao, S. Yu, and D. Xie, "Social influence modeling using information theory in mobile social networks," *Information Sciences*, vol. 379, pp. 146–159, Feb. 2017, doi: 10.1016/j.ins.2016.08.023.
- [49] N. Singh, N. Sinha, and F. J. Liébana-Cabanillas, "Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence," *International Journal of Information Management*, vol. 50, pp. 191–205, Feb. 2020, doi: 10.1016/j.ijinfomgt.2019.05.022.
- [50] Y. K. Dwivedi, N. P. Rana, M. Janssen, B. Lal, M. D. Williams, and M. Clement, "An empirical validation of a unified model of electronic government adoption (UMEGA)," *Government Information Quarterly*, vol. 34, no. 2, pp. 211–230, Apr. 2017, doi: 10.1016/j.giq.2017.03.001.
- [51] O. S. Fadairo, N. S. Olutegbe, and A. M. Tijani, "Attitude of crop farmers towards e-wallet platform of the Growth Enhancement Support Scheme for input delivery in Oke-Ogun area of Oyo state," *Journal of Agricultural Informatics*, vol. 6, no. 2, Art. no. 2, Jun. 2015, doi: 10.17700/jai.2015.6.2.184.
- [52] D. Lestari, "Measuring e-commerce adoption behaviour among gen-Z in Jakarta, Indonesia," *Economic Analysis and Policy*, vol. 64, pp. 103–115, Dec. 2019, doi: 10.1016/j.eap.2019.08.004.
- [53] T. T. Nguyen, H. T. Nguyen, H. T. Mai, and T. T. M. Tran, "Determinants of Digital Banking Services in Vietnam: Applying UTAUT2 Model," *Asian Economic and Financial Review*, vol. 10, no. 6, Art. no. 6, Jun. 2020, doi: 10.18488/journal.aefr.2020.106.680.697.
- [54] T. N. Phan, T. V. Ho, and P. V. Le-Hoang, "Factors Affecting the Behavioral Intention and Behavior of Using E-Wallets of Youth in Vietnam," *The Journal of Asian Finance, Economics and Business*, vol. 7, no. 10, pp. 295–302, 2020, doi: 10.13106/jafeb.2020.vol7.n10.295.
- [55] J. Hair, W. Black, B. Babin, and R. Anderson, *Multivariate Data Analysis: Global Edition*, 7th ed. Pearson, 2014. Accessed: Nov. 25, 2021. [Online]. Available: <https://www.pearson.com/uk/educators/higher-education-educators/program/Hair-Multivariate-Data-Analysis-Global-Edition-7th-Edition/PGM916641.html>
- [56] A. A. Bailey, I. Pentina, A. S. Mishra, and M. S. B. Mimoun, "Mobile payments adoption by US consumers: an extended TAM," *International Journal of Retail & Distribution Management*, 2017.
- [57] V. Venkatesh and H. Bala, "Technology Acceptance Model 3 and a Research Agenda on Interventions," *Decision Sciences*, vol. 39, no. 2, pp. 273–315, 2008, doi: 10.1111/j.1540-5915.2008.00192.x.
- [58] P. G. Schierz, O. Schilke, and B. W. Wirtz, "Understanding consumer acceptance of mobile payment services: An empirical analysis," *Electronic commerce research and applications*, vol. 9, no. 3, pp. 209–216, 2010.
- [59] O. Alaeddin, A. Rana, Z. Zainudin, and F. Kamarudin, "From physical to digital: Investigating consumer behaviour of switching to mobile wallet," *Polish Journal of Management Studies*, vol. 17, no. 2, pp. 18–30, 2018.

- [60] E. L. Slade, Y. K. Dwivedi, N. C. Piercy, and M. D. Williams, "Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: extending UTAUT with innovativeness, risk, and trust," *Psychology & Marketing*, vol. 32, no. 8, pp. 860–873, 2015.

Factors impact on Job satisfaction of Generation Z in Sport Businesses in Ho Chi Minh city, Vietnam

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Abstract—This descriptive research aims to explain the characteristics of employees at generation Z (Gen Z) in Vietnam which influence on their interests and priorities towards their job satisfaction at sport businesses in Ho Chi Minh city. The survey research was designed based on the Job Descriptive Index (JDI) measure about job satisfaction and the sample used 480 respondents who are working in Ho Chi Minh city from January to April, 2022. The regression analysis results showed that there are five concerns for Gen Z to decide to join and stay in sport organizations. The leadership and salary factors take strongly influence to job satisfaction and the least influence is colleague factor. The findings show that the characteristics influence on job satisfaction of Gen Z which differ from previous generations. Human resource managers exploit the results to develop training courses for managers, competitive salary system, and working conditions to attract and retain Gen Z.

Index Terms—Generation Z, job satisfaction, Job Descriptive Index

I. INTRODUCTION

People at generation Z (Gen Zers), who are born after 1995 and the cutoff point is 2009 [43] or 2010 [14], are the youngest cohort contributing the generational diversification and different expectations towards the job in the workplace. According to the Vietnamese Statistics Office, Gen Zers are expected to occupy over 35% of the Vietnamese working age group in 2025 and rise their influences on the local labor market. They were born in the era of technology and raised in inheritance of the benefit of computer revolution and internet explosion which help them with being familiar with social web, digital devices, and network communication [61]. These characteristics have composed their different expectations from older generations' towards their job.

It is required to study the Gen Zers' characteristics and preferences as well as factors influence their job satisfaction at sport businesses today. The development of sport socialization causes sport business increase strongly in Vietnam [68], especially in Ho Chi Minh city where is the largest and modernest city in this country. This fact lead to the high demand on workforce for that kind of company which is considered to be for youths where Gen Zers should be majority because of mostly clients at Gen Z [54]. Gen Zers are both young, healthy and tremendous human resource but they are considered the "job hoppers" [10] who easily move job than previous generations. The understanding of factors impact Gen Zers' job satisfaction can help employers attract and retain these quality workforce who are considered more effective performance and less commitment.

There are many studies have been done to research the factors influence job satisfaction but researchers paid little

attention to affects of demographic variables on employees' expectations and demands towards their jobs. Ref. [4] claimed that the age and generational differences should be considered to explain the problems of human resource management confront. Previous studies of job satisfaction have produced inconsistent and contradictory results and empirical studies about Gen Z in VietNam recently lack of specific and theoretical basis so the conclusion was based on subjective assumption and quite similar to older generations.

In this research, the characteristics and preferences of Gen Zers are studied and explained based on previous works to find out factors affecting their job satisfaction. The implications from these results related to working condition and policy company are discussed to attract and retain employees at Gen Z for managers in Vietnam. The research question could be: "How does JDI reflect the job satisfaction of Gen Z in Vietnam? and "What lessons for human resource management should be considered to attract and retain employees at Gen Z?"

II. LITERATURE REVIEW

A. Job satisfaction

Job satisfaction which has been described in various theoretical points but consistently is individual's pleased feeling or state of mind towards their job. In the early days, Ref. [24] proposed a clear definition of job satisfaction that it requires a combination of many psychological, physical and environmental factors driving to an employee satisfied with his job. It is related to the emotional interaction between a worker and his job and his working condition which affected his well-being and health [38]; [17]; [72]. Job satisfaction is defined as a state which an employee had a clear effective orientation that can be done by his feelings, beliefs and behaviors towards the work in his organization [69]; [70]; [62]; [8]; [26]. Once employees perceive how well their jobs respond to their needs when they work hard and achieve good results, they have the positive emotional state towards the job, [39]; [40]; [55]; [34]; [52]. In other studies, researchers explained job satisfaction effected positively on work motivation [42]; [67]; [25]; [3], which causes their working harder and more creative [21]; [34]; [11]; [65]. They also have a harmonization between their life and their work [63]; [32]; [6].

B. Leadership

Leadership involves the relationship between employees and superiors and the leadership style of the leader to per-

form the functions of management in the organization. For Gen Zers who are technologically savvy and socially connection youths, the good relationship with their managers are important to feel comfortable to discuss and communicate [16]. They want to receive knowledge and experience which are helpful feedback to their personal development. For Gen Zers, the directed manager who provides worthy recognition and appropriate support to their team are also their desire model to become in the future [44]. They also trend to appreciate their leaders who respect and motivate their working [36]. It is said that:

H1: Leadership has positively influenced on the job satisfaction

C. Salary and benefit

Salary and benefit is a big concern of workers [62]. They also have positive motivation if they are paid an interesting salary [60];[71]. Gen Zers are too young to consider financial plans like getting married and having children [51] but they consider the salary and benefits if those commensurate with their effort put into their work or not [44]. Gen Zers also prefer a job with various benefits and extra money which provide a part from the leading salary [31]. They try their best in working and extra time for the higher payment and salary increasing opportunities which are worthy to their performance [16];[58];[12]. It is said that:

H2: Salary and benefits have positively influenced on job satisfaction

D. Nature of work

Nature of work refers to an intrinsic motivation of an employee towards her job which effect to decision of choosing the job. When employees are assigned jobs that require skills or abilities and clear requirements, they will feel the meaning of the work [22]. Employees realize that job results are highly dependent on their own efforts, initiatives, and decisions so they have more responsibility for work results. They also need to receive feedback from their work with clear information about the effectiveness of the work performed directly or indirectly. For the job, Gen Z preferred those which provided them flexibility and enjoyment [44], feeling of valuable, and feeling of pride with various tasks and skills required [16]. It is said that:

H3: Nature of work has positively influenced on the job satisfaction

E. Opportunities of training and promotion

Training and promotion opportunities relate to employees' perceptions of opportunities of training, personal development, and advancement within the organization and employees' targets during their work [62]; [64]; [28]; [18]. Compared to previous generations, Gen Z have more career options because they have more education [20] and more career information. Therefore, Gen Zers not only find their job for earning but for opportunities for developing also [5]; [44]. They would like to improve both technical knowledge and soft skills from their job [59]; [48]. Employee at Gen Z eager to be perfect, upgraded themselves and keep up with the development of society so employees want to gain experience from working to develop, dedicate and more associated with the company [31]; [27]. The effectiveness of train-

ing and the fairness of company promotion policies are consideration for Gen Zers about their job satisfaction [16]; [13]. It is said that:

H4: Opportunities of training and promotion have positively influenced on the job satisfaction

F. Colleague

Colleague relation or relationship with co-worker at work in the workplace such as coordination, cooperation, and helpfulness among staff is one of factors influence on job satisfaction [62]; [30]; [46]. At the age of younger than 27 years old, most of Gen Zers start working in a new environment – workplace and eager to learn new things and connect to new friends – coworkers. Although they can access the borderless information in internet to work individual, they appreciate teamwork which they can receive support from co-worker for higher productivity [31]. Therefore, they trends to collaborate well to their colleagues to accomplish the task better [30]. The good co-worker relationship is influenced on their job result as well as considered an expectation for Gen Zers towards their job [44]; [35]. It is said that:

H5: Colleague has positively influenced on the job satisfaction

III. RESEARCH METHODOLOGY

A. Questionnaire design

The JDI was applied as the proposed hypothesis to observe the factors affecting job satisfaction of Gen Zers in Vietnam because it comprehends the assessment each factors affecting job satisfaction and provide researchers flexible instruments in both reasoning and practical fields [53]; [1]; [56]; [15]. Based on other related studies of Gen Zers' job satisfaction, the mearsuments are adjusted into twenty one observation variables. While Opportunities of traing and promotion (OP), Salary and Benefit (SA), Colleague (CO), Leadership (LE), and Nature of work (WO) were five independent variables, dependent variable was Job satisfaction (JS). The questionnaire was designed for the quantitative research to collect answers. The five-point Likert scale, with 1 being totally disagree to 5 being totally agree was used, is considered a common and basic tool to make questions in social science research [29].

B. Sample taking:

Ho Chi Minh city is one of the leading economic regions of Vietnam where concentrates both domestic and foreign businesses so it was chosen to conduct the survey. The survey was conducted on Gen Z staffs who are working at sport business in Ho Chi Minh city in from January to April, 2022. Convenience sampling method was used to collect data because of its quickness and easy accessibility to a large number of respondents. The survey was conducted cross over 24 districts in Ho Chi Minh city. The survey collected 20 samples at each districts. There were 75.6% answered by respondents who was born from 1995 to 2009 and the majority of respondents are full-time working (over 90%).

IV. RESULTS AND FINDINGS

A. Demographic statistic

There is diversification of gender participating the young workforce with male (46.2%), female (45.0%), and other (8.7%). Gen Zers who are from 13 to 27 years old are dominant in the survey (75.6%). Over 90% respondents having a bachelor degree and higher while 8.6% employees finished high school program. The majority of surveyors have been with their jobs from 1 to 3 years (74.7%) and in staff position (54.5%).

B. Reliability test

The results of the reliability assessment show that all groups of observed variables are achieved Cronbach's Alpha coefficient higher 0.7 and higher than the Cronbach's Alpha if Item deleted coefficient of each observed variable. Besides, the value of Corrected Item - Total Correlation of the observed variables is greater than 0.3. It can be said that the measurement used is appropriate [50].

C. Exploratory Factor Analysis (EFA)

The result of EFA shows that the observation variables can contribute to the research model because the satisfactory factor loading in the Rotated Component Matrix for each observed variable was higher than 0.5 [23]. They are grouped into five independent variables which are Leadership, Salary and Benefit, Opportunities of training and promotion, Nature of work, and Colleague. The dependent variable can be grouped into one factor of Job satisfaction. The result of Kaiser – Meyer – Olkin measure of sampling adequacy (KMO = 0.86 for independent variable and KMO = 0.716 for dependent variable) is greater than 0.5 and Bartlett's test of Sphericity is less than 0.05 demonstrates that the EFA is appropriate for all variables [9]. The Extraction Sums of Squared Loadings (Cumulative %) means that 71.9% of the variation in the research data explained by five factors.

D. Pearson correlation analysis

The result of Pearson correlation analysis shows there is a positive correlation between each independent variable and dependent one. Correlation coefficients of Leadership (LE) is 0.656 means the strongest positive correlation while the Opportunities of training and promotion (OP) is 0.405 means the weakest positive correlation to the Job satisfaction (JS) (Nettleton, 2014). The Salary and benefit (SA), Nature of work (WO), and Colleague (CO) are 0.589, 0.516, and 0.446 respectively.

E. Multivariate regression analysis

There are five factors affect the job satisfaction of Gen Z. The results of multivariate regression showed that all factors were accepted because their Sig value were less than 0.05. The VIF values are less than 5 so there is no multi-collinearity in the model [2]. The Leadership variable (LE) was the most significantly influenced (37.8%) on the Job satisfaction, the second was Salary and benefit (SA, 36.2%), the third was Nature of Work (WO, 23.2%), and 11.4%, 9.5% for Opportunities of training and promotion (OP) and Colleague (CO) in respectively.

Therefore, all hypotheses are accepted and the standard regression equation is written below:

$$JS = 0.378 * LE + 0.362 * SA + 0.232 * WO + 0.114 * OP + 0.095 * CO + e$$

F. One-way ANOVA

The result indicates that there is a difference in satisfaction among respondents of different ages because the Sig value of ANOVA is less than 0.05 at between groups. The Mean values in Descriptive statistic table show that respondents whose year of birth before 1995 is 3.7982 which is higher other groups so their level of satisfaction is higher than the rest of the groups.

For other demographic variables (gender, education, years of working, and position), the results show no significant differences among groups of respondents.

V. DISCUSSION

Generation Z contributes to the workforce of the future and plays a very important role in the business. In diversified human resource, Gen Zers are hired and considered an invaluable asset which ensure organization enough input to enter the operations effectively and sustainably. Once they dissatisfy towards their job and leave the organization, not only the hiring cost but other values of human capital, organizational knowledge, skills and know-how, relationships and customer resources also lose. When employees have job satisfaction, on the other hand, they will tend to stay with the company for a long time and contribute more to the organization [7]; [45]; [41].

The research results reflect the influence of each element of JDI and the reviewing the theoretical basis of JDI and previous empirical studies on job satisfaction. There is a similarity in factors but a difference in impact level for each element influencing on job satisfaction of Gen Zers in other countries. Comparing to the study of conducted in Australia (cf. McCrindle and Fell, 2019), Gen Zers there found interesting in challenge jobs with promotion opportunities rather than salary they received. The study of for Slovak Gen Zers (cf. Karacsony, 2019) provided quite similar results which showed both salary and wage and opportunities of training and development are the most concern. Gen Zers at Indonesia (cf. Dwidienawati and Gandasari, 2018) also preferred a job with competitive salary and personal development opportunities. In this study, level of positive impact of each job component is identified orderly Leadership, Salary and benefit, Nature of Work, Opportunities of training and promotion and Colleague from high to low.

The study provides understanding of expectation of Gen Zers towards their job in Ho Chi Minh City, Vietnam. The leadership variable has a significant influence on job satisfaction of Gen Zers. They expect to get helpful feedback from their direct manager (Mean = 3.45) and promotion to the position of their manager (Mean=3.42). The fair evaluation and appropriate support from the direct manager (Mean = 3.39) provides them chances to take progress and promote their performance. Their direct manager, therefore, should play a role as a tutor or a coacher who provides guidance and advices rather than orders to make Gen Z comfortable to communicate (Mean = 3.41). Salary and benefit is the sec-

ond concern. Respondents desire that they can earn more from their job from benefits and extra money (Mean = 3.33) and salary increasing opportunities (Mean = 3.34). They also expect to be paid fairly and received benefits commensurate with their efforts (Mean = 3.27). Unlike the previous generation, young Vietnamese people and newcomers at the company often accepted low wages to gain experience. More career information allows Gen Z flexible in leaving and jumping to different companies and positions. It can be said that Gen Zers find opportunities not jobs, fair evaluation and payment should be implemented clearly. Therefore, companies need to satisfy employees at Gen Z the monetary concerns to get them stay longer [66]. Third, Nature of work or Work itself is an intrinsic motivation which can make Gen Zers themselves satisfy with their jobs regardless outside effects. Gen Zers find a meaningful job which they can exploit their ability (Mean = 3.85) and they proud of their contributions to organization and society (Mean = 3.87). This is understandable and explained in terms of researches of Vietnamese Gen Z characteristics of their behavior consumption [19]; [37] and environmental issues responses [49]. It can be said that the intrinsic motivation for Gen Z in Vietnam come from meaningful activities which contribute to social development and environmental protection which cause their pride in their job (Mean = 3.82). Next, although the results show the Opportunities of training and promotion and Colleague are less important than other factors, they positively influence on job satisfaction for Gen Zers. Good colleague relationship, worthy recognition, and promised opportunities for development are considered as requirements and desires of employee towards working environment [64]; [57]. It can be said that employees would like to take progress in knowledge and position (opportunities of training and promotion), receive financial motives (salary and benefit), and feel comfortable when they work with their co-worker (colleague relation).

The lessons can be learnt for Vietnamese employers are training courses for managers, transparent and competitive salary system, open workspace, and diversified activities to satisfy and retain Gen Zers. Vietnamese managers should be trained to have understandings of Gen Z and appropriate methods to support their subordinates in onboarding and during they working in the workplace. Feedback in both positive and negative directions should be transferred from managers to staff in a friendly way. The better relationship between manager and staff, the more satisfactory for employees towards their job and managers are in charged of this relationship development. Next, pay range must be fair and enough room for different performance and effort of each individual. The employee competence must be assessed accurately and clearly to provide them satisfactory feeling in day-by-day working. Once benefits and extra money opportunities are transparent and competitive, Gen Zers satisfy with the payment and stay longer. Besides, diversifying activities and providing flexible working ways at the enterprise for employees to exploiting their ability are needed. Both clear job description and challenges compose a meaningful job for Gen Z. Enriching the social activities programs should also be applied in sport companies to provide them chances to contribute to community.

The limitation of research can be explained and conducted in future researches. There are other factors which were not mentioned in the research affect the job satisfaction of Gen Zers in Ho Chi Minh city. The respondents of the survey are from 22 to 27 years old and most of them evaluated their first job. The reputation and size of a company may be less important to them because they need to have experiences before applying to famous and big corporations. The operating procedures including companies regulations, facilities, and working procedures were not considered because Gen Z cannot compare with previous companies. Therefore, the results of this research can be applied to propose useful and meaningful solutions for human resource management in Vietnam. For the sample of respondent, future researches should be conducted in a larger number and compare the different results between other regions (if any). The post - Covid19 period is also taken account to evaluate the changes in the labor market including job satisfaction affect of Gen Z (e.g work-life balance, hybrid working, etc.)

REFERENCES

- [1] Abraham, A. (2018). Exploring Teacher-educators' Job Satisfaction Using Job Descriptive Index. *Horn of Africa Journal of Business and Economics*, 32-48.
- [2] Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance Inflation Factor: As a Condition for the Inclusion of Suppressor Variable(s) in Regression Analysis. *Open Journal of Statistics*, 05(07), 754-767.
- [3] Ali, B. J., & Anwar, G. (2021). An Empirical Study of Employees' Motivation and its Influence Job Satisfaction. *International Journal of Engineering, Business and Management*, 5(2), 21-30.
- [4] Andrade, M. S., & Westover, J. H. (2018). Generational differences in work quality characteristics and job satisfaction. *Evidence-based HRM*, Vol. 6 No. 3, 287-304.
- [5] Arar, T., & Öneren, M. (2018). Role of Talent Management in Career Development of Generation Z: A Case Study of a Telecommunication Firm. *International Academic Journal of Social Sciences*, 28-44.
- [6] Aruldos, A., Kowalski, K. B., & Parayitam, S. (2020). The relationship between quality of work life and work-life-balance mediating role of job stress, job satisfaction and job commitment: evidence from India. *Journal of Advances in Management Research*, 36-62.
- [7] Azeem, S. M. (2010). Job satisfaction and Organizational Commitment among Employees in the Sultanate of Oman. *Journal of Psychology*, Vol 1, No. 4.
- [8] Aziri, B. (2011). Job satisfaction: a literature review. *Management research and practice*, Vol. 3 Issue 4, 77-86.
- [9] Bartlett, M. (1995). Test of significance in factor analysis. *British journal statistical Psychology*, 77-85.
- [10] Bolden-Barrett, V. (2020, February 4). *Millennials, Gen Z are ditching the job-hopper label, study says*. From HR Drive: <https://www.hrdrive.com/news/millennials-gen-z-are-ditching-the-job-hopper-label-study-says/571533/>
- [11] Borisov, I., & Vinogradov, S. (2019). The Relationship among collaboration - oriented managerial environment, job satisfaction, and workplace creativity. *Social & Economic Review*, Vol. 17 Issue 3, 5-19.
- [12] Chan, S. H., & Ao, C. T. (2018). The Mediating Effects of Job Satisfaction and Organizational Commitment on Turnover Intention, in the Relationships Between Pay Satisfaction and Work-Family Conflict of Casino Employees. *Journal of Quality Assurance in Hospitality & Tourism*, 206-229.
- [13] Cho, M., Bonn, M. A., & Han, S. J. (2018). Generation Z's Sustainable Volunteering: Motivations, Attitudes and Job Performance. *Sustainability*.
- [14] Dimock, M. (2019, January 17). *Generations & Age*. From Pew Research Center: <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>
- [15] Duong, V. H., Nhung, D. T., & Linh, T. M. (2021). Identifying work-related factors influencing job satisfaction using job descriptive index questionnaire: a study of IT companies in Hanoi. *Journal of International Economics and Management*, Vol 21 No 1, 63-85.

- [16] Dwidenawati, D., & Gandasari, D. (2018). Understanding Indonesia's Generation Z. *International Journal of Engineering & Technology*, 245-252.
- [17] Faragher, E. B., Cass, M., & Cooper, C. L. (2013). The Relationship between Job Satisfaction and Health: A Meta-Analysis. In C. Cooper, *From Stress to Wellbeing Volume 1* (pp. 254-271). London: Palgrave Macmillan.
- [18] Fletcher, L., Alfes, K., & Robinson, D. (2018). The relationship between perceived training and development and employee retention: the mediating role of work attitudes. *The International Journal of Human Resource Management*, Vol 29, 2701-2728.
- [19] Francis, T., & Hoefel, F. (2018, November 12). *True Gen: Generation Z and its implications for company*. From McKinsey & Company: <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/true-gen-generation-z-and-its-implications-for-companies>
- [20] Fry, R., & Paker, K. (2018, 11 15). *Early Benchmarks Show 'Post-Millennials' on Track to Be Most Diverse, Best-Educated Generation Yet*. From Pew Research center: <https://www.pewresearch.org/social-trends/2018/11/15/early-benchmarks-show-post-millennials-on-track-to-be-most-diverse-best-educated-generation-yet/>
- [21] George, J. M., & Jones, G. R. (2012). *Understanding and Managing Organizational Behavior, 6th Edition*. New Jersey: Pearson Education, Inc.
- [22] Hackman, J. R., & Oldham, G. R. (1975). Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 60(2), 159-170.
- [23] Hair JF, B. W. (2009). Multivariate data analysis. *Pearson Prentice Hall, Upper Saddle River, vol 7*.
- [24] Hoppock, R. (1937). *Job Satisfaction*. Harbour: Oxford.
- [25] Iman, N., & Lestari, W. (2019). The effect of leadership on job satisfaction, work motivation and performance of employees: Studies in AMIK Yapennas Kendari. *African Journal of Business Management*, 466-472.
- [26] Inuwa, M. (2016). Job Satisfaction and Employee Performance: An Empirical Approach. *The Millennium University Journal*, 90-103.
- [27] Jayatilake, H. D., Daud, D., Eaw, H. C., & Annuar, N. (2021). Employee development and retention of Generation-Z employees in the post-COVID-19 workplace: a conceptual framework. *Benchmarking: An International Journal*, 2343-2364.
- [28] Jehanzeb, K., & Mohanty, J. (2018). Impact of employee development on job satisfaction and organizational commitment: person-organization fit as moderator. *International journal of training and development*, Vol23 (3), 171-191.
- [29] Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert Scale: Explored and Explained. *British Journal of Applied Science & Technology*, 396-403.
- [30] Kanapp, C. A., Christine, W., & Moellenkamp, S. (2017). Challenges and strategies for incorporating Generation Z into the workplace. *Corporate real estate journal*, Vol 7, 137-148.
- [31] Karacsony, P. (2019). Generational Differences in Motivation at Work in Slovakian Small and Medium Sized Companies. *Open Journal of Social Science*, Vol 7, 182-191.
- [32] Kasbuntoro, Irma, D., Maemunah, S., Mahfud, I., Fahlevi, M., & Parashakti, R. D. (2020). Work-Life Balance and Job Satisfaction: A Case Study of Employees on Banking Companies in Jakarta. *International Journal of Control and Automation Vol. 13, No. 4*, 439-451.
- [33] Khalil, S. H., Zada, S. S., Tariq, M., & Irshadullah, M. (2018). Impact of Intellectual Stimulation on Employees' Job Satisfaction. *Journal of Research in Social Sciences*, Vol: 6 Number 2, 152-167.
- [34] Kian, T. S., Rajah, S., & Yusoff, W. F. (2014). Job satisfaction and motivation: what are the differences among these two? *European journal of Business and Social Science*, Vol. 3 No.2, 94-102.
- [35] Kirchmayer, Z., & Fratričová, J. (2020). What Motivates Generation Z at Work? Insights into Motivation Drivers of Business Students in Slovakia. *Innovation Management and Education Excellence through Vision 2020*, 6019-6030.
- [36] Lazányi, K., & Bilan, Y. (2017). Generation z on the labour market – Do they trust others within their workplace? *Polish Journal of Management Studies*, Vol. 16, 78-93.
- [37] Le, T. D., Nguyen, P., & Kieu, T. (2020). Ethical Consumption in Vietnam: An Analysis of Generational Cohorts and Gender. *Journal of Distribution Science*, Vol.8, 37-48.
- [38] Lewig, K. A., & Dollard, M. F. (2003). Emotional dissonance, emotional exhaustion and job satisfaction in call centre workers. *European Journal of Work and Organizational Psychology*, 366-392.
- [39] Locke, E. (1976). The Nature and Causes of Job Satisfaction. In M. E. Dunnette, *Handbook of Industrial and Organizational Psychology* (pp. 1297-1343).
- [40] Lofquist, L., & Dawis, R. (1991). *Essentials of person environment correspondence counseling*. Minneapolis: University of Minnesota Press.
- [41] Luz, C. M., & Oliveira, S. L. (2018). Organizational commitment, job satisfaction and their possible influences on intent to turnover. *Revista de Gestão, Vol. 25 No. 1*, 85-101.
- [42] Maslow, A. (1937). A theory of human motivation. *Psychological Review*, 50(4), 370-396.
- [43] McCrindle, M. (2014). *The ABC of XYZ: Understanding the Global Generations, 3rd edition*. Australia: Bella Vista: McCrindle Research Pty Ltd.
- [44] McCrindle, M., & Fell, A. (2019). *Understanding generation Z: recruiting, training, and leading the next generation*. Australia: Northwest NSW: McCrindle research Pty Ltd..
- [45] Mohammed, F., & Eleswed, M. (2013). Job satisfaction and Organizational Commitment: A Correlation study in Bahrain. *International Journal of Business, Humanities and Technology*, Vol. 3, No.5, 43-53.
- [46] Nabahani, P. R., & Riyanto, S. (2020). Job satisfaction and Work motivation in enhancing Generation Z's Organizational Commitment. *Journal of Social Science*, 234-240.
- [47] Nettleton, D. (2014). Selection of Variables and Factor Derivation. *Commercial Data Mining*, 79-104.
- [48] Nguyen, H. T. (2021). *Vietnamese Gen Z can be the most productive remote workforce, yet face uncertainty over skills gap*. Vietnam: PwC.
- [49] Nguyen, T., Huynh, M. K., Le, T., Ho, N., & Doan, N. (2022). Factors Affecting of Environmental Consciousness on Green Purchase Intention: An Empirical Study of Generation Z in Vietnam. *The Journal of Asian Finance, Economics and Business*, Vol 9, 333-343.
- [50] Nunnally, J., & Bernstein, I. (1994). *Psychometri theory*. NewYork: McGraw-Hill.
- [51] Paker, K., & Igielnik, R. (2020). *On the Cusp of Adulthood and Facing an Uncertain Future: What We know about Gen Z so far*. Washington DC: Pew Research Center.
- [52] Park, S., & Kim, S. (2017). The Linkage Between Work Unit Performance Perceptions of U.S. Federal Employees and Their Job Satisfaction: An Expectancy Theory. *Transylvanian Review of Administrative Sciences*.
- [53] Price, J. (1997). Handbook of organizational measurement. *International Journal of Manpower*, Vol. 18, 305-558.
- [54] Raggiotto, F., & Scarpi, D. (2021). *Generation Z Active Sports Tourism: A Conceptual Framework and Analysis of Intention to Revisit*. Springer Books
- [55] Ramlall, S. (2004). A Review of Employee Motivation Theories and their Implications for Employee Retention within Organizations. *The Journal of American Academy of Business*, Cambridge, 52-63.
- [56] Rawabdeh, M., & Nawafleh, S. (2018). Compensation system and job satisfaction: the application of the job descriptive index in the public-sector of Jordan. *International Journal of Productivity and Quality Management*, Vol 28 No 3, 299-317.
- [57] Raziq, A., & Maulabakhsh, R. (2014). The Impact of Working Environment on Job Satisfaction. *2nd Global Conference on Business, Economics, Management and Tourism 30-31 October 2014, at Top Hotel Prague* (pp. 717-725). Czech Republic: Procedia Economics and Finance, ELSEVIER.
- [58] Rue, P. (2018). Make Way, Millennials, Here comes gen Z. *Sage Journal*, Vol 23(3), 5-12.
- [59] Schawbel, D. (2014, 7 7). From <https://danschawbel.com/blog/5-predictions-for-generation-alpha/>
- [60] Silan, E., & Širok, K. (2018). The Importance of Employee Satisfaction: A Case Study of a Transportation and Logistics Service Company. *Management*, Vol. 13 Issue 2, 111-136.
- [61] Singh, A., & Dangmei, J. (2016). Understanding the Generation Z: The future workforce. *South-Asian Journal of Multidisciplinary Studies*, Volume 3, 1-5.
- [62] Smith, P., Kendall, L., & Hulin, C. (1969). *The measurement of satisfaction in work and retirement*. Chicago: Rand McNally.
- [63] Soomro, A. A., Breitenecker, R. J., & Shah, S. A. (2018). Relation of work-life balance, work-family conflict, and family-work conflict with the employee performance-moderating role of job satisfaction. *South Asian Journal of Business Studies*, 129-146.
- [64] Spector, P. (1997). *Job satisfaction: Application, assessment, causes and consequences*. Thousand Oaks CA: Sage Publication Inc.
- [65] Subekti, A. (2021). The Influence of Performance Appraisal System towards Job Satisfaction, Motivation, as well as Employee Performance. *International Journal of Economics, Business and Accounting Research*, Vol 5, No 2, 104-113.

- [66] Tarigan, J., Cahya, J., Valentine, A., Hatane, S., & Jie, F. (2022). Total reward system, job satisfaction and employee productivity on company financial performance: evidence from Indonesian generation z workers. *Journal of Asia Business Studies*.
- [67] Theresia, L., Lahuddin, A. H., & Ranti, G. (2018). The Influence of Culture, Job Satisfaction and Motivation on the Performance Lecturer / Employees. *International Conference on Industrial Engineering and Operations Management Bandung*. Indonesia.
- [68] Truong, T. H., Ngo, H. V., & Le, P. Q. (2021). Setting up the Socialization Solutions for Development of Futsal in Vietnam. *International Journal of Sports Science and Physical Education*, 6(2), 35-40.
- [69] Vroom, V. H. (1964). *Work and Motivation*. NewYork: John Willey and Sons.
- [70] Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H. (1967). *Manual for Minnesota satisfaction questionnaire*. University of Minnesota.
- [71] Wolomasi, A. K., Asaloei, S. I., & Werang, B. R. (2019). Job Satisfaction and Performance of Elementary School Teachers. *International Journal of Evaluation and Research in Education*, Vol 8 No 4, 575-580..
- [72] Yu, J., Ariza-Montes, A., Hernández-Perlines, F., Vega-Muñoz, A., & Han, H. (2020). Hotels' Eco-Friendly Physical Environment as Nature-Based Solutions for Decreasing Burnout and Increasing Job Satisfaction and Performance. *Environmental research and Public Health*, 6357.

APPENDIX

A. Appendix 1

Questionnaire design

Variable	ID	Measure	Source
Independent variables			
Opportunities of training and promotion (OP)	OP 1	You satisfy with the fair opportunities of training and promotion	McCrindle and Fell, 2019; Dwidienawati and Gandasari, 2018; Karacsony, 2019
	OP2	You satisfy with technical knowledge improvement through training courses	
	OP3	You satisfy with soft skills improvement through training courses	
	OP4	You would like to get a higher position	
Salary and benefit (SA)	SA1	You satisfy with the fair salary payment for your effort	
	SA2	You satisfy with the benefits and extra money provided	
	SA3	You satisfy with salary increasing opportunities based on performance	
Colleague relation (CO)	CO1	You receive high productivities because of supporting from colleague	
	CO2	You feel comfortable when you work with your team	
	CO3	You can work better if you get along to your colleague	
	CO4	You cannot do job done if you conflict with your team	
Leadership (LE)	LE1	You feel comfortable with your direct manager	
	LE2	You receive helpful feedback from your direct manager to progress	
	LE3	You would like to get the position as your direct manager	
	LE4	Your direct manager provides fair evaluation and appropriate support to your team	
Nature of work (WO)	WO1	You love your job because it makes sense to you	
	WO2	You love your job because you can use your knowledge and skills studied	
	WO3	You proud of what you are working	
Dependent variable			
Job satisfaction	JS1	You feel excited when you go to work	Collected by author
	JS2	You think about making creative and new things when you are working	
	JS3	You have work-life balance and enough energv for working	

Source from Smith et al. (1969) and adjusted by Author (2022) from previous empirical studies

B. Appendix 2

Profile of respondents

Demographic variable		Frequency	Percent
Gender	Male	222	46.3
	Female	216	45.0
	Other	42	8.7
Year of birth	Before 1995	76	15.8
	From 1995 to 2009	363	75.6
	After 2009	41	8.5
Education	College	213	44.3
	University	184	38.3
	Postgraduate	41	8.5
	High school	42	8.8
Years of working	Less than 1 year	57	11.8
	From 1 to 3 years	359	74.7
	More than 3 years	64	13.3
Position	Staff	262	54.5
	Middle manager	97	20.2
	C-level	93	19.3
	Other	28	5.8

C. Appendix 3

Cronbach's Alpha

Items		Corrected Item – Total Correlation	Cronbach's Alpha if Item Deleted
Opportunities of training and promotion (OP)	OP1	0.721	0.800
	OP2	0.678	0.819
Cronbach's Alpha = 0.852	OP3	0.672	0.821
	OP4	0.701	0.809
Salary and benefit (SA)	SA1	0.688	0.775
Cronbach's Alpha = 0.833	SA2	0.687	0.777
	SA3	0.707	0.756
Colleague (CO)	CO1	0.702	0.831
Cronbach's Alpha = 0.864	CO2	0.731	0.819
	CO3	0.708	0.829
	CO4	0.710	0.828
Leadership (LE)	LE1	0.662	0.823
Cronbach's Alpha = 0.851	LE2	0.684	0.814
	LE3	0.712	0.802
	LE4	0.708	0.804
Nature of work (WO)	WO1	0.659	0.808
Cronbach's Alpha = 0.835	WO2	0.724	0.746
	WO3	0.709	0.760
Job satisfaction (JS)	JS1	0.661	0.748
Cronbach's Alpha = 0.814	JS2	0.680	0.729
	JS3	0.653	0.756

D. Appendix 4

Exploratory Factor Analysis

KMO and Bartlett's Test		Independent	Dependent
Kaiser – Meyer – Olkin Measure of Sampling Adequacy.		.864	.716
Bartlett's Test of Sphericity	Appro. Chi-Square	4109.422	494.660
	df	153	3
	Sig.	.000	.000
Total Variance Explained			
Extraction Sums of Squared Loading (Cumulative %)		71.921	72.888

Rotated Component Matrix of 18 observed variables for five independent factors

	1	2	3	4	5
CO2	.825				
CO1	.814				
CO4	.808				
CO3	.804				
OP1		.832			
OP4		.815			
OP3		.802			
OP2		.797			
LE2			.795		
LE4			.790		
LE3			.787		
LE1			.761		
WO2				.848	
WO1				.829	
WO3				.828	
SA2					.844
SA3					.836
SA1					.812

Rotated Component Matrix of 3 observed variables for one dependent factor

	1
JS2	.863
JS1	.851
JS3	.847

E. Appendix 5

Correlations of each pair variables

	JS	LE	SA	WO	CO	OP
JS Pearson Correlation	1	.656	.589	.516	.446	.405
Sig. (2-tailed)		.000	.000	.000	.000	.000

F. Appendix 6

Regression analysis

Model	Standardize Coefficients Beta	Sig.	VIF
LE	.378	.000	1.487
OP	.114	.000	1.208
CO	.095	.002	1.289
SA	.362	.000	1.257
WO	.232	.000	1.257

G. Appendix 7

One-way ANOVA of Year of birth result

Test of Homogeneity of Variances				
	Levene statistic	df1	df2	Sig.
Based on Mean	.704	2	485	.495
Based on Median	.631	2	485	.532
Based on Median and with adjusted df	.631	2	482.330	.532
Based on trimmed mean	.747	2	485	.474

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.779	2	3.389	9.924	.000
Within Groups	165.644	485	.342		
Total	172.442	487			

H. Appendix 8

Descriptive statistic

		Minimum	Maximum	Mean	Std. Deviation
Opportunities of training and promotion (OP)					
OP1	You satisfy with the fair opportunities of training and promotion	1	5	3.30	.840
OP2	You satisfy with technical knowledge improvement through training courses	1	5	3.33	.816
OP3	You satisfy with soft skills improvement through training courses	1	5	3.32	.815
OP4	You would like to get a higher position	1	5	3.25	.839
Salary and Benefit (SA)					
SA1	You satisfy with the fair salary payment for your effort	1	5	3.27	.806
SA2	You satisfy with the benefits and extra money provided	1	5	3.33	.866
SA3	You satisfy with salary increasing opportunities based on performance	1	5	3.34	.829
Colleague (CO)					
CO1	You receive high productivities because of supporting from colleague	1	5	3.41	.863
CO2	You feel comfortable when you work with your team	1	5	3.44	.879
CO3	You can work better if you get along to your colleague	1	5	3.51	.881
CO4	You cannot do job done if you conflict with your team	1	5	3.42	.901
Leadership (LE)					
LE1	You feel comfortable with your direct manager	1	5	3.41	.884
LE2	You receive helpful feedback from your direct manager to progress	1	5	3.45	.927
LE3	You would like to get the position as your direct manager	1	5	3.42	.889
LE4	Your direct manager provides fair evaluation and appropriate support to your team	1	5	3.39	.889
Nature of work (WO)					
WO1	You love your job because it makes sense to you	1	5	3.82	.893
WO2	You love your job because you can use your knowledge and skills studied	1	5	3.85	.877
WO3	You proud of what you are working	1	5	3.87	.915
Valid N(list wise)		480			

Quality of information disclosure with the use of SASB standards in the construction industries in Mexico

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Abstract—The research aims to evaluate the current situation of quality of information disclosure that the construction sector in Mexico has in their reporting method using the international standards issued by SASB (Sustainability Accounting Standards Board). In order to achieve this goal, the entities that report, which are listed in the SASB official website and which were considered within the construction industry (Construction Materials – Extractives & Minerals Processing, Real Estate – Infrastructure and Home Builders – Infrastructure), were evaluated following the recommendations that the SASB itself establishes by industry and that should be included in the disclosure reports of the companies. The research found that the disclosure has significant variances by industries and companies in Mexico in terms of quality of information disclosure. Our results show that the quality of disclosure can not only be assessed in terms of whether it uses metrics or not, but that company-focused descriptive language is an important communicator to consider as good quality of information disclosure by companies. companies to interested parties because of the financial impact that it could represent in taking actions, or action plans, that stakeholders should consider.

Index Terms—SASB; reports; sustainability disclosure; commitment to stakeholder; construction industry.

I. INTRODUCTION

Sustainability is one of the actions that societies currently have to combat the problems arising from climate change since it helps to achieve the needs of the present without compromising the ability of future generations to meet their own needs [1]. In this way, applied to companies, it refers to doing business without negatively impacting the environment, community and society as a whole, given that otherwise, negative impacts would be generated not only to the environment but also could generate inequality and social injustice [2].

Nowadays, as a response to the fight against the feared climate change, investors have shown greater interest in issues related to sustainability due to the relevance that these issues are gaining. In this way, the private sector has been adapting to these new measures as a demonstration of its contribution to solving the problem, with ESG (Environmental, Social and Governance) terminology having gained trend and evolved in recent years, since This terminology refers to a set of standards that assess a company's behavior and that socially and environmentally responsible investors use to evaluate potential investments. The foregoing represents a need on the part of companies to adequately convey these terms with a considerable value towards sustainability that transmits transparency and responsibility towards in-

vestors, or their respective stakeholders, in an appropriate manner that may have a particular interest in the business, because this could have a direct or indirect impact on the company's finances. Despite the great importance of the private sector in terms of sustainability, one of the sectors that contributes the most to the increase in health and environmental problems, due to the carbon dioxide (CO₂) emissions it emits, is the commercial and residential construction industry. This industry has been considered one of the biggest polluters due to the release of CO₂, since it emits a total of 39% of CO₂ [3], so this industry has an opportunity and responsibility to reduce its emissions, as well as the correct disclosure of information in ESG (Environmental, Social and Governance) terms that demonstrates its commitment to society and the environment. In this way, it is important to identify that the ESG ecosystem has demonstrated important advances in recent years towards greater harmonization on the subject of disclosure, given that there are current practices that help obtain more transparent data such as sustainable reports, which are regulated by frameworks and standards, that help investors to identify the good commercial and extra-financial practices of companies in terms of sustainability and ESG, where investors consider them as one of the most important areas to prioritize.

The aim of this paper is to analyze the current situation of disclosure by examining the reported information of the construction sector in Mexico and classified them according to the quality of information they have on their sustainable reports. To do this, three industries were identified that are part of the construction sector that are reporting with SASB (Sustainability Accounting Standards Board) standards, which are listed on the official SASB website [4], in Mexico and that seek to communicate financially material Sustainability information to investors. The identified industries from the SASB official website are: Construction Materials – Extractives & Minerals Processing, Real Estate – Infrastructure and Home Builders – Infrastructure.

The next section presents the theoretical framework and reviews the current literature available for quality of information disclosure. The methodology is presented in section III followed by the results in section IV. Research conclusion is presented in the last section.

II. THEORETICAL FRAMEWORK

Climate change has manifested itself in recent years as one of the greatest challenges for this generation of human-

ity and the consequences on natural ecosystems have been notorious and are worsening in various regions around the world, in such a way that they exceed the capacity of those systems to fully adapt according to the Intergovernmental Panel on Climate Change in its fifth assessment report [5]. This is because in recent years it has been possible to notice a temperature increase of 1.0°C compared to pre-industrial levels, which is why in 2015 the Paris Agreement was signed to limit global average temperature increases to 2°C.

The emission of (CO₂) into the atmosphere leads to various negative repercussions that contribute to various social, economic and political problems [6], [7], [8]. The construction sector has been one of the main sources of CO₂ emissions, since for each ton of cement a ton of CO₂ is generated [3], even without considering the emissions from the transport machinery or the construction process, and that it is responsible from 5 to 7% of global CO₂ emissions into the atmosphere [9]. In 2015, in the specific case of Mexico, it was estimated that a total of 600 million tons of CO₂ were emitted, where it has been found that during the period 1990 and 2015, CO₂ emissions have increased rapidly in a 54%. [10].

The evident problems that we have witnessed related to climate change are one of the most worrying issues that we have today and that future generations will have, however, the arrival of the Covid-19 pandemic has made it even more evident the great importance that must be had for social issues, where sustainability is one more aspect to be considered by investors when deciding to buy, sell or hold securities in a certain company. This sense of responsibility for investors has been reflected in a 29% increase from the total of 2,092 investor signatories to 2,701 from 2019 to 2020, with a similar case occurring in the increase in the number of asset-owning signatories with 21% per part of the Principles for Responsible Investment, which reflect the growing relevance of environmental, social and corporate governance issues in the context of investment practices [11].

This was supported by a survey conducted by ISS to institutional investors, where it was found that 62% of respondents, receiving from a total of 65 leading asset managers worldwide, social problems attract more attention compared to before the arrival of COVID-19 and 44% of respondents expect that future ESG ratings will pay more attention to safety, diversity and inclusion in the workplace [12]. This is because since 2006, there has been an increase in shareholder proposals requesting that companies report on their climate change performance, as it is seen as a link between long-term corporate health and systematic management in ESG terms [12]. In addition, through the ESG Global Study 2022 report [13], it was shown that more than a quarter of global investors show an interest in complying with ESG criteria within their investment approaches.

In this way, given the increased concern on the part of investors and considering that the new normality requires a correct quality of the information transmitted on the performance by companies in terms of ESG, various frameworks and standards have emerged as measure support to companies for the development of reports. These reports are highly relevant when communicating relevant and accurate information about the social and environmental commitment that companies have to investors, such as the Sustainability Ac-

counting Standards (SASB), the Global Reporting Initiative (GRI) [14], the International Integrated Reporting Council (IIRC) [15], etc. Although there are various frameworks and standards, in this project in this document we will be focusing on the use of SASB standards.

The Sustainability Accounting Standards Board (SASB) was created in 2011, which connects with companies and investors about the financial impacts of sustainability, helping investors to make better decisions, given that global investors currently want to know how companies are doing regarding the environmental, social and governance (ESG) issues that also influenced company finances. According to SASB [16], these standards can have several benefits for investors, such as access to corporate data in terms of ESG that can be comparable, consistent and relevant that could be useful to create or improve long-term business value, as well as developing a deeper understanding of the risks that exist within the business sector being evaluated and some other benefits.

Although the disclosure of the information is an important tool for companies to be in contact with their stakeholders and the level of commitment may vary according to the location of the company, ethics, social and environmental impacts, as well as political problems and the level of publication seems to be higher for companies that belong to sensitive companies such as basic materials [17], [18], [19], the quality of information disclosure remains as an area of concern nowadays. This is because in most industries, despite showing a high level of disclosure of information, the quality that they present is considered a limitation that investors currently have to make informed decisions [20].

The above was supported by [20] where it is mentioned that in 2016 a total of 692 companies were analyzed to assess the quantity and quality of current disclosure practices and it was found that most of the companies analyzed are characterized by high levels disclosure, however, the quality of this information is poor. Although the previous study was a great reference on the quality of information at that time and its quality was expected to increase over the years, the study does not show the results by region or country to assess how the situation is in some countries regarding this quality of information. In the case of Mexico, there is still no relevant information to date where the quality of the information disclosed by the companies that make the SASB standards has been evaluated. For this reason, in this document the objective and relevance of this falls on the quality of the information that companies related to the construction industry in Mexico transmit in their reports.

III. METHODOLOGY

For purposes of this research, although there are currently 77 industries listed by SASB in his official website to disclose different topics and the information shared by each of them may have variations, the methodology used for this document is based on the analysis of reports of the companies listed on the SASB page of those companies related to the construction sector. In this research, the Construction Materials – Extractives & Minerals Processing, Real Estate – Infrastructure and Home Builders – Infrastructure sectors, listed on the official page of the SASB for the year 2022

TABLE I
SUSTAINABILITY DISCLOSURE TOPICS & ACCOUNTING METRICS BY SASB.

Nº	Construction Materials – Extractives & Minerals Processing	Real Estate – Infrastructure	Home Builders – Infrastructure
1	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	Energy consumption data coverage as a percentage of total floor area, by property subsector	Number of lots and homes delivered on redevelopment sites
2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Total energy consumed by portfolio area with data coverage, percentage grid electricity, and percentage renewable, by property subsector	Number of lots and homes delivered in regions with High or Extremely High Baseline Water Stress
3	Air emissions of the following pollutants: NOx (excluding N2O, SOx), particulate matter (PM10) dioxins/furans, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and heavy metals	Like-for-like percentage change in energy consumption for the portfolio area with data coverage, by property subsector	Total amount of monetary losses as a result of legal proceedings associated with environmental regulations
4	Total energy consumed, percentage grid electricity, percentage alternative, percentage renewable	Percentage of eligible portfolio that has an energy rating and is certified to ENERGY STAR, by property subsector	Discussion of process to integrate environmental considerations into site selection, site design, and site development and construction
5	Total fresh water withdrawn, percentage recycled, percentage in regions with High or Extremely High Baseline Water Stress	Description of how building energy management considerations are integrated into property investment analysis and operational strategy	Total recordable incident rate (TRIR) and fatality rate for (a) direct employees and (b) contract employees
6	Amount of waste generated, percentage hazardous, percentage recycled	Water withdrawal data coverage as a percentage of total floor area and floor area in regions with High or Extremely High Baseline Water Stress, by property subsector	Number of homes that obtained a certified HERS® Index Score and average score
7	Description of environmental management policies and practices for active sites	Total water withdrawn by portfolio area with data coverage and percentage in regions with High or Extremely High Baseline Water Stress, by property subsector	Percentage of installed water fixtures certified to WaterSense® specifications
8	Terrestrial acreage disturbed, percentage of impacted area restored	Like-for-like percentage change in water withdrawn for portfolio area with data coverage, by property subsector	Number of homes delivered certified to a third-party multi-attribute green building standard
9	Total recordable incident rate (TRIR) and near miss frequency rate (NMFR) for (a) full-time employees and contract employees	Description of water management risks and discussion of strategies and practices to mitigate those risks	Description of risks and opportunities related to incorporating resource efficiency into home design, and how benefits are communicated to customers
10	Number of reported cases of silicosis	Percentage of new leases that contain a cost recovery clause for resource efficiency-related capital improvements and associated leased floor area, by property subsector	Description of how proximity and access to infrastructure, services, and economic centers affect site selection and development decisions
11	Percentage of products that qualify for credits in sustainable building design and construction certifications	Percentage of tenants that are separately metered or submetered for grid electricity consumption and water withdrawals, by property subsector	Number of lots and homes delivered on infill sites
12	Total addressable market and share of market for products that reduce energy, water, and/or material impacts during usage and/or production	Discussion of approach to measuring, incentivizing, and improving sustainability impacts of tenants	Number of homes delivered in compact developments and average density
13	Total amount of monetary losses as a result of legal proceedings associated with cartel activities, price fixing, and anti-trust activities	Area of properties located in 100-year flood zones, by property subsector	Number of lots located in 100-year flood zones
14		Description of climate change risk exposure analysis, degree of systematic portfolio exposure, and strategies for mitigating risks	Description of climate change risk exposure analysis, degree of systematic portfolio exposure, and strategies for mitigating risks

Source: Table created by author.

were taken into account, which adds up to a total of 10 companies analyzed considering the recommended metrics to be included by the SASB (Table I). In this way, the effectiveness of the quality of information disclosure was evaluated according to the methodology used in [20], where they used a quality classification scheme in the scope of analysis and disclosure, composed of 4 metrics. These metrics are shown in the next paragraphs.

- No Disclosure: The company does not provide disclosure relevant to the topic under analysis

- Boilerplate: The company provides disclosure using generic language that could be applicable to most, if not all,

issuers in the industry. Normally, such disclosure has not been tailored to reflect the company's specific and unique circumstances, and lacks sufficient and significant information that would allow for differentiation between the company and most, if not all, of its peers.

- Company-tailored narrative: The company provides disclosure using specific language that can be understood only in the context of the issuer. Such disclosure has been sufficiently and significantly tailored to reflect the company's specific and unique circumstances. Therefore, if analyzed outside the context of the company, such disclosure would not be applicable to other issuers. However, such disclosure

does not provide information that enables quantitative comparisons of performance between companies.

- **Metrics:** The company provides disclosure using quantitative performance indicators which, by their nature, can be understood only in the context of the issuer.

In this way, adapting the aforementioned methodology for this research, weights were assigned with evaluation scales for each of the classifications, in terms of metrics, a classification from 0 to 3 was added, where 0 represents No disclosure, 1 Boilerplate, 2 Company-tailored narrative and 3 Metrics as the best score for using metrics. This with the aim of classified the various sustainability disclosure topics and accounting metrics that SASB establishes for each of the industries. In the case of the construction materials industry, there are currently 13 metrics to be considered by the SASB, while by Real Estate and Home Builders there are 14 for each, as shown in the following table.

TABLE II
FIRST METRICS BY INDUSTRY.

	Construction Materials	Real Estate	Home Builders
Number of accounting metrics	13	14	14
Total SASB	39	42	42

Source: Table created by author.

Subsequently, a classification of "high quality", "medium quality" and "low quality" was made, which has variations according to the score obtained as shown in the Table III.

TABLE III
FIRST CLASSIFICATION FOR DISCLOSURE QUALITY

Disclosure quality	Construction Materials	Real Estate	Home Builders
High quality	39-35	42-37	42-37
Medium quality	34-24	36-26	36-26
Low quality	23-0	25-0	25-0

Source: Table created by author.

It is important to consider that there are current metrics considered by SASB that although they cannot be measured in terms of metrics or "hard data", companies do provide relevant information for their stakeholders. This information of only measuring or classifying the quality of information based on metrics could be a disadvantage in terms of quality when in reality there is quality. Due to the above, a metric was proposed in the same way in terms not only of whether or not they provide metrics in their reports, but also whether they provide quality information and metrics, where 0 represents No disclosure, 1 Boilerplate, 2 Company-tailored narrative and 2 Metrics as showed below.

TABLE IV
SECOND METRICS BY INDUSTRY

	Construction Materials	Real Estate	Home Builders
Number of accounting metrics	13	14	14
Total	26	28	28

Source: Table created by author.

TABLE V
SECOND CLASSIFICATION FOR DISCLOSURE QUALITY

Disclosure quality	Construction Materials	Real Estate	Home Builders
High quality	26-24	28-26	28-26
Medium quality	23-16	25-17	25-17
Low quality	15-0	17-0	17-0

Source: Table created by author.

IV. RESULTS

The purpose of this section is to represent the results by each sector. In the table VI can be found the number of companies that disclosure information according to the scales 0-3 and 0-2 explained in the section III.

A. Construction Materials – Extractives & Minerals Processing (CM – E&M)

In this sector there were only 2 companies that provide disclosure information for their stakeholders for the 2021 year at the moment of writing this paper. There were found that there is a lack of disclosure quality by one of the companies and was classified with a medium-quality disclosure, while the other enterprise provides high-quality disclosure in its report with almost all the topics explained according to the SASB standards.

In this sector, although the company had a high level of disclosure quality, the problem that it demonstrated as a lack of data was not providing information regarding the cases of silicosis within the company, which did occur in the company with a low quality of disclosure of information. On the other hand, a great difference could be noted in the disclosure of information regarding the incident rate, where the company with a medium is currently developing the rate.

B. Real Estate – Infrastructure (RE - I)

This sector was the most dominant of the sectors evaluated, given that 6 companies that made reports on the year 2021 were evaluated. However, according to the first scale, 3 of the 6 companies evaluated were classified as having low disclosure quality, 2 with medium quality and 1 with high quality. The case of quality of information using the second scale, in terms of high, medium or low, was similar to the first scale, except that there were 3 companies with a medium quality of information disclosure.

One of the most predominant metrics in this sector was the one where the SASB standards requested the area of flood zones. This information was fully completed only by one company with a high level of disclosure of the information using metrics, and the other companies showed a low level by using generic language or not giving information regarding this graph. This is because it was possible to notice that the company that managed to report that information is an enterprise considered bigger than the others and was able to address said studies recommended by the SASB standards.

In the same way, another relevant metric was the use of energy star certification, where it was noted that companies did not share information without explaining, while others explained that they carried out other types of similar certifications or that the energy star certification does not apply in Mexico.

TABLE VI
NUMBER OF COMPANIES THAT DISCLOSE INFORMATION ACCORDING TO THE SCALE CLASSIFICATION

	CM – E&M				RE - I												HB - I			
Scale classification	First scale		Second scale		First scale						Second scale						First scale		Second scale	
0	1	4	1	4	7	3	4	1	1	9	7	3	4	1	1	9	6	3	6	3
1	0	2	0	2	2	2	0	0	7	3	2	2	0	0	7	3	3	0	3	0
2	0	0	12	7	1	1	0	0	2	0	5	9	10	13	6	2	1	2	5	11
3	12	7	-	-	4	8	10	13	4	2	-	-	-	-	-	-	4	9	-	-
Total	13	13	13	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14

Source: Table created by author.

C. Home Builders – Infrastructure (HB – I)

The Home Builders - Infrastructure sector had the evaluation of 2 companies that report to the year 2021. Low and medium-quality classification results were given for both scales.

The criterion that stood out the most in this section was that of the HERS index, where one company states that they do not have information available, while the other company, despite not having the HERS index in its report, mentions that they make use of other indices

V. CONCLUSION

As a result of this research, it was noted that despite there are several factors that can influence when deciding whether to invest, maintain or withdraw shares within a certain enterprise, the importance of hard data or metrics when evaluating a company is very useful to have more clarity the situation of the company that is useful for investors, since interpret standardized sustainability data will vary greatly.

It was found that most of the companies related to the construction industry show an average quality of the information transmitted, with 4 of the companies analyzed being considered at a low-quality level for the first scale and for the second 3 entities, being only 2 companies for both scales in terms of high quality of disclosure.

However, despite the relationship between the quality of information and the performance that they demonstrate, it is advisable to include graphs and be as explicit as possible about the company's actions, because this is subject to ambiguity and, as it was noticed, demonstrate a low quality of information disclosure and that as a result, investors do not have tools for correct decision making.

It was also noted that having a rigid evaluation, in terms of whether or not companies reported in their reports using metrics, could be a limitation for those companies that did cover the points established by the SASB standards, but certain companies actually explained their situation on these points and future action plans. Due to the above, a second evaluation metric was established, such as Table IV and V, where the evaluation method was not so strict with those companies that did report information to their stakeholders (as are explanations of why they did not apply a certain parameter requested, or proposed, by the SASB regulations or because they have it as a short-medium term action plan) but they did not use metrics so as not to harm their performance in this investigation. This resulted in a slight increase in the evaluation results, as has been observed, since an entire sec-

tor cannot be classified very strictly knowing that various implications may occur for certain cases.

On the other side, even though action plans are required by companies for some metrics and these do not show a metric recommended by the SASB, some companies have clearly and concisely communicated their future plans in terms of action and this has resulted in a slight increase in the quality of disclosure of information by the company by the second scale.

Another aspect found within this investigation was that the disclosure of information is also dependent on other external factors and not merely on the company, such as the evaluation of the areas of flooding that SASB recommends in its evaluation metrics, which may be dependent on the information available at the public level if the company does not have the capacity to carry out such studies, or the use of certain types of certifications. that are not applicable or not very common in Mexico. The latter is a recommendation to companies that even when these aspects do not apply at the moment in their area of action, such information is shared as detailed as possible, while on the part of the SASB, include within these same sections that they consider other types of evaluation standards and not just one that in some cases may not be applicable, reputable or useful in specific countries.

In the case of the Construction Materials – Extractives & Minerals Processing (CM – E&M), despite the fact that there are variations in the quality of the information according to the size of the company and that each company is free to choose what type of information to share or No, it is recommended that companies mention in their reports the situation of the aspects recommended in SASB in their reports so that the stakeholders can know how this parameter is. For example, even if there are no cases of silicosis within the company, it will always be worthwhile to represent it in a textual way as it has been represented in the long-term and short-term plans for the reduction of emissions. Another similar example is the Total recordable incident rate (TRIR), which despite the fact that these incidents do not exist within the company, it is always worth explicitly mentioning that there are no reported incidents. On the other hand, it is also advisable to express that the company is taking action on certain types of issues, such as product innovation. Product innovation can also be related to the size of the company, however, it is worth mentioning that it is being worked on so that investors also know future plans in the short, medium and long term.

For Real Estate – Infrastructure (RE - I), the most notorious issue was adaptation to climate change, which although

this is a relatively new issue that companies are considering, according to the results, only one company fully complied with this theme in the criterion of flood zones. Just as it happened in the previous Construction Materials – Extractives & Minerals Processing (CM – E&M) sector, if there are no such actions within the company at the moment due to operating costs or for any other reason, if it is planned to comply with the criteria and improve the quality of the disclosed information, it is useful to consider mentioning that it is in the future plans of the company to carry out this type of study that can have long-term consequences, but that can be counteracted if an adequate plan of adaptability is expressed. Another criterion that should be mentioned is the total amount of water extracted by area, since, like some other criteria, with the current scarcity of water that exists in the country and that was strongly experienced in the northern part, without a doubt, this criterion will also be a relevant aspect for investors to consider, as well as the action plans that companies have to face in the coming years, which are expected to continue to be affected by the shortage.

For Home Builders - Infrastructure (HB - I), as happened in the last two sectors, they should also consider to disclose information for future plans to consider the recommendations from SASB. The case of water is also a relevant issue when considering Land use and ecological impacts, where it is advisable to express how the current situation of the company is, as well as the environmental considerations that must be considered taken into account in the design, development of the site and construction so that this information, which will have consequences in the future, can be viewed by stakeholders and know that the company is taking it into account in its current or future action plans.

A factor to be considered after this research was the limitation in the region for the construction sector because there are not many companies that have this type of sustainable reporting practices and that are registered, or do so, through SASB standards. The above would mean that this construction sector needs to implement more presence of sustainable reports in Mexico so that the sustainable commitments that they are achieving can be understood, if this is the case, therefore, both the government sector, as well as the stakeholders interested in the companies belonging to this sector should opt for trying to encourage this sector to handle this type of practices that can help to obtain social, environmental and economic well-being. This is also a reason to consider carrying out a broader investigation when analyzing other means by which companies usually report their ESG practices, such as GRI and IIRC, and establishing metrics to measure the quality of the information shared for the construction sector, highlighting that this sector is one of the main polluting sectors. However, despite the amounts of emissions made by this sector, it is one of the most important sectors for the development of a country's economy, therefore, to ensure the interaction of those investors with social and environmental interests, it is You must begin to implement sustainability reports that can be the means of communication between the company and investors that help its stakeholders to make investment decisions. Similarly, the role of government is also an important factor, since this can even mean an area of opportunity to seek to

encourage, inform and create relationships so that the construction sector turns to carry out more sustainable activities and that these are also transmitted to their respective stakeholders. Since these actions would also support the reduction of CO2 emissions released into the atmosphere by an important sector, which in turn would mean the achievement of Mexico's climate objectives.

For the mentioned, by performing these actions, companies could benefit from access to capital and good public relations while investors, in the other side, obtain a better understanding of companies' actions and have a better investment thinking or not while having benefits for the environmental and social sector.

REFERENCES

- [1] Hernández Paz, Abraham Alfredo y González García, Héctor y Tamez González, Gerardo (2016) Desarrollo sustentable: de la teoría a la práctica. Ediciones DeLaurel, Monterrey, Nuevo León. ISBN 9786079705664
- [2] A. Spiliakos (2018). What Does "Sustainability" Mean In Business? Available: <https://online.hbs.edu/blog/post/what-is-sustainability-in-business>
- [3] [Growing, Buildings. (2017). Construcción y Emisiones CO2 a la atmósfera. Available: <https://growingbuildings.com/construccion-y-emisiones-co2-a-la-atmosfera/>
- [4] SASB (2018). Companies Reporting with SASB Standards. <https://www.sasb.org/company-use/sasb-reporters/>
- [5] IPCC, (2014). Climate Change 2014 Mitigation of Climate Change. Working group III contribution to the fifth assessment report of the intergovernmental panel on climate change.
- [6] H. Aceves Gutiérrez, M. Ibarra, Santa Magdalena; López Chávez, Oscar [1] ; Arévalo Razo, José Luis [1]. Documento: Procesos de construcción, emisión de dióxido de carbono y resultados socio-económicos durante la pandemia del covid-19 en México.
- [7] Hepburn, Cameron & Stern, Nicholas. (2008). A new global deal on climate change. Oxford Review of Economic Policy, 24 (2), United Kingdom. (Pp. 259-279). Available: <https://www.jstor.org/stable/23606644?seq=1>
- [8] Moreno Sánchez, Ana y Urbina Soria, Javier (2008). Impactos sociales del cambio climático en México (primera edición). México.
- [9] Van Den Heede P and De Belie N 2012 Environmental impact and life cycle assessment (LCA) of traditional and green concretes: Literature review and theoretical calculations Cement and Concrete Composites 34(4) 431–442
- [10] Instituto Nacional de Ecología y Cambio Climático (INECC, 2015). Inventario Nacional de Emisiones de Gases y Compuestos de Efecto Invernadero. Available: <https://www.gob.mx/inecc/acciones-y-programas/inventario-nacional-de-emisiones-de-gases-y-compuestos-de-efecto-invernadero>
- [11] PRI (2020). Annual Report. Enhance our global footprint. Available: <https://www.unpri.org/annual-report-2020/how-we-work/building-our-effectiveness/enhance-our-global-footprint>
- [12] ISS Insights (2020). ISS ESG Survey Results Highlight Increased Asset Manager Focus on Social Issues in Light of COVID-19 Pandemic. Available: <https://insights.issgovernance.com/posts/iss-esg-survey-results-highlight-increased-asset-managerfocus-on-social-issues-in-light-of-covid-19-pandemic/>
- [13] Capital Group. ESG Global Study 2022.
- [14] GRI (2020). About GRI. Available: <https://www.globalreporting.org/about-gri/>
- [15] IIRC (2015). About us. Available: <https://www.integratedreporting.org/the-iirc-2/>
- [16] SASB (2021b). Why Investors Use SASB Standards. Available: <https://www.sasb.org/investor-use>
- [17] Michelon Giovanna. Sustainability Disclosure and Reputation: A Comparative Study. Department of Economics and Management, University of Padova, Padova, PD, Italy
- [18] Adams, C . A. (1999) The Nature and Processes of Corporate Reporting on Ethical Issues, CIMA Research Monograph, London
- [19] Guthrie, J .and Parker, L . D .(1990) 'Corporate social disclosure practice: A comparative international analysis ', Advances in Public Interest Accounting, 3 , 159 – 175 .

- [20] Rodríguez Arturo, Cotran Henrik, and Stewart Levi S. Sustainability Accounting Standards Board. Evaluating the Effectiveness of Sustainability Disclosure: Findings from a Recent SASB Study. *Journal of applied corporate finance*.

Improving brand safety through brand risk management activities: A case study of F&B enterprises in Vietnam

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Abstract—This research aims to evaluate the impact of brand risk management activities on the brand safety of enterprises in the food & beverage manufacturing and processing industry in Vietnam. The research data was collected from random questionnaires with 401 respondents from 72 enterprises (both large and SME enterprises) in the food & beverage manufacturing and processing industry in Vietnam. Research results indicate that all four factors of brand risk management activities including strategy, processes, personnel, and investment have impacts on the brand safety of enterprises in the food & beverage manufacturing and processing industry in Vietnam. The result confirms important roles in promoting brand risk management activities to help the brand has stable and sustainable development.

Index Terms—Brand, brand risk management, brand risk management activities, brand safety

I. INTRODUCTION

Risk management is the identification, assessment, and prioritization of risks through the rational and economical application of resources to reduce, monitor, and control the probability of unfortunate events [1]. Enterprise Risk Management – ERM is an essential innovation in the development of risk management [2]. Over the past 100 years, enterprise risk management issues have been extensively studied by many scholars, such as: The Risk Management Association, formerly known as Robert Morris Associates, established in 1914 by American credit officers. This association focuses on credit risk research for financial institutions [2]; differentiation between the concepts of uncertainty and risk [3]; hard measures of financial risk [4] still in use today; new risk management thinking through insurance [5], designing of accessories to reduce the risk of car accidents [6], risk management in public policy [7], risk management in system administration dedicated to corporate senior management [8], risk management in corporate brand valuation [9], risk management in the global supply chain [10], information security risk management [11], risk management in the banking field [12]. There are some conflicting opinions about the impact of risk management on firm performance. Several studies pointed out that the application of enterprise risk management brought many economic benefits and revenue efficiency [13], but there were also studies from the same time showing that applying enterprise risk management did not make significant changes to the firm's key indicators [14], or the practice of enterprise risk management did not increase the firm [15]. Risk management is both a potential but also a risk if over-quantified [16]. Quantifying and managing risks for tangible assets have been concerned

and proven to be an extremely challenging mission [17] in the past few years but risk management must be not only for tangible but also intangible assets in the organization [18] because intangible assets are the only and sustainable source of competitive advantages of the enterprise [19]. Intangible assets to be listed include specific technologies, copyrights, patents, customer information, trademark, brand, reputation, and corporate culture, as well as software and other intangible computer-based assets [19]. This study focuses on intensively researching risk management for brand, an intangible asset that has great influence on businesses and the market.

In the modern economy context, an enterprise's desire to survive in the market means that it must have a brand strong enough to stand out and position in the hearts of customers [20]. However, the greater the influence of the brand, the more risks it brings to the enterprise [21]. Any crisis related to the brand can affect the trust of customers and lead to many unintended consequences [22]. Brand risk is a factor that can affect an enterprise's brand equity [23]. Since half a decade ago, there have been empirical studies emphasizing the importance of brand risk management activities [24]. In a society with the development of a community empowered to criticize and require transparency by social networks these days, building a brand becomes a brand-protecting mission through brand risk assessment and control [25]. In addition, brand-associated reputation risks threaten revenue and can lead to litigation, financial loss, or customer reduction [26]. Therefore, good risk management will prevent crises and help governance entities ensure the safety of protected objects [27], in this case, it is brand safety [28]. Acknowledging the potential association between brand risk management activities and brand safety, but, there are few theoretical frameworks mentioning this relationship. The following research is conducted with the desire to solve this gap.

In Vietnam, the food & beverage manufacturing and processing industry has a great potential in attracting investments. This industry is in the Top 3 of the largest proportion and main industry groups [29]. The food and beverage industry in Vietnam is projected to have a growth rate of 5-6% in the period 2020-2025. However, during the past thirty years of integration, Vietnam has recorded hundreds of brand crisis stories inside and outside the territory of brands in this industry. Many brands lost in the international market and businesses caught themselves infringing intellectual property rights of their own products when they started exporting products such as Ben Tre coconut candy (1998),

Trung Nguyen coffee, Phu Quoc fish sauce, etc [30] [31]; Some brands completely lost points with consumers when they failed to fulfill their social responsibility to the community such as when Vedan MSG polluted Thi Vai River [32], Tan Hiep Phat with the incident "the fly in the bottle of green tea" [33]. Most recently, the world's best Vietnamese rice brand ST25 was copyrighted and protected by an American enterprise throughout the United States. The same brand risk story from the late 20th century still came back after 30 years, causing damage to the brand in particular and the country's economy in general. Therefore, this study will focus on proposing and examining the impact of brand risk management activities on the brand safety: A case study of F&B enterprises in Vietnam.

II. THEORETICAL BACKGROUND

Enterprise risk management (ERM) is a process of establishing systematic and disciplined activities applied to strategic planning and applied throughout the enterprise. Risks are factors that cannot be completely eliminated, so implementing a model to manage risks is to detect events, assess, and manage events that are likely to affect their business goals in order to minimize negative impacts and help businesses seize better development opportunities. The COSO ERM cube framework [34] is provided as a risk management framework in four risk categories: (1) strategic; (2) operation; (3) reporting; and (4) compliance to achieve business objectives (Fig. 1).

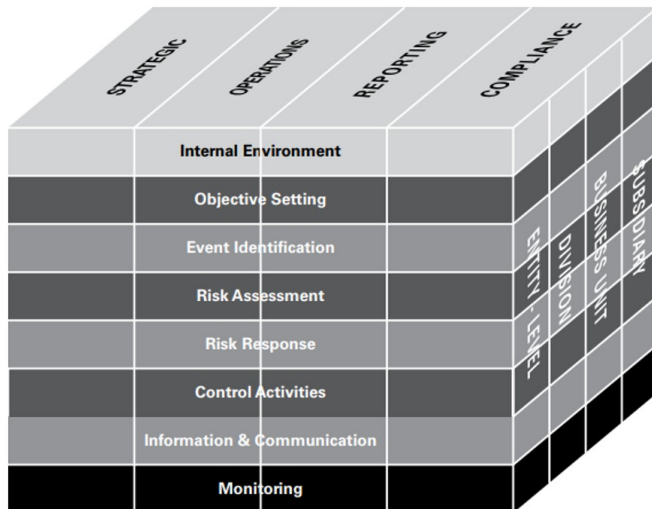


Fig.1 COSO ERM Cube framework

From the above enterprise risk management frameworks, it is found that enterprise risk management focuses on detecting risks and taking initiatives to properly control those risks to help ensure internal business objectives as well as competition with external competitors [35]. Meanwhile, a brand is an essential source of competitive advantages for a business [36], so effective enterprise risk management means good brand risk management. In fact, there are studies suggesting that enterprise risk management and brand risk management are equivalent. [37] [38].

The theory of brand risk management suggests that the primary goals of brand risk management (BRM) [39] are to proactively avoid potential brand risks and eliminate or pre-

vent existing brand risks with the aim of ensuring that the overall brand value is not diminished. The issue of brand risk management has been mentioned in many previous studies because brand risk is a problem associated with the survival of a business. Effective brand risk management activities can help strengthen a business's competitive advantage, enable long-term growth and sustainable profitability, and help enhance strategic decisions, decrease psycho-social risks in the working environment of the business [40]. Brand risk management activities can include practical or strategic activities, training and staff development activities, social responsibility activities, existing risk management processes, and financial investment in risk management.

According to the Resources-Based view, the competitive advantage of a business starts with the resources it holds [41]. In short, business resources and competitive advantages on the market are closely related. Specifically, resources are the root of competitive advantage. To find, allocate, and implement resources effectively is an issue that business leaders need to focus on to avoid wastage. The importance of brand risk management in improving sustainability and safety for the brand of a business [41] [42] [43] was mentioned in many earlier studies. Within this study and based on the RBV theory, the author will analyze 04 brand risk management activities - the observable variables for brand risk management activity variables include: *(1) strategy; (2) personnel; (3) process; and (4) investment*.

First and foremost, the branding **strategy** is a strategy created to strengthen sustainable competitive advantage for the brand in particular and the business in general [44]. The branding strategy ensures the development and maintenance of a product's values and features stay consistent, different, appropriate, and appealing to customers [45]. To complete a brand risk management activity model, the business needs an overall strategy [46] covering the factors impacting brand risks, such as: risks from cultural, political, juridical, and social factors; risks from the brand equity management capability; risks in brand promoting activities; risks in brand extension activities as the basis for proper responses to brand risks regardless of the situation. In the classic enterprise risk management ERM model of COSO, the strategic factor is also an important side of the proposed cube [34]. A brand risk management strategy is also the best tool to show that the enterprise has been ready to develop in every aspect.

Secondly, after obtaining a strategy, **personnel** – the implementing team is the decisive factor [47] to bring life to the brand risk management programs in the strategy's direction. In the past, brand risk management was not highly prioritized and was not handled by a specialist. Now, however, brand risk management is a top priority and enterprises are aware of the need for a stable team that understands the business, and behaves cleverly to deal with brand risks [48]. Sometimes, the team can work directly at the enterprise or major media companies that take on cases, but they mostly need high-quality human resources for this challenging task. When brand risks take place, a series of questions need answers: Who is responsible for identifying brand risks; Whom to report to when there is a problem; Who is responsible for tackling this problem. Personnel is not merely a specialized division but sometimes calls for the participation

of the entire enterprise with the direction and unity from its specialists. The effectiveness of brand risk management (including security for that brand) will be more stable and sustainable if the enterprise has good internal communication with its employees. Besides, employees are one of the crucial parts of the team contributing to improving brand personality [49]. By stabilizing the internal team, the enterprise will help its employees understand, comply, and stay loyal to the brand first; from there, they act to show the brand value to customers in the most natural manners [50]. And last but not least, each of the personnel in the enterprise is a brand ambassador that contributes to the brand's prosperity. To conclude, the brand risk management activity model cannot be complete without involving a high-quality human resource in implementing, operating, handling, and protecting the brand.

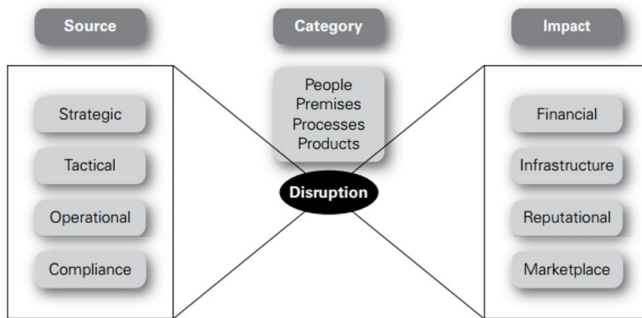


Fig.2 Bow-tie framework in brand risk management

Thirdly, in any brand risk management **processes**, the enterprise always places risk identification and assessment at the top priority [51]. Identifying and assessing risks even when the risks have not taken place is a strategic preparation act. The strategic factor or process in the bow-tie framework (Fig.2) [51] for business risk management indicated its importance in risk management activities. The process explains how to implement brand risk management step by step as proposed [46]. The steps in a brand risk management process are both risk sharing and standardized to bring down the time spent tackling familiar risk issues and identify the core sooner when facing new issues, helping reduce the pressure for the brand of the enterprise to overcome potential crises.

Fourthly, brand risks management activities are ones that require financial **investment**. The enterprise cannot manage risks effectively without finance and positive investment. The level of investment into brand risk management is one of the three advantages affecting a service firm's operation [52]. Studies also pointed out that developing new services and investing in the brand play an important role in enhancing competitive advantage for enterprises and improving their performance on the market. In brief, investing labor, wealth in brand risk management is equivalent to investing in activities to keep the brand safe. Preparing reserve funds or supporting financial solutions in case of risk happenings is among the smart methods by smart owners.

Brand safety is one of the intrinsic factors of Brand security mentioned in Management of Non-traditional Security (MNS) [53]. Brand security is safety (S1), stability (S2), and sustainability (S3) of a brand through all the activities the

enterprise carry out to protect a brand from risks to respond to crises and manage recovery post crises [54]. A safe brand will offer competitive advantage, helping the enterprise grow more sustainably [55]. Safety and sustainability are closely associated and deeply influence each other [56].

III. HYPOTHESES DEVELOPMENT

From the above literature, this study categorizes four activities in brand risk management that a firm should focus on in order to construct its brand safety, they are strategy, personnel, processes, and investment. Based on the above arguments, we proposed the following hypothesis:

H1: Brand risk management activity – the completion of the strategy in brand risk management positively influences brand safety.

H2: Brand risk management activity – the lack of personnel and quality of personnel in brand risk management negatively influence brand safety.

H3: Brand risk management activity – the completion of the processes in brand risk management positively influences brand safety.

H4: Brand risk management activity – the level of investment in brand risk management positively influences brand safety.

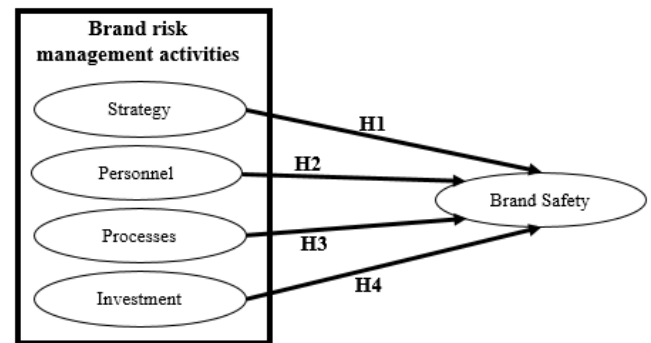


Fig.3 The proposed Research Model

IV. RESEARCH METHODOLOGY

The quantitative survey lasted from May 2022 to September 2022. Through Haiphong Science and Technology Association, New Rural Association, and several other business associations throughout the country, the study reached random 72 food & beverages manufacturing and processing enterprises all over the country. At each business, the research team conducted random survey in the personnel of selected divisions (associated with brand management), such as: CEO, director board, marketing & communication, sales, legal, and customer-service department. Due to the limited survey locations, most of the questionnaires were collected by handing out directly at the enterprise. A minority part of the questionnaires were collected online after confirming the will to cooperate of the enterprise. The questionnaires were collected randomly from above enterprises in the food & beverage field with 426 answers. After leaving out unqualified answers because: (1) the business type is not in the research area; (2) the response quality is not adequate, the rest 401 answers are qualified for inputting and analyzing data.

The survey applied the 05-point Likert-type scales to measure the level of agreement with the statements: 1 means “total disagree”, 2 means “not agree”, 3 means “neutral”, 4 means “agree”, and 5 means “complete agree”. SPSS 26.0 software was utilized to assist data inputting and analyzing.

TABLE I
ITEMS OF THE CURRENT STUDY

Constructs	Number of Items	Sources
Brand risk management activities Strategy Personnel Processes Investment	27	Lai & Samad [57]; Hofman and Keates [1]; and self-developed for this study
Brand Safety	6	Hoàng Đình Phi và Nguyễn Văn Hường [58]

V. DATA ANALYSIS AND RESULTS

After carrying out descriptive statistics of 401 respondents surveyed, Table II below illustrates sample's characteristics. In particular: The gender percentages are almost equal with 189 male respondents, making up 47.1%, while female respondents account for 52.9%. The age in the survey is mostly within the working age, ranging from 25 to 44 (about 82%). The survey samples are all from pointed divisions with associated with brand management like: CEO (51 questionnaires - 12.7%), director board (51 questionnaires - 12.7%), marketing & communication (129 questionnaires - 32.2%), sales (137 questionnaires - 34.2%), customer service (22 questionnaires - 5.5%), and corporate legal department (11 questionnaires - 2.7%). A majority of the respondents have Bachelor's degrees or higher (approximately 96%) and have experience in the current positions of less than 10 years (about 75%). The questionnaires were distributed nearly evenly among business sizes: large-sized enterprises account for 46.1% (185 questionnaires) and small and medium-sized enterprises account for 53.9% (216 questionnaires). The study also collected answers from all three regions in Vietnam, but the number of questionnaires is largely in the North (332 questionnaires - 82.8%) and some in the South and the Central. The questionnaires were also distributed among 06 sectors in the food & beverage manufacturing and processing industry: (1) Milk and dairy products (18.2%); (2) Sugar, confectionery, and other nutritious food (27.7%); (3) Packaged food, seasoning, and cooking oil (19.0%); (4) Fresh and frozen food (11.2%); (5) Alcoholic drink (13.2%); and (6) Non-alcoholic beverages (10.7%). Interestingly, among the answers, only 20% of the respondents said they had never faced brand risks, while the rest had (about 80%); and among them, 7.8% of the respondents thought their enterprises have been facing many brand risks (more than 5 times).

The descriptive statistics (Table III) below show that the surveyed people expressed positive responses towards measurement items in this study. Most of the scale values are higher than 3 (on the 5-point Likert scale) for the independent variable and dependent variable. The study utilized SPSS 26.0 software to analyze factors and examine the reliability and consistency of the scales. During the first EFA analysis process, all the variables found to have Factor Loading under 0.7 had deleted. Factors with accepted Factor Loading will have their reliability examined. The following

TABLE II
DESCRIPTION OF RESPONDENT'S CHARACTERISTICS (N=401)

Variable	Attribute	Frequency	Percentage (%)
Gender	Male	189	47.1
	Female	212	52.9
Age	25-34	169	42.1
	35-44	160	39.9
	45-54	54	13.5
	>=55	18	4.5
Degree	High school Graduation	2	0.5
	Vocational high school	13	3.2
	College's degree	34	8.5
	Bachelor's degree	283	70.6
	Master's degree	69	17.2
Job tenure	<3 years	128	31.9
	3-10 years	170	42.4
	>10 years	103	25.7
Job position	CEO	51	12.7
	Director Board	51	12.7
	Marketing & Communication Department	129	32.2
	Sale Department	137	34.2
	Customer Service	22	5.5
	Legal Department	11	2.7
Firm size	Large size	185	46.1
	Small & Medium size	216	53.9
Product sector	Milk and dairy products	73	18.2
	Sugar, confectionery, and other nutritious food	111	27.7
	Packaged food, seasoning, and cooking oil	76	19.0
	Fresh and frozen food	45	11.2
	Alcoholic drink	53	13.2
	Non-alcoholic beverages (soft drinks, coffee, tea)	43	10.7
Area	Northern of Vietnam	332	82.8
	Center of Vietnam	17	4.2
	Southern of Vietnam	52	13.0
Number of times faced with brand risks	0	83	20.7
	1-2	110	27.4
	3-5	117	44.1
	>5	31	7.8

table indicates that some observable variables were deleted because their Factor Loading were low (under 0.7), including BRS4 and BP9 in brand risk management activities; BS5 and BS6 in brand safety. The other items were remained for further analysis.

TABLE III
DESCRIPTIVE STATISTICS OF THE CURRENT STUDY

Constructs	Items	Description	Mean	Std. Dev.	Deleted in EFA
Strategy (BRS)	BRS1	The enterprise has clear brand development strategies (public with the enterprise's internal: strategy objectives, strategy scale, competitive advantage, strategy activities and the brand's core capabilities)	3.68	.895	
	BRS2	The enterprise has a mission, vision, core values public on its official media sites	3.71	.926	
	BRS3	The enterprise always forecasts and assesses (probability of happening, level of impact, level of seriousness,...) types of brand risks the enterprise may face in each year	3.70	.867	
	BRS4	The enterprise has backup plans to minimize the risks when brand risks occur	2.99	1.091	Deleted
	BRS5	The enterprise has the policy to accept brand risks that those risks have insignificant impact compared with potential communication effectiveness	3.54	.896	
Personnel (BP)	BP1	The enterprise does not have a dedicated division for brand management	3.04	1.223	
	BP2	The enterprise does not hire expert for consulting brand building and managing	2.91	1.125	
	BP3	The enterprise does not hire expert for consulting brand risk management	2.67	1.132	
	BP4	The enterprise lacks a specialist team with the capability of solving brand risk issues (if occur)	2.87	1.122	
	BP5	The enterprise lacks a legal	3.02	1.17	

Constructs	Items	Description	Mean	Std. Dev.	Deleted in EFA
		department with knowledge of the laws directly related to the enterprise's brand		1	
	BP6	The enterprise's employees are not willing to participate in preventing brand risks for the enterprise	3.49	.893	
	BP7	The enterprise lacks personnel training in brand risks the enterprise may face and related action plans	3.15	1.101	
	BP8	The enterprise's core employees lack awareness in proactively protecting the brand of the enterprise	2.98	1.146	
	BP9	<i>The managing director is the key personnel to solve all brand risk issues of the enterprise</i>	3.48	.921	Deleted
Processes (BRP)	BRP1	The enterprise promulgates regulations and processes of handling brand risks for all employees	3.29	.969	
	BRP2	The enterprise has monitoring processes to ensure brand development goes hand in hand with developing the main business of the enterprise	3.34	1.019	
	BRP3	The enterprise has specific plans and action plans (to control risks) for each type of brand risk (when it occurs)	3.42	.962	
	BRP4	The enterprise has plans and communication routes to prevent brand risks	3.04	.939	
	BRP5	The enterprise has monitoring processes for communication activities and monitors communication channels to control brand risks	2.98	.979	
	BRP6	When there are brand risks, the enterprise will hold meetings with the board of director and make tackling decisions depending on the specific situation	3.60	.982	
	BRP7	The enterprise has processes preventing brand risks and applied them effectively before	3.30	.918	
	BRP8	The enterprise has internal professional and tools to identify early risks for the brand	3.00	.979	
	BRP9	The enterprise has the internal professional and tools to analyze and assess types of hidden risks and the consequences it bring for the enterprise	2.91	.980	
	BRP10	The enterprise has processes solving brand risks and applied them effectively before	3.30	.958	
Investment (BRI)	BRI1	The investment budget for brand risk management is prioritized in the enterprise's annual budget	4.40	1.432	
	BRI2	The enterprise has reserve funds to repair damages caused by brand risks	4.20	1.601	
	BRI3	The reserve funds are always sufficient for repairing damages caused by brand risks	3.05	1.130	
Brand Safety (BS)	BS1	The enterprise is not being mistaken for any brand that was/is present on the market	3.70	.867	
	BS2	The enterprise is not in any lawsuits related to trademark disputes	3.29	.969	
	BS3	The enterprise's products are not being counterfeited/faked on the market	3.34	1.019	
	BS4	The enterprise does not get complaints from customers about their product lines on the market	3.42	.962	
	BS5	<i>All brands/trademarks of the enterprise were registered and protected within the territory of Vietnam</i>	3.68	.895	Deleted
	BS6	<i>All brands/trademarks of the enterprise were registered and protected in the exporting country and other countries</i>	3.71	.926	Deleted

After removing variables in the first EFA, the author conducted the second EFA analysis. In this assessment, KMO = 0.47 > 0.5 shows that the correlation coefficient between variables are very good and sig Bartlett's Test = 0.000 < 0.05

indicates that the variables in EFA are correlated, so EFA analysis is appropriate.

TABLE IV
KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.947
Bartlett's Test of Sphericity	Approx. Chi-Square
	7627.562
	df
	300
	Sig.
	.000

Besides, in this phase, four factors were concluded to build brand risk management activities and name: (1) strategy, (2) personnel, (3) processes, (4) and investment (Table V).

Utilize Cronbach's Alpha to examine the reliability of the scales in this study. The Cronbach's Alpha values in the study are all between 0.762 and 0.956, Eigen values are from 2.075 to 7.165 and Cumulative explained is above 69%. Item to total correlation is above 0.5.

From the Factor Loading result (Table V) and the correlation matrix result (Table VI and Table VII) below, we concluded that the variables in the study have adequate validity and reliability. The Table VI indicates the correlation between variables and the table VII illustrates the result of regression for all the relationships.

TABLE V
RESULTS OF FACTOR ANALYSIS

Construct	Item	Factor loading	Eigen-value	Cumulative explained (%)	Item-to-total correlation	Cronbach's Alpha
Strategy (BRS)	BRS1	.921	3.313	78.262	.844	.905
	BRS2	.918			.832	
	BRS3	.914			.840	
	BRS4	.914			.840	
	BRS5	.777			.643	
Personnel (BP)	BP1	.914	5.973	74.660	.883	.951
	BP2	.861			.815	
	BP3	.903			.868	
	BP4	.908			.875	
	BP5	.888			.849	
	BP6	.736			.672	
	BP7	.860			.814	
	BP8	.829			.776	
	BP9	.829			.776	
	BP10	.875			.839	
Processes (BRP)	BRP1	.793	7.165	71.645	.747	.956
	BRP2	.833			.793	
	BRP3	.839			.800	
	BRP4	.790			.744	
	BRP5	.860			.825	
	BRP6	.834			.794	
	BRP7	.864			.825	
	BRP8	.884			.850	
	BRP9	.885			.851	
	BRP10	.875			.839	
Investment (BRI)	BRI1	.776	2.075	69.180	.534	.762
	BRI2	.854			.630	
	BRI3	.863			.663	
Brand Safety (BS)	BS1	.849	2.825	70.622	.719	.859
	BS2	.878			.753	
	BS3	.709			.543	
	BS4	.911			.814	

TABLE VI
CORRELATION MATRIX

Construct	Mean	S.D.	1	2	3	4	5
BRS - Strategy	3.66	.791	1				
BP - Personnel	3.02	.965	.641**	1			
BRP - Processes	3.22	.819	.792**	.774**	1		
BRI - Investment	3.88	1.154	.295**	.557**	.461**	1	
BS - Brand Safety	3.77	.810	.450**	.244**	.456**	.240**	1

Note: (1) Mean = average scores; S.D.= standard deviation; (2) All coefficients are calculated based on mean centered scores, ** p<.01.

All the proposed hypothesis in the study were examined by applying regression analysis through SPSS software using linear regression analysis technique (Table VIII).

Results show that all the proposed hypothesis (H1, H2, H3, H4) are all right and meaningful. Firstly, BRS strategy influences brand safety positively and significantly with $\beta =$

TABLE VII
THE RESULT OF HYPOTHESIS TESTING

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	1.776	.216		8.231	.000	
Strategy (BRS)	.304	.086	.297	3.519	.001	2.776
Personnel (BP)	-.314	.072	-.374	-4.334	.000	2.903
Processes (BRP)	.432	.101	.437	4.295	.000	4.045
Investment (BRI)	.112	.043	.159	2.573	.011	1.497
R Square = 0.280						
Adjusted R Square = 0.270						
Durbin-Watson = 1.592						
P value = 0.000						
Dependent variable: Brand Safety (BS)						

TABLE VIII
THE RESULT OF HYPOTHESIS TESTING

	Hypothesis		Conclusion
H1	Brand risk management activity – the completion of the strategy in brand risk management positively influences brand safety.	BRS → BS (+)	Supported
H2	Brand risk management activity – the lack of personnel and quality of personnel in brand risk management negatively influence brand safety.	BP → BS (-)	Supported
H3	Brand risk management activity – the completion of the processes in brand risk management positively influences brand safety.	BRP → BS (+)	Supported
H4	Brand risk management activity – the level of investment in brand risk management positively influences brand safety.	BRI → BS (+)	Supported

0.297 and $p < 0.001$ supporting H1. The BRP personnel factor is found to impact brand safety with $\beta = -0.374$ and $p < 0.05$ supporting H2. Processes are found to positively and significantly impact brand safety with $\beta = 0.437$ and $p < 0.001$ supporting H3. Investment is found to affect brand safety with $\beta = 0.159$ and $p < 0.05$ supporting H4.

The examination result of multi-collinearity indicates that VIF ranging from 1.497 to 4.045 still guarantees multi-collinearity of independent variables is not considerable.

The analysis result for the regression equation for influential factors are as the following:

$$BS = 1.776 + 0.304 \cdot BRS - 0.314 \cdot BP + 0.432 \cdot BRP + 0.112 \cdot BRI$$

VI. DISCUSSION OF THE RESEARCH RESULTS AND CONCLUSION

This study examines the influence of brand risk management activities on the brand safety of enterprises. Research results show that all four factors of brand risk management activities: strategic, personnel, process, and investment, all of which have direct, significant impacts on brand safety. Among them, the processes factor is the most influential with $\beta = 0.437$. The finding of this study have contributed to brand risk management theory and resource-based-view theory by highlighting the importance and necessity of internal brand risk management activities to ensure brand safety.

A. Theoretical contributions:

First, this study contributes to the history of brand risk management by identifying four factors of brand risk activities, including: strategic, personnel, process, and investment

through hypothesis development, testing reliability, validity, and evaluating the appropriateness of the scales.

Secondly, this result confirms the proposition that brand risk management activities have a significant effect on brand safety. In the history of research, Damodaran (2007) suggested that risk management activities can include identifying, assessing and prioritizing risk reduction. However, it can also include resource allocation to improve the effectiveness of risk reduction, risk monitoring and risk control (Hubbard, 2009). The strategy for brand risk management relies on this, and its focus is that risk management "can limit the organization's ability in achieving the strategic objectives with the ultimate goal being creating and protecting stakeholders' values" (Frigo & Anderson, 2011). The results of this research indicate that, in order to keep the brand safe, the enterprise's manager and stakeholders, which includes not only shareholders but also employees. In other words, personnel quality and the participation of all employees in brand risk management help improve brand safety and serves as the first step in making the enterprise's brand stable and sustainable for the long term. This finding confirms the research results of Hofman & Keates (2013). Apart from that, companies are increasingly interested in brand risk management due to damages in expenses or reputation harm (Hillson, 2010). Therefore, the instability and complexity of the current business environment, as well as the increasingly strict regulatory reviews and severe competitiveness, is the main motive to enhance brand risk management activities. That means the availability and completion of brand risk management procedure plays an important role in securing companies' brands. Materials about brand building show that procedures in brand risk management activities are not only repetitive but also constantly changes (Langenhan et al, 2013); therefore, needs adjusting constantly in accordance with the requirements of the external environment and the internal capabilities of the enterprise. However, current research also shows that other activities in brand risk management are not enough to guarantee brand safety without the investment factor. Investments may include financial budgets, human resources, and other resources required to carry out brand risk management, then showcase significant influences on brand security. This finding implies that when conducting brand risk management, brand and marketing managers should jointly carefully consider four factors, including strategy completion, company's personnel quality, the availability and completion of procedures, and financial investments, etc. This result complies with the ones in the Hofman and Keates's research (2013).

B. Practical implications

The completion of the **strategy** in brand risk management positively influences brand safety, the more complete the enterprise's brand-related strategies, the greater the brand safety. As for the strategic aspect, the enterprise needs to consider two subjects: inside the enterprise (the enterprise's personnel) and outside the enterprise (customers, partners, competitors, etc.). Regarding subjects inside the enterprise, the business owner needs to spread comprehensive messages to share specific brand strategies, including: the strategy's objectives, activities, and core value of the brand. When the

team understands the strategies correctly and willingly stands the leadership, they will also be important factors in maintaining brand safety for the enterprise. Besides, as for outside subjects, the enterprise needs to position and determine its differences through the mission, vision, and core values public on its official sites such as its website, fanpage, YouTube, LinkedIn, etc. This public information will help the enterprise showcase its values and obtain the right positioning on the market as well as help customers easily acknowledge the enterprise's differences so it will be easier for them to decide to choose the enterprise. Next, to ensure the best brand risk management, the enterprise should have meetings to discuss forecasts about the brand risks the enterprise may face. When brand risks are forecast, strategists of the enterprise should work together to assess the probability of happening, the level of impact of that brand risk, and jointly come up with backup plans to handle brand risks thoroughly as well as response plans when risks become crises in order to minimize damage to the brand. Thorough preparation will help provide the brand with the best protection. Another crucial factor in completing brand risk management strategies is that the enterprise should have policies to accept some risks as its accompanying factors because some risks are tricky to control, the risk of counterfeiting for instance. When accepting risks, the enterprise will have proper communication plans to warn customers and review its internal operation in refining products/services until it completely controls the brand risks it is accepting. Understanding both the pros and cons of dealing with brand risk management is an important factor to help securely protect the brand of the enterprise.

In terms of the lack of **personnel** and quality of personnel in brand risk management negatively influence brand safety, the lack of human resource and increasing low-quality personnel in brand risk management will decrease brand safety. It is an inevitable consequence as human is one of the prominent factors contributing to the process of tackling an issue. The lack of human resource will obviously cause work delay, but low-quality personnel will also lead to catastrophic consequences. Through this study, enterprises should have divisions or specialized departments for brand management. In addition, hiring brand building, managing consultants is essential. Experts with outstanding expertise, experience, and skills and flexible work hours will be the quickest solution to fulfill personnel qualification in brand risk management. Furthermore, it's especially necessary to conduct and promote training specialists with the capability of solving brand risk issues when they become crises. During training, this team will become the first soldiers to support and accompany the enterprise in keeping the brand safe. Moreover, these days, the laws on branding are relatively transparent. Enterprises in the food & beverages manufacturing and processing industry are the ones facing many brand risk domestically and internationally, so improved personnel quality for the legal department will be the first protective and proactive shields in understanding the law, complying with the law, and protecting the brand by the most official tool: the law.

Regarding the completion of the **processes** in brand risk management positively influences brand safety. Completing

processes in brand risk management will help elevate the brand. Among brand risk management models, the process is always an important factor because the process is a factor guaranteeing smoothness in an organization's operation. Good processes will provide a smooth mechanism and a stable system. In brand risks management activities, building processes in managing risks as well as handling risks is the best way to protect the brand.

In terms of the level of **investment** in brand risk management positively influences brand safety. Increasing investments into brand risk management activities also helps enhance brand safety. Therefore, enterprises should set a priority for budgets for brand risk management activities in annual budget. Having a particular budget will boost personnel training, hiring experts, adding more optimal risk monitoring tools. Additionally, because of the policy to accept some risks, the enterprise should have reserve funds to fix the damage caused by the risks. The cost of handling brand crises will be accounted for to make sure it will be more and more optimal and will not influence business profits.

VII. LIMITATIONS AND DIRECTION FOR FUTURE RESEARCH

The author did their best to send the questionnaire throughout the country, but the limited research space is mostly located in the North, not covering much of the Central and the South. More studies are needed in the other parts of Vietnam to guarantee the sample covers regions more evenly.

In addition, this study only works in the food & beverages manufacturing and processing industry. More experiments are needed in other industries in the future.

Finally, this study only focuses on researching the concentration of brand risk management activities on brand safety without considering control variables, such as company size, product field, or the number of times of facing brand risks, etc. More studies are needed to account for control variables to compare results with other variables to create the most comprehensive solutions for all subjects.

REFERENCES

- [1] D. W. Hubbard, *The Failure of Risk Management: Why It's Broken and How to Fix It*. John Wiley & Sons, 2020.
- [2] J. R. S. Fraser and B. Simkins, *Enterprise Risk Management: Today's Leading Research and Best Practices for Tomorrow's Executives*. John Wiley & Sons, 2010.
- [3] F. Knight, *Risk, Uncertainty and Profit*. University of Chicago Press, 1921.
- [4] H. Markowitz, 'PORTFOLIO SELECTION*', *The Journal of Finance*, vol. 7, no. 1, pp. 77–91, Mar. 1952, doi: 10.1111/j.1540-6261.1952.tb01525.x.
- [5] RB Gallagher, 'Riskmanagement: a new phase of cost control', *Harvard Business Review*, vol. 34, pp. 34–39, 1956.
- [6] R. Nader, 'UNSAFE AT ANY SPEED. THE DESIGNED-IN DANGERS OF THE AMERICAN AUTOMOBILE', 1965, Accessed: Jun. 20, 2021. [Online]. Available: <https://trid.trb.org/view/108844>
- [7] W. D. Ruckelshaus, 'Science, risk, and public policy', *Science*, vol. 221, no. 4615, pp. 1026–1028, Sep. 1983, doi: 10.1126/science.6879200.
- [8] Grose, V. L., 'Managing risk: systematic loss prevention for executives', *Prentice Hall*, 1987.
- [9] F. Beccacece, E. Boronovo, and F. Reggiani, 'Risk Analysis in Brand Valuation', Social Science Research Network, Rochester, NY, SSRN Scholarly Paper ID 931023, Jul. 2006. doi: 10.2139/ssrn.931023.

- [10] I. Manuj and J. T. Mentzer, 'Global supply chain risk management strategies', *International Journal of Physical Distribution & Logistics Management*, vol. 38, no. 3, pp. 192–223, Jan. 2008, doi: 10.1108/09600030810866986.
- [11] X. Zhang, N. Wuwong, H. Li, and X. Zhang, 'Information Security Risk Management Framework for the Cloud Computing Environments', in *2010 10th IEEE International Conference on Computer and Information Technology*, Jun. 2010, pp. 1328–1334. doi: 10.1109/CIT.2010.501.
- [12] J. Bessis, *Risk Management in Banking*. John Wiley & Sons, 2011.
- [13] M. F. Grace, J. T. Leverty, R. D. Phillips, and P. Shimp, 'The Value of Investing in Enterprise Risk Management', *Journal of Risk and Insurance*, vol. 82, no. 2, pp. 289–316, 2015, doi: 10.1111/jori.12022.
- [14] D. Pagach and R. Warr, 'The effects of enterprise risk management on firm performance', in *The Routledge Companion to Strategic Risk Management*, Routledge, 2015.
- [15] L. Agustina and N. Baroroh, 'The Relationship Between Enterprise Risk Management (ERM) And Firm Value Mediated Through The Financial Performance', vol. 5, no. 1, p. 11, 2016.
- [16] Peter L. Bernstein, 'Against the Gods: The Remarkable Story of Risk', 1996. <https://b-ok.asia/book/836375/33bf2c> (accessed Jun. 20, 2021).
- [17] M. Gerber and R. von Solms, 'Management of risk in the information age', *Computers & Security*, vol. 24, no. 1, pp. 16–30, Feb. 2005, doi: 10.1016/j.cose.2004.11.002.
- [18] P. Saeidi *et al.*, 'The influence of enterprise risk management on firm performance with the moderating effect of intellectual capital dimensions', *Economic Research-Ekonomska Istraživanja*, vol. 34, no. 1, pp. 122–151, Jan. 2021, doi: 10.1080/1331677X.2020.1776140.
- [19] H. Itami and T. W. Roehl, *Mobilizing Invisible Assets*. Harvard University Press, 1991.
- [20] K. Philip, *Principles of marketing*. Pearson higher education, 2017.
- [21] Abrahams, D., *Brand risk: adding risk literacy to brand management*: CRC Press., 2016.
- [22] Hegner, Sabrina M., Ardion D. Beldad, and Sjarlot Kamphuis op Heghuis, 'How company responses and trusting relationships protect brand equity in times of crises', *Journal of brand management*, pp. 429–445, May 2014.
- [23] C. J. Cobb-Walgren, C. A. Ruble, and N. Donthu, 'Brand Equity, Brand Preference, and Purchase Intent', *Journal of Advertising*, vol. 24, no. 3, pp. 25–40, Oct. 1995, doi: 10.1080/00913367.1995.10673481.
- [24] J. P. Peter and M. J. Ryan, 'An Investigation of Perceived Risk at the Brand Level', *Journal of Marketing Research*, vol. 13, no. 2, pp. 184–188, May 1976, doi: 10.1177/002224377601300210.
- [25] S. Fournier and J. Avery, 'The uninvited brand', *Business Horizons*, vol. 54, no. 3, pp. 193–207, May 2011, doi: 10.1016/j.bushor.2011.01.001.
- [26] L. Hsu, S. Fournier, and S. Srinivasan, 'Brand architecture strategy and firm value: how leveraging, separating, and distancing the corporate brand affects risk and returns', *J. of the Acad. Mark. Sci.*, vol. 44, no. 2, pp. 261–280, Mar. 2016, doi: 10.1007/s11747-014-0422-5.
- [27] N. V. Hường, B. V. Nam, and H. Đ. Phi, 'Quản trị tốt an ninh phi truyền thống để phát triển bền vững', *Tạp chí Công an Nhân Dân*, vol. Số 9, 2017.
- [28] S. Bellman, Z. H. S. Abdelmoety, J. Murphy, S. Arismendez, and D. Varan, 'Brand safety: the effects of controversial video content on pre-roll advertising', *Heliyon*, vol. 4, no. 12, p. e01041, Dec. 2018, doi: 10.1016/j.heliyon.2018.e01041.
- [29] Đức V. H. and Long L. H., 'Các nhân tố tác động đến hiệu quả sản xuất của doanh nghiệp vừa và nhỏ tại Việt Nam', *KINH TẾ VÀ QUẢN TRỊ KINH DOANH*, vol. 9, no. 1, pp. 68–80, 2014.
- [30] Hà Thị Nguyệt Thu, 'Bảo hộ quyền sở hữu trí tuệ đối với nhãn hiệu trong kinh tế thị trường.' (2013):, *Tạp chí Lý luận Chính trị*, vol. 6, pp. 56–61, 2013.
- [31] Ho Ngoc Luat, 'Recent renovation of mechanism and policies for Science and Technology development at local levels and recommendations for future', *Journal SCIENCE AND TECHNOLOGY POLICIES AND MANAGEMENT*, vol. 1.1, pp. 37–51, 2012.
- [32] Dai Vo, Luoc, 'Tài cơ cấu kinh tế Việt Nam-các rủi ro và giải pháp', *VNU Journal of Science: Social Sciences and Humanities*, vol. 32.1S, 2016.
- [33] Chi, Nguyễn Thị Kim, 'Sức ép để doanh nghiệp thực hiện trách nhiệm xã hội của doanh nghiệp', *VNU Journal of Social Sciences and Humanities*, vol. 3.1b, pp. 63–73, 2017.
- [34] K. Prewett and A. Terry, 'COSO's Updated Enterprise Risk Management Framework—A Quest For Depth And Clarity', *Journal of Corporate Accounting & Finance*, vol. 29, no. 3, pp. 16–23, 2018, doi: 10.1002/jcaf.22346.
- [35] P. Saeidi, S. P. Saeidi, S. Sofian, S. P. Saeidi, M. Nilashi, and A. Mardani, 'The impact of enterprise risk management on competitive advantage by moderating role of information technology', *Computer Standards & Interfaces*, vol. 63, pp. 67–82, Mar. 2019, doi: 10.1016/j.csi.2018.11.009.
- [36] D. Abrahams, *Brand Risk: Adding Risk Literacy to Brand Management*. London: Routledge, 2016. doi: 10.4324/9781315569864.
- [37] R. F. Knight and D. J. Pretty, 'A survey of brand risk management', *J Brand Manag*, vol. 7, no. 5, pp. 353–365, May 2000, doi: 10.1057/bm.2000.25.
- [38] C. W. Park, A. B. Eisingerich, G. Pol, and J. W. Park, 'The role of brand logos in firm performance', *Journal of Business Research*, vol. 66, no. 2, pp. 180–187, Feb. 2013, doi: 10.1016/j.jbusres.2012.07.011.
- [39] J. R. Copulsky, *Brand Resilience: Managing Risk and Recovery in a High-Speed World*. St. Martin's Publishing Group, 2011.
- [40] M. K. Langenhan, S. Leka, and A. Jain, 'Psychosocial Risks: Is Risk Management Strategic Enough in Business and Policy Making?', *Safety and Health at Work*, vol. 4, no. 2, pp. 87–94, Jun. 2013, doi: 10.1016/j.shaw.2013.04.003.
- [41] M. Agus Harjoto and J. Salas, 'Strategic and institutional sustainability: corporate social responsibility, brand value, and Interbrand listing', *Journal of Product & Brand Management*, vol. 26, no. 6, pp. 545–558, Jan. 2017, doi: 10.1108/JPBm-07-2016-1277.
- [42] L. Paape and R. F. Spekklé, 'The Adoption and Design of Enterprise Risk Management Practices: An Empirical Study', *European Accounting Review*, vol. 21, no. 3, pp. 533–564, Sep. 2012, doi: 10.1080/09638180.2012.661937.
- [43] D. E. Schultz and M. P. Block, 'Beyond brand loyalty: Brand sustainability', *Journal of Marketing Communications*, vol. 21, no. 5, pp. 340–355, Sep. 2015, doi: 10.1080/13527266.2013.821227.
- [44] J. M. Murphy, 'What Is Branding?', in *Branding: A Key Marketing Tool*, J. M. Murphy, Ed. London: Palgrave Macmillan UK, 1992, pp. 1–12. doi: 10.1007/978-1-349-12628-6_1.
- [45] B. M. Ghodeswar, 'Building brand identity in competitive markets: a conceptual model', *Journal of Product & Brand Management*, vol. 17, no. 1, pp. 4–12, Jan. 2008, doi: 10.1108/10610420810856468.
- [46] C. Hofman and S. Keates, *Countering Brandjacking in the Digital Age: ... and Other Hidden Risks to Your Brand*. Springer Science & Business Media, 2013.
- [47] J. Copulsky and C. Saia, 'Brand Risk', in *Enterprise Risk Management*, Elsevier Inc, 2015, pp. 109–123. doi: 10.1016/B978-0-12-800633-7.00008-0.
- [48] G. J. Biehal and D. A. Sheinin, 'Managing the Brand in a Corporate Advertising Environment: A Decision-Making Framework for Brand Managers', *Journal of Advertising*, vol. 27, no. 2, pp. 99–110, Jun. 1998, doi: 10.1080/00913367.1998.10673555.
- [49] I. Papasolomou and D. Vrontis, 'Building corporate branding through internal marketing: the case of the UK retail bank industry', *Journal of Product & Brand Management*, vol. 15, no. 1, pp. 37–47, Jan. 2006, doi: 10.1108/10610420610650864.
- [50] S. Henkel, T. Tomczak, M. Heitmann, and A. Herrmann, 'Managing brand consistent employee behaviour: relevance and managerial control of behavioural branding', *Journal of Product & Brand Management*, vol. 16, no. 5, pp. 310–320, Jan. 2007, doi: 10.1108/10610420710779609.
- [51] P. Hopkin, *Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management*. Kogan Page Publishers, 2018.
- [52] S. Matear, B. J. Gray, and T. Garrett, 'Market orientation, brand investment, new service development, market position and performance for service organisations', *International Journal of Service Industry Management*, vol. 15, no. 3, pp. 284–301, Jan. 2004, doi: 10.1108/09564230410540944.
- [53] H. Phi *et al.*, 'Management of Nontraditional Security: A New Approach', p. 253, Apr. 2019.
- [54] H. Phi *et al.*, 'Management of Nontraditional Security: A New Approach', p. 253, Apr. 2019.

- [55] M. K. Langenhan, S. Leka, and A. Jain, 'Psychosocial Risks: Is Risk Management Strategic Enough in Business and Policy Making?', *Safety and Health at Work*, vol. 4, no. 2, pp. 87–94, Jun. 2013, doi: 10.1016/j.shaw.2013.04.003.
- [56] W. Nawaz, P. Linke, and M. Koç, 'Safety and sustainability nexus: A review and appraisal', *Journal of Cleaner Production*, vol. 216, pp. 74–87, Apr. 2019, doi: 10.1016/j.jclepro.2019.01.167.
- [57] F.-W. Lai and F. Samad, 'Enterprise Risk Management Framework and The Empirical Determinants of Its Implementation', *Paper presented at International Conference on Business and Economics Research*, vol. 1, Nov. 2010.
- [58] H. Đ. Phi and N. V. Hường, *Tổng quan về Quản trị An ninh phi truyền thống*. 2016.

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