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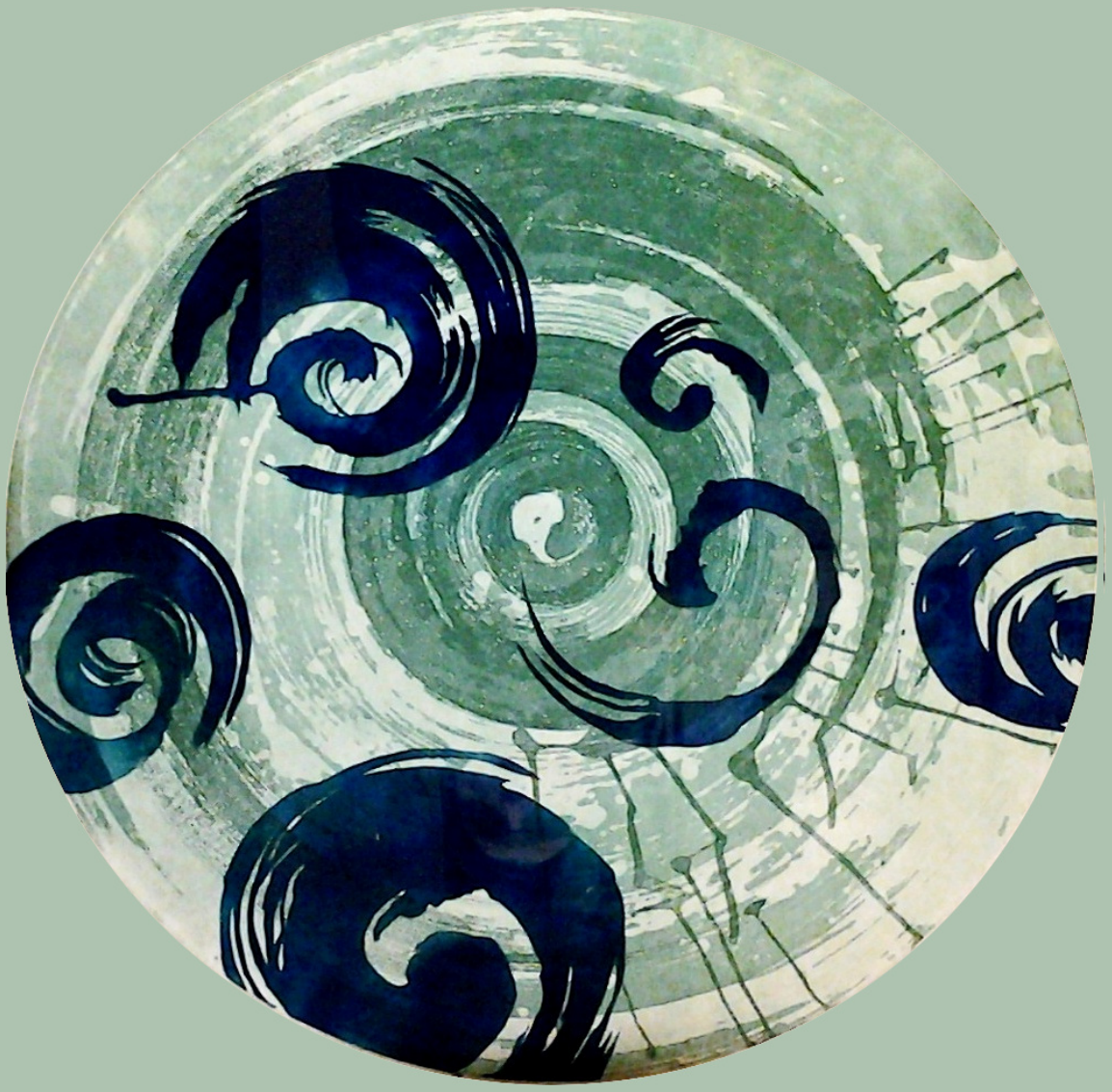

Shivani Agarwal, Darrell Norman Burrell,
Vijender Kumar Solanki (eds.)

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Ul. Solec 38/103
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Contact: secretariat@fedcsis.org
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THE First International Conference on Research in ManagementandTechnovation (ICRMAT-2020) held virtually on December 05-06, 2020 in Adarsh Vidya Mandir's Kaushalya Devi Maheshwari Girls College, Nagpur, Affiliated to RTM Nagpur University, Maharastra, India. The event was held online due to a covid 19 pandemic thathas affected worldwide.

In the first edition of ICRMAT2020, we collected 115abstracts, and in the next stage, we get 78 full manuscripts. The response was from more than 10 countries and 65 different reputed institutions. We have finalized only 30 quality manuscripts for oral presentation for two days events upon our reviewers' recommendations.

The program started with prayer; the welcome speech was given by Sh. GovindLal Ji Sarda, Chairman KDM, who shared their happiness at this international conference. The proceedings cover was released bySh. GovindLal Sarda, Sh. Ashok Kothari and Sh. Giriraj Kothari (Member Trustee). The Guest of Honor was Dr. Nguyen Thi Dieu Linh, Dy Head of Science & Technology Department, Dr. Truong Thanh Hang, Vice – Dean of Accounting and Auditing Faculty, Hanoi University of Industry, Vietnam, who shared good wishes to the conference. Dr. Shivani Agarwal, KIET Group of Institutions, Delhi-NCR, India reads out the conference report, who is the Lead Proceedings Editor of ICRMAT2020.

Out of five tracks, the first track wasa session chaired by Ms. Kumud Sharma, Deputy General Manager- Global Sales Organization-ACL Mobile (A Sinch Company) and Dr. Dibya Jyoti Bora, Faculty of Computer Science,Kaziranga University, Assam, India, on the titled "Innovative Decision Making and Performance Comparison". Dr. Darrell Norman Burrell gave the first keynote speech from the Florida Institute of Technology, USA. After the keynote speech, all the assigned authors have given their presentations and handled well all the audiences' queries.

A second track was a session chaired byDr. Nguyen Ngoc Anh, Head division of graduate training and research, SAMI, Hanoi University of Science and Technology, Hanoi, and Dr. Geeta Rana, Associate Professor, Swami Rama Himalayan University, Dehradun India, on the titled "Decision Making towards Human capital". Authors presented their papers and shared the discussion upon the audience's query as well.

Ms. Crystal Dipsingh-Bachoo, MD, Parallax Brand Consulting Ltd, T&T, West Indies, and Dr. Do Hai Hung, Business & Management Faculty, Hanoi Universityof Industry, Viet Nam deliver the second and third keynote speech, and we have completed the Day-1 for the conference.

The second day started with thefourth keynote speech by Dr. José António C. Santos, School of Management, Hospitality and Tourism (ESGHT) and Research Centre for Tourism, Sustainability and Well-Being (CinTurs) University Of Algarve, Portugal. The Third Track which was session chaired by Dr. Sachin Gupta, Department of Business Administration, Mohanlal Sukhadia University, Udaipur, Rajasthan, India,and Dr. Sonal Pathak, Dept of Management, Manav Rachna International University, Faridabad, Haryana, India on the titled "Social & Digital Electronics". After the keynote speech, all the assigned authors for the session has given their presentation and handled well all the queries by the audiences.

The fifith Keynote speech was given by Dr. Katarzyna Wasielewska, Systems Research Institute, Polish Academy of Sciences, Poland. The fourth track was session chaired by Dr. Raghvendra Kumar Agarwal, Associate Professor, Department of Computer science & Engineering, GIET University, Gunupur, Odisha, India, and Dr. Rinki Dahiya, Assistant Professor, Department of OB & HR, Indian Institute of Management, Sirmaur, HP, India on the titled "Business Decisions through Unleash Technology", where authors share their research progress and given insightful discussions with session chair and audiences.

The fifth and last track for the conference wasa session chaired by Dr. Jyoti Mishra, Department of Mathematics, and Dr. Ashish Mishra,Department of Computer science and engineering, Gyan Ganga Institute of Technology and Sciences, Jabalpur, MP, India, on the titled "Build your Business Resilience in the time of crisis". Dr. Gloria Jeanette Rincón Aponte gave the sixth and final keynote speech from the Universidad Cooperativa de Colombia, Bogota, Colombia.

We are truly thankful to Prof. Maria Ganzha, Series Editor for publishing our conference proceeeddings in ANNALS, Poland. The vote of thanks given by Dr. Vijender Kumar Solanki, CMR Institute of Technology, Hyderabad, TS, India. We want to thank *the almighty* to bestow his blessings to make the event successful. We are thankful to Management Trustees, Principal, Head of Department, KDM Girls College teachers. Their wholehearted support makes this event successful and meaningful for the research community.

Finally, last but not least, we write thanks to Sh. Mayur Shah, CEO AVM Nagpur, Ms. Punam Kabra, Ms. Rinkel Rajkotiya, IT Head Ms. Kalindi Shah from KDM college, Nagpur and Mr. Ravindra Sharma from Swami Rama Himalayan University, Dehradun India for their untiring efforts to make this two days program lively to participants.

Editors:

Dr Shivani Agarwal

Dr Darrell Norman Burrell

Dr Vijender Kumar Solanki

International Conference on Research in Management & Technovation

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Innovative doctorate programs in cybersecurity, engineering, and technology in the USA and UK that can be completed by professionals around the world without relocation

Dr. Darrell Norman Burrell
Florida Institute of Technology
https://orcid.org/0000-0002-4675-9544
https://www.researchgate.net/profile/Darrell_Burrell2

Dr. Maurice E. Dawson
Illinois Technical University
https://orcid.org/0000-0003-4609-3444
https://www.researchgate.net/profile/Maurice_Dawson2

Dr. Calvin Nobles
Temple University

***Abstract*—Every year in the U.S., 40,000 jobs for information security analysts go unfilled, and employers are struggling to fill 200,000 other cybersecurity-related roles. Colleges and universities have created certificates, undergraduate and graduate programs to train professionals in these job roles. The challenge of meeting the cybersecurity workforce shortage through degree programs is intensified by the reality of the limited number of cybersecurity and engineering faculty at colleges and universities. This paper explores the essential need to develop more doctorate faculty in technology-related areas. It explains some unique and non-traditional paths to doctoral completion that allow professionals with significant real-world work experience to complete a doctorate without career interruption and relocation from highly respected and established universities in the U.K., USA, and Australia.**

***Index Terms*—Doctoral studies, cybersecurity doctorates, faculty development, Engineering doctorate, on-line doctorate.**

I. Introduction

ACCORDING to Newman (2016), the cybersecurity threat landscape is continually evolving as malicious cyber actors pursue new vectors to target and capitalize on newly discovered or known vulnerabilities. In 2017 a hacking group known as the Shadow Brokers, claiming to have breached the NSA-linked operation known as the Equation Group. The Shadow Brokers provided samples of the stolen data and attempted to auction off other stolen data (Newman, 2017).

The global cybersecurity workforce will have more than 1.5 million unfilled positions by 2020 (Van- Zadelhoff, 2016). Every year in the U.S., 40,000 jobs for information security analysts go unfilled, and employers are struggling to fill 200,000 other cyber-security related roles (Kauflin, 2017). Threats of cyber-attacks have spurred global interest in protecting digital property from external intrusions. The identified risks to American private and public entities were part of an ongoing scenario that emphasized secure, internal, cyber information (Pierce, 2016; Stevenson, 2017). This importance came about because many in the business market had echoed the need for a skilled workforce within cybersecurity, and numerous efforts were made to address those concerns (Pierce, 2016; Stevenson, 2017).

II. The Review Of The Literature

The onslaught of cyber-attacks enhanced the need to fill positions focused on preventing data breaches (Pierce, 2016; Stevenson, 2017).

Besides, the shortage of skilled personnel provided a new dynamic to finding qualified workers that understood the complexities of cybersecurity, contributing significantly to the company's overall needs (Pierce, 2016; Stevenson, 2017).

Technologies have also led to significant changes in how our society communicates and even completes a college degree (Rahim, Burrell, Duncan, & Finch, 2020). Emerging technologies have allowed the pursuit of academic scholarship to take on new forms and new multimodal ways (Rahim, Burrell, Duncan, & Finch, 2020).

More importantly, they can provide students with multimodal ways to consume information and ultimately promote learning (Rahim, Burrell, Duncan, & Finch, 2020). That is also true for graduate education, specifically doctoral capstone projects. In many academic fields of study, newer forms of media have yet to be used as a tool for expressing and communicating academic content. Educational institutions still retain the dissertation's traditional form as the demonstrative tool of academic knowledge and doctoral experience.

Fell, Flint & Haines (2011) have added practice-based rather than discipline dependent research. They also highlighted that professional doctorates are embraced by working people with vast professional experience. Simultaneously, they are customarily undertaken within the student's work environment to produce practical knowledge for professional practice and the profession, leading eventually to professional and organizational change). Fell, Flint & Haines 2011). The Council of Graduate Schools developed a publication titled *The role and nature of the doctoral dissertation: a policy statement* contends that "dissertation research should provide students with hands-on, directed experience in the primary research methods of the discipline, and should prepare students for the types of research/scholarship that will be expected of them after they receive their Ph.D. degree" (Hancock, 1991, p. 3).

The emergence of on-line and non-traditional educational programs has created new innovative solutions for

addressing workforce development shortages by allowing professionals must work to be still able to pursue education and professional development opportunities (Rahim, Burrell, Duncan, & Finch, 2020). Universities are creating new degree programs and new approaches to learning that facilitate the innovative expression of academic scholarship (Rahim, Burrell, Duncan, & Finch, 2020).

These innovations have also included changes and new approaches to doctoral education. Perry & Imig (2008) outline, "as a result of these conversations, new forms of the capstone project are emerging. For example, the University of Southern California program has introduced thematic dissertations, wherein students conduct individual investigations of field-based problems as part of a group organized around a set of related problems. The University of Houston has put together a candidacy paper task force, which considers capstone models such as a needs analysis for educational institutions, the development of institutional-change plans, and a critical analysis of a district program. Both the University of Missouri–Columbia and the University of Florida are considering the role that solving "real-world" problems might play in a capstone piece. As a result of the focus on problems of practice, some institutions have suggested that the dissertation committee should include professional as well as academic members."

III. The Development Of Non-Traditional Doctoral Programs

Several accredited U.S. universities have successfully developed non-traditional doctoral programs that offer limited face to face teaching residencies and on-line learning. These programs allow students from all over the world to complete a doctoral degree in Information Technology, Engineering, and Cybersecurity while working full time and not moving or relocating to complete their degrees. These are all brick and mortar universities that are leveraging their campus resources to engage professionals with significant work experience in the field, which could become effective faculty members in the future with a doctorate degree. These programs have several similar characteristics, like either on-line or limited residency offerings. These programs have coursework combined with dissertation research. These schools include:

1. The George Washington University in Ashburn VA, USA offers an on-line Doctor of Engineering that can be finished remotely in Cybersecurity and Technology Management
2. Old Dominion University in Norfolk, VA, U.S. offers an on-line Ph.D. in engineering management and systems engineering.
3. Dakota State University in Madison, South Dakota, USA, has an on-line Ph.D. in Information Security.
4. The University of the Cumberlands in Williamsburg, KY, USA, has an on-line Ph.D. in Information Technology with options to study Blockchain Technology at the graduate level on-line.
5. Mississippi State University in Starkville, MS, USA has an on-line Ph.D. in Systems and Industrial Engineering.

IV. U.S. Research Only Ph.D. Program

Usually, the U.S. approach to doctoral study includes academic coursework and then dissertation research. Still, one university in the U.S., Capitol Technology University, in Laurel, Maryland, USA, has a doctoral approach like many European Universities where students engage in their independent research. This program also allows students who have completed doctoral credits at other universities but failed to achieve their doctorate to transfer their credits and complete their doctorate in an accelerated format. They offer Ph.D. programs in Artificial Intelligence, Emergency and Protective Services, Human Factors, Unmanned Systems Applications, and Technology.

V. Ph.D. by Published Research or Ph.D. by Publication

The Ph.D. by Published Research or Ph.D. by Published Works emerged as an option in 1966 at Cambridge University in the U.K. and has grown to become a viable path for doctoral degree completion in the U.K. and Australia (Peacock, 2017). The Ph.D. by published works was initially conceived to allow practitioners such as creative writers, artists, and accomplished executive to obtain an earned doctorate that would afford them the ability to take their knowledge, experiences, and accomplishments along with a doctorate degree in the university classroom (Peacock, 2017).

The Ph.D. by published works program works by the students submitting a collection of prior peer-reviewed published research and works all from the matching field for examination (Peacock, 2017). The portfolio submission can include peer-reviewed full paper conference proceedings, peer-reviewed academic articles, and peer-reviewed book chapters. The submission of published works is critical content analysis as an evaluated equivalent to fulfilling requirements for a doctoral degree (Peacock, 2017). The critical content analysis explains the relevance, impact, and unifying significance of the publications in the academic field (Peacock, 2017). Universities offering these programs include:

Middlesex University in the U.K. offers a Doctor of Professional Studies by published works.

London Metropolitan University in the U.K. offers a Ph.D. by Published Works.

These universities offer flexible doctoral programs that are a perfect fit for working professionals of those that want to be able to work full time while they pursue a doctorate. These programs also offer organizations new options support high potential employees with professional

development funding support for these employees to pursue doctoral level professional development. Each program is geared towards working professionals and executives in the Cybersecurity, Engineering, and fields to bring their expertise to universities that are challenged to meet new workforce demands in Technology, Engineering, and Cybersecurity.

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Enhancement of Images Taken in Fog Condition: A Review

Rajashree Das, Tridipjit Rajkonwar, Dr. Dibya jyoti Bora
Department of Information Technology
School of Computing Science
Kaziranga University
Assam, India

***Abstract*—Images captured using camera systems in foggy weather conditions often suffer from poor visibility and can be seriously degraded due to atmospheric conditions , which creates a lot of impacts on the outdoor computer vision systems. To solve this problem, image enhancement is very important as this process is used for enhancing the quality of an image, and for this purpose numerous visibility enhancement techniques have been used and applied. In this paper, we have tried to describe how to enhance an image using different techniques and methods. For this, various techniques and methods have been studied for image enhancement used in different research and review papers. The main goal of this paper is to understanding and reviewing the techniques used for image enhancement.**

***Index Terms*—atmospheric conditions, computer vision and visibility enhancement.**

I. Introduction

FOG IS the visible aggregation of a great number of water droplets and ice crystals which are suspended in the atmosphere close to the ground level. These droplets and ice crystals reduces the amount of visibility and contrast of the image which results in blurring of edge information and make the object identification way too difficult. Image enhancement is the process of adjusting digital pictures in order that the results square measure a lot of appropriate for show or any image analysis. Image enhancement techniques remove blur and noise, improve the standard of quality of images for human viewing, increase distinction, as enhancement operations. It is often required to enhance the value of images and therefore, certain image enhancement techniques have been use. Enhancement of image is may be a terribly difficult issue in several analysis and applications. The technique applied for enhancing images is applicable for medical image processing and image processing application areas like satellite image processing, biometric image processing, etc.

II. Literature Review

In the past few years, many researchers have published various research and review papers on Image Enhancement techniques using different algorithms. So far, several task have been done for image enhacement. So, here in this section, some of the work have been discussed.

Ping-Juei Liu, Shi-Jinn Horng, Jzau-Sheng Lin et al. [1] proposed the paper named Contrast in Haze removal :Configurable Contrast enhancement Model Based on Dark Channel Prior. In this review paper, De-hazing is carried out by adjusting the saturation and contrast of the image to improve the quality of the post-processed image. The struggling in haze removal algorithm is reformulated subjecting to luminance reconstruction scheme which is based on the statistical analysis of luminance value of the image. The accretion of contrast is based on the variance in the gradient space and the interpretation of the contrast showing that the dark channel magnifies the divergence details by increasing the changes in the input image gradient or the saturation of the scene radiance is enhanced by decreasing the differences to the estimated initial dark channel. The final resultant contrast value imperious for the given brightness value. Here, the atmospheric light estimation module operates on colour consistancy method which outperforms even when the noise is accepted.

Zheqi Lin et al. [2] proposed "Dehazing for images and video using Guided Filter" where high-performance vision algorithm is required for the effective removing of haze and fog from the image. So here in this paper, a fast real-time image and video dehazing method has been proposed. And here also the airlight and the down-sampled transmission estimation and extraction are performed ease using this proposed algorithm. In this paper, they have used the improved guided filter is used for estimating the transmission map which can be further refined and up- sampled according to one's need.

R. Ahila Priyadarshini, S. Aruna et al. [3] proposed "Visibility Enhancement Technique for Hazy Scenes". Here in this paper, an effective visibility enhancement technique for single image de-hazing is designed by using Dark Channel Prior technique.This will helps in estimating the dark pixels having low intensity at any one of the RGB channels and this dark channel provides exact estimation for obtaining the transmission map. For the edge preservation of transmission map, the bilateral filter has been used. And to obtain the gamma correction technique and for estimating the exact colour of the hazy input image, a Laplacian distribution value is used. And for gauging the sufficient transmission map, gamma correction technique has been used. To evaluate the quality of the enhanced image, performance metric such as PSNR, e metric and σ metric are used for measurement.

Mohammad Javed Abbaspour, Mehran Yazdi, Mohammadali Masnadi-shirazi et al.[4] proposed "A New Fast Method for Foggy Image Enhancement". In this paper, a novel method has been proposed to enhance the contrast in

foggy images and this develops an image atmospheric model which is based on the Koschmieder's theory of atmospheric vision. To acquire an outline of a strength of the fog in different areas of the image morphological operators operation is performed. This proposed algorithm outperforms regarding quantitative and qualitative analysis and also the computation time is low.

Ashok Shrivastava, Sanjay Jain et al.[5] proposed "Single Image Dehazing based on one dimensional linear filtering and adaptive Histogram Equalization method". In this review paper, the study presents a single image de-hazing method which is based on a one-dimensional linear filter. The main goal of this proposed paper is to resolve any type of foggy issue by using this algorithm, which is basically based on mean enhancement methodology and adaptive histogram equalization method. YCbCr model excels in colour compression in which Y luminance can be used separately for storing in high resolution and the chromaticity components treated separately so that it can be used to enhance the results. Eventually, it achieves the linear complexity and results demonstrates the effectiveness of this algorithm.

S. S. Negi, Y. S Bhandari et al.[6] proposed "A Hybrid approach to Image Enhancement using Contrast Stretching on Image Sharpening and the analysis of various cases arising using Histogram", where they have discussed about the contrast stretching and image sharpening techniques. It is an approach that will concurrently adjusts contrast and enhances boundaries of the input image. On the gray-scale image, this contrast stretching will be applied and then it proceeds to Laplacian mask, and then finally, Laplacian image will be included to the original gray-scale image to obtain the desired sharpened image.

Seyed Pooya Ehsani, Hojjat Sayed Mousavi, Babak. H. Khalaj et al.[7] proposed "Chromosome Image Contrast Enhancement Using Adaptive, Iterative Histogram Matching". Here, in this paper, they have explained an adaptive and iterative histogram matching (AIHM) algorithm for chromosome contrast enhancement used in the various medical applications. To meet the various requirements of the user and to obtain the different results, some parameters in the presented model has to be selected. The detailed simulations were accomplished by using different sets of single chromosomes, indicating that the proposed methodology enhances the details appropriately.

Che-Lun Hung, Ren-You Yan, Hsiao-His Wang et al.[8] proposed "Parallel image dehazing algorithm based on GPU using fuzzy system and Hybrid evolution algorithm" where they have explained a parallel hybrid evolution algorithm based on GPU which is proposed to enhance the computational performance. In this conventional evolution algorithm, the calculation of fitness function occupies most of the processing time. So to overcome such circumstances, we need to implement this part on GPU by using CUDA framework to reduce the processing load.

Kwang Yeon Choi, Kyeong Min Jeong, Byung Cheol Song et al.[9] proposed "Fog detection for de-fogging of road driving images".In this paper, they have generally explained the fog removal technique deteriorate the visual due to excessive contrast improvement. Here the fog detection algorithm is designed such that it selectively apply de-fogging method only at a foggy region. Apart from, an excessive contrast enhancement adjustment and luminance compensation should be done to avoid the output to be too dark. This proposed algorithm will be able to produce 97% of the fog detection accuracy and the subjective image quality is improved.

Khairunnisa Hasikin, Nor Ashidi Mat Isa et al.[10] proposed "Enhancement of the low contrast image using fuzzy set theory" where they have discussed fuzzy gray-scale enhancement technique. The fuzzy measures in the image are augmented by using the mentioned technique. By using power law transformation and saturation operator, the membership function has been modified. The intensities are increased of the underexposed regions, and intensities are decreased of the overexposed region, which is why the dynamic range is to be maintained. Other methods that are being used are INT operator and NINT operator.

Raju, Ganesamoorthy, Madhu S. Nair et al.[11] proposed "A new fuzzy-based decision algorithm for high-density impulse noise removal". In this paper, they have discussed about a new fuzzy logic and histogram-based algorithm for magnifying low contrast color image. In this methodology, there are two parameters such as K and M, where K is the contrast identification parameter and M is the image's average intensity parameter. The RGB image is transformed to HSV color space. Under the controlling of parameter M, V component is strained in order to magnify the image. The quality of visuality is modified by this method.

Dong-Liang Peng, Tie-Jun Wu et al.[12] proposed "A generalized image enhancement algorithm using fuzzy sets and its application". Here, in this paper, the generalized fuzzy enhancement method that overcomes the limitations of the traditional fuzzy method of enhancement. The enhancement problem that occurs because of the low contrast and the narrow gray range images is solved by this method. Here, they have focused on the improved label algorithm is used for image segmen- tation and recognition, which is helpful in understanding an image and in object recognition.

III. Image Enhancement Techniques

Various techniques are used for image enhancement, which are given below.

A. Histogram Equalization

Histogram equalization is a very common method in image processing of contrast adjustment using the input image's histogram. Suppose we have an image which is predominantly dark. Then its histogram would be skewed towards the lower end of the grey scale and all the image detail is compressed into the dark end of the histogram. If it could stretch out the grey levels at the dark end to build a more consistent histogram then the image would become

much understanding. Histogram equalization stretches the histogram across the entire spectrum of pixels (0 – 255). It increases the contrast of images for the completeness of human scrutiny and can be applied to normalize illumination variations in image understanding problems. Histogram equalization is one of the operations that can be applied to acquire new images based on histogram specification or modification. Histogram equalization is considered a global technique. This process is quite simple to understand and for each brightness level j in the original image, the new pixel level value (k) is calculated as given in equation

$$K = \sum_{i=0}^{j} N_i / T \ldots\ldots\ldots\ldots\ldots$$

Here, the sum counts the number of pixels in the image with the brightness equal to or less than j, and T is the total number of pixels. The main objective of histogram equalization is to find gray level transformation function T to transform image f such that the histogram of T(f) is equalized.

B. Convolutional Neural Network

Convolutional Neural Networks (CNN) is a class of deep learning neural networks. In short it is a machine learning algorithm that can take in an input image, assign importance to various aspects/objects in the image, and be able to differentiate one from the other. CNN algorithm works by extracting features from the images. Any CNN consists of the following:

- The Input layer which is a grayscale image.
- The Output layer which is a binary or multi-class labels.
- Hidden layers consisting of convolution layers, rectified linear unit layers, the pooling layers, and a fully connected Neural Network.

The job of CNN is to lessen the images into a form that is easier to process, without losing features critical towards a good prophecy. This is important when we need to make the algorithm scalable to massive datasets. A CNN works by extracting features from the input images. This abolish the need for manual feature extraction. The features are not trained. They are learned while the network trains on a set of images. With the help of this, one can make deep learning models extremely accurate for computer vision tasks.

C. Fuzzy Logic Technique

Fuzzy logic is a technique used for representing and manipulating uncertain information. This logic has been productively found in different elements of image processing. Recently fuzzy based algorithms for image enhancement have been evolved with better performance compared to that of conventional and other advanced techniques like GLG. This image processing technique includes mainly three stages, they are image fuzzification, modification of the membership values, and, if needed, image DE fuzzification. After the images data are converted from gray-level domain to the fuzzy membership realm , relevant fuzzy techniques modify the membership values.

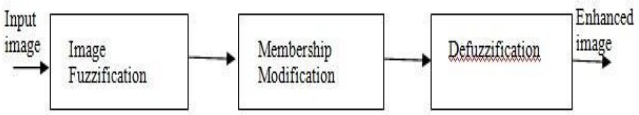

Fig.1

D. Neuro Fuzzy System

A Neuro-fuzzy system is a fuzzy system that uses a learning algorithm derived from or inspired by neural network theory to determine its parameters by processing data samples. These are the Artificial Neural Network (ANN) based fuzzy systems. An ANN dictate the effects of data samples by simply processing it. Prophetic power of ANN is more than compared to that of signal analysis techniques. Fuzzy set theories are essential basically for dealing with the uncertainty. Neuro-Fuzzy system is basically a system where the fuzzy rules and sets are adjusted by using neural network techniques in repetitious manner with the set of pair of input and output data vectors. At first, such system acts like a neural network where learning of parameters occurs and at the time of execution it behaves like a fuzzy.

Neural networks will detect all types of noise whether it is salt and pepper, gaussian and non-gaussian noise. And then, the Fuzzy logic will apply proper filter based on what type of noise the image has.

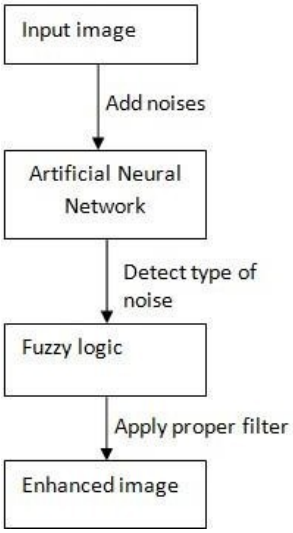

Fig. 2

E. Restoration Algorithm

Restoration algorithm is used for restoring of images that are corrupt or noisy and estimating the clean, original image. Image restoration is performed by reversing the process that blurred the image and such is performed by imaging a point source image, which is called the Point Spread Function(PSF) to restore the image information lost to be blurring process. Image restoration algorithms distinguish themselves from image enhancement methods in that they are based on models for the degrading process and for the ideal

image. Here, a novel real-timing algorithm for image restoration is being proposed in edge computing. At first, 10 classical functions are being used to determine the population size and maximum repetition times of adhesion fruit fly optimization algorithm. Secondly, TFOA is used to optimize the optimal parameters of least squares support vector regression kernel function, and the error function of image restoration is taken as an adaptive function of TFOA. Thirdly LLSVR algorithm is used to restore the image. Through the comparison and analysis of experiments, the proposed method could be able meet the requirements of the real-time image restoration, and this proposed algorithm can speed up the image restoration and improve the quality of the image.

F. Contrast Stretching

Contrast stretching is a simple image enhancement technique that attempts to improve the contrast in an image by stretching the range of intensity values it contains to span a desired range of values of the image. To emerge the range of brightness values in an input image the contrast enhancement techniques are to be used, so that the input image can be efficiently displayed in a proper manner desired by the analyst. The level of contrast in an image may vary because of poor illumination or improper setting in the acquisition sensor device. Therefore, there is a need to manipulate the contrast of an image to compensate for difficulties in image acquisition. The motto behind contrast stretching is to increase the dynamic range of the gray levels in the image being processed. The idea is to modify the dynamic range of the grey-levels in the images. Linear Contrast Stretch is the simplest contrast stretch algorithm that stretches the pixel values of a low-contrast image or high contrast image by extending the dynamic range across the whole image spectrum from 0 – (L-1).

G. Koschmieder's model

Koschmieder proposed that visibility is inversely proportional to the extinction coefficient of air, and this model has been widely adopted during the past century because of its efficiency. Using the radiative transfer theory, the authors present a study of general relationship for the law of contrast reduction and point out that the Koschmieder model is only workable to situations when a common-size object can be viewed from tens of kilometers away. By the adapting this model, we can enhance the gradient and contrast of the image.

TABLE 1. COMPARATIVE ANALYSIS OF IMAGE ENHANCEMENT TECHNIQUES

S.N.	Techniques	Advantages
1	Histogram equalization	This technique is very much simple. The global histogram equalization can only be done completely automatically.
2	Convolutional Neural Network	This algorithm can take images as input, and assign importance to various objects of the input image. The preprocessing required in this algorithm is much lower as compared to other classification algorithms.
3	Fuzzy Logic Technique	The fuzzy rule-based approach is a powerful method for the formulation of an expert system in a comprehensive way. Fuzzy logic represents the good mathematical frameworks to deal with the uncertainity of the available information.
4	Neuro Fuzzy System	The neural networks basically used for identification of noise using the statistical parameters whereas fuzzy logic is used for the enhancement purpose.
5	Restoration Algorithm	This algorithm is a process of recovering the original image by removing noise and blur from the image.
6	Contrast Stretching	Contrast Stretch is the simplest contrast stretch algorithm that stretches the pixel values of a low-contrast image or high-contrast image by extending the dynamic range across the whole image spectrum.
7	Koschmieder's Model	This model is suitable for both color and gray scale images and is able to perform image in real time. With this model, one can recover the original fog-free image.

IV. CONCLUSION

Images are more important in day to day life of human beings. The quality of image is affected from environmental conditions including their capturing method, storing technique, and representing behavior. Maximum road accidents in India occur due to poor visibility of objects . the fog changes the contrast of object as differed from originality. The overall statement is targeted to analyze the reality behind the foggy images and their restoration. In this paper, the methodology review of different visibility enhancement approaches and contribution of research communities in each of these category is described elaborately. This paper surveys some of the areas where image enhancement is done with the help of some of the mostly used enhancement techniques.

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Decision Making Of Suitable Bioenergy Power Plant Location: A Case Study

Muhammed Sutcu[1], Fatih Yasin Güner[2], Ramazan Duran[3], İsmet Söylemez[4,*]

[1]Asiss. Prof., Department of Industrial Engineering, Abdullah Gül University
[2]Department of Industrial Engineering, Abdullah Gül University
[3]Department of Industrial Engineering, Abdullah Gül University
[4]Dr., Department of Industrial Engineering, Abdullah Gül University
[1]muhammed.sutcu@agu.edu.tr, [2]fatihyasin.guner@agu.edu.tr, [3]ramazan.duran@agu.edu.tr, [4]ismet.soylemez@agu.edu.tr
Corresponding Author

***Abstract*—Selection of an appropriate place for biomass power plant is very essential, balance of transported amount and collected amount should be in a balance. Otherwise, transportation cost is going to cause huge loss of profits. According to references that referred in literature review, to determine appropriate places for biomass power plant, facility location problem have applied. This research addresses Facility Location Problem and then Mixed Integer Programming Model is developed which maximizes the potential value of facilities is going to be built. That model is used for solving different size of problems such as number of cities that is going to be selected and transportation budget. After 21 different size of the model is solved, the solution is compared and ideal solution trying to be elected. Therefore, the case of electing 3 cities or 5 cities should have 3 billion budget and 7 city electing should have 5 billion budget with respect to regression trend line. For this purpose, the logistics on Turkey, biomass potential and cost in mind, the most appropriate location and the type of bioenergy plants should be selected in this study.**

***Index Terms*—Biomass, Renewable energy, Optimization, power plant selection.**

I. Introduction

BIOENERGY is one of the renewable energy types which is obtained from biological resources. Although bioenergy is used frequently, amount of energy that obtained from a bioenergy power plant in Turkey is considerably low. According to Yılmaz [1], there are 73 active bioenergy power plants in Turkey. Additionally, the biggest power plant in İstanbul which is Odayeri has 33.81MWe installed capacity which is less than 1/20 capacity of the biggest bioenergy power plant in the world. The biggest power plant is Ironbridge and it has capacity of 740 MW.

The total biomass energy potential in Turkey shows that approximately 33 million tons of oil equivalent. When viewed biomass potential in Turkey seems to be very large. Based on this situation, existing facilities continue producing electricity and also new facilities should be opened in the most efficient way. For this purpose, the logistics on Turkey, biomass potential and cost in mind, the most appropriate location and the type of bioenergy plants should be selected [2].

II. Literature Review

Decision-making methods and applications for bioenergy systems are classified [3]. Additionally, authors keep an account of methods that used for bioenergy problems. That gives brief introduction to method and problem mapping. De Mol [4] define simulation and optimization models can be used for cost estimation. On the one hand, output of the simulation model can be throughput of biomass, cost, energy consumption and number of transportations. On the other hand, optimization model especially used for selection of site of energy plant. Fiedler et al. [12] describe variety of biomass supply and main objectives in planning of supply systems. Additionally, elements of supply system and the fundamentals of decision making in supply logistics are emphasized.

The logistical challenges in the supply of biomass to a bio-refinery are analyzed [5]. They have also developed a mathematical model that can be used to design the supply chain and manage a bio-finery logistics. Supply chain design decisions are long-term decisions; As logistics management has medium and short term decisions, they want to help coordinate these decisions with the proposed model. The model helps determine the number, location and size of refineries required to produce biofuels using biomass. They also wanted to determine the amount of biomass delivered, processed and stocked over a period of time in the model. In the model, biomass raw material, biomass transport, inventory and processing costs are given as input. Bowling et al. tried to provide a systematic approach for optimal production planning and plant layout of a bio refinery [6]. First, a representation has been developed to include biomass raw material, pre-treatment centers and central processing plants to produce the desired products and by-products. A mathematical model was then developed to determine the most appropriate supply chain, size, operational strategies and location to be installed in the bio refinery and pre-treatment center facilities. The model determined the maximum net profit. To this end, it has made it possible to consider the optimum selection of different components at the same time, taking into account the specific location configuration, biomass selection and processing facilities. The purpose of

this model is to increase profits by taking into account the general sales and the costs of raw materials, transportation costs, capital costs of the facilities and operating costs of the facilities. The model also used convex relationships to guarantee an optimal global solution. The supply chain planning of biomass in Thailand are considered [7]. The aim of this study is to establish a planning system for biomass plant location selection and biomass allocation to each plant. The three components of the biomass supply chain are considered as suppliers, bio-power plants and customers. A mathematical model has been developed with a mixed-integer linear programming in order to determine the amount of biomass that should always be ordered from different suppliers of the period and taking into account the constraints on bio-power plants. The aim of the model is to minimize the total cost by considering the four cost components, including the fixed opening of the proposed bioelectric power plants, the cost of materials resulting from the purchase of biomass, the transportation cost between suppliers and bioelectric power plants and the cost of holding stock.

The international forest biomass has said that it is considered a valuable renewable energy raw material, but the use of forest residues is difficult, it has been shown that factors related to collection, processing and transport impose restrictions on the economic viability of residue handling processes and affect their supply from dispersed raw material locations [8]. They said that it is very important to take into account these supply chain issues in order to optimize decision-making on suitable locations for biomass power plants that want to use forest residues. In this article, work has been conducted in Australia and Tasmania and presents a research for the integration of Multi-Criteria analysis (MCA) and Geographic Information systems (GIS) to identify the most suitable locations for potential biomass power plants. The amount of forest harvest biomass residues was estimated in Tasmania (NIPNF) according to a non-industrial private natural resource model. The integration of a GIS model, including MCA and a supply chain cost analysis, attempted to identify and analyze the most appropriate locations that attempt to balance economic, environmental and social criteria within biomass supply. Jeong and Ramírez-Gómez [9] are stated that determining the correct location of a biomass plant is a critical issue due to its geographically characteristic biomass materials. The article said that a GIS-MCDA approach and sensitivity analysis should be performed with WLC to optimize the appropriate areas of a biomass plant. It has demonstrated that this approach can be used to solve renewable energy planning problems in the context of a sustainable environment. The results have not shown that the most appropriate places and products can be used as a recommendation for governments in countries and can be used in decision making for renewable energy management policy. McKendry [10] mentioned that the use of renewable energy sources is becoming increasingly necessary. Biomass is a renewable energy source that is widely used in the third world, but has been used less recently in the Western world. He recently mentioned that there has been a focus on identifying suitable biomass species that can provide high-energy outputs instead of fossil fuels.

Román and Paneque [11] mentioned that biomass is now used for energy purposes such as heat and electricity generation. Potential raw materials are wheat, oats and barley straw, corn stock from the agricultural industry and wood waste from the wood industry and sawdust from the wood industry. The most suitable place to establish an energy production facility, distance from villages, energy demands, industrial location and so on. it was determined according to various conditions. A proposal has been created for optimal location and installation. A total of 19 regions that meet the requirements for the three scenarios are specified as eligible locations.

III. Proposed Work

Currently, in each city biomass can be reached up to the same amount. Additionally, this amount can be increased with biomass that supplied from neighbor cities in return for transportation cost. Collected biomass amount is equivalent to potential electrical energy which is going to be used for biomass power plant. Selection of a place for biomass power plant is very essential, balance of transported amount and collected amount should be in a balance. Otherwise, transportation cost is going to cause huge loss of profits. According to references that referred in literature review, to determine appropriate places for biomass power plant, facility location problem have used. Data which is taken from BEPA and will be used for model, kept as TEP (Ton equivalent oil)/Year. However, this unit is not useful to make calculation for determining capacity of power plant. Therefore, that value is converted into mWh with formula that given below.

$(TEP/year) * 11600 * 365/24/10/1000/\mathrm{n}$; 11600 is used for converting TEP to kWh 365 is used for converting Year to Day; 24 is used for converting Day to Hour; 10 is used for efficiency ratio of burning biomass (10%); 1000 is used for converting kWh to mwah; n stands for number of facilities that shares all potential energy

In this model, each city of Turkey is assigned as a candidate city for biomass power plant. Cities are paying very little price to use biomass in the same city. However, for the different cities, transportation cost is directly affected by distance between cities. Transportation amount is limited by transportation cost. With different transportation cost limitations and number of facilities size of the model is differentiated.

A. Mathematical model

Our Facility Location Problem is formulated as the following in order to obtain maximizing the potential energy of all facilities that is going to be built with given amount of transportation cost and number of facilities that is going to be used.

Index
i,j : the index of city
n : number of city

Parameters
A_i : amount of biomass in city i
R_i : the ratio of amount and potential energy in city i
D : the distance between city i and j
TRij : transportation cost
$TrsBd$: transportation cost budget
EN : minimum amount of energy needed
$maxdis$: maximum distance of city that can be supplier
FA: the number of facilities which is going to be selected
TC : Amount of 100 tons that truck can deliver

Decision Variables
Xi : Whether the facility is opened in city i or not
Yij : Whether the biomass is supplied from city j to city i
Tij : Amount of transported biomass from j to i

Objective Function

$$max\ z = \sum_i \sum_j R_j * T_{ij} \quad (1)$$

$$\sum_{i \in n} X_i = FA \quad (2)$$

$$X_i - Y_{ij} \geq 0 \ \forall i, j \quad (3)$$

$$TR_{ij} / D_{ij} \leq A_j \ \forall i, j \quad (4)$$

$$Y_{ij} * D_{ij} - maxdis \leq 0 \ \forall i, j \quad (5)$$

$$\sum_i \sum_j A_j * D_{ij} * TCap * C * Y_{ij} \leq TrsBd \quad (6)$$

$$\sum_i T_{ij} \leq A_j \ \forall j \quad (7)$$

$$X_i, Y_{ij} \in \{0,1\} \ \forall i, j \quad (8)$$

$$T_{ij} \geq 0 \ \forall i, j \quad (9)$$

Objective function represents that model aims to maximize potential energy of facilities. Constraint (2) represents that number of opened facilities should be equal to how much facilities going to be opened. Constraint (3) guarantees that if facility is not opened in a city, nothing is going to be transported to that city. Constraint (4) represents that if there is no transfer between two cities transferred amount should be 0. Constraint (5) guarantees that two cities that make transfer between each other cannot be further than maximum distance. Constraint (6) guarantees that total transportation cost cannot exceed transportation budget. Constraint (7) represents that total transferred amount cannot be more than amount in the city.

IV. Numerical Results

As shown in the following figures, these are different solutions that received from GAMS software for different size of the problems. It appears that for different size of problems solution diversifies.

Solution with selecting 3 cities are finalizes at 3 billion budget and selecting Balıkesir, Aksaray, Osmaniye. Solution with selecting 5 cities finalises at 5 billion budget and selecting Balıkesir, Çorum, Diyarbakır, Aksaray, Osmaniye. Solution with selecting 7 cities selects Aydın, Bursa, Çorum, Diyarbakır, Tekirdağ, Aksaray, Osmaniye at 7 billion budget. Potential energy of each facility is given at Table 4. 7 Cities has huge superiority against other number of city selections in terms of total potential energy.

TABLE 1. CITIES THAT ELECTED FOR 3 CITY PROBLEM

	3 Cities		
Budget	1	2	3
100000000	Adana	Tekirdağ	Karaman
500000000	Adana	İzmir	Konya
1000000000	Adana	İzmir	Konya
1500000000	Adana	Konya	Maraş
3000000000	Balıkesir	Aksaray	Osmaniye
5000000000	Balıkesir	Aksaray	Osmaniye
7000000000	Balıkesir	Aksaray	Osmaniye

V. Conclusion and Future Scope

To sum up, this research addresses Facility Location Problem and then Mixed Integer Programming Model is developed which maximizes the potential value of facilities is

TABLE 2. CITIES THAT ELECTED FOR 5 CITY PROBLEM

	5 Cities				
Budget	1	2	3	4	5
100000000	Adana	Edirne	Tekirdağ	Karaman	Osmaniye
500000000	Adana	İzmir	Konya	Samsun	Şanlıurfa
1000000000	Adana	İzmir	Kırklareli	Konya	Şanlıurfa
1500000000	Adana	Balıkesir	İzmir	Kırklareli	Konya
3000000000	Aydın	Balıkesir	İzmir	Konya	Maraş
5000000000	Balıkesir	Çorum	Diyarbakır	Aksaray	Osmaniye
7000000000	Balıkesir	Çorum	Diyarbakır	Aksaray	Osmaniye

TABLE 3. CITIES THAT ELECTED FOR 7 CITY PROBLEM

	7 Cities						
Budget	1	2	3	4	5	6	7
100000000	Adana	Amasya	Samsun	Tekirdağ	Karaman	Bartın	Osmaniye
500000000	Adana	Bursa	İzmir	Konya	Samsun	Tekirdağ	Şanlıurfa
1000000000	Adana	Balıkesir	İzmir	Kırklareli	Konya	Samsun	Şanlıurfa
1500000000	Adana	Balıkesir	İzmir	Kırklareli	Konya	Samsun	Şanlıurfa
3000000000	Adana	Amasya	Balıkesir	Diyarbakır	İzmir	Kırklareli	Konya
5000000000	Adana	Aydın	Bursa	Çorum	Tekirdağ	Şanlıurfa	Aksaray
7000000000	Aydın	Bursa	Çorum	Diyarbakır	Tekirdağ	Aksaray	Osmaniye

going to be built. That model is used for solving different size of problems such as number of cities that is going to be selected and transportation budget. After 21 different size of the model is solved, the solution is compared and ideal solution trying to be elected. Therefore, the case of electing 3 cities or 5 cities should have 3 billion budget and 7 city electing should have 5 billion budget with respect to regression trendline.

In case of selecting 3 city with 3 billion budget, Balıkesir, Aksaray and Osmaniye should be selected. In case of selecting 5 city with 3 billion budget Aydın, Balıkesir, İzmir, Konya and Maraş should be selected. Finally, In case of selecting 7 city with 5 billion budget, Adana, Aydın, Bursa, Çorum, Tekirdağ, Şanlıurfa and Aksaray should be selected.

TABLE 4. POTENTIAL ENERGY OF EACH FACILITY

	3 Cities	5 Cities	7 Cities
100000000	343,7228752	300,0228	263,3946
500000000	485,2312222	398,46	348,0576
1000000000	569,5719178	469,3959	404,8532
1500000000	670,6477763	530,5549	448,4914
3000000000	845,3846499	690,7695	579,8774
5000000000	845,3846499	795,6892	718,3078
7000000000	845,3846499	795,6892	746,0887

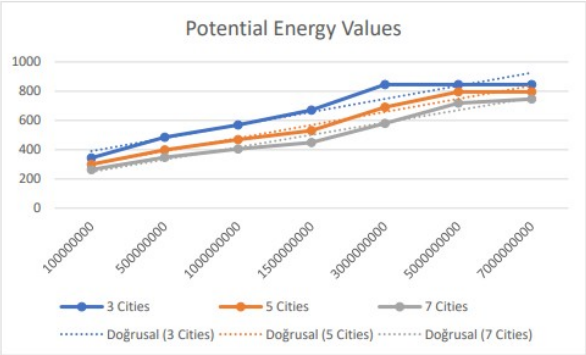

Figure 1. The objective function values of each solution

Figure 1 shows the objective function values of each solution. After 5 billion, it is very challenging to improve current solution.

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Role of Gender in Work-life Balance

Anjali Jindal[1], Shivani Agarwal[2]
[1]Assistant Professor, IILM Graduate School of Management, Greater Noida,
[2] (Corresponding Author) Assistant Professor,KIET School of Management,
KIET Group of Institutions, Delhi-NCR, Ghaziabad, India
[1]jindalanjali1@gmail.com [2]jindal.shivani24@gmail.com

***Abstract*—Purpose: Investigating the significant difference in the role of the gender on work-life balance among the employees (managers) in FMCG companies. It is done by assessment of changes in core dimensions of work-life balance.**

Design/Methodology/Approach: The assessment was done among 350 managers working in FMCG companies in Delhi/NCR. They had been given questionnaires to make assessment of the dimensions of different variables related to WLB. T-Test were applied to examine the role of gender on WLB.

Findings: The findings suggested significant difference in the exhibition of most of the facets of WLB between the two groups. The hypotheses were validated by the results obtained from the analysis.

Implications/Limitations: The significance has only been validated amongst a limited setup of FMCG managers which gives a conceptual base. It can further be extended to other sectors of public and private companies and to other job roles and services. Various measures of management of employees can further be identified based on this research finding to balance the life and work

***Index Terms*—Work-life Balance, Managers, FMCGs**

I. Introduction

THE term WLB was **first coined in 1986** to the noxious choices that many Americans were becoming in advance of the workplace, as they chose to ignore family, friends and leisure activities in the quest of business goals. During the 1960s and 1970s, employers believed work life balance mainly an issue for working mothers who grappled with the requirements of theirs jobs and nurturing children. Men began expressing their work life concerns during 1980s. By the end of the 1980s, WLB was more than just women's issues, affecting men, families, organizations, and cultures. WLB is accomplished "when an individual's right to a satisfied life inside and outside paid work is accepted and respected as the norm, to the mutual benefit of the individual, business, and society". (Taken from the Work Foundation)

WLB has been studied in the U.S. since the 1980s and in Europe, primarily the U.K. since the early 1970's (Frone, 2003; Murphy, 1996; Smith & Gardner, 2007; Stebbins, 2001). Cappelli (2000) asserted that the attention from organizations have been increasing towards the concept of WLB as a result to the need of attracting and retaining competitive employees in a dynamic labor market. Potential personnel no longer remain fully convinced with the remuneration and career aspects of a job. Businesses that help to enhance motivation, satisfaction, commitment, and lessen sources of stress, tend to enhance their capability to recruit and retain worthy employees.

Work life balance has become a concern with the changing environment (Pocock, 2005). In the past, business working hours were quantified in number of hours and minimum leave taken for the period opted for. This creates a dilemma to create a choice between work and family.

Extensively quoted in the prevalent press, the concept of "work-life balance" has gained attention because the view of balance is actually an empowering strategy to deal with spill-over between both the domains (Greenhaus et al., 2003). Previously, the balance was perceived as the absence of conflict (Duxbury, Higgins, & Lee, 1994). Researchers have found that initiatives related to work-life balance are linked with dynamic programs, seeking at attaining a shift in the corporate culture.

II. Review of Literature

Frone (2003) discussed that the phrase "work-life balance" has received significant consideration and commonly used in everyday language by a numerous of addressees, which makes it difficult to find a generally recognized the term within the work-life literature.

Guest (2002) notes that "balance" in the physical and psychological sense can be defined as "stability of body or mind". He also comments that in the English language, the word balance is often used as a verb and that can imply that it takes agency by the person to manage the balance. Achieving a harmonious integrity in one's work-life balance is an idiosyncratic, complex and ongoing process (Dowdall, 2004; Guest, 2002; Ibarra, 2003; Keene & Quadagno, 2004; Moody, 1997). It requires an individual's personal leadership (Brown-Klingelhoefer, 2003; Dowdall, 2004; Guest, 2002)

Pitt-Catsouphes, et.al (2006) called "almost taken for granted metaphor". Work-life (family) balance popularly defined in numerous ways (McMillan, Morris, & Atchley, 2011).

Bailyn, L. (2011) described a work design intervention related to gender equity in their working lives with their personal lives. The Issue showed that potential work with a work-family lens leads to changes in the temporal environment of work, in what has come to be known as flexibility in the workplace

Todd, P., Binns, J. (2013) recognized that in public sector, WLB as a reason of problem for management in an enhanced quality of working life. The results highlighted the lack of WLB discourse that conceals the tension between the necessary for managers to apply WLB in a more effective manner and the organization are established.

Steven Covey (2004) also supported the significance of work life balance, in his book "*The 7 Habits of Highly Effective People"*, where he maintains that balance lays the ground work for maintaining the other six habits he recommends for success. Balance requires renewal in the four dimensions that he identifies as physical, mental, social/emotional, and spiritual.

As suggested by Fisher et al. (2001), the present study defines work-life balance as a multi-dimensional construct. In this study, WLB will be measured by Scale developed by Fisher et.al., (2001). The labeling of the three components of the WLB Scale is three dimensions which is explained in detail for a better understanding of the construct. These dimensions are:

1) **Work Interference with Personal Life (WIPL):** WIPL specifically assessed the degree to which job has a deleterious impact on one's personal life. WIPL includes all time, energy, goal accomplishment and strain.
2) **Personal Life Interference with Work (PLIW):** It is assessed to the degree to which one's individual's life inhibits with work. Compared to WIPL, PLIW considered the opposite direction of the work/ personal interface: the degree to which aspects of one's personal life have a adverse impact on work.
3) **Work/Personal Life Enhancement (WPLE):** WPLE assessed the degree to which one's individual's life is augmented by job or vice-versa.

III. Proposed Work

The main aim of the proposed work is to assess the significant differences in the WLB of working males and females in NCR region. On the basis of objective hypothesis were developed for the study:

H1- There is a significant difference in the exhibition of the WLB of males and females.

IV. Research Methodology

A. Participants

The participants were 350 managers from the middle level hierarchy from FMCGs. The questionnaire was accompanied with an instruction note which stated the anonymity of the research. The confidentiality of the responses was also assured to the participants of the study. Researcher has received the completed questionnaires via mail or in-person. Out of 350 respondents, a larger chunk (70 %) were males, and 30% were females. The average age considered of the employee was 40.16 (SD=6.02).

B. Procedure

The significant difference in the WLB based on gender was explored in this study. The scale which was managed in the present study was the self-administered questionnaire. Scale used in this study is discussed in detail. The collection of data was done on the basis of the purposive sampling. Scoring for scale had been done as per the manual's given instructions.

C. Measure

To measure WLB, scale developed by Fisher, McAuley, Stanton, Jolton & Gavin (2001) was used. The instrument comprises of 24 items, capturing the three underlying dimensions of work life balance, to which participants respond using a five-point scale ranging from 1= Not at all to 5= Almost all the time. WIPL is assessed with twelve items; PLIW is measured with six items. Finally, the third dimension, WPLE is captured by six items.

V. Results and Discussion

The intent of the study was to assess the significant differences in the WLB of the male and female working NCR. Means and standard deviations were calculated for the employees. To test the hypothesis, t-test was used to study the differences.

H1 proposed that WLB perception will vary gender wise. The independent t-test was applied to examined the hypothesis, showed that gender difference exists in the perception towards the work-life balance. The results are presented in the given **table** show a significant difference exists between the male and female attitudes towards work-life balance ($t= 2.658$, $df = 348$, $p<0.05$). However, mean scores showed that male employees expressed higher levels of attitude toward work-life balance (X=

TABLE: Independent sample t-test for (Gender and Work-life balance)

Gender	N	Mean	SD	SE Mean	t-value	Df	P value
Male	245	28.96	5.09	.33	2.658	348	.008
Female	105	26.50	4.59	.46			

(SD- Standard Deviation, SE- Standard Error, df- degree of freedom, $p<0.05$)

28.96) compared to females (X=26.50). Thus, alternative hypothesis of the study was accepted.

The results indicate that male employees report greater satisfaction (higher mean values) in reference with all the dimensions of WLB as compared to female employees. The findings suggested that there is significant difference between all the dimensions of WLB on the individuals to strike a balance between their work and life.

H1 suggested that male and female managers perceive WLB differently. WLB from the perspective of gender role has been tested and the results accept the hypothesis which was in constant with many of the earlier studies (Guest, 2002; Halford, 2006; Loscocco, 1997). Reviews from other studies also indicate the same that the perception of WLB to be different across genders (Smithson and Stokoe, 2005).

Hochschild (1997) suggested that one-third of home activities were performed by men and two-thirds were performed by women. Consequently, if there are family conflicts and the woman is making less money than her husband, the woman is more than likely to leave the workplace. It was explained that effective work-life programs such as compressed work weeks, telecommuting, flexible work schedules, job sharing and on-site childcare proved beneficiary to both the employer and the employee, which leads to higher productivity and organizational loyalty (Whittard and Burgess, 2007).

Results indicate that male employees report greater satisfaction (higher mean values) in the perception of WLB as compared to female employees. The working women are exposed to more responsibilities like looking after their commitments towards family, bringing up children, household chores, etc. as well as working in the office to the utmost perfection. This puts some extra burden on them compared to their counterpart men. This disturbs the Work-life balance in women.

VI. Conclusion and Future Research

The current study makes significant contribution to knowledge and practice in this field. Demand for WLB varies as per gender variability. Men are hesitant to take flexible working cultures, so when it comes to women, it somehow creates an adverse influence on their careers since managers may doubt their dedication to their professional role. As a result, role of gender in WLB shows more impact for balancing between both the aspects of life and work in women as they need to cater the needs of home, nurturing children etc. This study therefore suggests a definite requirement for the embracing the policies on WLB by the companies, and provide a more flexible working arrangements.

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Understanding the Status of Computer Education in the State of Uttarakhand: A Case Study of Roorkee

Udit Aggarwal
Aspirational District Fellow, Ministry of Home Affairs, Government of India
udit.a2605@gmail.com

***Abstract*—Across the globe, many spheres of our lives whether it is related to the day to day functioning at the personal level or administration of various governments are transformed with the advent of Information and Communication Technology (ICT). In the present century, indeed, the Information and Communication Technology's convergence has to also accelerate the evolution of diverse services in the contour of e-Initiatives or to be particular e-Governance.**

Over almost three decades back with the modest commencement of e-Initiatives in various parts of the world, these engineering sciences have inarguably transformed some of the most rudimentary issues that at times trammeled communication and global outreach. In the state of Uttarakhand, many e-Initiatives have been launched to bring development to the state. Indeed, many efforts were taken to bring or to deploy e- Initiatives in the state, but there is a need to do a lot of work in terms of implementation and practical realization of the programs so that better services to the citizens of the state could be delivered.

This study would focus on a phased approach towards analyzing and realizing the impacts of e-initiatives taken by the state of Uttarakhand in the Education sector. This work would try to put forward an attempt to ascertain and explain the issues concerning e-initiatives taken in the sector of school education and would present a general review of the present model with a case study of city Roorkee. The computer literacy aspect among the school going children has also been taken up by analyzing their computer operating skills and knowledge. The study would reflect recommendations on the effective implementation of e-Initiatives in the sector of school education in the state so that a better education facility could be availed by the children.

***Index Terms*—Computer Education, Information Communication Technology in Schools, Computer and Learning Outcomes, Computer and Taboo, Government Schools v/s Private Schools, Computer Education in 21st Century**

I. Introduction

THIS century belongs to science and technology and in this era computer education has become a very integral part of every kind of profession. Almost every domain of our lives can be experienced dominated by computer programs. But technology has struggled to explore its way into the classrooms. It is equally imperative along with bettering the ways students are taught that students learn how to use the computers to develop their skills and get ready for careers in a world where computers have become as plebeians as the pen, pencil and, paper. It is often said that students are future leaders for any country. Children who are in school presently are future doctors, engineers, entrepreneurs, etc. and hence it becomes very important for the development of education that students must be taught about the computer, internet, and its benefits.

Information and Communication Technology (ICT) could prove to be the tool to bridge the digital divide amongst students of various socio-economic backgrounds and beyond geographical barriers. To bring social change and national development, it is universally acknowledged that ICT could be an important catalyst for the same. In this context, the Indian government has announced 2010-2020 as the innovation decade and for innovation, skills of reasoning and critical thinking are essential. Such skills need to be inculcated amongst students from the very beginning of the school level i.e. from the primary level and to nurture these skills classrooms need to be integrated with ICT.

UNESCO said that to achieve millennium development goals, education is important and without it, MDGs cannot be aimed at. Hence it becomes necessary to integrate ICT with education so that more people could develop and witness the growth, more people could acquire knowledge and learn more equal and just society, more mothers would be healthier and more children would survive and live, more people would think of future and more of them could work together.

The government of India had initiated ICT integration into selected primary, upper primary, and secondary schools aiming to expose children to the computer education system.

The main objectives of ICT in school education are:

- To develop the skills and scientific and technological temper among students of government schools.
- To reduce the span of the digital divide between urban and rural students.

- To make students and teachers computer literate and aware.
- To develop an environment where the learning and teaching process would be more interesting and effective.
- To provide training to the teachers and educators on computer syllabi, advance information, and communication technologies.
- To inculcate ability and confidence among students to use computers in the future.

Brief about Uttarakhand and ICT plan: State government realized that the aim of education in the running Century is being redefined. It is to form a better world through understanding and growth of human traits and not only for employment generation. Undoubtedly information and communication technology has revolutionized the world of learning and in present times it is very imperative to integrate IT with education in order to have the advantage of edge education. What has been stated by the state government as the objective of integrating ICT with schooling and education plan is to empower students with skills, knowledge, and understanding, to motivate students to become autonomous learners and encouraging e-learning and to make education in schools relevant to present nature of workplaces. Thrust has been put on quality learning where the traditional rote learning method is demotivated, curriculum to be made enriched to go beyond textbooks, and facilitating the student to 'Learn to Learn' and 'How to Learn'.

Other than students, this plan is made to be used as an instrument for teachers' professional development. It is not true to say that a computer can replace teachers but enables them to transact teaching effectively. The State government's aim under this plan is to computerize all the schools under the 'Aarohi' program by installing 5 to 6 computers in each school.

The present status of computer coverage in schools is as follows:

District	**Computerised Schools**	**No. of Computers**
Almora	205	982
Bageshwar	71	362
Pithoragarh	142	685
Champawat	61	202
Nainital	156	833
Udham singh nagar	91	664
Dehradun	149	838
Tehri	192	989
Chamoli	133	729
Pauri	288	1319
Rudraprayag	85	435
Uttarkashi	86	429
Haridwar	50	342
Total	**1709**	**8899**

(As per state's official website)

Simultaneously with the assistance of Microsoft and Intel, efforts are made to train the teachers. There are 17,170 teachers are working in secondary schools.

II. Review Of Literature

India draws a bead on to egress as the information and technology leader among the societies which are knowledge-based; it does so with the addition of children education as one of the basal concern. With the enforcement and enactment of the Right of Children to Free and Compulsory Education Act 2009, the government of India has corroborated its allegiance to ensuring universal elementary education for all. The Right to Education Act also includes the provisions for preparing Indian Children with 21st-century skills, to be specific, digital skills, and computer operating skills. However, India emerged as a hub for IT services, the economy shifted from agricultural to service economy after accepting the neo-liberal reforms of the 1990s, the status of computer education among school-going children, particularly those who are getting an education in government-run schools, is not up to the mark and it has various reasons responsible.

There is a huge number of literature available regarding ICT applications but lesser comparatively regarding the impact of ICT on the learning and achievements of the children. Most of the literature in this area of study is reported from other countries specifically the western developed world. There is an attempt in this chapter to present a summary of related literature under these headings:

1. Computers' Use at School level: Understanding the Effects.
2. Teachers and the use of ICT
3. The Education system of India: In the context of Computer Education

A. Computers' Use at School level: Understanding the Effects

Wighting M J (2006) used a mixed-method design among high school students to ascertain how far the com-

puters' use in the school classes affect the sense of learning in the community. The main objectives of his study are to determine the technological use in classrooms affect students' sense of learning in a community of the classroom and also to study how do the students delineate the classroom community and its necessity for their learning. After the analysis, it was reasoned out that:

1. Participants have a sense of classroom community and some of them were mindful of the feeling community and might be benefitted from the same.
2. Many participants are of the view that the community helped them in the learning process and important for them.
3. When concerning the sense of community and its necessity in learning, students identified the three major factors which include the use of computer and technology, sense of community, and the element of learner control.
4. Students uttered that they believed they had control over their learning with the computer to a greater extent when compared to learning through the books.
5. Students well thought of that they were learning conjointly in a community and building on information that they incurred either as a class or individually.

The limitation of the study is that the author discussed the students' community but the factors which influence the community were not taken into account.

Sutton and Kafai Y B (1999) have reviewed the use of the computer at school and the internet at the home of elementary school students. The outcome of the study indicated that most of the students' use of computers dedicated to games which followed by many other software activities. On the question of connecting the use of the computer at home and school, the suggestions of parents focused on ways in which information about the students may be availed from the school and support via exchanges with teachers.

The limitation to the above study is that the discussion over infrastructure which would be required at home and school is completely missed out. It only talks about the role of parents and potential directions in academic home computing.

B. Teachers and the Use of ICT

To identify the factors which can be proved most effective in encouraging and enabling teachers to use ICT, Scrim Shaw Peter (2004) reviewed the literature existing on enabling teachers to use ICT. There was an online survey conducted, visitors of the Becta Research website invited to list out the factors which they consider enabled them to integrate ICT in their teaching. The outcomes of the study suggested that the majority of teachers prefer to use a different version of the teacher-centered model. It is requisite for teachers to make changes in the ways they teach and there they have to make maximum use of ICT. Also, the personal characteristics of teachers may shape the extent they take up an innovation. There are different levels of teacher use of computers varying with their relationship with existing curricula. Some of them use ICT as a supplement to the curriculum; some use it as reinforcement on the advancement of the curriculum. Because of this, the training provisions have to be secernate to cope with the needs of teachers to ensure widespread use of ICT (teacher-level factors). There also exist school-level factors that can subdue its use and hence both school level and teacher-level factors need to be addressed.

Steve Kennewell (2004) has analyzed a range of case studies in order to précis the general principles to help new teachers to realize something of composite relationships involved in ICT's effective use in teaching and learning. Rather than imitating their mentors, the new teachers or trainee teachers should be able to plan for themselves using this understanding. These general principles for the new teachers furnish a basis for evaluating their practice and hash out how to improve. 'Thinking together' is one of the principles, where teaching student how to talk together, discuss together is a way of promoting effective thinking. 'Literacy and ICT' is another important principle where an association of computer integrated activities and collaborative learning could endorse literacy development. If to bring the transition from oracy to literacy then the computer has a crucial role to play in. But the author's study came up with a limitation as the author discussed the relationship between the oracy to literacy among students but not successful in portraying the findings of its initiatives.

C. Education System of India: In Context of Computer Education

The study was to ascertain the defiance Indian educational system facing in achieving universal access to quality and relevant education. Solutions to such challenges are related to the use of ICT and it becomes an area of interest for people around the world. The ministry of human resource and development initiated a program for universal access to develop the quality of education in secondary schools knows as RMSA (Rashtriya Madhyamik Shiksha Abhiyan) with the use of ICT having as the objective of transforming learning and teaching via ICT. However, in rural areas, there is no sufficient number of teachers who are competent in the use of computers, and even very less exposure to computers resulted in merely keeping computers inside the classrooms. Only when it can be said that beginning of the use of computers has started actually once the teachers, school staffs and students get more acquainted using computers. Only through the ICT literacy courses this kind of comfort can be

achieved otherwise deploying computers directly into the classrooms would only be an "expensive deployment model".

In 2005, UNESCO and MHRD conducted a study to analyze the usage of ICT in one thousand schools of India to evaluate and monitor the use and outcomes of ICT to realize the benchmarks for programs and policy improvements. 1000 schools which surveyed include 500 from Gujarat and 500 from Karnataka. Out of these 1000 schools, 398 were private schools and 602 were government schools, out of these 513 secondary schools and 497 primary schools. Major findings of the study are:

1. The ICT use was very limited as the schools having ICT department was very limited, resource allocation in terms of funds was very limited, very less number of ICT trained teachers and limited per capita availability of hardware, etc.
2. There were less than 6 computers per school and one computer over 72 students on average.

To review the use of technology in the context of Indian education, Sanjay Gupta, Suresh Garg, and Jyotsna Dixit (2011) conducted a study. With the beginning of the 21st century, we all realized that knowledge is the one major thing going to affect human endeavors in all spheres of life. In the 1970s and 80s, the material available on the web has certain limitations as it did not have appropriate instructional designs and also failed to provide an interesting learning atmosphere. In 1995, computers were equipped with CD-ROM drive which can save vast information in it per se audio, video, and image formats. But in 1996, there was a revolutionary development that happened when computer learning came with the Internet and the Internet proved to be the most efficient learning tool as it offers a global unbounded platform for information and communication. In the fact, the internet hasn't changed the expertise of learners and teachers though helped them to change their mode of production and skills.

The role of technology in India as a catalyst for teaching and learning is reviewed by Vijay Kumar R (2011) in his study. The fact to be acknowledged is that in today's teaching and learning process ICT has become a very integral part of it. If the technology is used effectively then it can regenerate the enthusiasm of teachers as they can learn new skills and also can prompt students to make classes more interesting and dynamic. Withal a teacher cannot be replaced by technology but can be used as an appurtenance tool in the entire learning process.

To ascertain the impact of ICT in classroom instruction, Anandan and Gopal (2011) conducted a study. There is a direct relationship between quality of education and quality of teachers; to a great extent, those teachers who use innovations in their teaching pedagogies through integrating technologies give the best to the students. Undoubtedly technology is a potent tool for solving problems, critical thinking, and conceptual development and if used effectively then it could help the students to make the learning process easier. To make students achieve a high level of competency and competitiveness, teachers need to integrate technology in the field of education. Hence, a teacher can also be called a "Teaching Technician".

III. Proposed Study

To analyze the impact of ICT policy in the field of education which is initiated almost a decade back in the state of Uttarakhand. This study is significant in a way to realize that actually where are we heading in terms of policy implementation and to find out its effectiveness. This study would look for the three components of ICT plan i.e. infrastructure, students' computer literacy and teachers' preparedness. It will analyze the extent of ICT integration among schools happened, the availability of infrastructure, accessibility to ICT tools for students and teachers, also to ascertain the kind of behavioral changes occurred in students and teachers in this regard of integrating education with ICT.

A. Research Questions

1. What is the impact of ICT integrated education on secondary school students?
2. What is the attitude and acceptance level among teachers towards ICT integrated education?

B. Objectives

1. Ascertain the impacts of e-learning and computers on students' learning.
2. Ascertain the effect of computer literacy among students on their academic achievements.
3. Ascertain the extent of availability of resources and frequency and kind of uses.
4. To determine the effectiveness of the curriculum in computer education and what steps efforts are been made by teachers to promote computer education among students.

C. Research Methodology

The design of the research methodology was qualitative. We have used qualitative methodology because, in this study, the examining of the ICT system in education shall be done per se its weaknesses and strengths, an investigation will be done about its current positioning, will try to understand the perception of teachers and students about the respective topic, also to understand the feelings, values that underlie and influence behaviors. For this purpose, the case study approach is used and 45 students and 20 teachers selected as respondents. In order to collect the perceptions of the stakeholders, personal interviews are

planned to be conducted using semi-structured and open-ended questionnaires.

For this research, the Roorkee block is selected for the case study. Roorkee block in total has 379 schools, including 107 primary schools, 26 upper primary schools, 7 government higher secondary schools, and 7 government inter colleges.

For this study, only government higher secondary schools and government inter colleges were taken into account. 45 students selected as respondents across 8 government higher secondary schools and governments inter colleges. Students belong to class IX to XII were selected as the respondents. The average age group they belong to is 15-20 years. Gender participation was in harmony and homogeneity. The average social category of the students is quite heterogeneous, as 40-50% of the students in every school belong to the SC category, 30-35% of them belong to either OBC or Minorities and the rest is other castes.

The 20 teachers were selected as respondents among 8 schools and are from various backgrounds such as Science, Mathematics and Languages, etc. The average age group they belong to is 33-56 years. Most of them are highly educated and completed their masters in their respective subjects along with other required training courses required to be a teacher in governments' schools. Interestingly, most of the teachers who are respondents belong to open categories or in other words, upper caste. However, this was not asked to them directly but analyzed with the surnames they informed while interviewing.

To know the situation of resource allocation from the government, a visit was done to District Education Head Office, located in Roshnabad, Haridwar. There happened one to one interactions with the officials to know and understand how execution is going on for integrating ICT with education. However things and evidence cannot be shared on record, but personal interviews provided substantial insights for this study.

To know the perceptions and understandings of those parents who send their wards in these government schools, telephonic conversation, and personal meetings were conducted. Most of them belong to economically and socially weaker sections who are largely indulged in daily wage-earning occupations or small businesses such as provision stores, knitting, etc. The education status of those parents was significantly low; hardly anyone of them achieved a high school education.

Data were collected by personally contacting the respondents, generally Focused Group Discussions (FGDs) for students, and one to one interview with the teachers either in person or on a phone call. All the respondents are residents of Roorkee block either the urban area or rural. The data were collected in the month of December 2018.

IV. Analysis & Interpretation

A. Effectiveness of ICT on Education- Perception of Students

1) Access

Access to computers, the internet, and other equipment is imperative for the students as it will directly and definitely affect the abilities of students and also it will ensure the development of technological knowledge to the students. The extent to which students have access to ICT decides their knowledge and skills.

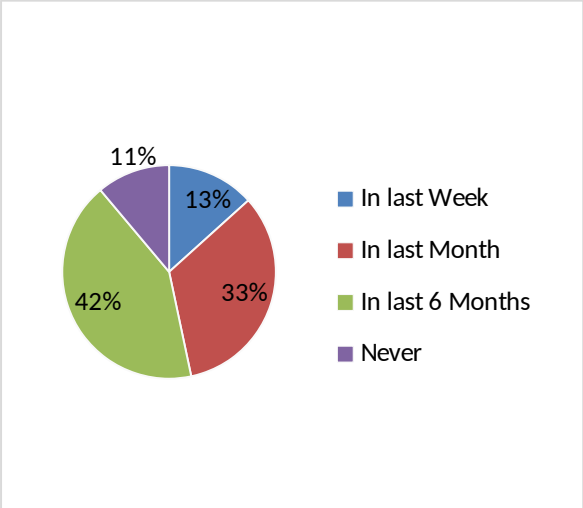

Fig.1: Use of Computer Outside School

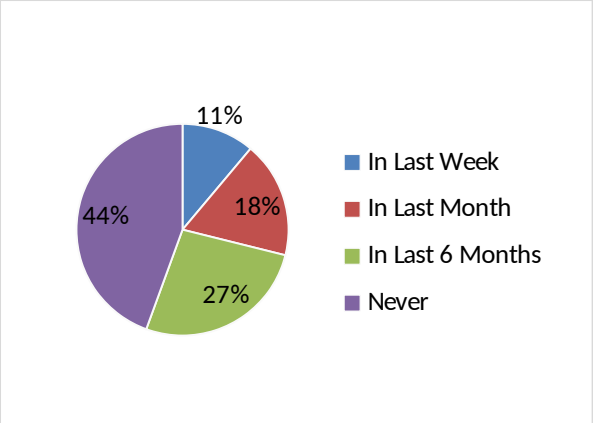

Fig. 2: Use of Computer in School

While analyzing the effectiveness of ICT in the case of Roorkee, access to the ICT emerged out to be a major limitation. It cannot be ignored that access to computers is dependent on the economic statuses which reflected in the responses where the majority of the students were never or used computers before 6 months outside of school. Those students who remained untouched from ICT in schools and even not having access to computers outside

of the school are on the verge of a technologically illiterate situation. Owing to the absence of touch with this technology, computers remain an alien thing to the students.

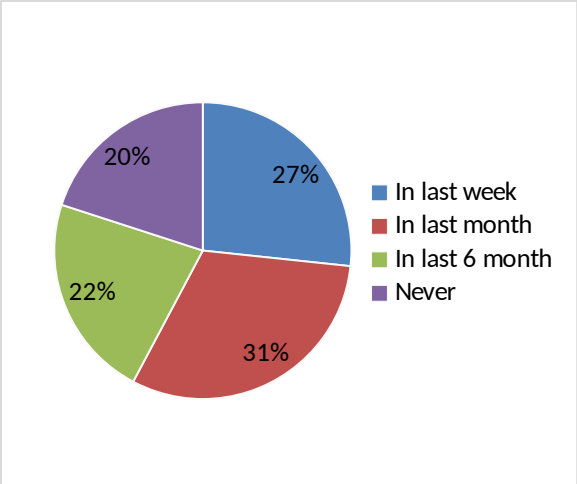

Fig. 3: Use of Internet

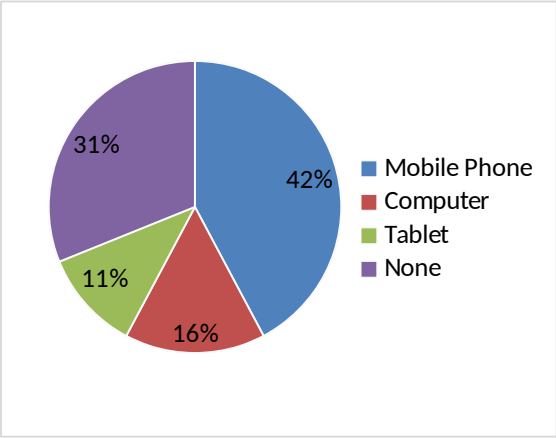

Fig. 4: Device used

One thing needs to be noted that it's not the case every student who has used the internet has his/her own device rather most of them have used it either on their parent's or friends' devices. The other shocking outcome from the fieldwork is that none of the students has ever accessed the internet on their schools' computer. Though schools have internet connection on a few systems, this is mostly for the use of clerical work or office use. Therefore, the students are not getting any benefit out of it. Again the usage of computers for this purpose too remains quite low and the undisputed reason came out is the lack of awareness of the functioning of computers. Most of them were of the view that they don't know how to operate a computer, and as they were never been in contact with computer usage, machines remain quite an alien thing to them and hence hesitated to use it. Because of this gap, they instilled with the fear that if they use a computer then something would definitely go wrong with the machine which they won't be able to correct.

On the lighter note, when asked how they have access to mobile phones and not to computers, mobile phones are very cheap in comparison with computers and necessity nowadays they replied. The average cost of their mobile phones varied from five thousand to 10 thousand and most of them informed that, since Jio introduced cheaper internet plans they were able to use the internet which is not the case earlier. They used to do recharge for internet packs in partnership with their friends. But this is an entirely different topic to do research on.

It is also important to ascertain how the students who have access to the computers and internet use it.

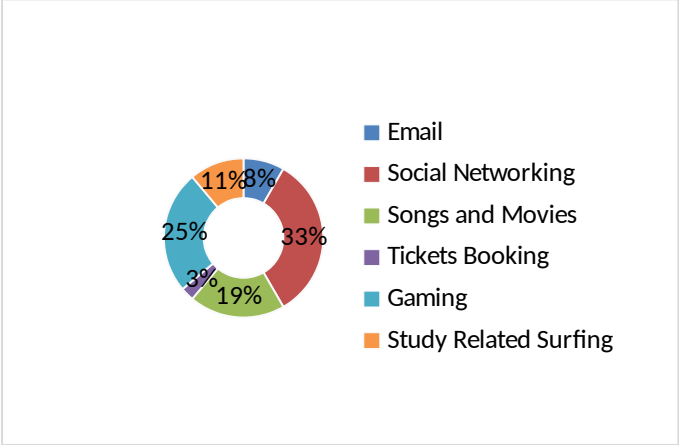

Fig. 5: Activities over Internet

Apparently, those students who have access to the internet and mobile phones use it for social networking sites, specifically Whatsapp and Facebook. But when asked about the features of Facebook, they came out as very less informed and also struggles with the language barrier in operating Facebook. Moreover, for them, predominantly Facebook is all about sharing pictures and videos. Here most important point to be noted is that none of them are aware of internet safety features regarding how to be safe while using the internet and social networking sites as they generally share their passwords among their friends and often ask their friends to do activities on behalf of them. They are even less informed about how to distinguish between fake news and in a way became prone to false news propaganda. What more problematic here is that usage of the internet and mobile devices remained very low when it comes to studying related surfing including using a dictionary, finding topics and lectures, etc. The very reason behind this could be the ineffective implementation of curriculum as it fails to push students to use the least available facilities construc-

tively and hence in absence of proper guidance their usage is largely limited to online movies and songs, gaming, and social networking sites. Out of all the respondents, only two said that they have used Email, and the rest of them never used this, more shockingly they don't even have mail IDs. This is valid to say that students are less aware of the productive usage of ICT.

2) Ability

A decade back, most of the private schools witnessed the ICT revolution with the introduction of SMART classes but few government schools received this development and those schools that have received it are not in the condition to use it properly. This is again an example of how ineffectively the curriculum is followed despite having guidelines.

Surprisingly none of the computer labs has an internet connection to them as informed by the students. Then what they do while visiting the computer labs was the next question. Regarding this, they opined, "We used to go and sit in groups, there was an instructor who comes to each group one by one, explain the names of the parts and their functioning and names of software installed in it". There was a school whose principal informed that they were provided with ten computers by the government a decade back, but due to lack of infrastructure machines were ruined due to rains and now they are left with nil working machines.

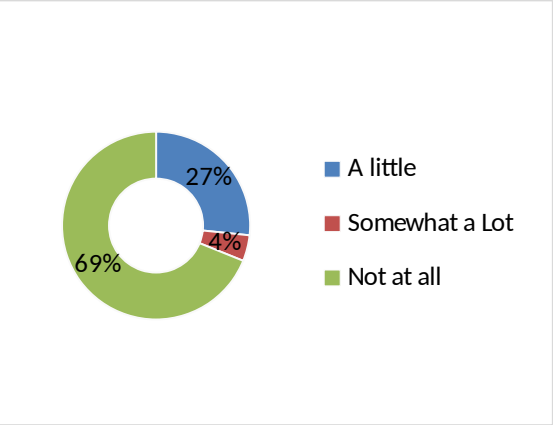

Fig. 6: Producing text using MS-Word

The ability of the students to produce a word file or PowerPoint file is highly limited. Most of the students have never used these features on their will and never asked to do so by their instructors as well, moreover cannot even identify the icons to such applications. Those who informed that they can perform a little on MS Word also said that they are not proficient in the English language and hence cannot produce a file on their own but can copy from the book. One more thing to be noted is that, none of them are with typing skills, hence typing speed remains very slow.

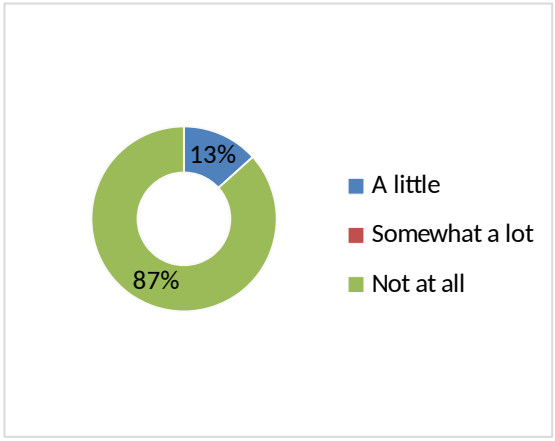

Fig. 7: PowerPoint Presentations

There were few responses in the case of MS Word who know somewhat a lot about the functioning, but none of them is completely proficient in performing actions in PowerPoint. Students responded in a way as if they are hearing about it for the first time. Not so surprisingly most of the respondents said that they are completely unaware of PowerPoint functioning. Those who have said that they know a little about PowerPoint do not know how to make multimedia PowerPoint presentations. Even they never made any presentation for the classrooms.

3) Attitude

When asked about the necessity of computer education to improve learning, most of the students strongly agreed with its necessity, and none of them show their disagreement with this. One could undoubtedly argue from their responses that they want to have access to computer education and ICT so that they can make themselves compatible with the advanced world. When asked to them about the role of computer education in getting a good job, most of them agreed but a few among them have also said that "No, computer education is not necessary to get a job". In their view, computer education is required for a specific kind of job and not for every kind of job. This shows how being unaware or untouched by the technological advancements in education caused them to be completely unknown from the changing job dynamics. Few of them wanted to be a teacher, few of them wanted to be bank personnel, few wanted to have a job in a private firm but not knowing how knowledge of computer could help them to pursue their dream careers.

Owing to very less exposure to cyber cafes and computer machines, the computers were seen as taboo in few societies and families and it was evident from the behavior and responses of a few students. When students were asked informally about using cyber cafés and going there to use computer machines, then they became shy and smiled. Few girl students responded with a shyness that

"Cyber café is not a good place to go". They have a taboo associated that cybercafes are those places where people go to watch porn and hence they never visited neither think of going. The same is the case with a few boy students who started looking at each other's faces and smiling when asked the same question. Also few of them have admitted that they used to go to cyber café with their friends to play games and not that frequently.

Presently, there is a high gap between the students who are in state-run schools and who are in privately run schools in terms of having technologically supported education. Respondents to this study have displayed theoretical knowledge about computer education which is again highly limited to the basic definitions of the parts of the computer as one respondent said when asked about CPU, "CPU is the brain of the computer". Computer education remains a subject that has the lowest participation from the students owing to various reasons discussed above. Moreover, there is a lack of faculty to teach students and there is no dedicated teacher for computer education only. There is a need of taking corrective and efficient measures to improve the current situation otherwise it would surely widen this divide.

B. Effectiveness of ICT on Education- Perception of Teachers

1) Access

The major factor which limits the teachers from using ICT in teaching and learning per se education is access to technology. The responses in general painted a dark picture related to the reality of technology access in schools.

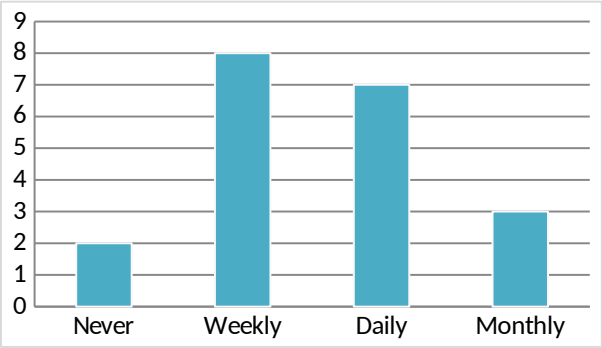

Fig. 8: Use of computer for activities other than school work

The responses clearly show that teachers in their personal space have better access to ICT tools such as computers as data clearly shows that most of the teachers use them either daily or weekly at least. Here, other activities included shopping, socializing, entertainment, etc. and for one or another purpose, they use a computer either weekly or daily. The age bracket of the teachers came out to be a striking feature in it, as those who are in the age bracket 28-45 are the most frequent users. However, in the case of teachers, the use of ICT in their domain is highly accessible but the situation is completely reverse in the work domain i.e. in schools. Teachers have very limited access to ICT in schools which limits their capabilities of introducing technologies in their teaching pedagogy and instruction methods owing to lack of infrastructure. Though this is a reality that every school is digitized its ambit remains very limited. Digitization of the schools is limited to the clerical work solely where the data related to students; their performances and attendances etc. need to be updated on the government portal. Surprisingly not firm actions and efficient policies were made to ensure access to ICT for teachers as well as for students which will be discussed later.

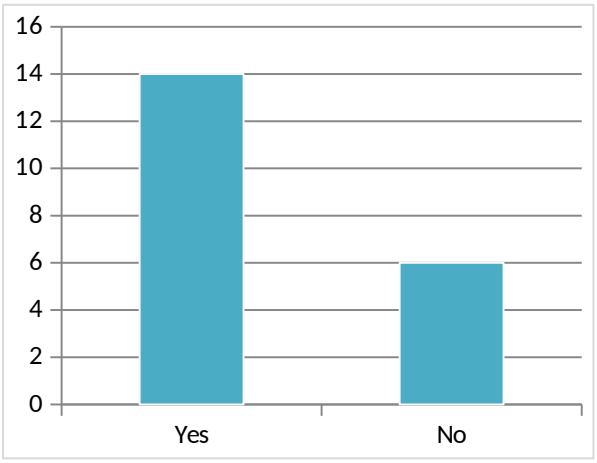

Fig. 9: Used computer & internet in making lessons in last 2 months

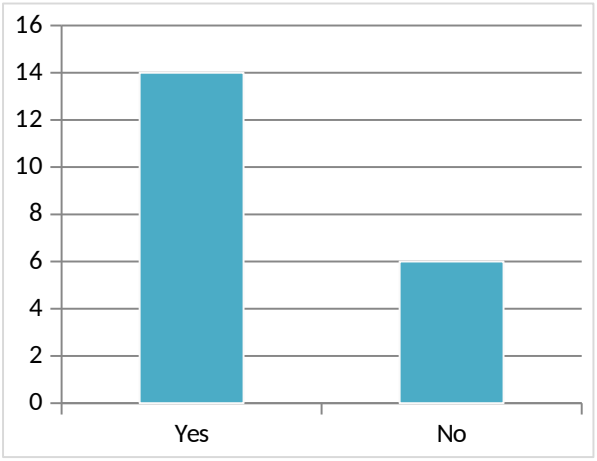

Fig. 10: Used computer and internet for teaching in front of class in last 2 months

There is no second opinion on the fact that there is a shortage of teachers in schools. There are schools that have 3-4 teaching staff on 2-3 classes for on average 120

students in total strength. There are no dedicated teachers for each subject and hence a single teacher is responsible for more than 3 or 4 subjects to teach. That means the teacher who is not so proficient and comfortable with the subject is forced to teach that too owing to a lack of teachers. To overcome this limitation and to deliver the lecture efficiently, teachers use ICT tools such as the internet either on mobile phones or computers to gather knowledge about other subjects' topics to prepare their instructions. Here one thing to be noted that, for this purpose, teachers use their personal equipment because schools do not have the infrastructure for ICT adequately.

2) Ability

The views of the teachers on the future availability of training programs and their present knowledge and skills are clearly divided. But largely the respondents agreed on the view that the younger the person is, the better the knowledge and skills s/he has in the context of operating ICT and technical tools. Few of the respondents who belong to the older generation admitted the viewpoint that the generation which they belong to has problems with handling technology and hence would struggle in adopting technology during teaching.

A teacher on average has a lecture of 35 to 45 minutes for over strength of 40-45 students each class. Teachers have to teach more than a single subject and generally, it is the routine that the teacher gives classes for 3 to 4 subjects in a day to either a single or many classes depending on the timetable. It would be easy for teachers if they would have better access to ICT tools to prepare instructions and study materials, it would have saved their time and quality education could also be ensured which ultimately would benefit the students.

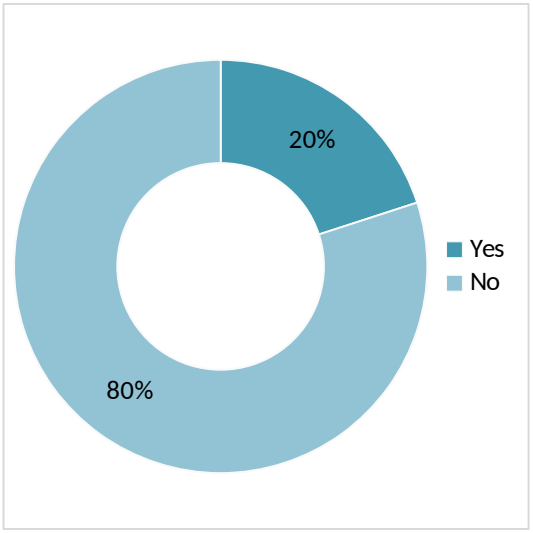

Fig. 11: Undergo professional training for ICT

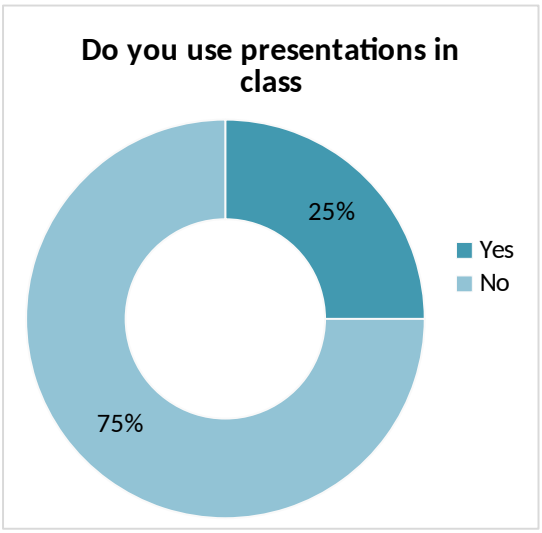

Fig. 12: Do you use presentations in class?

It is clearly evident from the responses that the maximum of the teachers didn't receive any professional training for ICT integrated teaching methods. However, training programs are running in the state in collaboration with private firms yet their reach remains limited. This has a clear effect on the second question which is asked to them, "Do you use presentations in class for teaching?" Maximum of the respondents said no in their answer that they don't use presentations and has two foremost reasons for it, first is the availability and accessibility issue in the context of ICT tools and technics and second is the lack of skills as they did not receive any professional training related to it.

When it comes to the technology handling skills there is an evident age-based divide among teachers. Those who belong to the old age category are struggling with it and those who are young have more proficiency when compared.

3) Attitude

There is no doubt in saying that limited access to ICT and unequal skills which teachers acquire have been responsible for the slow adaptation of ICT at the school level. But one more factor which is responsible for the degree of using ICT is the attitude, whether it's of students or teachers. According to the responses received while interviewing teachers and also from the literature read and analyzed earlier before this study, most of the teachers have a positive attitude towards ICT and highly optimistic about introducing technology in education. There were views of the teachers who said, not only to the students but teachers would also be benefitted from the introduction of ICT aided education.

However, there are responses from the teachers in which they said that introducing technology to education is unnecessary and would be an obstacle in teaching and

hailed conventional ways and methods of teaching. This is the plain reluctance and aversion with the use of technology that they have. This negative perception about ICT and its introduction to education could be due to a lack of awareness or due to the inability to adapt ICT. This unawareness and lack of knowledge related to the benefits of ICT integrated education among a few teachers is due to lack of training and education.

V. Discussion

Thanks to the digital revolution that the world is drifting towards an "information society" from being an "industrial society" in the last two decades. Digital technologies, specifically ICT are having and leaving a significant impact on our lives. By saying this, it doesn't mean that ICT and digital changes have altogether only positive impacts on the lives of people. ICT may cause significant good or harm depending on the design, execution, and implementation of it. Many elite private schools are experimenting with ICT integration in education from smart classrooms or e-classrooms to providing laptops, computer labs, and tablets. The central government of India and other states' government has tried to integrate education with ICT through various schemes and programs because the argument is largely accepted that "ICT has the potential to improve the quality and status of education".

To integrate education with ICT could have many aims but these two largely; ameliorating the present status and quality of education with the help of improving the process of teaching and learning and for the development of processes of education for improved management and administration. Notwithstanding, the measures espoused to accomplish these goals have been discrepant and inadequate.

A. ICT and Infrastructure

The study revealed how the state-run government schools are lacking basic infrastructure when it comes to ICT, despite the fact that the state had adopted the ICT policy more than a decade back. The computer or ICT labs should be seen as a very basic part of school infrastructure now, and then only the opportunities could be provided to teachers and students to integrate education with ICT at their level. The initial investments needed to set up an ICT lab in a school includes civil or construction, electrical, and furniture costs. Dependable power supply methods like solar energy could be the game-changing criteria for the success of this program. However, like the Kerala model, the local communities could be asked to provide and contribute to this component.

This inadequate infrastructure is very much dependent on the factor 'Resource Allocation' by the government of Uttarakhand. In a close-talk with a district-level official, it was informed that in Haridwar district, since 2014, no budget has been disbursed for the ICT section under the whole education budget of the state. However, provisions for the budget were made every year, but due to a lack of clarifications on guidelines, it lapsed year after year. The last budget for ICT integration in higher secondary and senior secondary schools which was disbursed was around 45 lakhs in total including the establishment of labs, purchasing of machines, etc. It is to be noted that the Haridwar district has six blocks in total comprising of more than 50 secondary and senior secondary schools. If we look at the budget allocation then, on average it is less than 1 lakh per school which is highly inadequate. The condition would have improved if the budget for ICT in the past few years did not collapse and if that continues then it would be very hard to bridge the digital divide between the student of private schools and government-run schools.

B. ICT and Teachers

NCERT also prepared the national level ICT curriculum, which includes a program for Teachers Professional Development (TPD). This program has workshops for teachers where they have face to face interactions with developers. This document of NCERT regarding ICT needs to be contextualized by the state government of Uttarakhand for successfully implementing ICT in schools.

The multi-functionality forced upon the teachers, usually overburdening the teachers which are adversely affecting their performance. Schools are running short of teachers and hence available teachers are asked to teach many subjects to different classes. The teacher has proficiency in his/her subject but asked to teach the subjects which are completely out of their domain and this negatively impacts their capacity to deliver meaningful instructions. During elections or any other government function, teachers' duty was changed from being a teacher to a government official who is doing work other than teaching. These issues need to be addressed immediately to prevent further rupture to the education process in schools.

C. ICT and Curriculum

One of the major drawbacks of ICT policy for the education of the state of Uttarakhand is that computer education is not included in a core syllabus and left as a choice based on the voluntarily selected subject. Ironically, it was asked to every school to adopt ICT policy but the curriculum for computer science as a separate subject was not developed and this situation remains the same till now. The level of computer literacy among students came out to be very low and those who have acquired some information about it are very basic and theoretical. This is understood as the schools are lacking ICT infrastructure, the practical exposure to the machine is certainly limited and so their practical knowledge about computers.

How ineffective the course curriculum for computer education is can be proved by comparing the textbooks of private schools and government schools. For example, when the computer sciences' textbooks for the tenth class of private school and state government-run schools were compared, then it shows that in private schools, students were taught HTML programming language whereas, in state-run government schools, students were still taught basics.

There is a lack of dedicated teaching staff for computer education. Few schools that have computer labs have hired an outside faculty to operate computer lab and teach basics to the students every if they come to the labs. However it is not done regularly because owing to irregular payment, outsourced faculties leave the school frequently.

We have to accept the fact that largely those families who cannot afford private education owing to limited resources of income send their children to government-run schools. These families are those who belong to socially and economically backward and deprived sections of the society. Governments aforementioned many times that they are aiming to ensure education for all, and hence their responsibilities lie on the government to provide them not only the education but the quality education so that their status in the society could be improved and could live a dignified life.

VI. Conclusion & Future Scope

In India, on the role of technology in education and its use in the teaching and learning process in classrooms, very limited research is done until now. The inadequate knowledge and awareness about ICT are responsible for selecting inappropriate components and adopting irrelevant models that provide sub-optimal outcomes. One more risk is there i.e., vendor-sponsored research in this area which might distort the research. There is a need for comprehensive and rigorous research work and documentation, ranging from the ICT integrated education program design to implementation processes and results, to find out the pros and cons of the process adopted, to analyze the outcomes, and to provide a cornerstone for maturing and refining the model.

There are four main and important components identified for the successful implementation of ICT in schools.

1. Foremost is to ensure adequate infrastructure in the schools, including basic infrastructure to the devices and connectivity. There should be effective provisions that need to be made by the government. This infrastructure should be supportive of student-teacher learning and teaching as well as the administration of school education.
2. To get desired outcomes from the program, it is imperative that teachers should be equipped with required training and traits so that a smooth transition from traditional ways of teaching to technological advancements could occur. There should be teachers' professional development training provisioned in the whole program.
3. There is a need to create an open education platform for students and for teachers too, where pooling of information and ideas could take place. This would help in developing an effective curriculum which would be in result more compatible with the moving world. This would promote community learning practices and would ensure the model of "learning from doing" is followed up well.
4. There is a need to create state-level ICT integration infrastructure so that it can be followed and implemented uniformly.

This study is conducted in Roorkee Block which is a completely accessible and urbanized city of the state. This place has no geographic challenges and people here enjoy certainly better living standards when compared to the rest parts of the state which has geographic challenges as it is a hilly state. The condition is worrying in Roorkee itself, and hence it is not so difficult to guess the situation of ICT integration in schools in other parts of the state.

The piecemeal nature of the above-mentioned efforts has been the reason for the failure of the ICT program most of the time. The decision-making process is so delayed that in the last few years budget collapsed because the department was not provided with the essential guidelines. This delayed functionality of the government shows how the government is ignorant of this policy. However, the government is spending a lot of money on other programs like RMSA and Girls students' residential schools' development to increase the enrollment rate and to reduce the dropout rate among girl students. The facilities related to the sanitation got the boost under the Swacch Bharat mission, as many toilets were constructed, girl students were provided with extra care and facilities, the element of computer education and ICT integration is completely ignored.

Now the government is asking the schools to look for help from the corporates under their CSR. This means that the government wants the school administration to establish contacts with corporate firms so that they can contribute to maintaining the ICT infrastructure in the schools. However success rate to this idea is very little because only one or two corporate firms contributed to this, that too not so significant. The local NGOs and clubs like the Rotary club are trying to address shortcomings in these government schools by providing stationery, mid-day meals, and uniforms to the students but when it comes to contributing towards ICT establishment, none took the initiative as of now. The simple reason is that it requires a lot of investment which a small NGO or a collective of people cannot afford to do. Let us assume, if in some places this idea of the government worked well, then what

about the rest of the places? Hence government should not be in a position of rollback when they are held accountable constitutionally to provide just education for all and to be specific for those who belong to socially and economically backward sections of the society. ICT could be a significant step that can eliminate the barriers related to the region, gender, caste by facilitating a higher degree of permeability of education.

Let us first MAKE INDIA then MAKE IN INDIA.

A. Future Scope

Future researchers may workout to design any working module founded on a theoretical framework that can be utilized by the government of the state.

There is a very recent trend which is developing nations are witnessing and so is India, which is using mobile-based applications. This is possible that in a few years the m-service could become very popular. Future work could be done to study or implement the newly introduced m-services integrated with the internet in the sector of education.

India is the home to the second-largest population in the world and hence resource scarcity is already an economic and political issue in India. There is a need for further research to find out creative solutions where technology and education can be integrated and shared.

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Trait Emotional Intelligence and its relation to Stress during the COVID-19 Pandemic. An empirical study on professional students of Dehradun, India

Mamta Bhatt[1], Dr Deepti Sharma[2]
[1]*PhD scholar, Uttaranchal University, Dehradun, Uttarakhand*
[2]*Associate Professor, Uttaranchal University, Dehradun, Uttarakhand*
[1]*meenupandey17@gmail.com*, [2]*deepti.sharma.sama@gmail.com*

***Abstract*—Emotional intelligence can be defined as a behavioral perception about understanding and regulating one's emotions. Trait emotional intelligence is the psychological construct measured by self- reported questionnaires, is considered part of a typical behavior, has been well studied in relation to stress, coping, positive thinking and adaptive responses and is amenable to training and enhancement. Covid-19 and its consequent lockdown present a unique opportunity to study stress. College students are particularly vulnerable group, not only because of the fear of the disease and its social impact, but also because of the strain associated with online classes, uncertainties regarding examinations and future career prospect and an overall bleak economic scenario. This study was conducted among college students pursuing professional courses in Dehradun, India, with a valid self-reported measure of EI, a global scale of perceived stress, and a self-made questionnaire about Covid-19 related stress, with the aim of assessing their emotional intelligence and to determine its correlation with stress. One hundred and eleven students were surveyed through an online questionnaire. Emotional intelligence had significant correlation with Covid-19 related stress, but not with perceived stress. Assessment of trait EI can identify students at risk of developing high stress.**

***Index Terms*—Emotional Intelligence, Trait EI, Stress, Covid 19, College Students**

I. Introduction

EMOTIONS and stress, as a basic human trait, are as old as the history of human civilization itself. The field of emotional intelligence (EI) has seen rapid advancements in the last three decades, despite it being a relatively new subject area. The various theories, models and measuring tools are a testimony to the rising interest in this field. A lot of occupational, academic, personal and professional traits, qualities and attributes have been studied in relation to EI and their correlation with each other have been explored[1,2]. As expected, because of so many diverging views, there is also growing debate about the true meaning, and definition of the term as well as the correct tool to measure it. Since the landmark studies of Mayer and Salovey in early 90s[3], there have been numerous attempts by various scholars to define and describe EI in their own ways. In simple terms, Emotional Intelligence can be defined either as self- perception about one's own emotions or an ability to control negative emotions and focus on positive emotions.

Theories of Emotional Intelligence have evolved into three diverging models – Mayer and Salovey's 'ability' model, Petrides and Furnham's 'trait' model and Goleman's and Bar-On's 'mixed' models. **1**) According to Mayer and Salovey, emotional intelligence is the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth[4]. **2**)The Goleman model holds that emotional intelligence is the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions effectively in ourselves and others[5,6]. 3) Bar-On's emotional social intelligence model defines EI as those non-cognitive capabilities and skills that affect one's ability to deal with social and environmental demands and pressures successfully[7]. 4) The trait model defines EI is as a constellation of self - perceptions located at the lower levels of personality hierarchies[8]. Mayer and Salovey argue that the ability to learn EI skills arises out of an inborn form of intelligence, and similar to IQ, EI predicts one's ability to learn emotional skills. Goleman and Bar-On believe that EI is a set of skills and competencies that can be learnt and enhanced.

Two distinct forms, ability EI and trait EI have been identified, as noted by Petrides and Furnham, and the distinction is made on the basis of measurement tool used[9]. According to them, measures of ability EI correlate with an individual's theoretical understanding of emotions and emotional functioning, and measures of trait EI correlate with typical behaviors in emotional situations as well as self-rated abilities[9]. Thus, all EI measures that are based on self-report items are called 'trait EI measures and all measures that are based on maximum performance items are called 'ability EI measures'[9]. These two aspects of EI are thought to be conceptually distinct[10]. Generally, trait EI has been reported to have stronger relation to adaptive outcomes than ability EI[11]. Trait EI has been shown to reduce stress reactivity in cognitive or psychosocial stress tasks in studies about self-efficacy, self-esteem and happiness[12]. Another major difference between the two is the notion that while ability EI is somewhat fixed, trait EI can be improved with training. Several studies and meta-analyses have looked into this aspect of trait EI and reported improvement,

through various training programs, in academic performance of students, and organizational performance of managers and leaders, among others[13,14,15].

A. Measuring tools of EI

MSCEIT – by Mayer, Salovey, Caruso[16], based on their ability model of EI, is a test of maximum performance, and is similar to IQ tests. Bar-On's Emotional Quotient – inventory (EQ-I), is based on his Emotional Social Intelligence model[7], and Goleman along with Boyatzis[17] developed his Emotional Competency Inventory (ECI) based on his emotional competency model. Schutte et al[18] developed a self- reported test (SSEIT) based on the ability model of Mayer and Salovey. Petrides et al[19], based on their Trait EI model have developed TEIQue – long and short forms. All of these tests have been extensively used and validated in different countries and population samples. Most of these are long and time consuming and not freely available with the notable exception of SSEIT. There are several advantages of using this test. First, it is freely available, unlike most other measures which are owned and run by large corporates and have to be purchased for either research or commercial use (except TEIQue-SF in a limited format). Second, it is very short and concise and takes much less time as compared to other tests. Third, it is one of the few tests, which has been used in a large and reputed meta-analysis, correlating EI with a variety of health indices. Fourth, it can be used both as a global measure of EI or a multi-dimensional scale measuring sub-sets of EI[20].

This scale measures 4 components of emotional intelligence based on the 4-branch model of Mayer and Salovey, namely the appraisal, expression, and regulation of emotions of oneself and others and the utilization of emotion in problem-solving. It uses a 5-point Likert scale ranging from 1 (strongly-disagree) to 5 (strongly-agree) and comprises of 33 questions. Although some later researchers have argued for using these components as a four -factor analysis of this tool[9], Schutte et al and others have advocated use of the composite scale as single factor for scoring EI[20].

B. Emotional Intelligence and Gender

It is generally believed that women fare better than men in all aspects of emotions, and a large body of literature suggests the notion that women score better than men in all EI measures and domains[21,22,23,24]. In a review by Malouff et al describing studies employing SSEIT, it was found that although there was gender difference in EI, not all studies reported a statistically significant difference[20]. In a study by Petrides et al[25] on trait EI, females scored higher than males on the social skills factor, but not on composite scores. Another study has shown that, it is the other demographic variable, age, rather than gender, which accounts for a larger effect on EI than gender[26]. Studies by several other researchers do not support the notion of women having higher EI than men[27,28,29]. Similar conflicting results have been reported in Indian studies. Pooja et al[30], in their study on Indian professionals, found that female employees have higher EI score than males as measured by Trait EI scale. A study from Tamil Nadu, India among medical graduates, reported higher EI in females[31], but another more recent study from the same state did not report any gender difference[32]. A study from Delhi, India, reported higher EI in females among 10thgraders[33] but some of the studies from other Asian countries among college students came to the conclusion that there was no gender difference in EI[34,35]. In another Indian study by Shanwal et al, girls fared better than boys, though the difference was more divided on the basis of urban and rural population, and not by gender and rural boys had the highest scores on EI[36]. Finally, a study from South India reported a higher mean scores of EI in males than females[37].The above discussion suggests that the topic of gender difference in EI is still open to debate and definitely requires larger studies and meta-analysis to settle this point.

C. Emotional intelligence and Stress

Lazarus and Folkman have argued that stress results from an interaction between the individual and the environment and it depends on the coping mechanism in response to the stressful situation[38]. The impact of EI on stress, and coping mechanisms has been well studied. Emotional intelligence has been significantly associated with healthy functioning, distress and post- traumatic stress[39]. People with high EI accomplish more positive outcomes, like psychological wellbeing, higher educational qualification, and career growth.[2]. Some of the recent research in the field of EI is directed towards finding individual differences that influence stress responding[40]. Higher levels of trait EI are associated with lower levels of perceived or occupational stress[41]. EI has been proposed to work as a buffer mechanism for stress and lead to positive outcomes[42].

Due to the complexity of stress pathway, there are many different ways to induce stress experimentally, like reading self-evaluative statements[43], showing emotive video clips[44] or asking participants to deliver an impromptu speech[45]. Besides these 'laboratory experiments', some methods use natural stress inducers, such as an examination, or a competition[46]. The specific emotions and physiological outcomes that arise in a stressful situation are quite unpredictable and depend on many different factors[47]. For this reason, making uniform conclusions from studies that have induced stress differently is really difficult.

D. Stress during Covid-19

Covid -19 and its consequent nation-wide lockdown present a unique opportunity to study stress. As a uniform global phenomenon, it provides a uniform external stimulus for generation of stress, and people with different demographic, socio-economic, educational, or vocational background are likely to have felt certain amount of stress due to the pandemic and related problems of various restrictions and economic slowdown as well as worry regarding the actual threat of the infection.

Word Health Organization declared coronavirus disease 2019 (COVID-19) as pandemic on 11 March 2020. The gov-

ernment of India, declared a nationwide lockdown on 24th March 2020. To different extent, the lockdown has affected all sectors of the country including the education sector, which till the writing of this manuscript, remains the only sector which has not been opened fully. The closure of schools, colleges, and universities has disrupted academic activities at various levels, including examinations, admissions and placements. Apart from the changes in the mode of teaching and learning, other restrictions for preventing disease spread, uncertainties about their examinations, admissions to higher courses, placements, and jobs may contribute to enhance the stress faced by the students.

Since the onset of coronavirus pandemic, several studies have been published looking at various emotions, and stress among students, parents, and other professionals[48,49,50,51], although only a few of them specifically studied the relationship of EI with stress and coping. A study from Australia reported that EI played an important part in positive coping strategies[52]. Another study from Poland concluded that trait emotional intelligence can predict the negative feelings of fear, sadness and anxiety associated with the pandemic.[53]. Some researchers have also used this opportunity to study stress with specific Covid-19 stress scales among different populations. While a study from Columbia has simply altered the perceived stress scale to add Covid-19 term in its questionnaire[54], another one from Canada is a more comprehensive scale dealing with different aspects of the pandemic, but more closely related to the risk of getting infected or the health problems and the failure of preventive measures[55].

Keeping this background in mind, there is clearly need for more focused studies looking at correlation of EI with this specific stress situation and to identify those susceptible individuals who can be benefitted from more targeted mentoring and counseling. As the authors plan to undertake a bigger study on emotional intelligence, a pilot study on students was undertaken. In this study, an attempt was made to understand the level of emotional intelligence of college students, the stress faced by them and to see if there exits any correlation between the two. We attempted to not only measure EI with an internationally valid tool, but also developed a short and concise Covid stress scale to assess the stress caused by the effects of lockdown, mainly affecting students.

II. Aims and Objectives

The present study was undertaken with an aim to assess the emotional intelligence of college students studying in professional institutes of Dehradun, Uttarakhand (India), and its correlation with Stress. The main objectives were defined as-

1. To determine EI by Schutte Self-reported Emotional Intelligence Scale of college going students of Dehradun pursuing professional courses.

2. To determine general stress by Perceived Stress Scale and specific Covid induced stress by a self - made stress questionnaire.

3. To determine correlation between EI and Stress.

Evaluating gender difference in EI was kept as a secondary objective, keeping in mind the small sample requirement.

III. Material and Methods

The sample population was college students of both genders, pursuing professional courses in various professional institutes of Dehradun, Uttarakhand, India. As it is a pilot study, a minimum sample of 100 was considered optimum. An online survey with three different questionnaires was planned. Because of the restrictions placed by the lockdown, participants were contacted through various social media platforms and contacts. All data were collected confidentially after informing the participants in detail about the study. The initial part of the survey included the demographic parameters. Following standard tools were used for the study. 1) For measuring Emotional Intelligence, Schutte Self-report Emotional Intelligence Test (SSEIT) was used. It consists of 33 questions regarding self- perception of emotions. Participants respond to items on a 5-point Likert-type scale ranging from 1 (strongly-disagree) to 5 (strongly-agree). For calculating EI, sum of all scores (as numbered in the options) is calculated. 2) For measuring stress, Perceived Global Scale for Stress (PSS) comprising 14 questions was used[56]. Each item is rated on a 5 points scale from 1 (never) to 5 (very often). As with EI scale, here also, sum of all options gives the total stress scale. Finally, a self-made stress questionnaire specifically dealing with stress related to Covid -19 was used with 8 questions with options similar to PSS (given in supplement). Following statistical analyses were done. 1) For internal reliability of scales, Cronbach alpha was calculated for all three questionnaires. Validity of Covid stress scale was tested with Pearson coefficient. 2) For comparing EI between genders, t-test for significance was employed. 3) For correlation between EI and Stress, Pearson's Correlation coefficient was used. SPSS (IBM Inc) version 23 was used for statistical analysis.

IV. Results

A. Demographics

A total of one hundred and eleven college students fulfilled the questionnaires completely and were subjected to analysis. Sixty-eight (61%) were females. Average age was 20.7 years. Maximum responders were from management courses. The majority of students belong to Uttarakhand and Uttar Pradesh. About three-fourths of participants were aware about the concept of EI. Table 1 summarizes the demographic details.

B. Validity and Reliability

Cronbach alpha for each questionnaire dealing with emotional intelligence, Perceived Global Stress and Covid related stress, respectively, was 0.897, 0.817, and 0.798, which showed good internal reliability of all three as a value greater

TABLE- 1- DEMOGRAPHIC DETAILS OF STUDY PARTICIPANTS

Age		
	Mean	20.7
	Range	18-26
	SD	1.41
Gender		
	Females	68(61.2%)
	Males	43 (38.8%)
Native State		
	Uttarakhand	42 (37.8%)
	Uttar Pradesh	24 (21.6%)
	Delhi	7 (6.3%)
	Others	38 (34.3%)
Course pursuing		
	BBA	47 (42.3%)
	MBA	29 (26.1%)
	Bsc/Btech	15 (13.5%)
	Msc	8 (7.2%)
	Others	12 (10.9%)

than 0.7 is considered adequate and above 0.8 is suggestive of good reliability (Table- 2). Testing with Pearson coefficient confirmed the validity of the Covid scale.

C. *Emotional intelligence*

The mean value for EI, for the total sample population was 130, with SD of16.89. This suggests an overall high to high normal level of EI of the study group. The mean score across many large samples has been reported about 124, with a standard deviation of about 13. Mean scores below 111 or above 137 are considered unusually low or high (Malouff et al 2009). In this respect, our sample population corresponds well with previous studies with SSEIT.

TABLE 2. CRONBACH ALPHA VALUES FOR ALL THREE SCALES

Scale	Cronbach alpha
Emotional Intelligence	0.897
Perceived Global Stress	0.817
Covid related stress	0.798

There was a significant difference between EI scores of male and female students, with values of 128.9 for males (SD= 20.23), and 130.9 for females (SD =14.51). ($p < 0.05$) (table 3 and table 4). This result is comparable to previous studies, both from India and abroad, which have shown a higher emotional intelligence among females than males, although as can be seen, the actual difference in mean EI among the genders is quite small.

Table 3. EI scores of female and male students

	N	Mean	Std. Deviation	Std. Error Mean
Females	68	130.9118	14.51375	1.76005
Males	43	128.9070	20.23177	3.08532

D. *Stress*

The mean value for perceived stress was 31.1 with SD of 8.99, which suggests moderate degree of stress. The mean value for the Covid stress scale was 27.8 with SD of 6.36. As expected, this scale yielded a very high level of stress among the study participants, with three of the participants scoring the maximum possible score of 38.

Table 5 summarizes the values of the three scales.

E. *Correlation between trait EI and Stress*

Correlation analysis using Pearson's correlation coefficient revealed significant negative correlation between EI and Covid stress scale. There was weak negative correlation observed between EI and perceived stress, but it was not statistically significant (table 6). For correlation analysis, global scale of EI was used and subscale calculation of four individual components was not done. As role of gender was not a primary objective of the study, correlation of stress scale with male and female groups was not performed separately.

Table 6 summarizes the correlation coefficients between EI and stress scales.

V. DISCUSSION

To the best of our knowledge, this is the first study from the state of Uttarakhand, India, assessing the emotional intelligence and its correlation with stress during the Covid -19 pandemic and consequent lockdown. This pilot study was undertaken in a small sample of college going students studying in various professional colleges of Dehradun, which is known as an education hub in Northern India, and attracts students from different parts of the country. As the authors plan to undertake a bigger study about emotional intelligence among professionals in education sector, this pilot study was conducted for validating the questionnaires, along with the study of stress caused by the present situation. Emotional intelligence and stress have been well studied topics, both among students and working professionals. However very few Indian studies have actually used internationally valid tools for measuring EI. The coronavirus pandemic and nationwide lockdown provide a unique opportunity to study the stress and the correlation of EI with stress.

The results of the study provide some interesting points to consider. First, the overall level of EI in this study was relatively high, as measured by the SSEIT tool. This is an interna-

TABLE 4. T-TEST AND P-VALUES FOR MEAN EI IN FEMALES AND MALES

	Test Value = 0					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Females	74.380	67	.000	130.91176	127.3987	134.4248
Males	41.781	42	.000	128.90698	122.6806	135.1334

Note: P value < 0.05

tionally valid tool to measure trait EI and has been used in previous studies among students. In several large population surveys, the mean EI score is around 124. In our study the mean EI score was 130.1, which suggests that college students pursuing professional courses have high-normal emotional intelligence. In a comprehensive review studying EI with SSEIT[20], mean EI scores among different student groups in different countries have been reported to vary from 117 to 133. Our result is fairly comparable to these studies. Second, there was a slight but significant difference in EI between male and female students. This finding is in accordance with the generally accepted wisdom that women have better emotional intelligence than men. Several studies, including the one by Schutte et al themselves for validation of their tool came to the conclusion that women score better than men in almost all EI tools and domains[21,22,23,24]. However, some of the relatively recent studies have shown that the gender difference is not uniform and EI scores are equal for both the genders. Larger studies are definitely needed to clarify this issue.

TABLE 5.TRAIT EI, PERCEIVED STRESS AND COVID STRESS SCALE VALUES (MEAN, SD)

Trait Emotional Intelligence		
	Mean	130.1
	Range	52-165
	SD	16.89
	Females	130.9
	Males	128.9
Perceived Stress (maximum possible 56)		
	Mean	31.1
	Range	4-50
	SD	8.99
Covid Stress (maximum possible 38)		
	Mean	27.8
	Range	6-38
	SD	6.36

The correlation analysis also showed an interesting aspect. Contrary to the available evidence and popular belief, there was no significant correlation between trait EI and general stress as measured by Perceived Stress Scale. This may be because of three reasons. First, as the sample size is small, the negative correlation may not have reached the level of significance. Although a minimum sample size of 100 is usually considered adequate for such pilot studies and for validation of questionnaire, this may not be adequate for correlation analysis. Second the EI scores of students skewed in the high normal range and very few students had low scores. This unequal distribution may also lead to inadequate correlation analysis. Finally, although Perceived Stress Scale is a validated tool for measuring stress, it may not have captured the accurate psychosocial and mental distress induced by Covid 19 pandemic. This assumption was also the reason for designing a short specific questionnaire related to specific issues about health, studies, career and economy arising out of this pandemic and lockdown. As expected, this scale produced very high scores of stress for the majority of students, but more importantly, emotional intelligence had a significant correlation with this stress scale. As discussed previously, trait EI is better correlated with stress than ability EI. Individuals with high EI seem better in coping with stress and have better adaptive responses to come out of stressful situations. It follows that measuring trait EI can identify those individuals who are at risk of developing high stress if faced with acute stressful surroundings. Such individuals can then be trained for improving their emotional intelligence by way of a targeted approach. College administration, by identifying students at high risk of stress, can plan special counseling sessions to improve not only their academic performance, but their overall health and well-being in a holistic manner.

TABLE 6. CORRELATION BETWEEN EI PERCEIVED SCALE AND COVID STRESS

Correlation coefficient		
	EI and Perceived stress	- 0.173 (p-0.069)*
	EI and Covid stress	-0.208 (p-0.028)**

Note: *P value > 0.05
**P value < 0.05

A number of studies, both from India and abroad have looked on this aspect of Covid 19 stress and emotions generated by this situation. However, there are very few studies which have actually correlated EI with Covid induced stress. Most of the Indian studies have only assessed various emotions, but not emotional intelligence specifically. A few foreign studies have analysed Covid induced stress and made their own tools but they were either a slight modification of perceived stress scale or stress scale primarily related to the infection and health. These were published in early part of the pandemic and do not quite capture the Indian scenario in the later part where several issues affecting students like online classes, diminishing career opportunities and a difficult economic situation give rise to some unique stressful situations. A short stress questionnaire dealing with these issues was specifically designed for the purpose of this study which showed good internal reliability and correlated better with emotional intelligence than the perceived stress scale.

A. Limitation and Future Direction

There are some notable limitations of this study. First, it is based on single point observational correlation rather than experimental evidence, and hence cannot fully confirm its result. More longitudinal studies are required to determine how EI impacts on stress. But given the limited opportunity of this pandemic, a significant correlation between trait EI and acute stress gives an indirect proof to the concept and moreover, makes a strong point for identifying persons with low EI. Another limitation is a small sample size, especially regarding the role of gender and any conclusion about this needs larger studies. Similarly, the non-significant association with perceived stress may have been due to this limitation. However, as the adaptive responses to stress are complex and not uniform, a more generalized stress, as measured by PSS may not be solely dependent on EI, but rather on other related aspects of personality and intellect. Thus, it may be surmised from the above discussion that dealing with chronic generalized stress may require more than just emotional intelligence, but it may certainly play a role in dealing with acute stressful situations arising out of our external environment and moreover, its evaluation can help identify those individuals who are at risk of developing high stress if faced with such situation. For both college administrators and HR managers, this can be a framework for better targeted approach to improve academic performance, in case of students, or to improve productivity, in organizations. Future research could focus on finding the empirical evidence of an improved emotional intelligence working to help ameliorate the stress.

VI. CONCLUSION

The main objective of the study was to assess the Emotional Intelligence (EI) of students in relation with Covid 19 stress and general stress as measured by two different scales. The outcome of this study showed a negative correlation between EI and Covid-19 stress, but there was no significant correlation with perceived stress. Our study shows that while EI may not be a good indicator of response to general chronic stress, it may prepare oneself better to deal with acute stressful situations like COVID-19. The study also shows that during unique stressful situations like Covid 19 pandemic, measures of stress should incorporate specific issues related to that situation to better understand the stress faced by population. We have used a tool to measure trait EI, which can be improved through training and it is hoped that the result of the present study can be applied in professional institutions for development of EI among students. For, it is not the intelligent, but emotionally intelligent individuals, who deal with stress in a better way.

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SUPPLEMENT. COVID–19 STRESS SCALE

The following set of questions ask about the impact of COVID-19 and the stress related to it. Answer quickly with the alternative that seems most appropriate. The options are as follows.

Never, Almost never, Sometimes, Fairly often , Very often. (made on google forms as Likert scale)

1. Have you felt stressed about the impact of COVID-19 on your studies

2. Are you worried that online classes are not enough to fulfill your academic and learning needs

3. In the last month, how often have you felt nervous and anxious that the pandemic may affect your career options

4. Do you feel upset that the pandemic will have a long-lasting impact on the economy and the job opportunities

5. How often have you feel confident that there are new opportunities for both learning and career because of pandemic

6. How often have you felt anger that the government strategies may not be enough to control the pandemic

7. How often have you felt worried that you or your family members may catch the virus

8. How often you felt worried that measures like wearing mask and social distancing will not be able to control the spread of the virus

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Technology and Innovation Management in Times of Crisis: Problems and Suggestions

M. Hanefi Calp
Assoc. Professor, Department of Management Information Systems,
Karadeniz Technical University, Trabzon, Turkey
mhcalp@ktu.edu.tr

***Abstract*—The economic, social and technological structures of the countries change in a short time in times of crisis and societies tend to especially towards information and communication technologies. This situation causes the technology, which is already widely used in daily life, to be more dominant in every field. Thus, many activities that are difficult to implement in real life such as identifying, sharing, monitoring, testing, predicting and making decisions, which are needed mostly in times of crisis, can be performed more easily. However, for the successful implementation of these activities, the right technology must be acquired, used and managed at the right time and the technology innovation process must be dynamic. Therefore, at this point, the subject of technology and innovation management comes to the fore. Considering the problems encountered in the management process especially during crisis periods, the importance of this issue is understood more. In this context, the study put forward some suggestions for the importance of technology and innovation management during crisis periods, the risks encountered in this process, threats and problems, and measures to be taken against these problems. The study is thought to be particularly important in terms of being prepared in terms of crisis periods that cause sudden, unpredictable and difficult-to-fix negative results.**

***Keyword*—Crisis, Technology, Innovation, Technology, Innovation Management.**

I. Introduction

TODAY, with the formation of information societies, obtaining, using, sharing and managing information is preferred as a management strategy. Technology is used effectively in this process. It is very important to use the technology resource effectively and efficiently and to create a value for the society [1]. Because technology provides new facilities and opportunities to societies. Thanks to technology, institutions or organizations can perform their duties more easily in cooperation with each other and can access all kinds of information they need faster. However, an important point here is to use the right technologies at the right time and sufficiently. Thus, the technologies used will be a labor force for societies and the competitiveness of institutions will be created [2].

With the development of technology, technological changes occur in line with the needs. These changes affect societies according to their level of development and welfare. It is necessary to monitor the technologies used, to anticipate the technological changes and to adapt to these changes in order to be affected from this situation at the minimum level in the negative sense and at the maximum level in the positive sense. They both lose their competitive power and cannot make the right decisions for their future when businesses providing information and service production cannot adapt to technological innovations or changes. In addition, they may face serious economic and strategic difficulties. With an effective and timely technology management, businesses can prevent damages that may come to them, and realize their production and investments more accurately. Therefore, considering the rapid development of technology, institutions need an effective technology and innovation management [3].

The concept of technology management can be expressed as the planning, development and implementation of technology in order for businesses to achieve their operational and strategic goals. This subject can be thought of as integrating engineering and management science disciplines. It is thought that technology management provides competition for businesses and is effective in creating value. According to the size of the businesses, technological management should ensure that the entire technological infrastructure is compatible with the needs of the institution or personnel [4]. Because societies may face certain risks or threats in their daily life and business life. Some of these risks and threats can cause low negative impact and some of their irreversible impact. Normally, risks with low realization potential have a high negative impact. The best example of this is infectious diseases, that is, global epidemics that have spread around the world. Global epidemics have various characteristics, spread rapidly to very large masses and cause fatal consequences, especially for human health. Therefore, at this point, in order to overcome the encountered risks with minimum damage, businesses should closely follow the technological developments especially in crisis periods and apply the necessary technology and innovation management processes effectively [5,6].

In this context, in this study, some suggestions are presented on the importance of technology and innovation management in crisis periods, the problems experienced in this period and taking necessary measures against these problems. In the second part of the study; technology, innovation, technology management and innovation management concepts are explained. In the third chapter, technology and innovation management in times of crisis and the problems encountered and suggestions in this process are in-

cluded. Finally, in the fourth part, there is the conclusion and recommendations part of the study.

II. Technology And Innovation Management

Technology and innovation management is both a technical field and a discipline. In this section, there are important subheadings about technology and innovation management. When the literature is scanned, it is seen that there are different definitions and approaches on technology and innovation management [7]. In Table 1, these approaches are summarized.

Table 1 Approaches to Technology and Innovation Management

Reference	Year	Author	Proposal
[8]	2000	Dogson	New product development R&D management Technology strategy Commercialization Technological collaboration Operations/Production Organizational learning Creativity Complexity Risks
[9]	2005	Tidd et al.	Strategic approach Strategic learning Setting effective external linkages Managing internal process Creating innovative new firms
[10]	2006	Adams et al.	Management of inputs Knowledge management Innovation strategy Organizational culture and structure Portfolio management Project management commercialization
[11]	2008	Shane	Development and introduction of new products Management and organization of innovation R&D project selection Portfolio management Technology and innovation strategy Intellectual property and innovation Technology-based entrepreneurship Financing of innovation
[12]	2012	Lopes et al.	Organizational strategy Project management Knowledge management Product management Types of innovation Technological innovation Open innovation

A. Technology

Technology is defined as an information field created by researching construction techniques and vehicles related to an industrial field and an application realized in order to obtain commercial value [13]. Technology is a physical product that generates information and value, and a non-physical service or output. In addition, technology contributes to a faster and higher quality product at a lower cost. Technology is an important resource for everyone and provides a competitive advantage especially for businesses [14].

B. Technology Management

Technology management includes the development, implementation, planning, control and coordination of technological tools to determine the strategic and operational goals of enterprises and to achieve these goals [15]. The concept of technology management includes the concepts of product and process development, the strategies of businesses, product development activities, process renewal and development method, technology transfer, change management and technological change [13]. In short, the technology management process consists of *determining, selecting, acquiring, using* and *protecting* technology [16]. Figure 1 shows Gregory's technology management process.

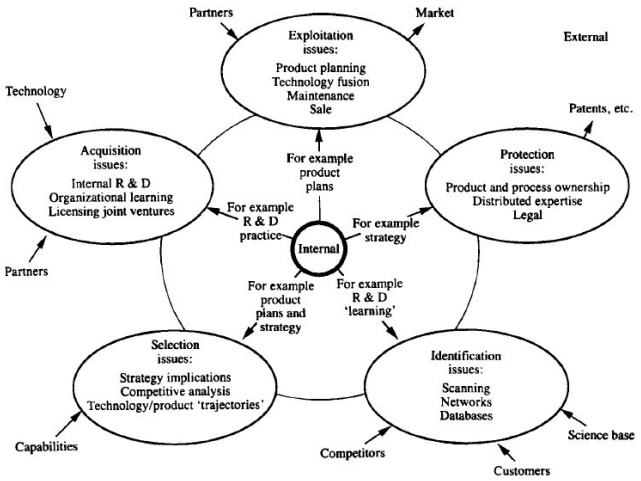

Fig. 1 Technology Management Process [16]

In summary, technology management aims to answer the following questions:

- How are technology policies and strategies developed?
- How to benefit from existing technologies?
- How to keep track of market and technology changes to ensure competitive edge?
- How is technology produced?
- How is technology protected?
- How to buy new technologies?
- How are technologies that will contribute to business processes evaluated and selected?
- How is technology transferred?
- How are technology producers managed?

▪ How are technology assets integrated and used effectively?

Technology management provides guidance on issues such as the combination of management and technique, the determining technology and investment method for businesses to compete, the way technology is produced, developed and marketed, how the organizational structure is changed according to new technological developments and the competitive strategy to follow with current technology.

C. Innovation

The concept of innovation is the state of making changes in the structures, strategies, management processes and administrative affairs of businesses. It is the application of a new product, idea, service or process in the business processes of the business. In addition, innovation refers to the change in different business processes and services. It is the process of generating ideas and designing technology for a product that has never been applied before. Innovation, which includes commercialization, is an organizational process from the creation of the idea to economic income. Reveals new ideas in solving any problem and implements these ideas in the market. Innovation is the transformation of an idea or knowledge into economic and social benefit in any field [18].

Innovation deals with finding a new management approach, commercialization, information processing methods and applying them. It is a tool for entrepreneurship. It enables new ideas to be transferred to a marketable product or service in the market. Innovation is actually a renewal process that businesses or organizations experience in order to adapt to environmental changes [19]. In Figure 2, the steps of the innovation process are given.

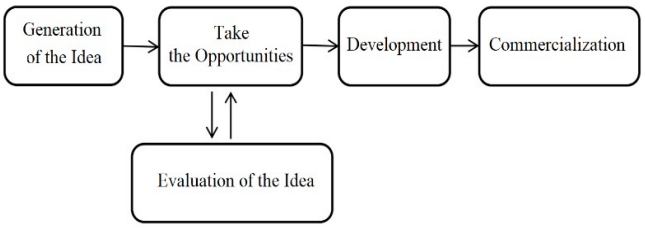

Fig. 2 Innovation process [20].

Innovation has social and organizational dimensions. The social aspect of innovation is to increase the quality of life and welfare of the society, and its organizational aspect is that competition has a process, and it provides to integration into the problem solving process [21].

D. Innovation Management

Innovation management plays an active role in providing companies with a sustainable competitive advantage and has a strategic understanding. A data source is required for this understanding to begin and apply. It is possible for businesses to use these resources effectively by developing and managing innovative ideas, services or products [19].

Innovation management activities fall under four categories:

- *technical integration* that integrates technology and markets to meet customer demands,
- *the innovation process* in which interdepartmental cooperation and cross functional activities are effective,
- *strategic technology planning* where projects for technology or competence development are envisaged,
- *the business development process* in which innovation by organizational change are developed, or that developed by innovations.

In summary, innovation management includes the elements of creating an innovation strategy, generating new ideas, prioritizing and selecting ideas, implementing selected ideas, and involving employees in the whole process [22-24].

III. Technology And Innovation Management In Times Of Crisis And Problems Encountered In This Process

Businesses and societies have to develop new strategies in the face of technology change. However, this process takes place in a troublesome and difficult way because there are too many variables and constraints. Especially in times of crisis, these processes create more problems. Therefore, threats, risks and problems that may be encountered in technology and innovation management applied in crisis periods should be determined in advance and necessary interventions should be made at an early stage. For example, businesses established for commercial purposes need to consider the customer and the industry in order to provide quality products or services. This is only possible with an effective technology and innovation management approach. A technology developed at an unexpected moment will cause the habits of the past to be seriously changed. At this point, the culture of being ready for technology and innovation and adopting this issue is important [14].

Since technology and innovation management is a very broad concept and an interdisciplinary subject, businesses experience some problems in this process, as in other management processes. It is possible to list these problems as follows [25]:

- Lack of knowledge
- Lack of resources
- Use of important resources in different projects
- Experiencing disciplinary problems
- Managers not taking responsibility when making particularly difficult decisions
- Weak cooperation culture in institutions
- Incompatibility between staffs
- Experiencing cultural differences
- Experiencing ideological or differences of opinion
- Communication problems
- Problems in technology supply

There are some difficulties in innovation management, such as not being able to determine how innovation is

formed or developed, the way of organizing for innovation and how the innovation will interact with the organization. The reason for these difficulties; innovation is a subject that focuses on fixed products and has defined boundaries, failure to centralize the innovation organization and the innovation processes consist of different subjects [26].

In general, the problems encountered in technology and innovation management are grouped under main headings below and the contents of each are given in items [14].

a) Problems Experienced in Technology Identification and Selection Step
b) Problems Encountered in the Technology Planning Step
c) Problems During Stakeholder Meetings
d) Problems During the Application of Technology Transfer
e) Problems Emerging from Insufficient Abilities (Human and Financial)
f) Problems Emerging from Ineffective Management

a) Problems Experienced in Technology Identification and Selection Step

- Wrong technology choice
- Inability to meet the needs due to the incompatibility of the determined technology with the infrastructure
- Perceiving the complexity of the specified technology by the customer or the user

b) Problems Encountered in the Technology Planning Step

- Not serving the user's needs
- Not taking part in the planning process
- Being indifferent to the technology to be acquired
- Being indifferent to the information, product or service to be obtained
- Exaggeration of technological capabilities
- Incorrect estimation of printouts
- Transferring technology by wrong means

c) Problems During Stakeholder Meetings

- Educational and cultural differences on both sides
- Differences in approach and strategy during the interviews
- Distrust among stakeholders
- Inconsistency in goals and objectives
- Conflict in pricing and marketing strategies
- Unrealistic time constraints to reach the goal

d) Problems During the Application of Technology Transfer

- Lack of experience of managers
- Obtaining technology-related documents incomplete
- Lack of achieving quality targets
- Lack of coordination in accessing materials for technology use
- Low quality and high cost in the materials reached
- Whether technology is monitored effectively or not

e) Problems Emerging from Insufficient Abilities (Human and Financial)

- The client's lack of experience and skills
- Lack of knowledge of the personnel involved in the process
- Not being open to new systems
- Lack of skills for technology internalization
- Communication problems between stakeholders
- Lack of report request

f) Problems Emerging from Ineffective Management

- Lack of support in management
- Inadequacy of senior management in intermediary role in all steps related to technology
- Errors, inadequacies and differences in working methods
- Inadequacy in putting current technologies into a competitive environment
- Inability of management to recognize and authorize staff with whom it works

Considering all these problems, businesses should understand product requirements, must be manufacturable products and provide skilled processing technologies in order to bring products to market faster and more cost-effectively. At this point, products and services wealth should be provided, especially in order not to be adversely affected by crisis periods. Because product and service wealth is a possible strategy to increase an organization's competitiveness. However, companies cannot effectively utilize production personnel or change their production practices to support process and product innovation [27].

IV. Conclusion and Recommendations

In the study, a detailed examination was made about technology and innovation management in crisis periods, management processes and the problems encountered in this process and some suggestions were presented. The results of the analysis showed that the rapid change and development experienced in technology significantly affect the business processes of the enterprises. In addition, the processes of defining, identifying, obtaining and protecting technology (technology management) must be carried out effectively and completely. Especially in times of crisis, this issue is much more important. The more effective and careful technology and innovation management is carried out in times of crisis, the more at requested time, the desired amount, lower cost and better quality of businesses can produce their products. In addition, with an effective technology and innovation management approach, enterprises can accurately predict the developments in the field of technology and thus plan their investments and production according to the data they have. The important point here is that, for a successful technology and innovation management, the people in the technological planning team should organize in cooperation, brainstorm periodically and adjust time management well.

Businesses should not be afraid of using advanced and new technologies, they should be more aggressive in technology transfer and use. Technology and innovation management organizes the group and ensures that the work is done more effectively, productively and widely. It is important that technology management activities take place in the light of the important results and suggestions mentioned above, in terms of being affected at a minimum level from possible adverse situations.

Finally, more scientific research should be done to clearly reveal the difficulties or problems encountered in the process. Different technology and innovation management approaches should be developed to overcome all problems, especially in times of crisis. In addition, a system can be developed to organize, manage, analyze and monitor technology and innovation management activities in a more dynamic and applicable manner. In addition, technology and innovation management should not only be adopted by individuals and institutions, but also countries should include this issue in their domestic policies.

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Exploring the path from idea generation till knowledge creation

Sonal Chaudhary
Alumni, KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad
Lucknow, India

Meenakshi Tyagi
Assistant Professor,
KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad,
meenakshi.tyagi@kiet.edu

***Abstract*—In the present era of Modernization and technology advancement, almost everything has evolved. But what we have witnessed is that something remains the same. One such thing is idea we are surrounded by ideas we may not realize but this modernization globalization is all due to some extra ordinary ideas.it can be a sword if we work hard for it or it can make you feeble . This is to strengthen over knowing about idea. How to use them, how to focus on them etc.**

***Index Terms*—Talent, Knowledge, Idea, Path Creation, Relationship**

I. Introduction

IN THE present era of Modernization and technology advancement, almost everything has evolved around three things: idea, talent and Knowledge.

A. Idea

Idea can be defined as one or more thoughts that come in one's mind. Ideas may be useful or useless. Ideas can show us path for better opportunities. And good opportunities shape one's life and future.

B. Talent

Unique way, or we can put it this way, talent differentiates one person from the other. It is not true that only an educated person is talented, there are lot of people who don't possess any degree or any certificate, but they are still talented, as they got some skill, which makes them talented.

C. Knowledge

Information, understanding, awareness that has been obtained by experience or study is known as knowledge.

Knowledge is the important tool to survive in the era of throat cut competition and survive and create a position of themselves in the world of digitalization.

Knowledge can be helpful in all the fields like Information Technology, Manufacturing, teaching, Academics, Engineering, Medicine, Pharmaceutical, Entrepreneurship and Start ups etc.

Figure 1 represent the path of idea generation till knowledge creation which is represented below:

II. Literature Review

Great ideas lead to great opportunities and vice versa. Ideas are responsible for the prosperity as well as downfall of humans but without one we would still be living in prehistoric times. No idea is too small as all sorts of ideas have potential to change the world. Now, above written can be sum up as:

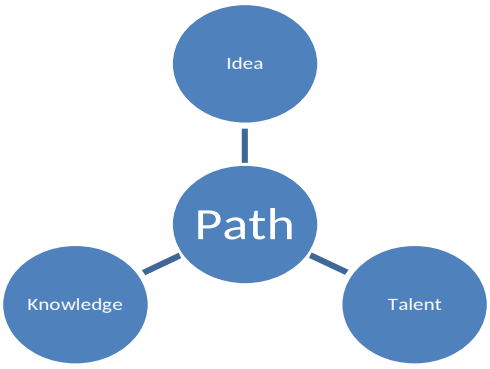

Fig. 1. Path of Exploration

1. Idea may be innovative.
2. Idea may be creative.
3. Idea may lead to a plan, thought or suggestion, especially about what to do in a particular situation.
4. Idea may be a concept developed by the mind.

For example, Start-Up India. Start-up India is a flagship initiative of the Government of India, intended to catalyse Start-up culture and build a strong and inclusive ecosystem for innovation and entrepreneurship in India. Since the launch of the initiative on 16th January, 2016, Start-up India has rolled out several programs with the objective of supporting entrepreneurs, and transforming India into a country of job creators instead of job seekers. It was a tremendous as well as legendary idea which with proper execution resulted in platform for other revolutionary ideas which may lead to employment etc.

Now, there are certain questions that come to our mind when we talk about an idea.

1. What is an idea?
2. What sorts of ideas are their?
3. And how to explain them once u have them?

III. Proposed Work

Let's understand them all together.

1. The word "idea" comes into play to describe thoughts and suggestions. For example- I have an idea, let's eat Pizza at Dominos for lunch.

2. We use the word “idea” to describe new concepts. For example- I have an idea — Lets prepare a machine that washes and dries our cloths automatically.
3. Also, we use the word “idea” when someone says something stupid. For example- You have no idea.

If we focus on the first two examples, the word “Idea” telegraphs that something new is coming. And in third one, it is just the word play.

One of the important aspects to having an idea is how to explain that to others. Hence, one must acquire ability to explain an idea. As when you know how to explain your ideas, your working life will improve. An idea needs to be explained with utmost ease, one need to be fully confident about the same. One should be fully comfortable about it so that others can feel the same. And use of the simple and mass communication skills is must. If it makes it easy, interesting then it may be with the help of Audio and Visual Aids. Thus, having an idea is not enough but you need certain talent to nurture it, develop it so that it may be fruitful. Which leads to our next big thing i.e. What is talent?

It is not true that only an educated person is talented, there are lot of people who don’t possess any degree or any certificate, but they are still talented, as they got some skill, which makes them talented. For example- Maker of Lijjat Papad Franchise, which is run by a group of household’s ladies, who are making millions. So, it is just the right use of skill set which makes you talented. Now, the question arises is can we acquire talent?

Talent is not something which is inherited in a person and but it is a skill that is developed by doing hard work, learning, practicing etc. in a span of time. When such skill nurtures and becomes fruitful, we may call that person talented. When we skillfully learn something and produce it the same way, we acquire that talent. Also, one can learn a skill, but converting it on an opportunity requires hard work, discipline, and practice.

Information, understanding, awareness that has been obtained by experience or study is known as knowledge.

Knowledge is valuable treasure which is gifted from our inner spirit which becomes the source of life. When we are born, all of us are same. Whether one is going to become a saint or a scientist, no one knows but it all depends on the knowledge, life experiences we acquire and resources we had to do so. A dead man got none- no life, no power and no knowledge. It is said that knowledge is divine gift that accompanies the spirit which is infused into a person between conception and birth. And, the spirit that is the life source. Without it, there is no life and no knowledge.

Knowledge is the mental grasp of the reality. It is awareness of the identity of aspects of the same. Several times, it has been implied that the **“KNOWLEDGE IS THE GREATEST VIRTUE”**

Now, question arises is how to acquire it? Well it is simple, Knowledge is everywhere, and we can acquire it in many ways:

• We can get knowledge from children as well as elders.
• We can get knowledge from the societies.
• We can get knowledge from Schools, Colleges and University.
• We can get knowledge from our families.
• We can get knowledge from our farmers, workers etc.
• We can get knowledge from the Electronic media i.e. TV, Radio, Computers, Internet etc.
• We can get knowledge from print media i.e. Newspapers, Magazines etc.
• We can get knowledge from libraries.
• We can get knowledge from surroundings.
• We can get knowledge from travelling, going places etc.

IV. Future Work

Future work plays a vital role in any research as it suggests the future scope of a research. Talking about idea generation, a good idea leads to - establishing a new Business; Business generates revenue and employment opportunities to people, which further leads to the growth of the society; Eventually, it leads to growth and GDP increase of the country.

On the other hand, Knowledge helps the idea to grow and flourish it in a right direction. it provides new way to do any work, which leads to better results.

V. Conclusion

Exploring the path from idea generation to creation of knowledge has many aspects related to it. An idea is a thought that comes to a person's mind based on his understanding, awareness, thought process, conception or notion which may lead to an innovative product or output, that help people to ease their life. though, just having an idea is not enough, instead it requires inner talent of idea or to transform the idea productively. Talent could be naturally inherited or can be developed with time.

Knowledge means information, awareness or awareness which is obtained by study or live experiences. We can get knowledge from a child as well as an adult or from school or college or from social media. Knowledge is present everywhere, but it depends on you that how you will grasp it.

For example: Startup India is one of the initiative of Indian government, that focuses on promoting innovation and entrepreneurship. To be a part of this initiative, entrepreneur needs to have an idea, which is backed up by inner talent and knowledge around that domain.

Hence, We can say that idea generation is the first thing that comes to one's mind, and its level depends on the talent and knowledge of an individual.

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Sustainable Evolution of Business during Covid-19 Pandemic—Innovation a New Normal

Mark Cherukuri[1], Praneet Amul Akash Cherukuri[2]

[1]University College of Law, Osmania University, Hyderabad, India.
[1]Dept. Of Computer Science, CMR Institute of Technology, Hyderabad, India.
[1]markson.c9@gmail.com, [2]chamul91@gmail.com

***Abstract*—The timing of COVID 19 and the effects due to the pandemic were never expected by any economic researchers nor were any organization ready to face such a depressing situation. Nevertheless, during these adverse effects, many businesses were able to manage their organizations, keep up with their products, and still make profits. Also, the pandemic became a platform for many long-existing technologies and new technology inventions that were backstage for many years to come into the limelight. While the pandemic showed great losses to organizations and businesses worldwide, the technology, Healthcare, and medical devices sectors turned out to be one of the most profit-making companies. In this paper, we tried to understand the business, managerial and technological decisions that played a key role in bringing these technologies into the limelight during these adverse situations and outline some of the most popular businesses amongst them.**

***Index Terms*—Business, Technology, Decision Making, COVID19, Managerial Decisions, Policy Making, Sustainable Development**

I. Introduction

As COVID-19 hit the world during December 2019 and it has been declared as Pandemic by the WHO alerting all the Nations to take preventive steps to stop the spread of the deadly virus and to eliminate it by implementing social distancing and high-end surveillance. The covid-19 pandemic has caused a shock to society and economies across the world were experiencing a great amount of distress. As an immediate step to control Covid-19, Lockdowns were recommended and implemented by all nations. Although the occurrence of a pandemic caused by a new SARS virus is not new to the researchers, the only effective option to control was social distancing as the spread of COVID-19 has a deep impact on the economy of all the nations. [1]

However, the COVID-19 pandemic has put a great amount of burden on the health infrastructure across the globe, and the rapidly spreading virus has caused an economic imbalance by making economic activity completely disrupted. Therefore the present "Sustainable Evolution of Business during Pandemic – Innovation a new Normal" paper ensures that it touches upon the new changes that have caused severe damage and it seeks to point the attention to unique measures that have greatly impacted the businesses and their growth: innovative startups businesses. The policy activities taken to secure economies during the COVID-19 appear to target set up companies, existing industry areas, and economies in that capacity, and in doing so those measures expect to ensure business and the continuation of essential financial movement. As the lockdown measure as a quick reaction to the rapidly spreading COVID-19 with an unimaginable threat to the existence of inventive new companies and organizations across the globe. There was a gigantic amount of difficulties that were brought in by the pandemic which came into existence inhibiting the normal conduct of business and people. We have featured a portion of the significant changes that occurred in the manners organizations worked and the adjustment in the utilization of buyers, we attempted to know how business visionaries are managing the progressions and acclimating to impacts of Covid-19, the new typical conditions, and what they are doing viably to secure their organizations. Importantly we have conceived a portion of the approach changes that got the business people to battle the pandemic and come out decisively, we have referenced a portion of the measures that could be actualized over the globe by policymakers to help the business visionaries who endure because of the pandemic. We have addressed a portion of the developments that changed the essence of the world and to more readily acclimate to the new typical conditions and a make hover of immense business.

II. Changes That Impacted The Businesses Across The Globe Due To COVID-19 Lockdowns

A. The research on the changes that impacted the businesses due to COVID-19

The businesses have been completely shut for about a month all over the globe and the changes this has brought in was a severe economic crisis there were several areas this has impacted and some of them are shown in Fig. 1.[2]

The food and Beverages Industry: Has suffered huge losses as the more number of people started consuming home cook food and increase home cooking by about 54%.

Home furnishing and improvement: Has seen a great increase as people started working from and spent more time at home allowing them to concentrate on Home improvement, which rose by almost 22%.

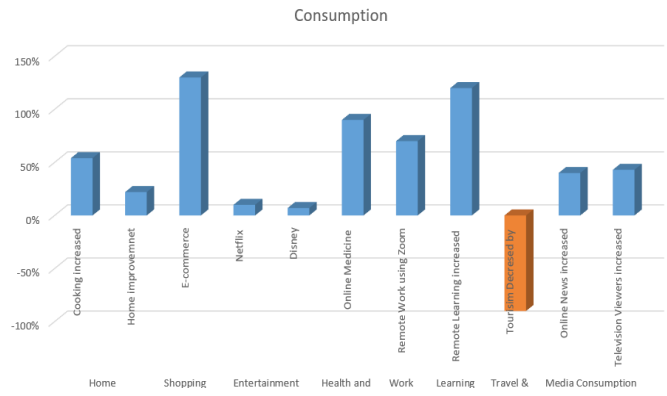

Fig.3. Bar Chart Representation of Increase & Decrease in revenue by various sectors during COVID-19

E-commerce business: There has been a see-through change in the number of transactions taking place as people perceived that Corona was even spreading through currency notes and another spending was mostly done online this change has seen a growth of almost 130%.

Netflix, Disney & Entertainment industry: There has been a high impact on the entertainment industry as this has suffered a lot as people were not moving out to malls and movies theatres across cities causing huge revenue loss, on the contrary, the online OTT applications like Netflix and Disney have increased their subscriber base by 10 million and 3 million respectively in just 3 Months period. [3]

Health and Wellbeing Industry: The pharmacy industry as such was one of the biggest game-changer in this tough times as the researchers were struggling hard to find medicine and vaccine for COVID -19 and supplements for the immunity against the disease, the health industry has seen a growth in online medicine sales by about 80%.

Working employees: Most of the employees were given the work from due to lockdown and this has become the new normal, employees were using the remote applications which allowed them to join the video conferences with team members and clients, there has been a 190mn users of Zoom application in just 3 months. [4]

Learning: As the schools and colleges were completely shut down this has severely impacted the learning requirements of the students and the examinations were either removed or postponed to a later date and this situation has given rise to online learning and classes for schools and colleges across the globe and this has increased by about 120%.

Travel and mobility: As traveling people have spread the COVID -19 among nations there has been a complete shutdown of airlines internationally and domestic services were stopped and this has completely disrupted and destroyed the travel tourism industry with about 90% decrease. [5]

Media consumption: The news was not given through paper as the spread was rampant and there was a great need to know what was happening across the globe as most of the people remind indoors there has been a great increase in online News by about 40% and television news by about 43%.

There is a great impact on the global economy is estimated at over 82 trillion dollars over 5 years and COVID-19 will hit hard the developing countries. 2 out of every 5 Jobs lost may not come back, there will a reduced Liquidity in the market.

III. The Policy Reforms Introduced to Tackle the Pandemic and Lockdowns

A. Economic Policy Reforms—Under Atmanirbhar Bharat During Covid 19

The Finance Ministry under foreign trade policy has been extended by one year. Under corporate Affairs companies' Fresh Start scheme delayed filings under the Companies Act, 2013, also there were many relaxations provided to companies under LLP. The environmental clearances were extended further till June 20 for the companies. The RBI has played a great role by easing the financial burden on the banks and other financial institutions, MSMEs. The Pharma area was upheld by the legislature by giving the natural clearances speedily for the mass medication producers and advanced the mass medication parks. Likewise with the help of the administration of more than 280 units in SEZs, producing fundamental things like drugs and medical clinic gadgets has come into activity. The import of ventilators, covers, PPEs, test packs, were excluded from essential traditions obligation and wellbeing cess (till September 2020). [14]

B. International Policy Responses To The Covid-19 Pandemic

The spread approach measures being called for to be set up or executed to help SMEs and new companies in 40 nations. The coded measures were those measures called for by partners, for example, business visionaries, researchers, or lobbyists were about 40.98% of all coded measures and strategy estimates reported by government or national banks were about 59.02%. There was an immense reaction from all the countries over the globe with prompt reaction to the pandemic the most famous strategy measure reported or actualized by governments overall is to upgrade an association's money related capital by decreasing credit financing costs or improving advance accessibility [6]. The nations about 87% around the world have started a reaction to the worldwide pandemic. The US supposition pioneers advocate not dismissing reasonable improvement objectives of UNO's (The 17 point Sustainable Development Goals) and therefore propose money-related government help be appended to adherence to measures so that there are no deviations to the drawn-out objectives of atmosphere changes.

In this manner, if the countries and their governments prevail with regards to giving prompt help to business visionaries under tension, will consistently keep up the drawn-

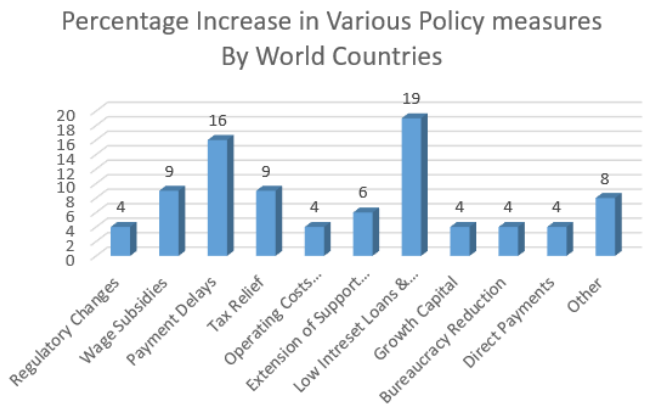

Fig 2. The number of countries where the identified policy measure was announced by the government.

out destinations of advancing wellbeing, value, natural assurance, and Sustainable Development.

IV. The Innovations That Changed the Metrics of the Global Fight Against the Pandemic

As comprehend that Human life is without a doubt the most important angle than the economy, and the flow research will consistently be alluded to as a mirror to this announcement and ought to never be misconstrued. The examination in India has made a change in perspective regarding the statures that is accomplished and the top among the Innovations that truly upheld the battle against the pandemic worldwide. [7]

A. Automatic Mask Machines

As there was an extreme deficiency of N-95 veils in India and to wipe out the import of unique programmed machines and their parts from China the designers from NIT and IIM Calicut, and a beginning up the firm from Bengaluru have strived and have begun producing these machines. "'The expense is required to be 40% less expensive than the ones as of now there. A comparative activity has been taken up by a Rajkot based industry that built up a one-of-its-sort, completely programmed machine that produces N-95 veils in mass to fulfill the need flexibly as opposed to depending on imports. [8]

B. Ruhdaar: The Low-Cost Frugal Innovator

The Engineers at Design Innovation Center (DIC) of the Islamic University of Science and Technology, alongside a group of designing understudies from IIT Bombay, have made a model of an ease ventilator and named it 'Ruhdaar'. Clinical specialists at SKIMS are attempting to assess it, which is at present working effectively in the research center and will cost around Rs 15000 in particular. The Innovators at REVA University in Bengaluru have imagined a broiler measured, ease, and compact ventilator that can perform well. The chancellor of REVA University dispatched 'Jeeva Setu' ventilators with the occupant staff to help the clinical foundation of the nation. "It is relied upon to convey 500-600 ml of air for each breath and 15-18 breaths in a moment according to the COVID patients' necessities. [9]

C. Low-Cost Ppes: The Navy's Innovation

As one of the authorities in the Indian Navy has developed a simplicity PPE that helped the Indian Navy increase a patent in relationship with the National Research Development Corporation (NRDC), an endeavor under the Ministry of Science and Technology. It is made of an unprecedented surface with high 'breathability', which is sensible for rankling and moist conditions regular in India and suitable for the atmospheric conditions. The development has been affirmed by ICMR too. The huge scope assembling of this PPE is in progress.[10]

D. COVI-SAFE: Transporting Patients

The authorities in Nagpur created COVI-SAFE to ensure the secured vehicle of Covid-19 patients. The case fits well on clinical beds and is impervious. Emergency workplaces like oxygen and ventilators can be successfully presented on the carton. Even more fundamentally, when the COVID calm breathes in, the air that rises out of the holder is isolated. The idea is to help keep masters and clinical consideration staff from getting polluted and further spread of the infection.[11]

E. Anti-Epidemic Robots

Along with Rwanda's Ministry of ICT and Innovation, UNDP Accelerator Lab sent five anti-epidemic robots to help bleeding-edge laborers battle the pandemic. The robots will uphold the location of COVID-19 cases including among returning residents, test patients, and offer different types of assistance in the emergency clinics. [12]

F. SystemOne

IiH pioneer, SystemOne, has such a stage, which has been tried by past flare-ups of TB, HIV, and Ebola. Established in Massachusetts in 2012, SystemOne has workplaces in Northampton, MA, and Johannesburg, South Africa. The organization centers around creating answers for infection reconnaissance and reaction. The organization's product, Aspect®, has been adjusted to investigate various irresistible infections including Zika, Ebola, HIV, Malaria, Hepatitis C, and more on a large group of demonstrative gadgets. The association has now adjusted the stage to test and track COVID-19 cases, giving ongoing dashboards to advise readiness, reaction, and following of results. Services of wellbeing would now be able to utilize the stage to screen the spread of the illness in their nations. [13]. India as well as the world is experiencing a lack of PPE, clinical gear, and medications to help battle this worldwide pandemic.

V. Conclusion

This exploration feature's that while new companies and private ventures are effectively utilizing the accessible assets from the legislatures as a quick measure to handle the pandemic, their development, and new advancements are

enormously affected. Thus, the officials and strategy changes ought to promptly take into account the significance and need of organizing free income to new companies and organizations by facilitating the guidelines that affect and cause obliges to the capital, however, have a dream for the drawn-out arrangements and measures fused and upheld by a more extensive enterprising environment to guarantee quickly and ideal recuperation with development focuses set up.

In conclusion, As the world is dealing with a deadly pandemic the timely response from the governments and the business to ensure that economy is restored and the timely innovations are brought into the market to face the challenges thrown by the virus and how we can overcome these situations going forward. As the world has been introduced to the new normal conditions, we all together should get ready to fight against any type of unknown enemy and should keep ourselves ready in the future with adequate financial and human resources in the R&D space. The Governments and the Global Organizations such as UNO and WHO should have the guidelines ready for such projects for the rest of the nations to implement and adapt given under any type of grave situation going forward so that the nation as a whole can come out with flying colors.

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Need and Importance of work Life Balance in the Organization

Deepti Dubey (Research Scholar)
e-mail: *deepty.varanasi@gmail.com*

Dr. Geeta Rana (Associate Professor)
Swami Rama Himalayan University

***Abstract*—Work life balance (WLB) is viewed as a vital component comparable to employee performance. The study goal is to survey on WLB as it influence current work organization. The examination work tried to investigate broadly whether there is connection between work adaptability and nature of yield, manager/representative link and expanded efficiency, working condition and the pace of yield and in conclusion professional stability and employee retention. Consequently the examination demonstrated that work adaptability, business/representative relationship, working condition and professional stability have a constructive outcome on improved nature of yield, expanded efficiency, pace of yield between representatives, employee retention. The discoveries indicated that: employees respond contrarily when they encounter work life imbalance and that administration ought to receive WLB activities to upgrade worker execution. From the examination discoveries, it is presumed that WLB is of noteworthy pith to current work organizations.**

***Index Terms*—Work life balance , managers, Representatives, Commitment, loyalty**

I. Introduction

IN PRESENT scenario, there is an expansion in ideas of the weights that work has on family and on the employees life. This has incited investigation verging on WLB. In an condition of elevated degree of serious loads originating generally from works to bring greatness administration, the profundity on employees are monstrous. This is so in light of the fact that the inquiry of contention or border between people's personal lives and work related pressure is basic to comprehension how organizational can use on their presentation and profitability levels just as persuading staff for worker responsibility (Deery, 2008; Cannon, 1998; Aluko, 2009)

Numerous specialists have commonly concurred on the significant function of WLB as it is connected with an person's mental prosperity and in general feeling of concordance in life, which is a pointer of balance between the workplace job and the family (Clark, 2000)

Ongoing research shows that the two workers and associations profit by effectively work and family life balance (Greenhaus & Powell, 2016; Hammer et al., 2015). WLB upgrades their prosperity and family fulfillment (Grzywacz, 2000). In working areas, the nonattendance of WLB creates lackluster showing and more non-appearance of representatives (Frone et al., 1997), however, work and family life balance is related with expanded occupation fulfillment and authoritative responsibility (Cegarra-Leiva et al., 2012; Wayne et al., 2004). As it were, employees‟ WLB encounters develop their job related commitment, which is identified with organizational execution advancement (Carlson et al., 2006).

II. Review of Literature

Merideth Ferguson et al (2012) comes across that WLB is suppose to be an intervening part in helping social backing's dedication to both work and family attainment.

Hua Jiang, (2012) demonstrated that, when employees immediate managers consider their junior as people with remarkable personality and require and entertain them the diversely however reasonably, workers look at them with elevated degree of confidence, trust, duty, contentment and command commonality, besides, employee while looking towards their dealing with reasonably by their organization create standard relationships with their organization. This examination likewise recognizes logical proper procedure and approaches utilize to prepare work-life choices as a huge predecessor encouraging high confidence, authority, attainment, and command commonality that workers see.

Goddard, et al., (2006) Environments with burden towards work, incorporatw with mentally prompted strain (work danger strain) have been linked with collapse, shrinking occupation fulfillment, and non appearance of authoritative authority.

Parikh and Gandhi (2014) reported towards the ongoing innovative changes attacked our home, rooms, and even communal capacities. Hereby examination recommendations were offered by creators to employees and associations. In one recommendations offered to associations expresses that associations could give "center hours" when a employee ought to be available and work around various beginning and finish times.

Gupta and Charu (2013) inspected the effect of WLB on work fulfillment of IT segment representatives.100 representatives were taken to gather information by receiving accommodation examining technique. A self-ar-

ranged survey was directed. Chi-square outcome shows that WLB and burnout influences the activity fulfillment among representatives in IT division.

Panisoara and Serban (2013) have analyzed the effect of conjugal status on WLB. Information were gathered from 132 workers by receiving accommodation inspecting technique. Fluctuating non-business linked issues (by methods for the existence of a spouse, a minor or significant kid) while work being stable (by methods for the condition of being an utilized individual normal for all the four gatherings of members) may propose that the expansion of requests achieved by the need to expect family or childcare obligations isn't really trailed by a huge change in the degree of WLB experienced as unmarried worker

Kulkarni and Kulkarni (2012) have thought that fruitful representatives are perceiving that positive WLB results for workers from accomplishing work life parity to the fulfillment of testing work and profession advancement are crucial elements of an effective business technique.

Parida (2012) has referenced that these days the existence of workers of both the gender, is progressively devoured of family and other individual obligations and interests. Along these lines, with an end goal to hold employees, it is progressively significant for organization to perceive this WLB.

Xinyuan et.al (2011), When lodgings with family heartfelt work environments give acceptable assistance for work and family needs, workers without a doubt will have high business satisfaction. At the point when work and family generally sustain each other (i.e; family experiences improve the responsibilities to work, and unfortunate propensity versa), agents have a more solid way of life (Aryee et al; 2005).

Nancy R. Lockwood, (2003)discover growing degrees of pressure can rapidly incite low laborer resolve, helpless productivity, and lessening position satisfaction. Distinctive certifiable repercussions are misery, alcohols and prescription abuse, intimate and budgetary issues, constant dietary issues, and worker burnout.

Haddon and Hede, (2009) find that work encroach with home life more than home life interferes with work life, concerning time and imperativeness. Of course, home life enables individuals to come over of essentialness gone from working.

III. Research Problems

The work pressure, for those working in is raising over the most recent decades. Factors, for example, the advances in data innovation, and data load, the requirement for quick reaction, the significance appended to the nature of customer care and its suggestion for consistent accessibility and the movement of progress all interest our time and can be wellsprings of weight. If in current era, enough accentuation isn't set on employees balance among work and family than its impact can be seen on profitability which additionally influences the turnover in the association. Changing socio-economic are at the back of the transition to catch hold of work life programs. The decline in the conventional family, and increment in double profession couples, and a climb in the amount of single guardian suggest that agents are rearranging more obligations outside work.

WLB in the working environment has become a more noteworthy issue as nonappearance of it when all is said in done show negative results, for instance, high turnover, decrease in work duty, terrible nature of yield, low effectiveness, and nonattendance of occupation satisfaction. Study show that worker motivation and productivity is low when work/life exercises are missing, association obligation to work/life exercises is solidly agreed with employee motivation and proficiency.

WLB has given affiliations and homes stress due to its significance; it has consequences for various divisions of both the employees which over the long haul impact the organization. Inconsiderateness of WLB of employees have cost organizations, consequently there is the need to sort out it. Heather (2011) "You will never feel truly satisfied by work until you are satisfied by life".

IV. Objectives of the Study

Present examination focuses in depth examination of past exploration work accomplished on WLB. It gives a comprehension on the Organization and people, extension and status of WLB. The objectives are:

1. To analyze the indications of undesirable work life balance.
2. To distinguish what managers can accomplish to decrease work life balance in work place
3. To recommend steps to defeat work life balance

V. Methodology

The article includes information gathered from past writing accessible on WLB. The secondary sources of information incorporates information from distributed and unpublished sources including diaries, web and so on.

A. The Signs of Unhealthy Work life Balance

1. Weariness. At the point when work expanded timeframes reliably and disregard as far as possible between our work and home life, we end up encountering physical and mental exhaustion, we wind up experiencing physical and mental weariness. Subsequently, your capacity to think plainly and your eye-hand coordination endures. We are not so much gainful but rather more inclined to commit errors. Our mind is fluffy, our reflexes are more slow, and we are in danger of injury, obligation, and in any event, corrupting our expert notoriety dependent on moderate or incapable execution.

2. Non attendance. At the point when we neglect to build up limits between our work and home life, we wind up missing significant family occasions. We additionally miss one of a kind minutes, commemorations, and birthday celebrations. Our nonattendance can truly harm our associations with friends and family and cause them to feel neglected.

3. No companionships. By investing the entirety of our energy zeroed in on our vocation, we don't devote whenever to sustaining and developing our friendships. Companions are a fundamental component of our emotionally supportive network. They shield us from getting segregated because of high measures of work and give us certain vitality and uphold. Having an emotionally supportive network is a vital aspect for having balance in our life, encountering fulfillments, and having individual fulfillment throughout everyday life. Be that as it may, companionships should be supported. Else, they don't keep going as long or their quality decreases.

4.Work load increment. The more hours we work at the workplace and the more reliably we do it, the more work we will get in remuneration. We will get greater obligation and more tasks. Presently, while this might be an incredible advance towards professional success and a pay increment, we need to ensure it isn't influencing different parts of our life. This is an elusive incline which can undoubtedly bring about a never finishing and expanding pattern of work, concerns, and weights. Having no work life balance or an undesirable measure of work life balance can bring about relentless measures of stress and health problems. It’s easy to see how your career can affect your health.

B. *Changing Work Place for Wok Life Balance*

Having our working environment engaged with evaluating our work-life balance is a smart thought. The work environment ought to have the option to do the accompanying:

1.Caution the laborers of how long work hours could influence our prosperity.

2. Encourage the employees to be more open about their issues in work particularly with the hours. They should let the employees feel that they can support their privileges

3. Develop helpful arrangements that perceive the relationship of mental issue and business related stress. These standards should detail the obligations and functions of the workers to advance emotional well-being. The principles ought to likewise detail the systems on how the organization could help their staff who have emotional wellness issues.

4. Give improved trainings to managers to assist them with spotting helpless work-life parity and stress. The managers ought to likewise be very much prepared in growing better frameworks for ensuring their employees.

5. Making sure that the work can be overseen inside a time span; work with a prioritization plot; which means do the most significant undertakings first before proceeding onward to less significant work.

6. Energize loosening up schedules that could advance incredible psychological wellness like exercise.

7. Audit workplaces and recognize the components of strategy, practice or culture that could be harming to everybody's solid work-life balance.

8.Allow all the employees to go to help administrations and advising held at working hours just like they would go to a clinical arrangement.

9. Monitor and assess the approaches routinely against work pointers like nonattendance, infection and staff fulfillment.

C. *Recommendations to Overcome Stress and To have a Balanced Work Life*

1. Don't allow your employees to work for fixed timing every day but give them weekly hrs of working time to work and they should be allowed to manage the timing as per their convenience.

2. When conceivable, consolidate a work-from-home strategy. Offering this advantage even a couple of days every year can have any kind of effect.

3. Make day care accessible to staff nearby or consolidate an advantage which would give day care at a limited rate.

4. Build up an arrangement with a neighborhood drycleaning support or indeed having one on spot.

5. Offer an assessment planning administration advantage.

6. Offer unconditional present wrapping administrations during the special seasons and for unique events.

7. Consider giving high-performing workers family get-away bundles notwithstanding, or on the other hand instead of, money related rewards.

8. Offer attendant services to assist workers with adjusting the numerous tasks throughout everyday life.

9. Offer scheduling of flextime or offer a rotating schedule for the employees.

10. Offer occasional hours, where representatives can leave from the get-go Fridays during specific seasons.

11.Make yearly commemorations with the organization an extra taken care of time day to support representatives to commend their residency. This day away from work will likewise fill in as an update that their manager cares.

12. Encourage representatives to abstain from checking their work email and voice message after the workday what's more, on ends of the week, to isolate work from their own lives.

13. Allow representatives to take a more drawn out lunch, in the event that they come in ahead of schedule or work later, to make up the missed time. This choice will

make it simpler for staff to plan arrangements or get things done on their break.

14. Hold virtual gatherings, so representatives don't need to be nearby to join in.

15. Encourage workers to take regular breaks to rehydrate for many occupied employees who neglect to take break of the day.

While the organization will most likely be unable to start these proposals, in any event, handling a couple of will help employees see your association's anxiety for genuine work/life balance in the working environment.

VI. Conclusion

WLB is expanding in significance because of its advantages and its additional bit of leeway to employee also, organization performance. Organizations should put forth more attempts to actualize work-life well disposed strategies and make a workplace that suits its employee's government assistance and way of life to guarantee WLB, this is significant as employee with adjusted life's yield best outcomes. In this way work-life adjusts have gotten essential in organizations which think about progress as an choice. In view of the discoveries of the investigation, it very well may be reasoned that WLB holds a ton of well beings for organizations. It is a stage for upgrading employees execution and for possible accomplishment of hierarchical objectives. In the event If one has sorted out some way to designate the essential time for every part of life appropriately and not reflect the issues in a solitary bit of life, it suggests that he has had the alternative to achieve w WLB (Aycan et al., 2007)

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The Effect of Corporate Social Responsibility Factor on the Sustainable Development of Industrial SMEs: A Case Study in Hanoi-Vietnam

Hung Do Hai*, Cung Nguyen Huu
School of Business Management, Hanoi University of Industry, Vietnam
*Corresponding author
dohaihung@haui.edu.vn, dohaihunghaui@gmail.com

***Abstract*—Implementing social responsibility activities (CSR) towards sustainable development (Sustainable Development) is one of the issues that businesses pay special attention. The study selected research scope in Hanoi, Vietnam. Applying qualitative and quantitative methods to evaluate the influence and the degree of influence of the corporate social responsibility factor on the sustainable development of industrial small and medium enterprises (SMEs) in Hanoi, Vietnam. The study carried out a survey of 182 industrial SMEs allocated according to different business sectors and territories in Hanoi. The research results showed that the social activities of enterprises have a positive influence on the sustainable development of industrial small and medium-sized enterprises in Hanoi, besides other factors such as: Conscious innovation; Finance; Human resources; Local support policies and the manufacturing.**

***Objectives of the study:* This study aims to evaluate the impact of corporate social responsibility factors on the sustainable development of small and medium industrial enterprises in Hanoi, among other factors such as: Manufacturing technology; Business's resource enterprises; Innovation; Local support policies.**

***Keyword*—Sustainable Development; Industrial SMEs; Social Responsibility**

I. Introduction

FACING the trend of extensive international integration, the issue of sustainable development in general and enterprise's sustainable development in particular in recent years has always been given special attention by state management agencies. Implementing sustainable development is the responsibility of the whole society, including the contribution of the enterprise community. However, to further promote the development of enterprises towards sustainability, the role of the enterprise's CSR activities should be considered [1].

In Vietnam, according to the annual report of Vietnam Enterprises 2018/2019 of Vietnam Chamber of Commerce and Industry (VCCI) in terms of classification of small and medium-sized enterprises according to the Government's Decree No. 39, according to the labor size: Medium enterprises with the number of 8,518 enterprises, accounting for 1.58%; small enterprises with the number of 115,235 enterprises, accounting for 21.35%; and micro enterprises with the number of 415,835 enterprises, accounting for 77.07%. The proportion of SMEs now accounts for 97.8% of the total number of enterprises in Vietnam [2],[3],[4]. Ha Noi is one of two largest cities in Viet Nam. The total number of enterprises in Ha Noi by the end is over 150,000 enterprises in 2019. In which SMEs account for approximately 98% of the total enterprises number, the number of industrial enterprises accounts for about 20% of the total SMEs number. In order to promote industrial SMEs in Ha Noi to maintain and develop more towards sustainable development [5].

The characteristics of SMEs are the limited amount of products, mainly base on manual labor, SMEs, usually only sell a few products and services in compliance with the qualifications and experience as well as finance capacity of business owners; The business capital of SMEs is mainly owned by the business owners, or borrowed from business owners relatives and friends, and the ability to access capital from credit institutions is low; SMEs are flexible due to low initial investment, use few labor and local resources. Therefore, SMEs can easily change their production plans, convert their business premises, change their business type and even easily dissolve their businesses; SMEs are established and operated mainly based on the capacity and experience of the business owners themselves, so the organization of the apparatus is very compact and management decisions are also quickly implemented [6]. Stemming from the characteristics of industrial SMEs in Vietnam and Hanoi now, it can be seen that, in the long term, the sustainable development of industrial small and medium enterprises in Hanoi is necessary and consistent with the general development trend of the world when international integration in countries are more extensive. The inherent characteristics of industrial SMEs in Hanoi currently mentioned above such as: limited capital, backward production technology, poor infrastructure will heavily affect labor productivity or problems in addressing environmental pollution and contribute to the overall development of society [7]. These barriers need to be thoroughly overcome in order to promote the industrial small and medium enterprises in Hanoi towards sustainable.

The development of enterprises depends on available resources, the issue of community benefits, solving environmental pollution in the production process is really necessary for businesses. In order to promote industrial small and medium-enterprises in Hanoi maintaining and developing towards sustainable development, study that assess the impact and impact level of CSR policies to the sustainable development of industrial small and medium - sized enterprises is essential in the current situation of industrial SMEs in Hanoi. Through the research results, the author proposes a number of solutions and recommendations for enterprises

and state management agencies to maintain and promote the sustainable development of industrial SMEs on a wider scale and more quality.

II. Literature Review

According to the World Business Council for Sustainable Development [8], sustainable businesses can be interpreted as corporate commitment to conduct ethically and contribute to economic development, while improving workforce's quality of life, their families, local and global communities in both the present and future. Therefore, in respect to SME sustainability, it covers most aspects of economy, social attitudes, safety and the environment [9].

As for the Corporate Social Responsibility (CSR) policy, first published in 1953 by HRBowen, the policy was designed to propagate and appeal to managers stop harming the rights and benefit of others, calling for charity to compensate for damages caused by businesses that harm society. Since then, the term corporate social responsibility has been interested by many researchers and given different points of view. D. Wood (2010) said that CSR is difficult to define, different objects understand different CSR. Each industry, organization, and government views CSR from a different point of view, so there are many different definitions of corporate CSR [10],[11]. Despite the lack of a consistent definition, all definitions show that the company should meet social expectations when planning environmental management strategies [12]. Carroll (1979, 1991) stated that: "Social responsibility is all the economic, legal, ethical and charitable issues of an organization that society expects from a given time." This is a concept that has been widely used in social responsibility studies, depending on which organization an administrator can choose from among the four levels [13]. Mujahid and Abdullah (2014) pointed out that CSR has a positive and significant influence on the financial performance of businesses as well as the wealth of share holders. In this same view, Kiran et al. (2015) emphasized, there exists a close relationship between social responsibility and profitability of enterprises; The study identified three main issues: (i) social responsibility has a positive impact on net profit and net profit margin; (ii) social responsibility has a negative impact on the total assets of the enterprise; and (iii) social responsibility has no significant effect on the profitability of the business. Research by [14] stated that social responsibility included the following components: CSR for social and non-social stakeholders (e.g. Environment or future generation), CSR for employees, CSR for customers and CSR for the government. According to him, the social activities of businesses related to these components would affect the level of employee engagement with the organization through social identity theory (SIT). Research results showed that CSR for employees has the greatest impact on employee engagement with the organization because it is related to careers, training opportunities, equality and working environment. CSR for customers has the second highest level of influence because it relates to the image of the organization, thus affecting the pride of the employees for the organization. Next is CSR for stakeholders (social and non-social). Finally, social responsibility to the government. Social responsibility will also create credibility for businesses with customers, investors, suppliers and governments. Thereby positively influencing decision making in favor of SMEs. CSR also brings competitive advantages, thereby affecting the efficiency of business operations of the organization. Organizations can enhance employee engagement by promoting socially beneficial activities. [15]

In general, the basic studies have emphasized the role of the implementation of social responsibility for the development and sustainable development of industrial small and medium sized enterprises. Considering the scope of research Hanoi, this issue has not been reviewed and evaluated in detail. Therefore, this study is necessary to assess the role and impact of social responsibility performance compared to other factors affecting the sustainable development of industrial small and medium-sized enterprises (SMEs) in Hanoi.

III. Proposed Work

A. Questionnaire and Data collection

In this study, raw data collection was conducted through in-depth interviews with experts and managers in industrial SMEs in Vietnam to develop an official questionnaire. The questionnaire consists of 3 parts. The first part information is details of respondents, part 2 is information related to the characteristics of the business, part 3 is the questions related to the factors affecting the sustainable development of industrial SMEs. The data collection is done through convenient sampling methods to collect feedback data of business managers on the impact of the corporate social responsibilities on the sustainable development of industrial SMEs in Hanoi.

The questionnaire uses the Rennis Likert scale (also known as the Likert scale), the Likert scale has 5 levels from low to high scores, ranging from 1-5 as follows: 1. Strongly disagree; 2. Disagree; 3. Normal; 4. Agree; 5. Strongly agree.

The total number of questionnaires issued is 225, collecting 205 feedbacks, the number of valid feedbacks for data processing is 182.

B. Data analysis

The raw data will be processed in SPSS 23.0 software after being collected. The study tested the reliability of a scale using Cronbach's Alpha coefficient, which is a statistical test of the degree of rigor with which the items in the scale correlate. Then, conduct Exploratory Factor Analysis (EFA) to check the unidirectional of the scales in the study. Finally, the study uses multivariate regression methods to evaluate the impact of the corporate social responsibility compared to the following factors: Conscious innovation; Business's resources; Support policies from the

government and the manufacturing factor to the sustainable development of industrial SMEs in Hanoi.

C. Research Models

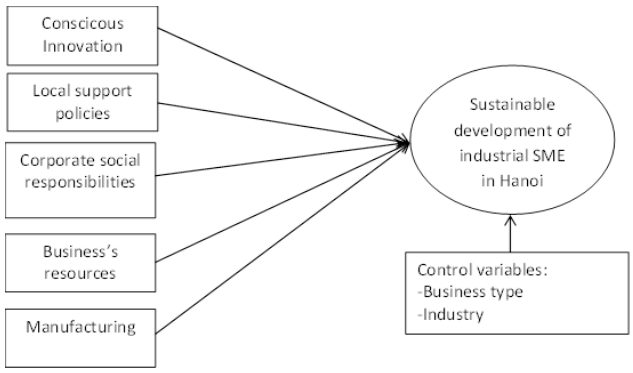

Figure 1. Research Model

Research hypotheses:

Hypothesis H1: The conscious innovation has a positive influence on the sustainable development of SMEs in Hanoi.

Hypothesis H2: The manufacturing has a positive affecting the sustainable development of SMEs in Hanoi.

Hypothesis H3: Operational factors of corporate social responsibility have a positive influence on the sustainable development of SMEs in Hanoi.

Hypothesis H4: The resources of enterprises have a positive influence on the sustainable development of SMEs in Hanoi.

Hypothesis H5: The local support policies have a positive influence on the sustainable development of SMEs in Vietnam.

Table 1. Measurement scale and construction source

Scale	Encode	Question	Source
Conscious innovation	YT1	The initiatives in the business have recorded	Quintero-Angel, M et al(2018) [16], Farsi, J. Y et al (2014) [17] và nghiên cứu của tác giả
	YT2	Business leaders are willing to take risks and fail	
	YT3	Enterprises have the incentive mechanism for incentives applied in reality	
	YT4	Enterprises always focus on high - tech applications in production activities	
Local support policies	CS1	Accessing the production premises easily	Le Ngoc Nuong (2018) [18] and Author's proposal
	CS2	Supported to participate in social activities	
	CS3	No difficulty in handling administrative procedures	
	CS4	Preferential tax policies in production and business activities	
	CS5	Enterprises are informed the change of environmental protection policy promptly	
	CS6	Accessing credit resources supported by the Government easily	
Operational factors of corporate social responsibility	TN1	Participating vocational training programs for young people in the community	Phan Van Dan (2012) [19]; Duyg u. T (2008) and Author's proposal
	TN2	Participating in construction of clean water and sanitation programs for the community	
	TN3	Participating in training, improving capacity and social knowledge for the workers	
	TN4	Participating in contribution of social activities in the locality	
	TN5	Focusing and paying attention on issues of environmental pollution treatment	
	TN6	Complying with the provisions of the law on ensuring food and environmental safety	
The resources of enterprises	NL1	Current financial resources are sufficient to expand business activities	Umar Ibrahim (2008) [20] and Trinh Duc Chieu (2010) [5]
	NL2	Current financial resources are sufficient to sustain the business activities	
	NL3	Human resources in enterprises have good working capacity	
	NL4	Annually, the number of qualified employees in the enterprise is becoming higher and higher	
	NL5	After training, labor is more productive	
Manufacturing technology	CN1	Prioritize in investing to renew equipment annually	Asma Benzazoua Bouazza (2015) and Sefiani (2013) [21]
	CN2	Manufacturing technology is top priority	
	CN3	Develop a new product development strategy	
	CN4	Focus on human resource investment to apply new technologies	
	BV1	Enterprises always have high profits and grow steadily every year	

Scale	Encode	Question	Source
The sustainable development of SMEs in Hanoi	BV2	Enterprises can expand production and business markets	Phan Van Dan (2012) [19] and Author's proposal
	BV3	Enterprises are recorded for environmental protection in production	
	BV4	Enterprises have made positive contributions to local environmental protection activities	
	BV5	Enterprises are always highly appreciated by local agencies for their contribution to local social activities	
	BV6	Enterprises always create motivation to work for labor	

(Source: Summary of the authors)

IV. Results And Discussion

A. Verify the reliability of the scale

The reliability of scales is assessed by Cronbach's Alpha coefficient. Results of calculating Cronbach's Alpha coefficients with each concept indicate that 5 groups of research elements have Cronbach's Alpha coefficient greater than 0.6 (Table 2). All observed variables have varied-total correlations meeting the requirement of > 0.4, expect the YT2 observations have a correlation coefficient that transforms slightly less than 0.4 (value of total correlation is 0.255), which is excluded from the research model. Therefore, the manufacturing factor scale and three other factors scale affecting the sustainable development of industrial SMEs in Hanoi – Vietnam are eligible for EFA analysis.

B. Exploratory Factor Analysis

The results of the EFA's all factors affecting the sustainable development of industrial SMEs in Hanoi produce the value of KMO (Kaiser-Meyer-Olkin) = 0.761> 0.6. Therefore, factor analysis is consistent with the research data obtained. The Bartlett's test value with the hypothesis (H0) is "non-correlated variables" with the value Sig = 0.00 <0.05.

Table 2. Results of EFA's factors and evaluation of reliability of the scale

Factors	Factor Loading						
	1	2	3	4	5	6	7
Cronbach's Alpha	**0.756**	**0.728**	**0.783**	**0.752**	**0.712**	**0.701**	**0.795**
CN1	0.782						
CN4	0.689						
CN3	0.615						
CN2	0.526						
CS3		0.765					
CS2		0.722					
CS1		0.701					
CS6		0.652					
CS5		0.582					
CS4		0.526					
TN2			0.735				
TN1			0.675				
TN3			0.632				
TN4			0.568				
TN6			0.452				
TN5			0.438				
NL1				0.746			
NL2				0.664			
NL3					0.781		
NL4					0.765		
NL5					0.695		
YT1						0.652	
YT4						0.586	
YT3						0.485	
BV1							0.836
BV3							0.807
BV4							0.786
BV2							0.761
BV5							0.745

Source: Results of data analysis through SPSS 23.0 of the authors

C. Regression analysis

Regression analysis value of R = results in the 0.562 and adjusted R2 is 0.525. This means that the relationship between the independent variables explains 52.5% of the dependent variable as "Sustainable development of industrial small and medium enterprises in Hanoi". Through ANOVA analysis results, the value of F = 62,322 with statistical significance Sig = 0.0015 <0.05. It can be confirmed the existence of relationships between independent variables and dependent variables. Thereby, showing that the research model ensures reliability.

Based on the Beta coefficient in Table 3, it can be seen that the factors in the research model, the Manufacturing technology (CN) factor have the largest Beta standardization factor = 0.296. Social resp (TN) factor has the smallest Beta coefficient = 0.1122. Sig value. of all variables <0.05. Therefore, the hypotheses H1, H2, H3 and H4 proposed in the research model are all accepted. The non-standardized regression model of factors affecting the sustainable development of industrial SMEs in Vietnam is determined as follows:

$$BV=-1,242+0,289*CN+0,265*TC+0,135*TN +0,189*CS+0,166*NL+0,104*YT \quad (1)$$

Table 3. Beta coefficient after performing regression

	Non-standardized coefficient		Standardized coefficient	Validation value t	Level of significance Sig.
	B	Standard error	Beta		
Constant	-1,242	0,216		-4,221	0,000
CN	0,531	0,063	0,289	6,227	0,000
CS	0,422	0,052	0,189	5,351	0,001
NL	0,158	0,045	0,166	3,462	0,011
TC	0,124	0,058	0,265	3,421	0,002
TN	0,292	0,039	0,135	4,421	0,001
YT	0,232	0,028	0,104	3,252	0,002

Source: SPSS23.0 data processing results of the authors.

Based on the regression equation (1), it can be seen that the manufacturing technology factor (CN) has the greatest impact on the sustainable development of industrial small and medium enterprises in Hanoi. Next are the factors is finance resources of enterprises (TC), factor of the local support policies (CS), factor of human resources, activities of social responsibility (TN) and finally the concious innovation (CS). It can be seen that the corporate social responsibility activity has a positive influence and the fourth effect in the author's research model, behind human resource factors, finance, concious innovation, local support policies and manufacturing technology.

The research results are similar to those of Phan Van Dan (2012), Quintero – Angel et al(2018) and Le Ngoc Nuong (2018). In Le Ngoc Nuong's study (2018), the local support policies have the fourth most powerful influence and the 1st strong manufacturing technology factor out of the 7 factors that have an impact on the development of small industrial enterprises and fit. However, the research results are not similar to abraham&moitra (2001)' s research and wang et al (2008), the corporate social responsibilty and concious innovation factors have the lowest impact on the sustainable development of the industrial SMEs. This can be explained that the industrials SMEs in Hanoi, it is characterized by limited resources, small production, so they are not focused and interested the corporate social responsibilty and concious innovation ideas. The situation of the long - term development of industrials SMEs in Vietnam and in particular in Hanoi is now the backward production level, barriers to administrative procedures and local support are not really good. Therefore, the results of the research report show that the factors of manufacturing technology, local support policies and finance resources is the most affect to the sustainable development of industrials SMEs in Hanoi, it's suitable for research practice.

D. Testing statistical hypotheses

Using Anova's variance analysis to determine the differences of types of businesses and industries participating in the survey. In this analysis, the coefficient of concern is the Sig coefficient. The hypothesis H0 poses is that there is no difference in the sustainable development of enterprises by business sector and type of enterprise. If the Sig coefficient is> 0.05, reject the H0 hypothesis, which means that there is a difference in the type of business and business lines in the field of SMEs development in Hanoi. If Sig <0.05, accept hypothesis H0.

The testing results of all groups of enterprises by type and business lines give Sig value <0.05. Specifically, testing the differences by type of enterprise has a value of Sig = 0.011; Testing difference by business lines has value of Sig = 0.002. Therefore, reject the H0 hypothesis.

According the research results, it can be seen that the factors of manufacturing technology and financial are the two most influential factors for the sustainable development of Industrial SMEs in Hanoi. This result is consistent with the current characteristics of Industrial SMEs in Hanoi when the most of them have limited financial resources, the production scale is small and out of date. In particular, for the social responsibility factor, the research results have shown that this factor positively affects the sustainable development of industrial SMEs and the level of influence is higher than the innovation consciousness. It can be argued that the implementation of social responsibility is a mandatory requirement for businesses in the process of moving towards sustainable development. Before businesses move towards innovation and creativity, it is necessary to perform well the responsibilities of the business to the employees in the organization and make a positive contribution to the community.

V. Conclusion And Future Work

Through the research results, the authors propose a number of solutions and recommendations for the policies on

corporate social responsibility for the sustainable development of industrial SMEs in Hanoi, specifically as follows:
Firstly, businesses need to build a system of specific rules and regulations on the salary and bonus regime for employees, ensuring fairness in the company. Besides, it is necessary to create a safe working environment in the aspects of food safety, fire safety, fire safety and human rights.

Secondly, strengthen the role of the industrial SME Association in Hanoi and other association in Vietnam, and to promote the development and cohesion between industrials SMEs. Supporting and promoting the propaganda and education for businesses about social responsibility and the meaning of local social activities. In addition, through these associations, businesses can timely access new policies, new legal documents of the State on sustainable development.

Third, strengthening the deployment of supporting activities and associating training with educational and training institutions to improve the quality of local human resources and human resources in enterprises. Business managers must be a bridge between local human resources, human resources in enterprises and quality education and training institutions to coordinate the deployment of more training courses for knowledge and skills for workers, thereby promoting the quality of human resources in the community of businesses and localities more and more developed.

Through the research results, it was shown that the social responsibility factor has a positive impact on the sustainable development of industrials SMEs in Hanoi, but the level of influence isn's as big as the manufacturing technology, finance or the local support policies. The research results are consistent with the current practice in Hanoi when the industrials SMEs have large limitations on manufacturing technology and finance resources and activities on implementation of social responsibility have not been focused.

The research still has some limitations when the sample size is not large, the research only stops the scope of research in Hanoi. In subsequent studies, the authors will expand the scope of the study and the wider sample size to determine more specifically the extent of factors affecting the sustainable development of industrials SMEs in Vietnam.

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Sentiment Analysis on Twitter by Using TextBlob for Natural Language Processing

Ditiman Hazarika[1], Gopal Konwar[1], Shuvam Deb[1], Dr.Dibya Jyoti Bora[2]
[1]*Student, School of Computing Sciences(IT), The Assam Kaziranga University, Jorhat, Assam, India*
[2]*Assistant Professor, School of Computing Sciences(IT), The Assam Kaziranga University Jorhat, Assam, India*
E-mail: cs19mscit003@kazirangauniversity.in, cs19mscit005@kazirangauniversity.in, cs19mscit001@kazirangauniversity.in, dibyajyotibora@kazirangauniversity.in

***Abstract*—The Internet has become an innovative platform regarding online learning, exchanging content, sharing views. In this paper, we will use Twitter as our social networking platform. Sentiment analysis on Twitter is based on opinion mining on posts to obtain the user's point of view. The leading goal deals with how opinion mining techniques can be accessed to analyze some of the tweets in many reports involving various types of tweet languages on Twitter and classify its polarity. Practical implication shows that the proposed machine learning classifiers are efficient and highly accurate.**

***Index Terms*—sentiment, opinion, polarity, classification techniques, TextBlob.**

I. Introduction

SENTIMENT analysis, one of the key emerging technologies provides people the freedom to analyze a huge amount of user-generated content available on the web[6]. Sentiment analysis is a type of NLP tool for tracking the mood of the public about a specific product or service. It deals with constructing a system to gather and analyze reviews about a certain product [4].

Few fields of research involve:-

- **Sentiment classification**:
  Handles the classification of complete documents based on opinions towards a particular object.
- **Opinion Summarization**:
  In this task, only the important characteristics of the product are extracted on which the customers have given their viewpoints.

II. Challenges in Sentiment Analysis

Some of the issues faced by sentiment analysis are:-

- A word having positive and negative sentiment has opposite orientations in various application domains.
  E.g. - "This movie sucks" implies a different meaning compared to "This vacuum cleaner really sucks''.
- Words with or without sentiment in certain sarcastic sentences are hard to examine.
- Sometimes words in a sentence without sentiment simply opinion.

III. Sentiment Analysis Tasks

The collected tweets are pre-processed for performing the data cleaning.

By using any feature selection methods important features are taken out from the clean text.

The data is divided, manually labeled as negative, positive & neutral Tweets for building a training set.

Features extracted and the training set labeled are given as an input to the classifier built for creating the test set [4].

Fig. 1. Steps in sentiment analysis
Source: www.quora.com

A. Data Sources

Opinion mining plays a major role in selecting the data sources. Twitter, a micro-blogging, social networking site with fixed content size and generally accessible information has to gain lots of popularity [3].

B. Methods for collecting Tweets

The tweets for research can be collected by following methods given below –

- Data repositories- UCI, SNAP & Tweepy.
- APIs- Two types of APIs provided by Twitter are- search API and stream API. Search API - Tweets are collected with respect to hashtags and stream API -It involves streaming real-time data
- Automated tools - classified into premium tools like -Sysomos, Radian6, Simplify360, Lithium & non-premium tools like -Topsy, Keyhole, Social Mention & Tagboard.

C. Preprocessing of Data

- Twitter data mining is a difficult process as it involves raw data and it is essential to clean it by the following methods-

Hashtags (#), retweets (RT), and account Id (@) needs to be removed.

Symbols, URLs, hyperlinks, non-letter data & emoticon are removed as only text data is needed.

Stop words like am, is, was etc. do not show any emotions. So these are removed for decompressing the data set.

Compress extra letter words like 'Funnyyy' to 'Funny'.
Slag words like c8, g9 are decompressed which are adjectives or nouns signifying the highest sentiment level. Removal of these words is essential.

D. Feature Extraction

-It involves the extraction of various aspects like adjectives, verbs, nouns which are identified as positive or negative to detect the polarity of the whole sentence. Some popular methods of Feature extraction are-

1) **Terms Frequency and Presence**: Individual and unique words and counting of their repetition are given these features.
2) **Negative Phrases:** Negative words changes meaning or orientation regarding a particular opinion.
3) **Parts Of Speech (POS):** Nouns, adjectives, verbs, etc. are founded as they are the important figures of thoughts.

E. Techniques related to Sentiment Classification

For identification of text, two techniques are used which are given below-

- **Technique based on knowledge** (Lexicon based technique)

-It relies on extracting the opinion-based lexicons from the text and then the polarity of those lexicons is identified.

- **Machine Learning**

- The major objective of this method is to develop an algorithm for optimizing performance by using training data like examples, past knowledge & experiences. This method provides the solution in two steps [5]:

1) The model is developed and trained using already labeled data.
2) Dividing of data into unlabeled or unclassified, which is based on the trained model.

Supervised and unsupervised techniques are two broad categories of ML techniques. Subjective data is used for supervised machine learning techniques which especially depend upon labeled training data. Textblob will be used in our project.

IV. Project Design

A. Flow diagram

Figure 2.

B. Steps involved

- **Tokenization**- Dividing a paragraph into different types of a statement or dividing a statement into different types of words.
  Example- Let us say a simple statement "The movie was great."
  *The *movie *was *great *. (After tokenization)
- **Cleaning the Data** - It involves removing special characters or any other words which do not add any value to the analysis part. Punctuations like the comma, full stop, exclamation are removed.
  Example- From the above Statement
  "The movie was great."
  . (Full stop) is removed.
- **Removing the stop words -** Remove all
  Those stop words, do not add any value to the analysis part. Words as 'a', 'is', 'was', 'the'; do not indicate any sentiment.
  Example- From the above Statement
  "The movie was great."
  "The", "was" is removed.
- **Classification-** The step classifies where the statement is positive, negative, or neutral. For positive words, we assign sentiment scores as "+**1",** for the negative words we assign **"-1",** and for neutral "0".
  Example- From the above Statement
  "The movie was great."
  movie – 0 great - 1
- **Apply supervised Algorithm for Classification** - This is the part where we train our model with a bag of words or lexicons and test it on the analysis statement. Once the model has been trained, we can perform a test on the analysis statement to test its accuracy for classification.

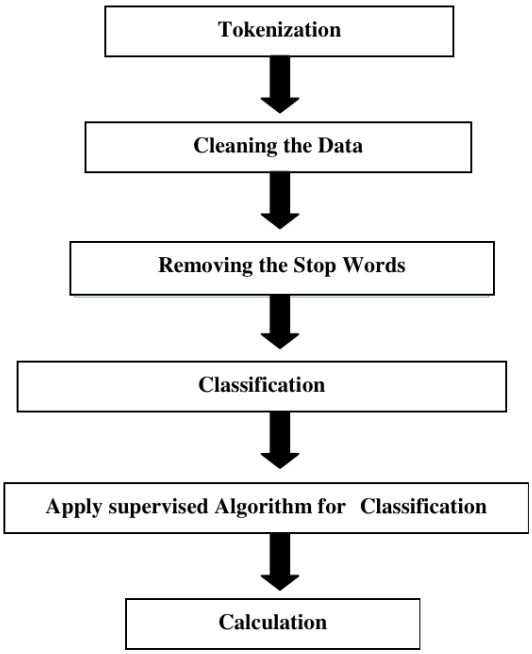

Fig. 2. Flow diagram of our project

V. Feature Implementation

A. A Twitter developer account

To access the Twitter API, we will need to sign up for the Twitter Developer website and then perform some steps for the creation of an application.

After complete approval, an access token is generated and we will have our Consumer Secret key, consumer key, Access token secret & Access token from the Keys and Access Tokens tab.

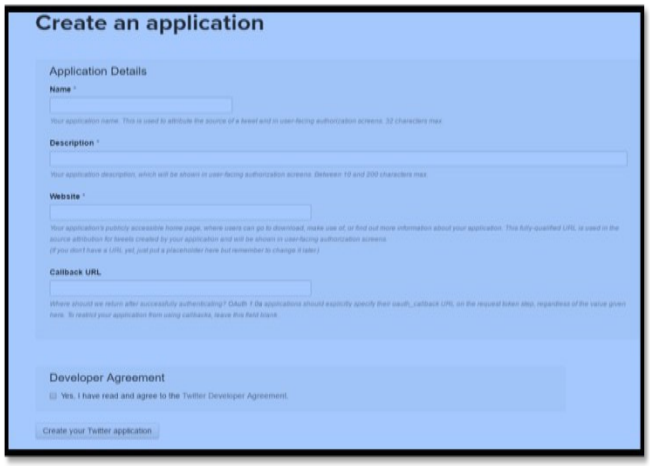

Fig. 3. Twitter Developer interface.
Source: https://docs.inboundnow.com/guide/create-twitter-application

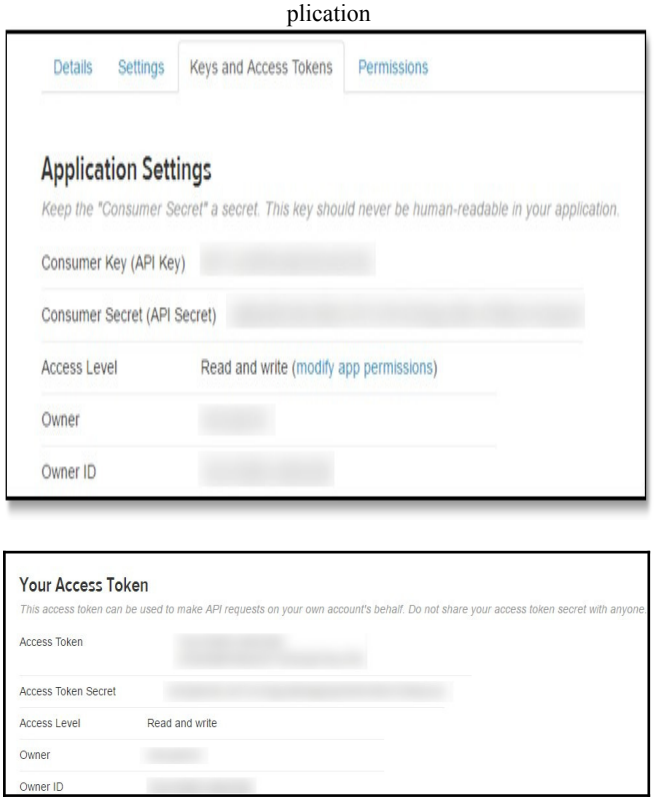

Fig. 4. Twitter access token and customer key interfaces.
Source:https://docs.inboundnow.com/guide/create-twitter-application

B. Anaconda navigator Installation

-It is a GUI that launches applications, manages conda packages, environments & channels without the need for accessing command-line commands.

-We can access the following applications through the navigator:

Jupyter Lab, Jupyter Notebook, Spyder, Pycharm.

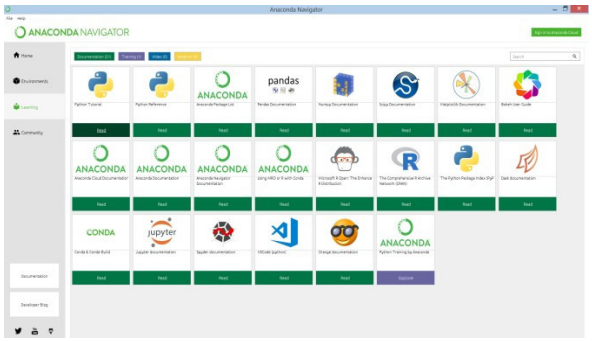

Fig. 5. Anaconda Navigator interface
Source: Project handling device

C. Installing Python Libraries

Python library is a collection of core modules that contains a reusable chunk of code that can be used subsequently.

The Following are some important libraries that we will be using in our project.

- **TextBlob :**

TextBlob, a Python library which deals with textual information which gives a simple API for accessing NLP activity like Noun Phrase extraction, PoS tagging, sentiment analysis, etc.

```
pip install -U textblob
```

- Install TextBlob: It can be installed by the following command through the anaconda prompt.

D. Features of TextBlob:

1) Tokenization:

It involves a large division of a large paragraph into words and phrases. A token simply means a word. Initially, we import the TextBlob object, TextBlob module & pass it the sentence for tokenization.

2) Lemmatization:

It refers to the tracing of a word to its origin as given in a dictionary. For using it through TextBlob, we need to access the Word object from the TextBlob module, pass the word & call the lemmatize method.

Example-

```
from textblob import Text
text1 = Text("oranges")
 print("oranges:", text1.lemmatize())
text2 = Text("radii")
print("radii:", text2.lemmatize())
text3 = Text("smaller")
print("smaller:", text3.lemmatize())
```

We perform lemmatization on the words "apples", "media", and "greater". In output get “apple”, “medium” and “great”.

3) Part of Speech tagging

It is the process of identifying the structural elements of a text document, such as verbs, nouns, adjectives, and adverbs.

Example-The interface for using the PoS tagging feature.

```
[17]: from textblob import TextBlob
      sentence = TextBlob("I am very happy to be a medium article writer especially about TextBlob")
      sentence.tags  #seperate as parts of speech tags
```

```
[('I', 'PRP'),
 ('am', 'VBP'),
 ('very', 'RB'),
 ('happy', 'JJ'),
 ('to', 'TO'),
 ('be', 'VB'),
 ('a', 'DT'),
 ('medium', 'NN'),
 ('article', 'NN'),
 ('writer', 'NN'),
 ('especially', 'RB'),
 ('about', 'IN'),
 ('TextBlob', 'NNP')]
```

Fig .6. TextBlob implementation
Source: https://www.analyticsvidhya.com/blog/natural-language-processing-for-beginners-using-textblob

4) Noun Phrase Extraction

It involves the extraction of phrases from a given context that contains nouns.

Let’s understand this feature with the following example.

```
from textblob import TextBlob
document = ("In computer science, artificial
intelligence (AI), sometimes called machine
intelligence")
text_blob_object = TextBlob(document)
for noun_phrase in text_blob_object.noun_phrases:
print(noun_phrase)
```

The output will give all the nouns in the document.

computer science
artificial intelligence
AI
machine intelligence

5) Tweepy

An open-source repository on python for communicating with the Twitter platform and use its API.

Tweepy has many features like:

1. Get tweets.
2. Make and delete tweets.
3. Follow and unfollow users.

VI. Research Scope in Opinion Mining and Sentiment Analysis

The main areas for future sentiment analysis are:

- Spam Detection Sentiment;
- Sentiment Analysis on short Sentence like short text;
- Improvement in sentiment word identification;
- Development of the automatic analyzing tool;
- Accurate Analysis of policy-related content;
- Proper classification of bipolar sentiments.

VII. Limitations

The major limitations related to Sentiment analysis or opinion mining are as follows:-

- Spam and fake reviews detection-
  The spam contents on the web can be removed by identifying duplicates, removing outliers & consider the reputation of the reviewer.
- Classification Filtering limitation-
  There is a limitation in determining popular thought or concept. For better sentiment analysis this limitation needs to be reduced.
- Availability of opinion mining software-
  Great quality Opinion mining software -very expensive and only can be afforded by big organizations and government.
- Domain Independence-

The sentiment words are domain-dependent i.e. good performance of one feature set in one domain but at the same time, it may perform very poorly in another domain.

VIII. Conclusions

Sentiment analysis or opinion mining covers a wide area of real-time applications, meanwhile, it has suffered from many research limitations.

Since the fast growth of the internet and internet-related applications, Sentiment Analysis becomes the most interesting research area among the natural language processing community. In this research paper, we have analyzed the

sentiment on the Tweets, extracted from Twitter and classify them according to their polarities.

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Proposed Hypothesis on replacing Non-Deterministic Approach to Abstraction due to the exhibition of faulty speculations

Shreya Indukuri[1], Anil Kumar Reddy Konda[2], Mellacheruvu Janakirama Sharma[3]
Student, Department of Computer Science, India.
[1]*indukurishreya@gmail.com* , [2]*anil76201reddy@gmail.com* , [3]*mjanakiram@gmail.com*

***Abstract*—Non-Determinism is the word that is used to refer to an event or a series of the same that is said to be unpredictable but is assumed to be belonging to a domain of possibilities. From the inception, non-deterministic approaches have played a huge role in statistics, machine design, the definition of Random, and a few other domains to mention. Non-Deterministic processes are defined as the paths that lead to no fixed state but a set of possible states instead. One of the crucial reasons would be delving into the human understanding of processes and the ability to justify happenings around. A behavior that has accumulated throughout the evolution of mankind is to explain boundaries based on what is being perceived. The argument of Human Understanding of processes around can be of huge prominence as they play a vital role in explaining and demystifying a lot of misconceptions. One such aspect that is a resultant of this phenomenon would be a nondeterministic approach. The key focus of this paper will be on emphasizing how humans are limited to perceiving reality, how several misconceptions have accumulated around misstated definitions by the virtue of the same, have a closer look at Randomness, a sheer epitome of the same, and also propose a few potential applications that are affected by the hitherto stated problem.**

***Index Terms*—Random, Pseudo-Random, Deterministic, Non-Deterministic, Computation, Abstraction, Probability**

I. Introduction

IN THE ideology of imagination, and information passing system is a folk of glimpse which influences the human consciousness, this apt perception together designs a computation leading to the approach of the computational theory of mind. The theory of computation is a field of study that focuses on how methodically problems can be determined with the stimulation of algorithms. This field is extensively subdivided into three considerable concepts, automata theory and formal languages, computational complexity theory, and theory of computability. One of the certain classes of automata theory includes algorithms practicing Deterministic and Non-Deterministic ways of approach. The term Determinism signifies the dearth of a free desire where it contradicts the concept of randomness and assures an accurate calculation towards any happening. Practically, every event with a provided pattern operates in such a manner that every current state is entirely dependent on its preceding states. If something is deterministic, you have all of the data necessary to predict (determine) the outcome with 100% certainty.[1] The procedure involved in calculating the result from all the data feasible is simply referred to as a deterministic process. In other words, if we can predict with 100% certainty where a y-value is going to be based only on our x-value, then that's a deterministic relationship.[1] The concept of Non-Determinism has been defined to intervene when there is no possibility of a theoretical path of predisposing the structure's accurate performance. This behavior might sometimes be certain as well as uncertain depending upon unpredictable situations which might be the complexity, visibility, dependability, or many more. According to conventional theory, a Non-Deterministic approach is a structure that outcomes distinct results or behaviors on each run. A nondeterministic algorithm represents a single path stemming into many paths, some of which may arrive at the same output and some of which may arrive at unique outputs.[2] There might not be any assurance of a guaranteed solution for every possible path, but there will be a true solution for any one of the possible paths. However, on closer observation, it occurs with obvious implications that every happening has a well-defined and quantifiable process running in the back-end. Usually, the non-deterministic approach is applied when we are in search of an approximate result, as the accurate result will only be produced via the Deterministic Approach which costs much higher than the Non-Deterministic approach. Through this paper, the authors intend to modulate the perception of conventional Non Deterministic theory where it has been stated that for an event/series of events, the system exhibits unpredictable varied outcomes. On the contradictory, the key focus of this thesis would be to initiate a thought process in a particular direction by conveying that there seldom exists a non-deterministic process as such. The conventional theory has resulted in faulty consequences for many of the day to day applications.

II. Related Work

A. Scope of Argument

It might be argued that the definition of non-determinism that is currently established leaves no scope for a loop-hole and is ideal. But the following considerations are to be made prior. Non Deterministic processes are said to lead to a set of possible outcomes rather than a single outcome itself, as the path of flow of the process might not be determined with ease. Be that as it may, it also follows that with a critical understanding of a happening and a technologically advanced computational means, there exists seldom an outcome that remains to be unexplained. This includes events that fall into the bucket which preponderances of all communities

have been considering to be uncertain for now. Also, the role played by non-deterministic processes in day to day scenarios cannot be looked down upon. With such an opinion, one definition that could safely replace the conventional existing definition and still fit in every application is of abstraction. Abstraction is the property by which an entity fails to interact/know about another entity. Although how abstraction is achieved can be vague and context centred, it can be validly stated that the usage of non-determinism finds productivity due to abstraction of the involved processes. Unpredictability or Uncertainty is to be approached as ambiguities that arise due to abstract level processes that are too complex to be processed and calculated that they end up being ignored. This shouldn't interfere with the fact that a happening can still be predicted or explained with a proper trace back of available data.

B. Randomness and it's Prominence

The word Random is used to describe the insignificance of an event/entity. For an event/an entity to be labeled as random, it requires that there be an absolute lack of relevance and predictability. Randomness finds a lot of prominence in the domain of statistics and Machine Learning. Randomness is used as a tool to help to learn algorithms to be more robust and ultimately result in better predictions and more accurate models [3]. There can be varied sources for randomness under machine learning i.e., in Data, Evaluation, Sampling, and Algorithms. Having a deeper look, a random data sample from the collection can be considered to evaluate the model, we use randomness for proper evaluation and fitting of the proper validation as the outcome, it helps the algorithms to avoid the risk of overfitting the tiny training set and standardize the extensive problem. Within a software, a random number generator is operated to generate random numbers.

It's a simple math function that generates a sequence of numbers that are random enough for most applications.[4] This math function is deterministic. If it uses the same starting point called a seed number, it will give the same sequence of random numbers[4]. The best use is to get reproducible results by fixing the random number generator's seed before each model we construct. It's better to make a good practice to include a default section of every attempt, where we must try to give the exact sequence of random numbers to every individual algorithm trying to compare and analyze using certain techniques.

C. Randomness and Non-Determinism

It would then follow that Randomness and Non-Determinism go hand in hand. A justification that is believed to be appropriate in this context says that the outcomes of a non-deterministic approach can be considered to be random. Let us consider for instance that there is a nondeterministic finite automaton that can reach 2 states Qa and Qb when confronted with an input symbol x. Now, in the case of x being given as an input to this non-deterministic system, it would be unpredictable to conclude on the state that this automaton will settle for (it could be either of Qa and Qb). On a much-detailed observation, it would appear obvious that either of the states occurring with equal probability implies that the actual state of settlement is of insignificance and is completely deprived of a pattern. Due to this reason, the states are said to be random.

D. Everything that is wrong with the above approach

Random vs Pseudo-Random is a debate that is commonly prevalent among computer scientists, mathematicians, and statisticians. This debate is a result of an inconsistent explanation of the aspect of randomness and is bolstered with algorithms prescribed for randomness (an algorithm is a well-defined process). The above-described perception and explanation might appear to one as firmly justifiable and valid until the below aspects are taken into consideration.

1) The Concept of Non-Determinism

An inferable statement from the above explanation has to deal with the extent of the unpredictability of the outcome. Even Though the fundamental definition of non-determinism is about the unpredictability of outcomes, a detailed contemplation about the same would suggest that no occurrence can be unexplained. Having said that, many events are too complicated and costly to be reasoned that they are just labelled as irrational and random. But with rapid advancements in technology and zeal to explore reality a little further, more and more events are being explained and predictable than ever before.

During a simple event of tossing a coin, the prediction of the outcome of the event becomes so complicated and error-prone that the outcome is considered uncertain. However, be assured that this event is in no way unpredictable and can be strictly explained through rotational dynamics making it highly predictable. The ignorance that mankind has imposed on the predictability of such events is a sheer case of an anomaly with a human process which is omnipresent when the value of gravity is taken to be 10m/s2 instead of 9.8m/s2 to consider 0.333333333 as 1/3. Such ignorance led to inconsistent explanations as stated herein.

2) Relevance with probability

Processes that are considered to be non-deterministic as per the conventional definition are omnipresent when there comes a need to bring in equal probabilities and uncertainties. Since the outcomes of non-deterministic occurring are unpredictable, it would follow that Random values generated as a result of a nondeterministic occurring are bound to concord with probabilistic estimates. Hence such events are used in contexts that require equal probabilistic occurrences. When two teams are under conflict to decide on the winning team, a coin is tossed (as the outcome of the coin is too complicated to predict, it is considered random making the probability of outcome fairly equal) giving both the parties an equal opportunity to win. On the contrary, as per the conventional definition of random, a random outcome should have no relevance meaning an outcome of a strictly biased

event could still be considered random as long as the outcome has no relevance. If one is asked to generate a random number in the interval of (1,3) (excluding both the boundaries) then the outcome would always be a 2 which can still be random but not so unpredictable.

3) The question of irrelevance

As per the traditional definition of randomness, it would follow that a random entity is bound to be irrelevant to the context and completely independent of the context of the application. However, in this scenario, it becomes obvious that there is a huge prominence for the values that are said to be random. Once these random values are mapped to real-time events, they inherit some significance by the virtue of their value making them no more random.

E. Case Study

1) Schrodinger's Cat Experiment

Schrodinger's cat experiment is a classical experiment in the history of quantum physics that is believed to be a demonstration of randomness. In this experiment, a cat was placed into a box containing radioactive substances. As time progresses, there occurs a decay in the radioactive substance triggering a Geiger counter which results in a toxic explosion that might or might not kill the cat. Once this experiment is carried forward, until the box is opened up, one cannot be assured of the outcome of the experiment i.e. whether the cat is alive or dead and hence, the outcome is said to be random.

This justification of the experiment is flawed based on what was just stated above. The outcome of the experiment contradictory to the popular belief is much predictable and traceable based on scientific calculations. Presently, the rot of the radioactive substance is administered near the laws of quantum mechanics. This implies the particle begins into a consolidated preparation of "going just before rot" afterward "not going away near rot". If we apply the spectator driven plan to this case, so the entire framework remains as a blend of the two prospects. The cat finally ends up each useless and alive at the same time. Because the life of a cat that is each useless and alive at the same time is absurd and does not take

place in the actual global, this thought test suggests that wave function collapses aren't just pushed by conscious observers. The outcome of the experiment has more to do with quantum physics and nuclear physics which would bring in complex calculations making it very much strenuous job to predict given the high chances of error and high precision computations that prevail. Be that as it may, human incapability to predict a few happenings shouldn't imply an unpredictability of an event itself as such. Happenings however complicated and uncertain they may appear, are still predictable or in the alternate direction traceable for their current state and there is nothing unpredictable as such.

In summary, quantum state collapse isn't driven simply by aware observers, and "Schrodinger's Cat" was simply a teaching tool fabricated to undertake to form this truth additional obvious by reducing the observer-driven notion to absurdity. Sadly, several standard science writers in our day still propagate the misperception that a quantum state (and thus reality itself) is set by aware observers. They use this inaccurate claim as a springboard into aery and non-scientific discussions regarding the character of reality, consciousness, and even jump mysticism. To them, "Schrodinger's Cat" isn't an associate degree embarrassing indication that their claims square measure wrong, however proof that the globe is as absurd as they claim. Such authors either see Schrodinger's Cat or deliberately twist it to sell books.

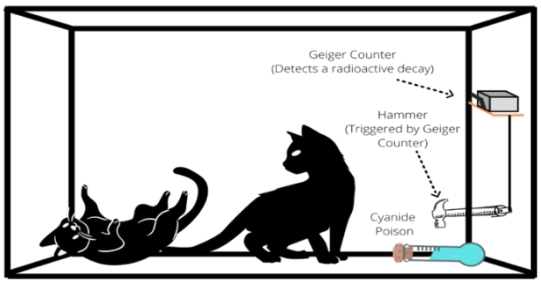

Fig 1. Schrodinger's Cat Experiment

III. PROPOSED THEORY

A. Abstraction in and as Non-Determinism

In the face of conflict as such, one would want to have an alternate approach to non-determinism and randomness that would be a proper substitute to the conventional definition being followed. It can then be safely inferred that based on all the anomalies and contradictions herein, abstraction as a mechanism would properly suffice and substitute for all the ideologies and applications of non-determinism and randomness.

Abstraction is the mechanism that ensures no complete knowledge about one end of a phenomenon reaches the other end. The role played by abstraction is very critical in the discussion of randomness and non-determinism as follows.

B. Justifying Unpredictability

The assumed unpredictability of non-determinism is properly established with the help of abstraction. A process running at an abstract level does not reveal complete details about itself and hence the outcome becomes unpredictable. It may then be argued that the process continues to be definite and predictions can be made out of insights or statistical inferences. But it is to be noted with caution that by drawing insights or statistical inferences about a process, one is exploiting its abstraction hereby making it no more uncertain. In the case of Schrodinger's cat experiment, the outcome of the experiment is put at an abstraction until the box is opened and hence the uncertainty that follows explains everything.

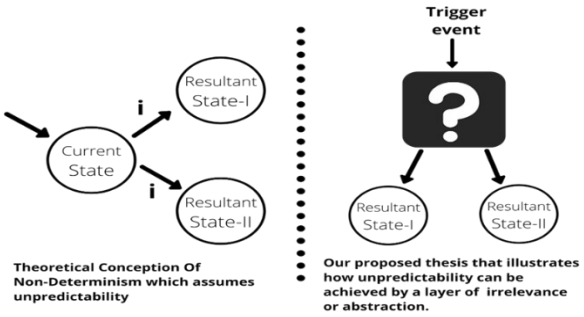

Fig 2: A figure representing how the abstract concept of non-determinism can be implemented using abstraction/irrelevance

C. *Abstraction of Relevance*

It would follow that the ideal definition of random defines irrelevant entities/values in a scenario. This can also be satisfied by putting the context of usage at an abstraction to the algorithm of production. With events occurring at an abstract level, the relevance of the outcome would be undefined as such and hence abstraction can ensure irrelevance. One counter-argument that can be made at this point of the discussion revolves around the fact that mathematical and statistical means can be used to explain the nuances of events and their outcomes even if put at an abstract level. However, by doing so, one is again disturbing the layer of abstraction and bringing in relevant insights about the happening here by breaking the conditions needed for nondeterminism.

In the case of tossing a coin or rolling a dice, abstraction usually prevails as users are seldom aware of the metrics and their values needed to reach a prediction with certainty. However, it is to be noted that this abstraction can be broken making the event predictable and biased.

In the case of the Schrodinger cat experiment, the outcome of the experiment i.e. the cat being alive or dead is put at an abstraction to the experimental setup. Also, the outcome is irrelevant as the context of usage is undefined and independent of the underlying process. Simply put, the cat is alive or dead has no relevance to external surroundings and hence the outcome is considered insignificant.

D. *Around Probability*

From the previously stated, it is clear that a context of usage, relevance, and a disruption of the envelope of abstraction surrounding a process would make it no more uncertain and hence cannot be considered non-deterministic. It would bring in obvious implications as the probability is applicable for events with quantifiable and ideally equally likely outcomes. But to prove or disprove or even learn the probabilistic progress of an event is to determine the frequency of outcomes corresponding to an event which again tampers with the abstraction layer of the experiment. Simply put, even if one were to generate the same number/entity for an

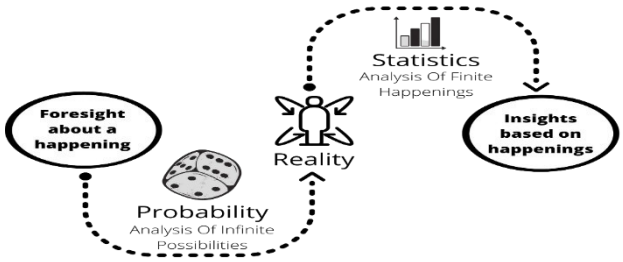

Fig 3: Figure distinguishing how probability and statistics differ as per predictabilty

indefinite amount of time, it is to be accepted as random given the context of usage is an abstraction to the method of generation. The moment this algorithm of generation is challenged and put to test is the moment that the algorithm loses its property of randomness.

IV. CONCLUSION AND FUTURE SCOPE

The traditional definition of non-determinism as illustrated in this paper is tainted and has not covered all the possibilities of uncertainty, therefore it can be proved that the traditional definition leads to a false conclusion for non-determinism. Be that as it may, it can also be observed that despite an unsound definition, the processes or events that are in play to bring about nondeterminism well did the job. However, it is of utmost prominence to alter an incorrect way of perception so as to rectify a direction of research that can follow as a result of this incorrect perception. In this paper, the authors have proposed a modified version of the traditional definition and this shift in perception has been a safe one i.e. the proposed definition majorly changes the ideology or explanation of certain events yet happens to satisfy all the previously existing applications without any actual need to change. The replacement of unpredictability of nondeterminism with the abstraction process of non-determinism or even realizing that the latter results into the former for that matter would trigger a sequence of thoughts and hence result in much more convenient and justifiable implementations of random and non-deterministic processes. This does not result in any change of the system but the definition itself is redefined from the traditional definition. All the change that is needed is in the way of perception.

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Election Infrastructure Security: Grants and Reimbursement to the States for Usage of their National Guards in State Active Duty Status to Provide Cybersecurity for Federal Elections

S. Raschid Muller, Ph.D., MBA
Assistant Professor of Cybersecurity
Capitol Technology University
Laurel, MD, USA
Email - srmuller@captechu.edu
https://orcid.org/0000-0002-1742-7575

Corey E. Thomas, LTC, US Army
Administrative Law Attorney
National Guard Bureau
Washington, DC, USA
Email - cethomas1091@gmail.com

***Abstract*—Because presidential and congressional elections (hereinafter Federal elections) are State-administered activities with a Federal nexus, the Federal government should both reimburse and provide grants to the States when using their National Guards in their State Active Duty (SAD) status[1] to perform cybersecurity assessments and testing before the election, provide general cybersecurity and immediate cyber support in response to a cyber-attack (if required) on Election Day, and provide any post-election support as necessary and appropriate. First, decision-makers must develop an election infrastructure protection plan that effectively utilizes the best assets in a whole-of-nation approach to help meet the three policy goals of election cybersecurity, "access, integrity, and security." Currently, there are gaps in election security that the National Guard is well-position and best-qualified to fill. Once the decision-makers agree on the approach, they can move on to the second step, which is to address how to best support the States in funding the activities through grants, reimbursement, or a combination of the two. This paper explains how the U.S. Constitution, along with specific Federal laws, support the thesis and proposes new legislation that Congress should pass to eliminate current confusion while promoting the unity of effort amongst all stakeholders.**

***Index Terms*—election infrastructure, cybersecurity, National Guard, State Active Duty**

[1] For the purposes of this paper, the term "status" for the National Guard is to mean how the members are commanded, controlled, and financed while serving. When members of the National Guard are placed in their State Active Duty (SAD) status, the Governor of the State has command and control, and their service is financed by their State. When serving in their status under Title 32 of the United States Code (T-32), the Governor of the State has command and control, but their service is financed by the Federal government. When serving in their status under Title 10 of the United States Code (T-10), the President of the United States has command and control, and their service is financed by the Federal government.

I. INTRODUCTION

TO UNDERSTAND how the States administer Federal elections in this country, one must first refer to Article I, § 4 [1], and Article II [23] of the United States (U.S.) Constitution. Article I, § 4 governs congressional elections. While the States set policy regarding the time, place, and manner of congressional elections, Congress may modify the States' policies except for choosing Senators [1]. Under Article II, § 1, while the States still have the responsibility of administering presidential elections, Congress sets the time and date. Thus, the U.S. Constitution clarifies that, while the States administer Federal elections, the Federal government has a direct interest in the process. Additionally, while the Framers did not contemplate electronic elections and cyber-attacks when they drafted the U.S. Constitution in 1787, the powers reserved to the States remain unchanged even though conflicting interpretations often test their permanence. These conflicts arise despite existing laws and policies. As this paper will demonstrate, sometimes the laws and policies provided are not enough to prevent friction between Federal departments/agencies and State governments. National Guard involvement in the provision of cybersecurity for Federal elections is one area where a lack of clarity now exists and must be provided by Congress to ensure the integrity of the election infrastructure now and in the future.

According to Volume 1 of the publicly published and redacted report from the Senate Committee on Intelligence (SCI) [4], during the presidential election of 2016, the U.S. election infrastructure,[2] voting systems, and polling places throughout the States were the focus of multiple cyber-attacks by Russian actors. Thus, the 2016 presidential election made it abundantly clear that the U.S. election system is not safe from cyber-attack. In Volume 3 of the SCI report [17], the Federal government expressed a united interest in

[2] The Secretary of the Department of Homeland Security (DHS) designated election systems a critical infrastructure (CI) in 2017 (DHS, n.d.). Election systems were made a subsector to the Government Facilities CI Sector (DHS, n.d.).

protecting the integrity of U.S. elections by using a whole-of-nation approach [2] to deploy effective cybersecurity measures in protection the election infrastructure [4]. The Fiscal Year 2020 (FY20) National Defense Authorization Act (NDAA) serves as additional evidence of the Federal government's interest in exercising the whole-of-nation strategy to secure the election infrastructure, which includes the provision of funding [9].

Once decision-makers agree upon the general plan and methodology, the focus should turn to the employment of the right Federal, State, and private sector assets. Because election administration is primarily a responsibility of the States [6], foreign actors' election infrastructure cyber-attacks do not immediately constitute homeland defense issues.[3] Unless otherwise determined by the Secretary of Defense (SecDef) or the President of the United States (POTUS), cyber-attacks on the election infrastructure are the first issues of homeland security [22]. 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).

Historically, the National Guard has served as the first military responder in the homeland [12]. When it comes to the provision of cybersecurity as part of election administration within the States, utilizing the experience and expertise of the State's National Guard should be no different. Utilization of the National Guard must be not only factored into the consolidated election infrastructure security plan and approach, but the Federal government's potential percentage share of any costs incurred should be agreed upon ahead of time. Provision of Federal grants and reimbursement funding for the National Guard to perform cybersecurity functions during Federal elections should not be a point of conflict. Suppose the Federal government can reimburse the States for using their National Guards in their State Active Duty (SAD) status to protect a citizen's right to receive an equal education [14] or respond immediately to a request for assistance during a major disaster or emergency. In that case, it stands to reason that the Federal government can reimburse the States for using their National Guards in their SAD status to protect U.S. citizens' right to vote free from undue influence or coercion. The same holds for the provision of grants.

Many credible studies have addressed the National Guard's usage to protect certain the Federally protected rights of U.S. citizens. Also, Chief, National Guard Bureau Instruction (CNGBI) 3000.04 outlines how the National Guard may provide this civil support in their various statuses. In comparison, the development of specific laws and policies governing how stakeholders should work together in response to a cyber-attack on the election infrastructure is relatively new. Further, there are no studies that address and articulate the thesis of this paper, which is, because Federal elections are State-administered activities with a Federal nexus [9], the Federal government should provide grants and reimbursement funding to the States when using their National Guards in State Active Duty (SAD) status to perform cybersecurity assessments and testing using their Cyber Protection Teams (CPTs)[4] before the election, provide general cybersecurity or immediate cyber support using their Defensive Cyberspace Operations Elements (DCO-Es)[5] in response to a cyber-attack on Election Day or perform any post-election cybersecurity-related activities.

II. The Foundation

A. Reserved under the U.S. Constitution

To understand powers reserved to the States under the U.S. Constitution, one should review Article I, § 8, Clause 16 [22], and the Bill of Rights [1]. While the Congress has the power to place any State National Guard on Federal orders in the service of the United States [21], the appointment of officers and training of the National Guard is reserved to the States [22]. Under the Second Amendment of the U.S. Constitution, the right to maintain a militia is reserved to the States [1]. Today, the State militia is formally referred to as the National Guard. When States utilize their National Guards, they often serve in their SAD status. In some instances, the National Guard's service inures to the benefit of the Federal government. In such cases, the State may seek reimbursement. Thus, when considering whether the Federal government should agree to provide grants or refund funding to the States for cybersecurity activities performed by their National Guards in SAD status during Federal elections, the decision-makers should ask one main question. Did the activities performed by the National Guard in their SAD status serve to the benefit and interest of the Federal government? If so, then it is reasonable to posit that the Federal government should share in the States' costs.

1) Statutory Authority

Current Federal law supports appropriated funds, including homeland security grants, to the States when they perform activities that directly address critical infrastructure threats. For instance, under 6 U.S.C. § 608 [18], Congress authorized federal funding, by way of grants, to States and high-risk urban areas that help enable them to address multi-

[3] When issues of homeland defense arise, even if the issue is a cyber-attack, the Department of Defense (DoD) is the lead federal agency (LFA). In such cases, the status of the National Guard is not in question because when the National Guard is in the service of the United States to augment the DoD, members of the National Guard serve under Title 10 of the United States Code, versus Title 32. In contrast, the DoD is not the LFA in issues of homeland security. The LFA for homeland security is the Department of Homeland Security (DHS).

[4] The mission of a Cyber Protection Team (CPT) is to provide mission assurance and threat mitigation support to United States (U.S.) Critical Infrastructure Key Resources (CIKR) and U.S. Military Services and Combatant Commands key terrain. National Guard personnel on CPTs may serve in their Title 10, Title 32, and State Active Duty statuses (*see* for example https://co.ng.mil/Army/Cyber/).

[5] A Defensive Cyberspace Operations Element (DCO-E) is a State asset serving as a first responder for State Governors and Adjutants General during cyber emergencies (Defensive Cyberspace Operations - Internal Defensive Measures). National Guard personnel on DCO-Es may serve in their Title 32 and State Active Duty (SAD) statuses (*see* for example https://co.ng.mil/Army/Cyber/).

ple threats to critical infrastructure, to include cyber-threats. Under 6 U.S.C. § 660 [19], Congress directed the Director of CISA to, among other things, work with State and local governments, and other entities, to develop a cyber-incident response plan (CIRP) that addresses explicitly cybersecurity risks in all critical infrastructure, which includes the election infrastructure. The National Cyber-Incident Response Plan (NCIRP) [4] was published by DHS in 2016, before the creation of the CISA in 2018. To date, DHS has not updated the plan. Additionally, the plan does not address funding (State reimbursement) or the National Guard in their SAD status when responding to cyber-incidents during Federal elections [4].

To add, the provision of cybersecurity across the United States to multiple entities takes qualified personnel and funding. Even though election security is one of the CISA's top priorities, in November of 2019, the agency reported that it had only 24 cybersecurity advisors and 100 protective advisors to support cyber and physical security assessments of the 16 critical infrastructure sectors [7]. As Figure 1 [3] below demonstrates, CISA personnel provide scanning, assessment, and system testing services to the States and local election jurisdictions. However, the CISA does not have enough personnel to cover the demand, nor does it have a current plan to address cyber-incident response [7]. The National Guard is best-qualified and well-positioned to fill this critical gap for the Federal government.

Service	States	Local election jurisdictions
Continuous scanning of internet-accessible systems for known vulnerabilities	40	161
Assessments of potential network security vulnerabilities	26	20
Remote testing of externally accessible systems for potential vulnerabilities	4	44
Assessments of states' and local jurisdictions' susceptibility to malicious emails	10	5
Educational posters on cybersecurity	19	1,202

Fig. 1 Number of selected Cybersecurity and Infrastructure Security Agency (CISA) services provided to States and local jurisdictions in 2018 & 2019, as of November 6, 2019. Retrieved from, *Election Security: Department of Homeland Security (DHS) Plans are Urgently Needed to Address Identified Challenges Before the 2020 Elections*, February 2020, GAO-20-267, p. 19.

Further, under 52 U.S.C. §§ 20901-21145, also known as the Help American Vote Act (HAVA) of 2002 [10], Congress directed the States to perform multiple acts to include replacement of punch card and lever voting machines, and overall improvement of election administration by developing uniform, non-discriminatory election technology. Implementation of the HAVA requirements gave rise to many physical and cybersecurity threats to the election infrastructure. As Figure 2 above demonstrates, multiple threats exist to the election infrastructure pre-election, Election Day, and post-election. Through its CPTs and DCO-Es, the National

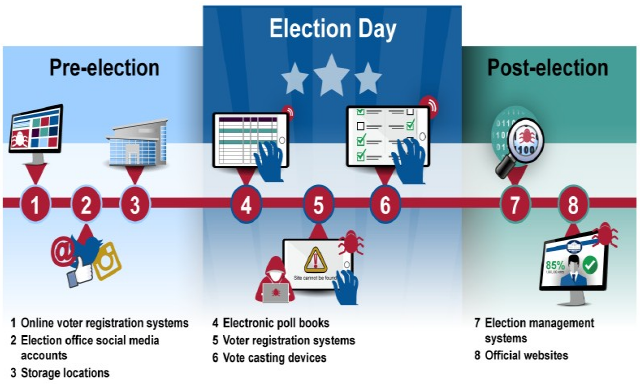

Fig. 2 Threats that exist to the election assets during the three phases of Federal elections. Retrieved from, *Election Security: Department of Homeland Security (DHS) Plans are Urgently Needed to Address Identified Challenges Before the 2020 Elections*, February 2020, GAO-20-267, p. 10.

Guard is well positioned and qualified to provide cybersecurity in each of these phases.

III. State Usage Of Federal Funds To Address Cyber-Threat

Congress has appropriated millions of dollars for State use in election security. In the FY18 Consolidated Appropriations Act, public law (P.L.) 115-141, Congress appropriated $380 million for State use in the administration of Federal elections, which includes election cybersecurity [8]. In the FY20 Consolidated Appropriates Act of 2020 (P.L. 116-93), Congress appropriated an additional $425 million for the same purpose [9]. To finance the usage/transfer of personnel in support of the changes implemented under the rule, the funding authorized under HAVA 2002 does appear purposed for State National Guard personnel. Congress must pass legislation explicitly addressing this issue. The laws must be clear and unambiguous. Because, as Figure 3 below demonstrates, the cybersecurity threats to the election infrastructure are vast. To address those threats, it will take a straightforward, whole-of-nation approach [2] that includes usage of the National Guard's CPTs and DCO-Es.

IV. Recommendations

A. Modify and Pass Election Security Act

Congress should modify and pass the currently proposed Election Security Act [5]. The language contained in the suggested modification should be fashioned after the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5189 [15], expressly granting funds to the States for costs incurred while using their National Guard to perform pre-election, Election Day, and post-election cybersecurity activities (i.e., cyber-attack prevention and election system protection measures). The law should also authorize reimbursement of the State's for costs in-

Adversarial/malicious	
Hackers/hacktivists	Hackers who break into networks for the challenge, revenge, stalking, or monetary gain, among other reasons. Hacktivists, or ideologically motivated actors who take advantage of cyber vulnerabilities to further political goals.
Malicious insiders	Insiders (e.g., disgruntled organization employees, including contractors) whose position within the organization allows them to gain unrestricted access and cause damage to the targeted system or to steal system data. These individuals engage in purely malicious activities and should not be confused with nonmalicious insider accidents.
Nations	Nations, including nation-state, state-sponsored, and state-sanctioned programs that use cyber tools as part of their information-gathering and espionage activities.
Criminal groups and organized crime	Criminal groups who seek to attack systems for monetary gain. Specifically, organized criminal groups that leverage cyber vulnerabilities to commit identity theft, online fraud, and computer extortion.
Terrorists	Terrorists who seek to destroy, incapacitate, or purposefully misuse critical infrastructures in order to threaten national security, weaken the economy, and damage public morale and confidence.
Unknown malicious outsiders	Threat sources/agents who, due to their success in remaining anonymous, are unable to be classified as one of the five types of threat sources/agents listed above.

Fig. 3 The sources of cybersecurity threats to the election infrastructure. Retrieved from, *Election Security: Department of Homeland Security (DHS) Plans are Urgently Needed to Address Identified Challenges Before the 2020 Elections*, February 2020, GAO-20-267, p. 34.

curred to provide additional National Guard personnel to respond to any cyber-attack on a Federal election (i.e., cyber-incident response). Suppose Congress does not pass the Election Security Act. In that case, the new legislation's language should be nested under Subtitle II, Voting Assistance, and Election Administration of Title 52 of the United States Code, Voting, and Elections [24]. Whether integrated into proposed or current law, the new rule should, among other things, specifically address grants or reimbursement funding for using the Cybersecurity Relief Fund (CRF) and clearly outline the ability of POTUS, acting through the Director of CISA, to authorize the release of those funds. The grant and reimbursement funds represent the Federal government's percentage share of the Federal election administration expenses incurred by the States while providing the necessary cybersecurity not covered by HAVA 2002. With that said, neither the Governors nor POTUS should have to make any declarations similar to those required under the Stafford Act. Why? Because, unlike the impact, or potential impact, of a hurricane, tornado, or earthquake that may be purely a State responsibility, a Federal election by its very nature is a matter of Federal interest that bears Federal responsibility from the onset. Like current grants that States are receiving for election administration improvement, States should receive grants for general cybersecurity activities performed by members of the National Guard in their SAD status pre-election, Election Day, and post-election. In the event of a cyber-attack, the States should be reimbursed for using their National Guard in SAD status for cyber incident response. An example of the section language suggested appears in Appendix 1.

4.2 Create a Federal Policy Governing use of the National Guard for Federal Elections

Second, Congress should draft a law similar to 10 U.S.C. § 275 [11] directing the Secretary of Defense, through the Chief, National Guard Bureau in partnership with the Director of CISA, to prescribe policy that not only aligns with the new law, but also specifically authorizes the use of the National Guard in their SAD status to perform cybersecurity functions during the three phases of the election process, outlines the cyber-incident response process, and describes how States are to be Federally reimbursed for costs incurred. This new law should be nested under Chapter 1011 of Title 10 of the United States Code, National Guard Bureau [13]. An example of the section language suggested for the CAA appears in Appendix 2.

V. Conclusion

In the U.S. Constitution the Framers tasked the States with the responsibility of Federal election administration. This responsibility has not changed since 1787. While it is clear that States bear the responsibility to administer Federal elections [9], the Federal government directly benefits from the work performed. It should, therefore, provide funds to the States in return. To the Federal government's credit, millions of dollars have already been allocated explicitly to the States to support the improvement of election system security. The HAVA of 2002 is one great example. However, one critical gap in funding remains. The funding gap lies in the National Guard conduct of Federal election cybersecurity activities pre-election, Election Day, and post-election. Because the Federal government receives a direct benefit from this Federal election cybersecurity support provided, the Federal government should share the cost by way of grants or reimbursement. Passage of new legislation that addresses explicitly provision of grants or reimbursement funding to the States for using their National Guard in SAD status to perform cybersecurity activities before, during, and after Federal elections will demand a whole-of-nation approach [2] led by the CISA with support from the DoD and the National Guard. Such a collaborative effort will most certainly help the Federal government draw closer to the three policy goals of election cybersecurity; "access, integrity, and security" [8].

Appendix 1

Sample Draft Language of Proposed Cybersecurity Legislation (Stafford Act, 1988, §§ 101, 202)

"[§0123]. Congressional findings and declarations

(a) The Congress hereby finds and declares that-

(1) because [any cyber-attack conducted during a congressional or presidential election (Federal election) is a direct attack on the election infrastructure of the United States]; and

(2) because [cyber-attacks conducted during a Federal election can] disrupt the normal functioning of [the Federal

government, and adversely affect public trust and confidence in the electoral process]; special measures, designed to assist the efforts of the affected States (. . .) in [providing cybersecurity during a Federal election], are necessary.

(b) It is the intent of the Congress, by this chapter, to provide an orderly and continuing means of assistance by the Federal Government to [the States] (. . .) in carrying out their responsibilities to [administer Federal elections] by-

(1) revising and broadening the scope of existing [election security] programs;

(2) encouraging the development of comprehensive [cyber-attack preparedness, response, and recovery] assistance plans, programs, capabilities, and organizations by the States (. . .);

(3) achieving greater coordination and responsiveness of [cyber-attack] preparedness, [response] and relief programs;

(4) encouraging individuals and [States] (. . .) to protect themselves [from cyber-attack] to [help] supplement or replace governmental assistance;

(5) encouraging [cyber-attack] mitigation, [response, and recovery] measures to reduce losses from [cyber-attacks], including development of [cyber-attack mitigation, response, and recovery] regulations; and

(6) providing Federal assistance programs for both public and private losses sustained during [Federal elections as a result of a cyber-attack].

[§0456. Federal Election Cybersecurity]
(. . .)

(a) Establishment of Program – [In addition to those funds authorized for distribution under the Help America Vote Act], the President may establish a program to provide (. . .) financial assistance to States (. . .) to assist in the implementation of [election cybersecurity activities to mitigate the risk of potential cyber-attacks, as well as respond to and recover from cyber-attacks]. [These measures shall be] cost-effective and (. . .) designed to reduce (. . .) damage and destruction of property, including damage to [the election infrastructure].

(b) Approval by President - If the President determines that a State (. . .) has identified [Federal election cyber-threats] in areas under its jurisdiction and has demonstrated the ability to form effective public-private [cybersecurity risk] mitigation partnerships, the President, using amounts in the [Cybersecurity Relief Fund (CRF)] (. . .) may provide financial assistance to the State (. . .) to be used in accordance with subsection (c) of this section.

(c) Uses of (. . .) Financial Assistance –

(1) In General - Financial assistance provided under this section—

(A) shall be used by States principally to implement [cyber-attack mitigation, response, and recovery] measures [during Federal elections] that are cost-effective and are described in proposals approved by the President under this section; and

(B) may be used -

(i) to support effective public-private [cybersecurity] partnerships;

(ii) to improve the assessment of a [State's election infrastructure] vulnerability to [cyber-attack]; or

(iii) to establish [cyber-attack] mitigation, [response, and recovery] priorities, and an appropriate [cyber-attack] mitigation, [response, and recovery] plan for the [State during Federal elections. This plan may include funding of the State's National Guard in their State Active Duty status].

(d) Cost Sharing.

(1) [Once approved by the President], financial assistance provided under this section may contribute up to 75 percent of the total cost of [cybersecurity activities performed by a State prior to, during, and after a Federal election. The President may accept this general rule and approve the Federal government to contribute up to 100 percent of the total cost of cybersecurity activities performed by a State prior to, during, and after a Federal election].

(2) the non-Federal share shall be paid from funds made available by the State."

APPENDIX 2

Sample Draft Legislation Directing Promulgation of Federal Policy for Use of the National Guard to Provide Cybersecurity During Federal Elections

(Restriction on Direct Participation by Military Personnel, 2016, § 275)

"[§0123 Use of the National Guard for Cybersecurity During Federal Elections]

[The Chief, National Guard Bureau, with the concurrence of the Secretary of Defense, and advice of the Director, Cybersecurity, Infrastructure Security Agency], shall prescribe regulations as may be necessary to ensure that [any Defensive Cyberspace Operations-Internal Defensive Measures (DCO-IDM)] conducted under this chapter [aligns with the Federal Election Cybersecurity Assistance Act (FECAA) and, unless otherwise authorized by law, does not constitute Offensive Cyberspace Operations (OCO) or DCO-Response Actions (DCO-RA). Such policy shall specifically address State usage, State funding, Federal funding, and Federal reimbursement, of their National Guard to perform cybersecurity activities prior to, during, and after Federal elections in the following statuses: State Active Duty (SAD), 32 U.S.C. § 502(a), 32 U.S.C. § 502(f)(1), and 32 U.S.C. § 502(f)(2)] (. . .)."

APPENDIX 3

Figures

Figure 1. A graphic depicting the number of selected Cybersecurity and Infrastructure Security Agency (CISA) services provided to States and local jurisdictions in 2018 AND 2019, as of November 6, 2019. Retrieved from https://www.gao.gov/assets/710/704314.pdf

Figure 2. A graphic depicting the threats that exist to the election assets during the three phases of Federal elections. Retrieved from https://www.gao.gov/assets/710/704314.pdf

Figure 3. A graphic depicting the sources of cybersecurity threats to the election infrastructure. https://www.gao.-gov/assets/710/704314.pdf

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Dr. S. Raschid Muller is a Senior Cybersecurity SME with the Department of Defense (DoD) at Fort Meade, Maryland. He teaches Cybersecurity at the undergraduate and graduate levels at Arizona State University, University of Maryland Global Campus, and Capitol Technology University. Dr. Muller is a 2020 Brookings Institute Fellow (LEGIS) currently serving on the House Committee for Homeland Security assigned to the Cybersecurity, Infrastructure Protection, and Innovation subcommittee in the United States Congress. He will attend U.C. Berkeley's Executive Leadership Academy in 2021 as a Fellow in the Goldman School of Public Policy. He is a member of IEEE, ISACA, NDIA, and AFCEA.

LTC Corey E. Thomas, Esq. is a Senior Administrative Law Attorney in the United States Army Judge Advocate General Corps. He is a graduate of Morehouse College, University of Arkansas-Little Rock Bowen School of Law, The General Staff and Command College, and National Defense University. Before joining the National Guard Bureau, he served as the Director for Domestic Operations at The Center for Law and Military Operations (TJAGLCS) in Charlottesville, Virginia. He is admitted to practice law in Arkansas state courts, the federal Eastern and Western Districts of Arkansas, the United States Court of Appeals for the Armed Forces, and the United States Supreme Court.

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An Analysis and Discussion of the Defense Information Systems Agency's Level of Compliance and Integration of the U.S. Congress' Title Viii National Defense Authorization Act Fy 2015 Subtitle D—Federal Information Technology Acquisition Reform

S. Raschid Muller, Ph.D., MBA
Assistant Professor of Cybersecurity
Capitol Technology University
Laurel, MD, USA
Email - srmuller@captechu.edu
https://orcid.org/0000-0002-1742-7575

***Abstract*—This paper reflects a conducted assessment of the Defense Information Systems Agency's (Department of Defense) compliance with the Federal Information Technology Acquisition Reform Action (FITARA) Section 833: Portfolio Management and Section 834: Federal Data Center Consolidation Initiatives. The paper is organized by providing an overview of DISA leading into a brief history of FITARA (and its associated federal government implementation). For Section 833, the Government Accountability Office (GAO) Information Technology Investment Management (ITIM) assessment tool was applied to DISA's Information Technology Capital Planning and Investment Control (CPIC) process for evaluation, analysis, and recommendations for improvement. Following GAO ITIM, Section 834 was introduced, leading into a PEST and SWOT analyses relative to DISA's implementation of the framework concluding with the evaluation and recommendations. Summarily, Kotter's 8-step change model was applied in a proposed 12 – 36-month plan for implementation throughout the agency for senior leadership in addressing the various gaps of both sections 833 and 834.**

***IndexTerms*—FITARA, DISA, GAO, IT Capital Planning**

I. Introduction

THE PURPOSE of this paper is to conduct an assessment of DISA compliance with the Federal Information Technology Acquisition Reform Action (FITARA) Section 833: Portfolio Management and Section 834: Federal Data Center Consolidation Initiatives [1]. The paper is organized by providing an overview of DISA leading into a brief history of FITARA (and its associated federal government implementation). After providing background information on Section 833, the Government Accountability Office (GAO) Information Technology Investment Management (ITIM) assessment tool [2] will be applied to DISA's Information Technology Capital Planning Investment Control process for evaluation, analysis, and improvement recommendations. Following GAO ITIM, Section 834 will be introduced, leading into a PEST and SWOT analyses relative to DISA's implementation of the framework concluding with the evaluation and recommendations. Summarily, Kotter's 8-step change model [3] will be applied in a proposed 12 – 36-month plan for implementation throughout the agency for senior leadership in addressing the various gaps of both sections 833 and 834 [1].

The Defense Information Systems Agency (DISA) is headquartered at Fort Meade, Maryland, since 2011. According to the DISA website [4], the agency is charged with the mission of "provide, operate, and assure command control, information-sharing capabilities, and a globally accessible enterprise information infrastructure in direct support to joint warfighters, national-level leaders, and other mission and coalition partners across the full spectrum of operations."

DISA receives funding through congressional appropriations and a Defense Working Capital Fund (DWCF) to meet the information technology requirements and needs of the entire Department of Defense (DoD). In 2018 DISA had a total budget of $9.4 billion (US), of which Congress budgeted $2.2 billion (US) through appropriations, and DWCF funding was estimated at approximately $6.9 billion (US). The agency's current mission priorities as per the DISA Strategic Plan [4] include: 1) improving responsiveness, agility, and collaboration with its various stakeholders and mission partners, 2) providing efficient, resilient, reliable, and assured infrastructure and services to its customers, and 3) defending the Department of Defense Information Networks (DODIN), securing its' data, and mitigating risks to the DoD holistically. Currently, DISA's Enterprise IT/IT Modernization efforts include the following:

- National Background Investigation System
- Cloud Computing
- Defense Information Systems Network (DISN) Tech Refresh
- CENTRIX
- The Global Command and Control System Joint Enterprise (GCCS-JE)
- Computing ecosystem

II. Literature Review

A. US Federal Government's Implementation of FITARA

Enacted on December 19, 2014, FITARA reflects US legislation to ensure that all federal Agency CIOs assume control of IT investments [5]. Indeed, the law requires that federal agencies in the US offer comprehensive inventories of data centers to the Office of Management and Budget (OMB) [6]. From recent reports by the Government Accountability Office (GAO), overall, $80 billion of the federal government budget is channeled to IT investments annually [7]. GAO has also estimated that this investment is likely to exceed $89 billion. Based on the historical context, most of these investments' projects have experienced years-long schedule delays and multi-million-dollar cost overruns [8].

Therefore, FITARA was established in response to the growing need for a long-term framework that would provide room for the management, assessment, and tracking of federal IT investments. Federal Chief Information Officers (CIOs) play active and crucial roles to achieve these requirements, and the GAO and Congress monitor their activities. FITARA focuses on seven major areas perceived to affect how federal agencies manage and purchase IT assets [1].

- Section 831 – Expanding the federal CIO authority
- Section 832 - Improvement of risk management and transparency in IT investments
- Section 833 – Portfolio reviews
- Section 834 – Federal data center consolidation
- Section 835 - Expansion of the use and training of IT Cadres
- Section 836 – The maximizing of federal strategic sourcing initiatives (SSI)
- Section 837 – Government-wide purchases of software

B. FITARA Section 833

Section 833, "Portfolio Review," holds that the main aim of FITARA is to develop government-wide processes through which agencies' IT investments could be better aligned, optimized, and consolidated [8]. Additionally, Section 833 calls for OMB to collaborate with Agency CIOs to establish standard metrics through which IT assessments can be achieved. It is also worth noting that through Section 833, FITARA calls for agencies to implement annual reviews of their IT portfolios [9]. It is also expected that agencies engage in a multi-year strategy that is updated and discussed to reduce and identify waste and duplication in their respective IT portfolios, a provision informed by the need to achieve cost savings [10]. Also, Section 833 calls for agencies to develop or identify mechanisms through which their respective IT investments' effectiveness and efficiency could be increased and ensure that they create or recognize opportunities through which increased utilization of shared-service delivery frameworks could be realized [11]. From these provisions, it can be inferred that Section 833 focuses on identifying potential waste and duplication and advocates for developing action plans through which IT resources, programs, or portfolios can be optimized at the agency level.

1) Federal IT Capital Planning and Investment Control (CPIC)

Established by the Government Accountability Office (GAO), the ITIM process reflects responsibilities and policy through which agencies' mission performance could be improved. ITIM process implementation involves selecting, controlling, and evaluating IT investments [12]. The central objective is to promote accountability among agencies. Furthermore, the legislation and its associated regulations aim to maximize the value with which IT investments are associated and eliminate inefficiencies, reducing duplicate spending [12]. FITARA strives to control the oversight, acquisition, and planning of IT resources by establishing specific responsibilities for agency Chief Executive Officers, the Chief Information Officer, and agency heads [5].

ITIM reflects a framework responsible for identifying and organizing critical processes through which IT investment could be successful. The CPIC process strives to plan, develop, and acquire capital assets and manage and operate those assets via usable life, having achieved the initial acquisition process [13]. Thus, GAO-ITIM's CPIC process reflects a decision-making mechanism striving to pave the way for IT investments' integration of effective strategic planning [14]. Three major phases have been documented about the CPIC process [2].

- PHASE 1 – Priorities are determined before making informed decisions regarding ongoing or new initiatives worth funding and necessary for inclusion in IT portfolios.
- PHASE 2 – Ongoing management procedures to monitor the nature of the selected initiatives' progress.
- PHASE 3 – Consistent evaluation of the process.

2) GAO-ITIM Framework for Improving the IT CPIC Process (Section 833)

As the IT CPIC process progresses to maturity, five major stages are embraced and operate so that each procedure builds on a preceding stage. The main aim is to ensure that an organization's IT investment is enhanced [14].

Stage 1 - Creating Investment Awareness

The first stage involves creating investment awareness, and the investment process is unpredictable, unstructured, and ad hoc. Indeed, this stage does not differentiate between the failure and success of different projects. Preferably, IT projects that are seen to reflect suitable investments or success are mostly attributed to the project team's exceptional actions, proving challenging to repeat [15].

Stage 2 - Building the Investment Foundation

The second stage implies that organizations strive to define and develop their IT investment boards and establish opportunities or business needs. The respective IT projects

are likely to address and employ the knowledge gained towards new IT proposal selection [16].

Stage 3 - Developing a Complete Investment Portfolio

The third stage focuses on developing a well-defined and consistent perspective on IT investment portfolios while maintaining integrated and mature evaluation, control, and selection processes. Upon selecting an IT project and discerning that it meets the expected performance expectations (as defined during the second stage), organizations likely establish IT investment portfolios via investment procedures aimed at expanding the firm's focus from that of a primary project-oriented context to that which embraces broader portfolio perspectives [13].

Stage 4 - Improving the Investment Process

In the fourth stage, the main focus is on improving the IT investment portfolios and processes while ensuring that the selection and mature control processes are maintained. This stage requires organizations to analyze their respective investment portfolios regularly [13]. The main aim is to allow for the continuous alignment of investments with the most recent architectural versions.

Stage 5 - Leveraging IT for Strategic Outcomes

Lastly, the fifth stage and GAO-ITIM IT CPIC implementation involve leveraging IT towards strategic results. The mastering of the evaluation, control, and selection processes culminate in shaping the results [14].

C. FITARA Section 834

FITARA Section 834: Data Center Optimization Initiative (DCOI) is the continuation of the Office of Management and Budget's Data Center Consolidation Initiative (FDCCI) that began in 2010. Section 834 required the government to consolidate and optimize its data centers by 2018. It was still extended by the FITARA Enhancement Act of 2017, which extends the requirement to the end of the fiscal year 2020 [17]. As a result of these initiatives, the federal government has witnessed significant savings based upon improved efficiencies, newer technologies, and the emergence of cloud environments. Because DISA has several data centers worldwide, the agency must comply with the latest initiatives and report annual inventories, savings, and findings to OMB. In this study, the SWOT and PEST analytic methods are used to gain insight into the degree to which DISA has implemented FITARA Section 834.

1) PEST and SWOT Frameworks for Analysis for Section 834

The selected analytic frameworks (PEST and SWOT) are different in assessing institutional ideas. Whereas the appearance of similar factors in each framework point to the similarity between these frameworks, PEST evaluates a view from a particular position or business standpoint. Also, PEST can be incorporated into SWOT, or it can be presented before the SWOT analysis to achieve a similar effect.

2) Political, Economic, Social, and Technological (PEST)

The four aspects constituting the PEST framework include political, economic, social factors, and technological [18]. The political factors that have conflicts and wars, international pressure groups, pressure groups or home market lobbying, initiatives, grants and funding, and trading policies [6]. Others include government term and change, government policies, regulatory bodies and processes, international legislation, future legislation, current legislation home market, and environmental or ecological issues.

Economic issues that the analytic method (PEST) examines include international monetary or trade matters, exchange and interest rates, end-user or customer drivers, distribution trends and market routes, specific industry factors, and market and trade cycles. Others include seasonality issues, taxation specific to services or products, general taxation issues, overseas trends and economies, home economy trends, and the home country situation [7].

Social factors include ethical issues, advertising, publicity, religious or ethnic characteristics, buying access and trends, significant influences and events, fashion and role models, consumer buying patterns, technology institutions, and brand image [14]. Additional social factors analyzed through the PEST framework include law changes that affect social factors, media views, consumer opinions and attitudes, demographics, and lifestyle trends.

In the study by

The technological issues or factors that the framework considers include global communications, intellectual property issues, technology patents, licensing and access, innovation potential technology legislation, consumer buying technology or mechanisms, information and communications, manufacturing capacity and maturity, technology maturity, the replacement of solutions or technology, research funding, and competing for technology development [9].

3) Strengths, Weaknesses, Opportunities, and Threats (SWOT)

The SWOT analysis [19] refers to a useful tool through which an institution's position could be understood and reviewed. The framework's application is essential because it informs decision-making regarding future institutional direction and new ideas [7]. Additional scholarly studies assert that SWOT analysis assesses information subjectively, and its central motivation is to promote informed decision-making, discussion, and understanding of institutional concepts [8]. The SWOT framework is divided into four sections: strengths, weaknesses, opportunities, and threats of an institutional idea [19]. Some of the institutional aspects that the SWOT framework seeks to examine include organizational capabilities, customers, and business solutions.

Strengths observed some of the factors considered during the analysis or application of this analytic method include people, assets, resources, unique selling points, competitive advantage, institutional capabilities, and advantages of a proposition [20]. Other factors observed that need to be con-

sidered while analyzing an institutional idea's strengths include communications, IT, quality, value, the likely returns, and innovative aspects [10].

Other studies have documented factors that need to be considered while analyzing the weaknesses of an institutional idea. Some of these factors include gaps in capabilities, a proposition's disadvantages, poor leadership and commitment, compromised cash flow and continuity, own known vulnerabilities, and lack of competitive strength [21].

Some of the forces that are worth considering concerning the analysis of the opportunities at the disposal of an organization include market volume demand trends, agencies, partnerships, information and research, market response to tactics, niche target markets, new horizontal or vertical markets, and global influences [22]. Others include innovations and technological developments, lifestyle or industry trends, competitors' vulnerabilities, and market developments [22].

Regarding threats, the SWOT analytic framework focuses on issues such as credit and financial pressures, insurmountable weaknesses, obstacles, new ideas, services and technologies, market demand, competitor intentions, IT developments, environmental effects, legislative effects, and political effects [11]. Additional scholarly studies have examined and documented some of the factors that the selected analytic framework considers while analyzing opportunities at the disposal of an institution's operations. In contrast, threats and opportunities examine external factors, strengths, and opportunities to explore internal factors.

III. Results & Analysis of Applied Frameworks to DISA

A. Analytic Results of FITARA Compliance to Section 833

When deploying the PFM ITIM assessment tool to the Agency TTPs, DISA's compliance with section 833 can be viewed as subpar according to the processes in place, which directly align with the grades received from the DoD CIO Annual Scorecard. Subsequently, the agency remains at Stage 1: "Creating Investment Awareness" of the five stages. After conversing with several key personnel and stakeholders with duties related to compiling section 833 data, there is a consensus that FITARA compliance "to the letter" isn't an agency priority with aggregating data at the "enterprise level." However, it should be noted that the agency is compiling the data at the "component level" throughout the various DISA Commands around the world. The issue is that a mechanism or process at DISA Headquarters Fort Meade for reporting purposes doesn't exist. As a result, the DOD CIO's office summoned DISA leadership to the Pentagon for questioning in which the agency had to devise a plan for future grading and compliance then.

The communication lines were opened from the meeting between DISA's Office of the Chief Financial Officer and the DoD CIO to review DISA's methodology to capture savings and define acceptable metrics from both parties. Consequently, while DoD CIO's office looks for ways to capture and track savings at the component level, DISA HQ needs to consider doing the same for the enterprise level to meet the already standardized needs. Summarily, VADM Norton commissioned a FITARA Tiger Team led by Mr. Chris Catlin to understand DISA's compliance better and look for a way forward.

B. PEST Analysis of FITARA Compliance

Political

Political decisions affect how (and when) institutions such as the military will be employed, and employment effects DISA's operations. The US as a democracy exhibits credible and transparent elections whereby most of the elected representatives (including the President of the United States of America) tend to have considerable influence on global and national policymaking [11]. Despite this promising trend, the US continues to fall victim to terror group threats [22]. For DISA, the political situations characterizing the environment in which it operates imply that checks and balances are imperative to note. The law protects most of the rights of the minorities and other stakeholders served by the agency. Despite the mixed outcomes, it is evident that the agency operates in a supportive and positive region due to political stability. Sands [22] asserted that stability is informed by low-risk military invasion due to the United States' military might and power. Based on these favorable conditions, DISA has implemented FITARA Section 834 through technological dominance, advanced infrastructure, and a stable political environment.

Economic

Operating within the world's largest economy, DISA has enjoyed a well-developed IT system through partnerships with renowned economic organizations. However, labor has proved costly in this economy. As such, DISA has had to implement some of its FITARA-related IT strategies through outsourcing cheap labor from the rest of the global economies. What remains unaddressed is the extent to which the cheap labor has (or otherwise) promoted the agency's central mission and vision. Also, rapid changes in the global economy, a platform served by DISA, have proved challenging relative to the implementation of FITARA Section 834.

Social

Like most other developed regions, the dominance of an aging population marks the social environment in which DISA operates. As such, its implementation of FITARA faces the threat of labor shortage. However, as DeVisser and Sands [5] observed, labor stability is likely to be achieved through stable educational systems. The majority of the population supports liberal mindsets to change the security world to an IT-driven platform. What remains notable is that there is increasing illegal migration and racial intolerance in most of the regions served by DISA, trends that threaten the agency's implementation of FITARA. Specifically, these trends threaten operational stability at DISA because many individuals are keen to realize socio-economic mobility. Still, some of the means that they use (such as the state as

mentioned above of illegal migration) imply that the security agencies served by DISA might be overwhelmed. The goals and objectives laid down by FITARA might experience stalled progress in implementation.

Technological

DISA's implementation of FITARA is dominated by an environment that proves to be one of the world's leaders in technology and science. Significantly, most of the individuals and organizations that the agency serves are characterized by a longstanding fascination for IT [6]. Thus, the institution has implemented FITARA while ensuring that it serves the people and the organization's technological needs. However, the environment served also faces stiff competition from rising economies. The dilemma is how DISA will satisfy its key stakeholders' technical requirements and implement FITARA while retaining technology supremacy.

C. SWOT Analysis of FITARA Compliance

Strengths

Regarding DISA's implementation of FITARA Section 834, the agency strongly emphasizes the military's general IT mission. This support implies that DISA can secure and maintain funding streams, especially when improved FITRA Section 834, implementation outcomes can be demonstrated [10]. Support for DISA's mission to serve other agencies and individuals is unlikely to wane soon [21]. Apart from political permission, it is observed that DISA operates in an adequate budget environment [11]. Additional strength lies in the decision by DISA to embrace new, responsive technology systems. DISA's ability to deploy modern IT systems is associated with high-level visibility and support [22].

Weaknesses

At DISA, one of the perceived weaknesses entails human capital. On the one hand, the IT staff adequacy reflects a notable strength. On the other hand, the staff is stretched thin and unlikely to attract dissatisfaction and turnover. Should the agency be forced to recruit new IT talent, several forms of challenges might prove significant. Some of these forms include the lack of a joint workforce document, challenges associated with contract resource procuring, and the general shortage of technically skilled talent [8]. Another weakness with which DISA is associated entails a lack of adequate enterprise controls and strategy. Due to the agency's restructuring, an apparent central decision authority might prove challenging to achieve. DISA's implementation of FITARA Section 834 is also marred by a weakness of the lack of adequate agency controls and strategy.

Opportunities

During DISA's implementation of FITARA Section 834, one of the disposal opportunities entails maximizing its move to another IT system. More analytics capabilities might be realized by accessing centralized data, especially when it ensures that infrastructure issues do not cause significant operations problems [12]. By maximizing the move to another IT system, it is projected that a new information superhighway will result in DISA. By establishing partnerships with similar organizations that serve identical agencies or individuals and offer related services, DISA might establish paths through which private options might be integrated into its current implementation of FITARA Section 834, upon which capacity concerns might be improved or offloaded [6].

Threats

Data breach forms one of the most significant threats facing DISA. Furthermore, the agency's morale and authority face the threat of goal and guidance imposition from "on high," a trend cautioned that is likely to reflect a lack of adequate control [9]. Given that the outside solutions are unlikely to fit in DISA's unique IT environment, the agency's systems rollout might be undermined significantly and end up blocking forward progress. The effectiveness and credibility of DISA's implementation of FITARA Section 834 also face the acquisition process's threat, primarily due to inadequate oversight.

D. Analytic Results of FITARA Compliance to Section 834

In summary, significant strengths characterizing DISA's implementation of FITARA Section 834 include improved data outcomes and analytics due to the ability to leverage new IT systems, the presence of funding streams, and the enjoyment of political support. Weaknesses include silo-based contract management, lack of adequate enterprise visibility and control concerning IT expenditure, the increasing demand for training and retention of the IT staff, and growing concern associated with human capital or staffing. Regarding opportunities, the SWOT analytic framework suggests that DISA's implementation of FITARA Section 834 could exploit mechanisms such as the development of public-private partnerships (that could, in turn, aid in addressing human capital or IT staffing issues) and maximizing benefits associated with IT rollout. It is also evident that several threats face DISA. Some of these threats include high visibility failures, IT rollout problems that might make the agencies or individuals served to lose trust, lack of adequate forward investments due to slow transition, and data breaches or cybersecurity issues that are likely to undermine the stakeholders of the stakeholders served; both at the individual and organizational or Agency levels.

IV. Recommendations

A. Compliance Section 833

To steer improvements in how DISA develops and executes its future and current action plans associated with IT investment, VADM Norton must embrace a structured IT investment process [16]. This procedure should concern initiative evaluation, control, and selection in future and current action plans. VADM Norton should ensure that life-cycle baselines are established and way-forwards are well defined for consistent effectiveness measured in metrics. Plan development is organized at a high-level to estimate the re-

turn on investment for proposed way-forwards' cost-effectiveness [2]. Senior stakeholders should be engaged about the prescribed process to include actionable transactions that directly affect metrics as varying from the baseline. During the monitoring of DISA's planned actions, it is recommended that the DISA director updates risk baselines, benefit, schedule, cost, and scope of work for all actions as deemed necessary, a step that is poised to ensure that the chosen investment actions are cost-effective [14]. Similarly, there is a need for the DISA director to develop a mechanism through which customer feedback could be tracked for resolving customer concerns that might have prompted the actions.

B. FITARA Compliance Section 834

To improve the degree of implementation of FITARA Section 834, one of the significant issues that DISA needs to embrace is understanding the baseline environment. DISA needs to collect input, define the vision from the SWOT and PEST analytic frameworks, establish transparency, and communicate accountability. Indeed, an achievement of this recommended mechanism requires that the agency identify an aggressive connection with significant stakeholders and ensure that partnerships, which form part of the opportunities at its disposal, are solidified. In so doing, it is projected that DISA will be better placed to discern what might be working and what might have failed, eventually ensuring that priorities are identified accordingly. Understanding the baseline environment is also projected to allow DISA to focus on the assurance of IT transition success while empowering its staff via adequate funding of strategies aimed at data protection. By implementing this mission, additional benefits might include continuous and resilient operations and prevention against possible data breaches that could, otherwise, compromise stakeholder confidence.

Further, it is recommended that DISA improves or consolidates its collaborative mechanisms by increasing its focus on staff training and continuing education. Success in improving collaborative tools in an agency such as DISA could be realized when big data analytics are used more effectively [7]. Thus, DISA needs to engage support organizations in garnering best practices that might shift from an oversight model to an operational model. It is also worth indicating that the recommended strategy of consolidating the agency's collaborative mechanisms might witness more success if the outsourcing model is considered and embraced more aggressively.

C. 8-Step Kotter Implementation Plan

This section applies Kotter's 8-step change model [23] to recommend a 12-36-month action implementation, especially about DISA's integration of FITARA. In this model, the first step concerns creating urgency.

Step 1 – Creating a Sense of Urgency

The change could happen if an entire organization embraces a sense of urgency regarding some needed change [23]. At DISA, this initial step calls for the sparking of initial motivation by prompting convincing and open dialogue regarding the extent to which FITARA Section 834 has been implemented, some of the threats ahead, significant milestones, or strengths that characterize the agency, and opportunities that are worth exploiting. Particularly, DISA needs to hold regular seminars and utilize relevant communication platforms to state potential threats to its current implementation of FITARA, establish scenarios depicting what is likely to characterize its future operations, and seek critical stakeholders' support towards the examination exploitation of opportunities at its disposal. To ensure successful change initiation, there is also a need for senior leaders and managers to sustain their long-term engagement and make it clear that the implemented strategies will be followed up and monitored continuously, which is likely to improve confidence among service users and key stakeholders.

Step 2 – Building Coalitions

From the change model, the second step involves the formation of a powerful coalition. This step requires change implementers or organizations to convince the targeted institutions, groups, and individuals that change is necessary [3]. For DISA, it becomes essential for the strategic personnel to stretch beyond change management and lead it. The selection of influential people, teams, or coalition needs to be determined by the IT personnel's political importance, expertise, status, and job titles. To ensure that team building and emotional commitment are realized and the right mix of team members from different levels and departments, DISA needs to share the assessments with Congress and the rest of the DoD sections to ensure that the proposed change is understood and supported accordingly.

Step 3 – Form a Strategic Vision

The third step requires creating a vision for change [24]. Notably, the recommended changes are likely to attract numerous solutions, approaches, or ideas regarding paths that need to be adopted during implementation. Therefore, DISA needs to ensure that the images generated by the team established are linked to the agency's overall vision while ensuring that they do not contravene FITARA's specifications. This linkage allows team members to quickly remember or grasp the change [23]. The vision paves the way for team members to understand the motivation and perceived benefits behind a given shift. For DISA, a summary capturing the projected future of the changed operations needs to be presented to the members.

Step 4 – Enlist a Volunteer Army

The process above needs to culminate in the communication of the stated vision. Specifically, DISA needs to stretch beyond special meetings and engage in regular discussions, ensuring that the team established for implementation purposes remembers and responds to the theme. By walking the talk, the selected team will demonstrate the behavior expected from other individuals and organizations. Also, visual communication will help address any anxieties and concerns raised by stakeholders such as Congress and the military personnel honestly and openly, having led by example.

Step 5 – Remove Barriers

The next step needs to constitute the removal of obstacles. Having built the people's buy-in and talked about the mission (which involves implementing the changes stated earlier), any resistance to change will have to be addressed. At DISA, removing obstacles or addressing any resistance change will have to be realized by establishing clear structures to empower team members towards vision execution, ensuring that the proposed changes move forward. Important to note is that addressing the barriers will require the selected team to identify specific groups that might oppose the proposed change (an example being the Congress) and sensitize them about some of the threats that DISA's implementation of FITARA faces currently, some of the opportunities at the agency's disposal, and the perceived benefits poised to accrue from the implementation of the proposed changes or the exploitation of any untapped potentials.

Step 6 – Generate Short-Term Wins

DISA's implementation of the proposed changes will need to be marked by creating short-term wins that seek to motivate team members towards further progress and attract support from otherwise negative thinkers and critics. Particularly, short-term wins will have to be realized by blending long-term goals with short-term targets. To reinforce the change implementation team, it is expected further that DISA will reward team members.

Step 7 – Sustain Acceleration

The seventh step will involve building on the change to ensure that improvements are made to the quick wins while keeping the long-term goals in mind. As each victory is realized, DISA's team will also be engaged in the analysis of issues that might have worked and those that require improvements, as well as approaches through which those improvements might be achieved. An example of an improved approach entails adding of new leaders and change agents to the initial change coalition or team [3].

Step 8 – Institute Change

Lastly, the change will have to be anchored in the rest of DISA's organizational culture. Making a change to be part of an organization's core ensures that it sticks and stretches into the far future for implementation by other workforce generations [24]. At DISA, making the change part of corporate culture will be informed by most of the scholarly affirmations documenting that an organization's corporate culture dictates what is likely to be supported by employee teams [24]. Thus, the continuous effort will be made to ensure that every aspect of DISA experiences or sees the change, a step projected to cement the agency's organizational culture's recommended strategies. Imperative to acknowledge that the success realized by the stepwise change and implementation of the recommended changes (aimed at strengthening DISA's implementation and integration of FITARA) will be determined by leadership support.

V. Conclusion

DISA needs to engage and manage the majority of key stakeholders' expectations more proactively. Notably, much time needs to be spent on input collection to ensure that the Agency's IT strategic plan is established quickly and communicated effectively. To ensure that the agency's priority projects are implemented timely, it is essential to act on and evaluate staff performance and measurable projects via the identification of the top talent and also directing the IT staff towards a transition to ensure that the organization achieves short maturity (via improved controls and governance, as well as assured consistent transparency to other individuals and organizations served). It is also evident that the degree to which DISA might integrate and comply with FITARA depends on the capacity to improve internal operations and its key stakeholders' experiences. Thus, there is a need for the organization to ensure that it poses a positive impact on the well-being of warfighters by establishing consensus and also demonstrating vision in the military IT community. In so doing, DISA's implementation of FITARA Section 834 might be more successful and ensure that it yields significant contributions to the IT rollout strategy.

Given the strengths and weaknesses revealed by the PEST and SWOT framework analyses, it is also essential for DISA to ensure that it maintains its stability while transforming the perceived weaknesses into opportunities for improvement. Indeed, these actions are poised to pave the way for the agency to steer dramatic improvements in the military IT environment, having advocated for an information-driven approach or model. Imperative to highlight is the extent to which DISA collaborates with significant stakeholders and achieves transparency. Accountability will play a moderating role in determining the successful implementation of FITARA Section 834 and the achievement of other internal and external goals with which it is associated.

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Dr. S. Raschid Muller is a Senior Cybersecurity SME with the Department of Defense (DoD) at Fort Meade, Maryland. He teaches Cybersecurity at the undergraduate and graduate levels at Arizona State University, University of Maryland Global Campus, and Capitol Technology University. Dr. Muller is a 2020 Brookings Institute Fellow (LEGIS) currently serving on the House Committee for Homeland Security assigned to the Cybersecurity, Infrastructure Protection, and Innovation subcommittee in the United States Congress. He will attend U.C. Berkeley's Executive Leadership Academy in 2021 as a Fellow in the Goldman School of Public Policy. He is a member of IEEE, ISACA, NDIA, and AFCEA.

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Performance Comparison of Routing Protocols in Opportunistic Networks

Chander Prabha[1] , Rakesh Kumar[2]
[1]*Associate Professor, Department of Computer Science and Engineering,*
[2]*Professor, Department of Computer Science and Engineering,*
Chandigarh University Gharuan Mohali Punjab, India
[1]*prabhanice@gmail.com,* [2] *Rakesh77kumar@yahoo.com*

***Abstract*—In today's world doing data transfer in delay tolerant networks (DTN) environment is a challenging task. In DTN nodes are characterized to meet opportunistically to do routing and data transfer. In opportunistic environment no end-to-end path exists between destination and source. The contacts are made opportunistic while coming in contact for a short span of time. All communication is within this span only. Due to this feature the DTN's are sometimes recognized as Opportunistic Networks (ON's). The rules are not predefined here for choosing the next node as applicable in conventional schemes of routing. In this paper the performance of opportunistic routing protocols have been investigated namely PRoPHET, Spray and Wait, SimBet, Bubble Rap in terms of robustness and scalability. The concept of Ant Colony Optimization is used to find optimal routes while doing routing decision. The performance of SimBet and Bubble Rap is better with respect to throughput as they belong to social context aware category of protocols. Performance is evaluated in terms of packet dropped and overhead ratio also. The overhead ratio is better in SimBet and Bubble Rap as compared to Spray and Wait and PRoPHET. Depending on buffer size, speed, contact times these routing strategies shows variable performance. The result indicates that the social aware algorithms have the ability and capacity to exchange/carry information faster and improve the connectivity in ON's.**

***Index Terms*—DTN's, ONE Simulator, ON's, ACO, Centrality.**

I. Introduction

IN MULTI-HOP Ad-hoc networks the communication is possible even if a direct route doesn't exist between source and destination. The communication is provided through opportunistic links. These networks are prone to long delays and therefore a part of delay tolerant networks (DTN's). In opportunistic environment strong connectivity is not a requirement. These networks uses store and carry forward concept. ON's are characterized as topology-less, no direct path, long disruptions and partitioning lasting for long periods. The idea of opportunistic networks was proposed by Kevin Fall [1] in 2007 as an extension of DTNs with an assumption of more unpredictable mobility [2]. The nodes came in contact opportunistically without any previous information. The features of ON's result in longer delays than conventional networks employed by MANETs. The existence of ON is shown in Fig.1.

The characteristic of opportunistic network are:

- Power constrained devices,
- Intermittent connectivity,
- Occasional contacts,

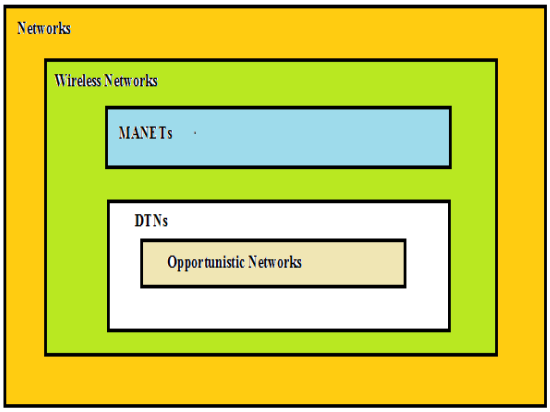


Fig. 1. Opportunistic Networks

- Highly mobile nodes,
- Non-existence of end-to-end paths.

The communication range of devices carried by humans, vehicles etc. are very short in opportunistic. Due to power-constrained and limited communication range of devices, it is sometimes tough to establish and preserve the connection and communication from source to sink. ON's are the one of the most interested evolution of MANET. The essential requirement of MANET is that the both source and sink nodes must be within the range at the same time and should be connected to the network, when sender wants to send the message and if the sink is not connected to the network messages get dropped at some point of network. ON's aim is to allow user enable to pass and receive data/information even in such a disconnected scenario. In ON's, nodes are able to do communication even if there is no route exists that connects. Routes are dynamically built, while messages are on their way to route between the source and the sink(s). Any encountered possible node can opportunistically be used as next hop, provided it is likely to bring the message nearer to the final sink. ON a promising and challenging research field due to these requirements. The design of efficient routing strategies for ON's is generally a complicated task due to the absence of knowledge about the topological evolution of the network. Fig.2. shows the hierarchy of communication networks.

A. Challenges and issues in ON's

Following are the challenges in opportunistic networks.

- Forwarding and routing of data
- Buffering
- Link Discovery
- Contact opportunity
- Security and privacy

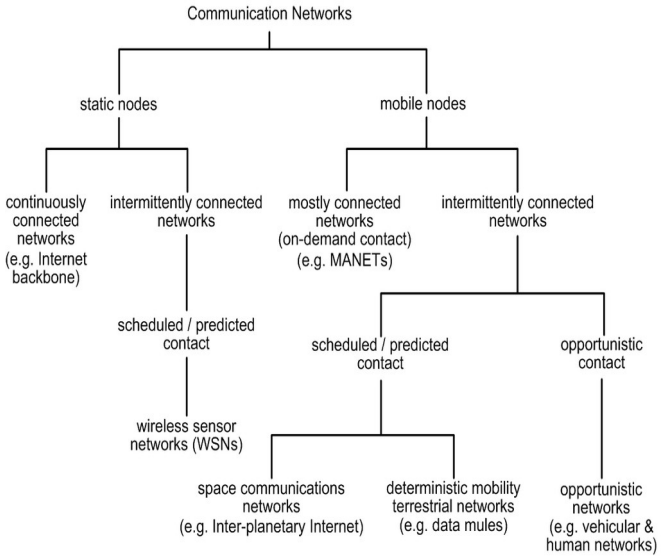


Fig .2. Hierarchy of Networks

The environment of opportunistic network is disconnected. The connectivity of nodes is sporadic. The sporadic connectivity of nodes limits the node contribution in forwarding the data and consequently affecting the performance of routing protocol. No information about the topology of network is available. All these challenges play a vital role and must be taken care of while designing and efficient routing protocol in opportunistic networks [3]. Section 2 describes routing protocols for performance comparison purpose in opportunistic networks.

The objectives of the results presented in this paper is to show that social context aware routing protocols have better performance than mobility based category of routing protocols in opportunistic networks. The performance of four protocols have been investigated and discussed in terms of metrics viz. throughput, packet dropped and overhead.

II. Related Work

This section presents review on common routing protocols in ON's under consideration in this paper. Most common approach of routing is presented by Vahdat and Becker [4] called Epidemic. The nature of this protocol is flooding-based and is under context-oblivious category of routing protocol in ON's. Here nodes replicate continuously and messages are transmitted to newly revealed nodes with a condition that they do not already retain a message copy. The messages are delivered ultimately to destination based on pair-wise information maintained by nodes on encountering each other. However if path to sink is not available then node will buffer/hold the message in summary vector index. Every message has a unique ID to avoid duplicity. To manage node resources utilization to be low, a hop counter is associated with each message that it can travel to.

Probabilistic routing algorithm called PRoPHET is presented by [5] Anders Lindgren and et al. PRoPHET stands for Probabilistic Routing Protocol using History of Encounters and Transitivity. It falls under mobility based category of routing protocols in ON's. The method adopted by PRoPHET is similar to Epidemic, here also nodes want to communicate exchange summary vectors (SV) when they meet. Additionally summary vectors of PRoPHET contains the delivery predictability information (DPI). This information is stored in the nodes. The internal delivery predictability vector is updated using DPI and then the information contained in the SV serve the purpose of deciding which messages to request from the other node. Here the node forwarding lean on the DPI of the nodes come across. This predictability of reliable node is an important parameter in PRoPHET. It is used to decide which node is more positive and trusty than the other for doing forwarding of messages to the destination node.

Thrasyvoulos Spyropoulos and et.al. proposed Spray and Wait protocol (SW) [6]. It consist of two phases: 1) spray phase and 2) wait phase. The SW protocol are part of mobility based category of routing approaches in ON's. In this routing approach on generation of any new message in the network, a number A is appended to the message, where A indicates maximum admissible replica of message in the network. In the first phase, spraying of message is done by originate node, after receiving the message by intermediate node, the second phase, wait activates where the intermediate node stores that particular message until the sink encountered directly.

The next two routing protocols (SimBet and Bubble Rap) under consideration are under Social context aware protocols in opportunistic networks. SimBet [7] uses the concept of Between-ness centrality that tells how much a node is interconnected. This algorithm is based on forwarding messages to nodes with having larger value of SimBet relevance. For reducing overheads it uses local centrality metric and between-ness metric. In order to make the forwarding decision SimBet exchanges the pre-estimated centrality and locally determined similarity of each node.

Bubble Rap [8] make use of two supposition a) every node must pertain to at least one social community. The popularity of that node is described by its centrality within its community (i.e. local centrality etc). b) There is a local ranking (local centrality) and global ranking of every node (i.e., global centrality) within its community and in the whole system respectively. The node may have several local centralities if node belongs to several communities.

Now the work has been extended for saving the energy of nodes. EEOR-FL [13] routing focuses on to balance energy consumption while maintaining lifetime of network. It uses a method to calculate the candidate list.

III. Simulation Strategy

In the present paper, simulations are done to analyze the performance of mobility based (PRoPHET and Spray and Wait) and social context aware (SimBet and Bubble Rap) based routing protocols using opportunistic network environment simulator (ONE version 1.4.1) [9]. This tool is used in ON research. It is based on JAVA environment that supports variety of mobility models. The ON are modeled as dynamic group of nodes (mobile) which joins or leave the group at any time. Five groups of moving nodes are taken viz. light weight vehicles, pedestrians, trams, bicycle and office workers. These groups follows Map based movement model to reach from one place to another with different speeds. Metrics for evaluating the performance of routing protocols are throughput, packet dropped and overhead ratio. Points followed while evaluating and getting the metrics results are:

i) ACO is used for doing routing decision. ACO is a meta-heuristic technique [10]. It finds solutions to combinatorial optimization problems and is an iterative distributed algorithm.

ii) Social information of the node is gathered by use of Between-ness centrality which shows how much packet delivers and drops in a network from source to destination [12].

iii) The shortest path is finding out by using Dijkstra algorithm [11].

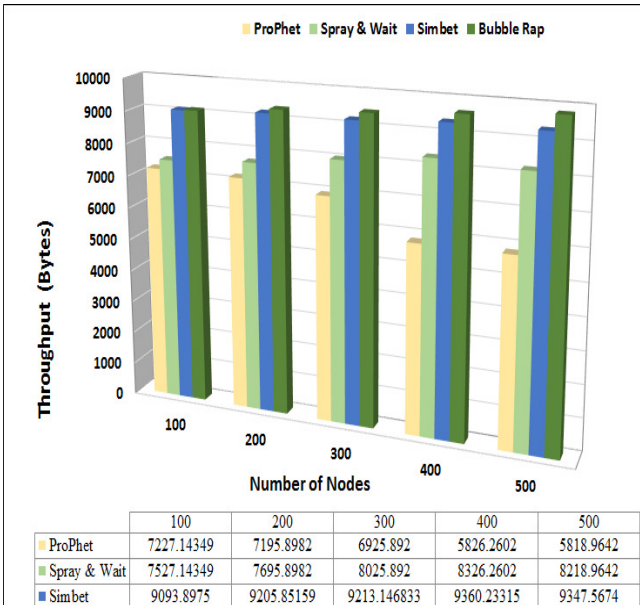
This paper uses ACO [14] [15] to optimize the multiple routes while searching the path. It depends upon behavior of real ants and having reinforce abilities viz. quickly recognizing the followed routes and knowledge about the distance to other routes. The parameter of concern of routing for optimization here is the between-ness centrality that describe the most important node in the network. The reason for choosing ACO algorithm [16] is specially it helps in propagation process at a faster rate.

IV. Results

Throughput: It is the defined as rate of successful message received/delivered. Fig. 3 shows throughput versus number of nodes of the four routing protocols. The throughput of social based routing algorithms are higher than the mobility based.

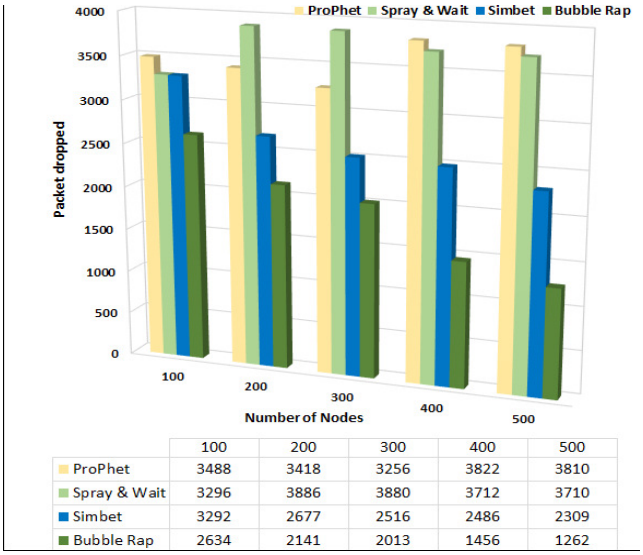
Dropped Packets: The reason for occurrence is network congestion. Mainly loss of packets occurs when more than one packet get into the network over a medium and fails to reach their corresponding destination. Fig. 4 shows no of packet dropped w.r.t four protocols. In terms of increase in nodes the packet drop decreases in SimBet and Bubble Rap, whereas it increases in case of PRoPHET and Spray and Wait. The reason for decrease in packet drop is due to increase in social interaction and optimization of ACO [16] during propagation process in case of social context aware routing protocols, whereas it is not the case with other two.

Overhead Ratio: Shown in Fig. 5. Calculation is done by using number of packet delivered, received at a node and number of packet dropped. It is less in SimBet and Bubble Rap as compared to PRoPHET and Spray and Wait. The ratio of overheads also increases as nodes increases in the network.



	100	200	300	400	500
ProPhet	7227.14349	7195.8982	6925.892	5826.2602	5818.9642
Spray & Wait	7527.14349	7695.8982	8025.892	8326.2602	8218.9642
Simbet	9093.8975	9205.85159	9213.146833	9360.23315	9347.5674

Fig. 3. Throughput versus Number of Nodes

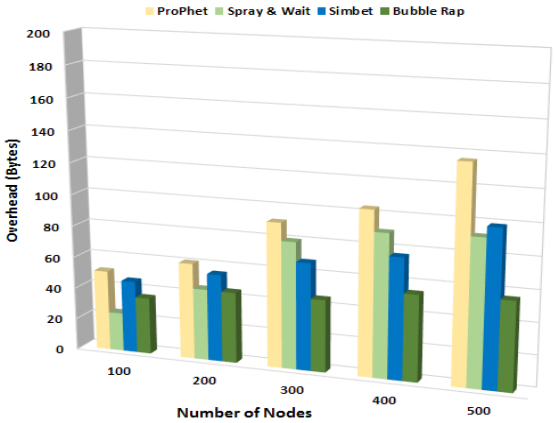


	100	200	300	400	500
ProPhet	3488	3418	3256	3822	3810
Spray & Wait	3296	3886	3880	3712	3710
Simbet	3292	2677	2516	2486	2309
Bubble Rap	2634	2141	2013	1456	1262

Fig. 4. Packet dropped versus Number of Nodes

V. Conclusion And Future Scope

In ON's connectivity in intermittent due to which spontaneous data transmission is required as and when connectivity become available. In this paper with the use of ACO optimization an attempt is made to improve the throughput of a network. By using between-ness centrality the packet drop rate and overhead ratio is reduced. In routing where nodes are themselves carriers then nodes in the network are also data collectors. Nodes are following either arbitrary or predetermined routes around in the network area to move.



	100	200	300	400	500
ProPhet	50.8467	60.8277	91.3324	103.7455	135.9453
Spray & Wait	24.3512	45.1767	80.1326	90.3642	92.4216
Simbet	45.8531	55.3378	67.922	76.4477	98.9632
Bubble Rap	35.8525	44.8702	45.7376	54.5582	56.3705

Fig. 5. Overhead Ratio versus Number of Nodes

Moving of nodes required to gather messages from the encountered nodes. These can be the only entities culpable for delivery of messages. This paper concludes that routing done through mobility based approach is not delivering better throughput as compared to social based. The packed dropped rate is also higher and it tends to increase wr.t scalability in mobility based (Spray and Wait and PRoPHET). The ration of overhead is also better in social based (SimBet and Bubble Rap). The work can also be enhanced by evaluating these protocols with respect to other parameters like buffer constraints, delay, and energy saving techniques.

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Building Healthcare 4.0 with Smart Workforce

Dr. Pushpendu Rakshit[1], Ravindra Sharma[2]
[1]Assistant Professor, ABSM, Amity University, Maharashtra, India.
[2]Assistant Professor, Swami Rama Himalayan University , Dehradun, India
[1]pushpendu_rakshit@yahoo.com, [2]*ravindrasharma97@gmail.com*

***Abstract*—Role of Indian pharmaceutical industry has been significant over the years. It's a leading nation for catering pharma and healthcare services across globe. The development, production, distribution and appropriate utilization of medicines, as well as the supportive functions of regulation, operational research, and training, all require the involvement of competent pharmaceutical professionals. Smart workforce can always contribute for better functioning of healthcare system in a country like India. Adoption of smart technologies by human resource could represent a new competitive advantage for pharma companies exhibiting smart pharma. The dynamic-consolidation, globalization, methodical developments, public policy, and competition-have pushed human resource leaders into new territory to address dynamic needs of pharma business. There exists a digital revamp in life sciences industries even following self-reliant India mission. This is a conceptual explorative research demonstrates future of smart Indian pharma, which is in a verge to become self-reliant. This study helps to focus on pharma workforce challenges such as performance management, compensation management, motivation, promotion, talent management, training and development with the help of AMO model comprising three main components such as ability, motivation, and opportunity. This would also alert both the clinical manufacturers and users resulting in designing personalized based better future of Indian pharma industry. This is an explorative study driven by secondary sources and tends to design prototype. Future Pharma would see the business link paraphernalia across development and dispersal by using better, more reliable larger volumes of data to revolutionize manufacturing.**

***Index Terms*—Smart human resource, digital innovations, healthcare, AMO model, Make in India.**

I. Introduction

SKILLED workforce is indeed an integral part of any system to avail the competitive advantages of the contemporary market. Indian healthcare has been one of the major stakeholders in both to meet the global demand and supply and in research and developments. Pharmaceutical 4.0 as a smart factory mentions to the novel tools and procedures that are allowing smart, decentralized manufacture, with intelligent workshops, cohesive IT systems, internet of things, artificial intelligence for flexible, highly integrated and robotic manufacturing arrangements. Also, life science engineering is one of the well flourishing areas in India and post COVID-19 there exist a great scope for further enhancements. Role of patient and medical data does play a critical role and thus a protruding feature for the life science engineering for a large extensive spell. There must be a paradigm shift in this sector to generate never earlier seen excellence and trustworthiness values. As per the research of Gallup, only 32% of reliant workforces sense a wisdom of belonging in their workplace. There is increasing consideration between the leaders and decision-makers apropos Pharmaceutical 4.0. Pharma industry face a chronic need to endure competitive in a market where product ranges are diversified, innovative start-ups stimulating the status-quo, logistical allies fetching more cohesive and patients more intricated in decisions around their upkeep. Realizing the potentials of gear shift would be the market differentiator for industries contending in this new normal atmosphere. This chapter tries to corelate boosting of Pharmaceutical 4.0, requiring configuration of branding scopes, potential opportunities, understandings future growth and culmination of technology with the medicinal industries principles. Population and employment are major concerns in our nation but on the contrary the skilled masses could prove to be a major game changer if skilled well (Sharma et al. 2018). There must be proper awareness and trainings to impart education in masses and make them handy so they can earn livelihood. India's biotechnology segment which encompasses biopharma, bio-industries, bio-service/s, bio-agricultural practices and bioinformatics is expected to upsurge with an average growth of 30% annually and reach $USD 100 million by the year 2025. Any which ways biopharma which includes vaccines, therapies and diagnostics, is the largest subset with closely 62% of total revenue at INR 12,600 crore. There have been research and developments to control the cost of lifesaving generic drugs and medicines. Also, there are many researches currently going on for finding COVID-19 vaccination. Initially there were only countable laboratories for such research and currents that surpasses in thousands. All these are possible only with dedicated and reliable workforce.

II. Review of Literature

This draws our attention towards the needs of further research as there exists a research gap. This is an explorative research. Mentioning the major aims, this study used qualitative method on secondary sources to proceed with development of prototype. The conclusive analysis helps to build a model based on the review of literature from existing work from multiple sources and researches.

(Tomervik 1995) explores that there exist cross cultural barriers but one can overcome same. This may differ from place to place and time to time and majorly there exist cross

cultural benefits at workplaces (Cassell 2001). Thomas (1995) explains that workforce diversities does not mean that there would be complete disagreement for the procedure of doing things but widens the scope to explore more potentials. Cox (2001) says that there exists diversification in workforce based on gender, religion and race but in healthcare sector there stands humanity as supremacy and nothing else than that as powerful. Workforce diversities can be beneficial for organizations and specially the pharma sector tends to serve all irrespective to their origins. (Saji, 2004). Effective talent retention strategies are vital for sustainable organizational growth (Sharma et al., 2019)

Performance and productivity could improve with diversified creative amalgamation of thought processes (Milliken & Martins, 1996). Performance management in group task could lead to better results (Hoffman, 1959). Pharmaceutical industry is one of the emerging industry managing and controlling manpower is a great challenge in this industry Rana et al. (2017)

Zemke, Raines, and Filipczak (2004) defined four specific generations that existing the workplace today: the Veterans, who are adaptive (aka Matures or Silent); the Baby Boomers, who are idealistic (Boomers); the Gen Xers, who are reactive (aka Xers; Hagevik, 1999); and the Nexters (aka Millennials), who are civic-minded. Veterans were born between 1922 and 1946. Each organization in pharma sector tends to compete among based on skilled workforce and taskforce (Carrel et al., 2000). (Allen et al., 2004) skilled and trained workforce could thrive for competitive advantage because different viewpoints can facilitate unique and creative approaches to problem-solving, thereby increasing creativity and innovation, which in turn leads to better organizational performance. Specially this was demonstrated during the pandemic crisis as all countries started supporting each other to meet demand and supply of pharma needs. Cloud-based human capital management solutions, insight-based analytics and democratized dashboards will enable the professionals to create a learning, collaborative and interactive talent scape for agile organization (Rana and Sharma, 2019)

The National Skill Development Corporation (NDSC), which is a not-for-profit nodal agency for skill development & entrepreneurship (Skill India Initiative) under current ministry of finance, Government of India has reported a major skill deficit in human resources for Indian pharmaceutical industry until 2022 (Er. Mandeep Singh, 2020). Branded generic medicines, low price levels, local market players driven by intense competition are key factors (McKinsey, 2020). India ranks tenth globally in terms of value, it is ranked third in volumes.

III. Objectives

1. To explore best workforce practices by Indian pharma industries.
2. To understand AMO model in context to Indian pharma workforce.

IV. AMO Model

This model helps to critically justify employee's ability, motivation, and opportunity to participate (AMO) which in return would increase employees' affective commitment. In the following study we are demonstrating the correlation between humans, as a vital resource for organizations, not only have a decisive role in the evolution of firms, but also act as the leader of all other resources to conquer rivals in today's dynamic atmosphere of businesses. Playing a pivotal role in triumph of the firms, human resource management needs human resource systems, policies and best practices. With respect to the ability, staffing challenges, training as well as development challenges, and talent management challenges were the three themes identified. Regarding the motivation, the deficiency of compensation packages, inefficient performance management, and promotion challenges were emphasized by the participants. Communication as well as information sharing challenges and insufficient attention to empowerment factors are major concerns. Fundamental roles of a human resource practitioners must be such that they are ready to support the workplace by maintaining the sanctity of work culture(Rana, and Sahrma.,2017).. Thus, this would support in scalability and sustainability of the pharma business and would also help to have best of the employees in the organization. In addition to the mentioned themes, some miscellaneous challenges were recognized, including the imperfective HRM governance, the organizational culture obstacles, and the nature of the industry. Human resource managers must recognize efforts and thus have 360 degree of appraisal practices to support AMO of employees.

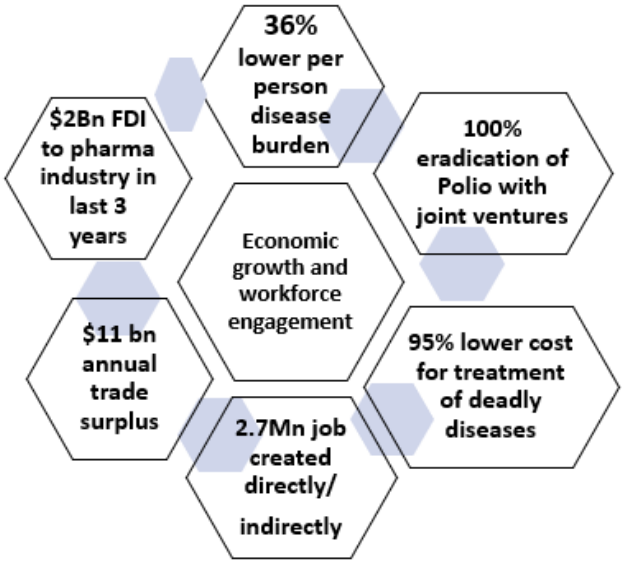

Fig.1 Economic growth and workforce engagement
Source: Authors own

V. Major Aspects Driving Attention Towards Upskilling Pharma Workforce

Top-down approach: the transformational journey with in a pharma company commences from top management and then flows to the lower level management and the best practices flow in the living blood of organization.

R&D: To reduce the 'time to market' for new drugs, pharma companies in India are leveraging workforce capabilities in medical skills and IT capability – a critical combination in today's research teams in global clinical R&D for clinical trials, data management, testing, etc.

Best industrial policy practices: As most of export in our nation incorporates medicines and generic drugs thus proper export -import policies must be framed and practiced to maintain integrity of business.

Innovations: Pharmaceutical innovation must be a never-ending journey and we demonstrated similar in the current pandemic crisis where the whole world is not only combating the virus but also in a way to explore the vaccination as soon as possible. Laboratories with latest tools and gadgets are equipped to provide better results.

Advancement in technology: Mechanization, automation, and computerization need people with the requisite skills to operate them. Pharma organizations must train their employees in the areas of evolving technical skills and technology-advancements from time to time.

Quality control: Increase in skill efficiency usually results in an increase in quantity, quality and output. A trained worker gives improved performance, machine and materials are carefully handled and more economically used.

VI. Discussion

India supported many nations globally through supply of medicines. By end of year 2020, most medications would have pricings based upon the outcomes they deliver, human body acceptance they show. Since numerous factors stimulus pharma manufacturing and usability results this means that there must be a paradigm shift to healthcare supervision paradigm, together to preserve the worth of all its throughputs along with sidestep challenges by the naive market entrants. If the challenge exist then still innovations would help to face the same for existing marketers. There might be situations to produce ground breaking naive drugs / medications / vaccinations for which current administrating cabinet of country, authorities and investors could support the inventions creating market values with export facilities.

Thus, would support building the associations and clinical set-ups essential to uplift not only experimentations / inventions but also in value creation. These practices would imbibe collaborations among global leaders not only in terms of technological amalgamation but also increase reachability of medicinal support.

Indian pharma companies so far have been on toes and fully feared up for combat with COVID-19 crisis. Being a larger producer of generic drugs and even a larger supplier, it is a tough rivalry of China. During the days of pandemic,

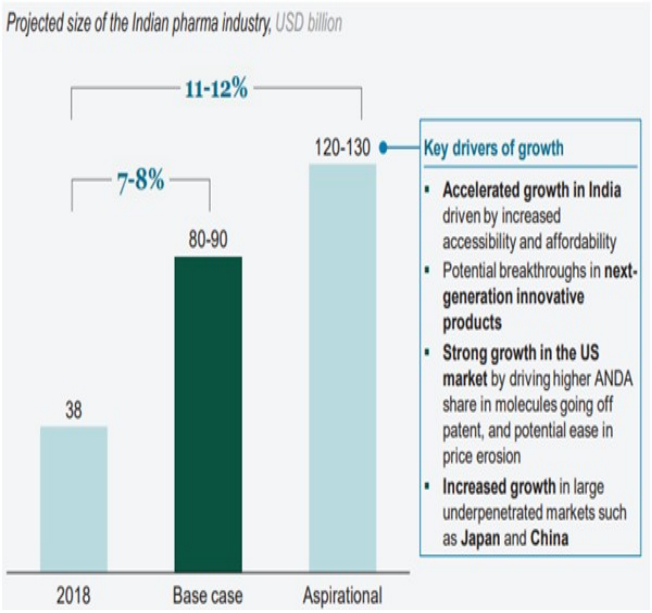

Fig.2 Indian pharma industry could grow to USD 120-130 billion by 2030

Source: IQVIA, AIOCD, Pharmexcil, IPA Team analysis, secondary research

India supplied drugs and medicines across world. Also lifted ban on exporting few of the drugs and generic medicines to tackle the crisis scenario across the countries of the world. Made in India medicines also found supporting the mantra of self-reliant India. India have been so far highly dependent on imports from China, nearly 70% in over the years for health care manufacturing. Antibiotics and several medicines related to cardiac ailments, high sugar, diabetes and tuberculosis are listed in the National List of Essential Medicines (NLEM) were available from China, thus dependency rate of other nations was very high. Now post COVID-19 scenario seems to change and new dawn of innovations and inventions have geared up across world. There seems to a be a larger scope for the nation to stand tall during this pandemic era. India have been extending continuous support to supply medicines to the nations in need. India also was appraised by World Health Organization during this crisis epoch.

VII. Implications

The study offers key implications for the top and middle level managers willing to adopt best industrial practices to have competitive advantages of market. Adoption of technology and industrial practices based on technology would help to explore better results. Development of soft skills, interpersonal, problem solving, negotiation skills and best ethical practices are the key to success in modern pharma industries. Thus, the role of workforce from medical staff, manufactures, service providers, medical fraternity till entire supply chain must be adoptive to best trends in practice.

VIII. Conclusion

Worldwide pharmaceutical marketplaces exist in the mid of foremost disjointedness. While evolution in advanced marketplaces will shrink, evolving marketplaces will become progressively imperative in the approaching spans. This contemporary pandemic has made world come to stand still with clinical / medicinal challenges. The world must learn a lesson from this and try to be proactive in healthcare and hygiene aspects which found absent in major parts of nations. The Indian pharma marketplace, laterally with the marketplaces of China, Brazil and Russia, would forefront developments within these marketplaces. Market in Indian has diverse features branding it as an exclusive business podium. Initially, branded generics control, manufacturing up for 70 to 80 % of the retail marketplace. Next, local companies have relished a leading place determined by formulation development competences and initial investments. Then, price echelons are low, determined by strong competition. While India ranks tenth globally in terms of value, it is ranked third in volumes. These characteristics mentioned in the first portion of chapter presents their own prospects and challenges. Pricing controls and an economic sluggishness can dissuade away reserves and pointedly dampen the market, permitting it to reach only USD 35 billion by 2020.

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AI-based Strategic Marketing: SMAI Model

Praneet Amul Akash Cherukuri*, Sai Kiran Vududala, Nishanth Raju Saraswathi, Jahanavi Sanda
Dept. of Computer Science and Engineering, CMR Institute of Technology, Hyderabad, India
chamul91@gmail.com, saikiran37544@gmail.com, nishanthraju2001@gmail.com , jahanavisanda30@gmail.com

***Abstract*—One of the important factors that play a vital role in the success of a business is marketing. Marketing has seen multiple changes throughout the decades in the Definition, Organization, and Implementation processes. With the advent of technology, especially Artificial intelligence many sectors underwent a great amount of transformation to get themselves equipped with the latest technological innovations. The business sector was also on the same lines with other sectors in this period of change. Marketing being a very theoretical and humanized concept it was pretty hard at first to incorporate changes accordingly. Later the scope for marketing enlarged and it slowly started making an entrance into inculcating the latest technologies. In this paper, the researcher studies the particularities of marketing and its integration with artificial intelligence, providently proposing a machine learning-based model (SMAI) involving strategic marketing decision making.**

***Index Terms*—Artificial Intelligence, Marketing, Business, Strategic Marketing, Machine Learning**

I. Introduction

THE CORE of a business's approach to reaching its customer is through marketing. Throughout the evolution of Business, many primary ailments of business kept changing with the change of the human mind and the way in dealing with business. But marketing always had it stand and was one of the primary sectors of business that was so consistent in the success of a business. With many new strategies being proposed in the sector of marketing it soon became one of the main branches of business and has greatly influenced people in making their final decisions. Usually, Marketing can be termed as influencing a person about the brand or educating oneself about the product to its fullest form strategically and interestingly. With the advent of technology, many sectors brought about a great change by formalizing and reevaluating their processes with technology and therefore increasing their efficiency. Though this same concept was continuously applied in the field of Marketing there was not much of a change or growth in business due to the unnoticed analytics that was greatly required for marketing.

Strategic Marketing was another such highlight that brought in a great change to the way marketing was dealt, and another dimension of thought was proposed to carefully strategize how a product was marketed, this strategy was physically done by humans and was an everyday job. When Artificial Intelligence came into existence, it shed light on many unnoticed facts and processes that were stagnant or were processes that were repetitive and showed a way to make it automatic and less time-consuming. This intelligent decision making and intuitive thinking through different dimensions made it a great choice to introduce it in the field of Marketing. Since the analytical analysis aligned with both the fields, it chose business much clearer to choose AI in the field of marketing. [1]

II. Prevalent System & Innovations Brought Through AI

Many systems came into existence with the advent of AI and hence multiple processes and algorithms were used to intelligently process and generate data that could generate greater leads in marketing and other management areas. Below are three business institutions that brought in a change in how they did Marketing and were successful in their journey.

A. Chase Bank

After a study with Persado, Chase Bank found that their approach to copywriting was very different from that produced by an Artificial Intelligence model. After they have compared their work with the model it was seen that the content provided by the model felt more humane and attracted more customers than their usual records show.[4]

B. Starbucks

Predictive Analytics, a form of AI was used by Starbucks which collects data from their loyalty cards and app and processes this data to achieve personalized recommendations through which it can push notifications to its customers on a much-individualized approach. Similarly, a study by Aberdeen suggested that companies that used predictive analytics in their marketing increased their organic revenue by approximately 21%.[2]

C. Nike

Nike improved its customer engagement by creating an application "Nike Maker Experience " that will give its customers an experience of customizing their shoes and hence improving their customer likeliness towards their products. In extension, they have stored the data and used machine learning algorithms to personally generate user recommendations that showed up in their accounts and improved their overall sales.[5]

III. Proposed Model – SMAI Model

Businesses have often faced ambiguity in the decision of introducing AI into their marketing strategy. A proper structure on how and what process of AI to introduce and what process could help in the increase of a particular type of business is a very tiresome process for business due to the lack of ability to understand. To compensate these companies are looking towards hiring data scientists and special AI teams to get a more clear understanding. In contrast to this in this research, we propose a Simple Marketing Artificial Intelligence (SMAI) Model that will help and guide companies to make intelligent decisions and develop their marketing strategies using AI and improve their sales. The model is built to understand any business needs and could analyze all the needs and recommend a proper AI strategy that could boost marketing and show an increase in sales. The result generated is not a single strategy but a group of strategies and what processes of AI and to what extent must be used in comparison to the previous strategies. From the above model, we could evaluate how the process could help us consider our options. The model consists of four phases, they are:

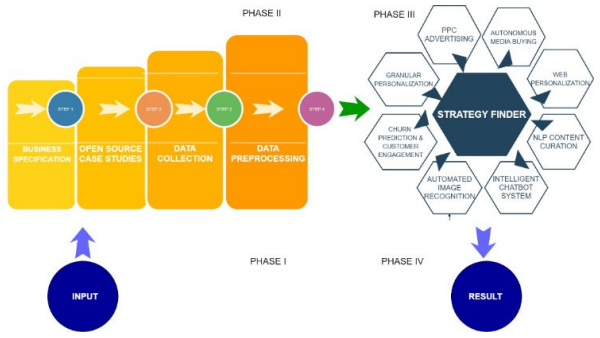

Fig.1. Bar Chart Representation of Increase & Decrease in revenue by various sectors during COVID-19

A. Phase I

In the first phase, input to the model is taken. The input to the model is mainly interfaced with the business model requirements about how the business works and what factors enable the betterment of the company. Important data that could help the model in outlining and helps in deciding to use a particular strategy are taken as indents. These indents are predetermined and are defined according to the various business models and types in the domains they exist. The input is taken in the form of a lengthy structure that clearly outlines every problem and since every business is ever-changing the need for a real-time model is necessary. Hence the data input is always dynamic and updates itself according to the changes made to the business model.

B. Phase II

The next phase focuses on the processing of the data through four various steps. These steps evaluate and outline the indents and trends through four various steps and preprocess and tag them with various machine learning algorithms and open-source data mapping to the real world. The business data and informatics is mapped to real-world open-source case studies and the particular data about that company or firm is retrieved. The phase consists of four different steps, the first step is permitted to analyze the business's information and remove it. Then the data is processed through the tagging system to the case studied and related data is tagged. Recommendation system technology using Bayesian classifiers can be used to determine the best data that could be tagged and curtained [3].Then in the next step, the data tagged is retrieved and moved to the next step for processing. In the next step, the data is processed and cleaned to send it for the strategy maker in which the data is used to make the final decisions.

C. Phase III

The next phase focuses on the processing of the data through four various steps. These steps evaluate and outline the indents and trends through four various steps and preprocess and tag them with various machine learning algorithms and open-source data mapping to the real world. The business data and informatics is mapped to real-world open-source case studies and the particular data about that company or firm is retrieved. The phase consists of four different steps, the first step is permitted to analyze the business's information and remove it. Then the data is processed through the tagging system to the case studied and related data is tagged. Then in the next step, the data tagged is retrieved and moved to the next step for processing. In the next step, the data is processed and cleaned to send it for the strategy maker in which the data is used to make the final decisions.

1) Granular Personalization

Marketing messages are generally be educated by a Client's advantages, buy history, area, past brand connections, and a large group of other information points.AI helps the marketing groups go past standard segment information to find out about customer inclinations on a granular, singular level. This assists brands with making curated encounters dependent on a client's interesting tastes.

2) AI-enhanced PPC Advertising

Pay per click advertising is one of the most huge markets in which many brands invest to increase their brand reach. With the advent of AI to understand and recommend new channels to advertise that may not have been or being used by the competitors in the market.

3) Autonomous Media buying

Digital Media buying is a process of autonomously buying paid ad campaigns that could help in achieving greater customer throughput. Automatic stages influence AI to offer an advertisement space pertinent to target crowds progressively. The offer is educated by information, for example, interests, area, buy history, purchaser expectation, and that's only the tip of the iceberg. This empowers promoting groups to focus on the correct channels at the right time, at a

serious cost. Automatic purchasing represents how AI can expand showcasing adaptability to address clients as their issues and interests develop.

4) Custom Web Personalization

Custom website personalization helps in enhancing the visitor experience with custom personalization to the website. By investigating much information that focuses on a solitary client (counting area, socioeconomics, gadget, collaboration with the site, and so on.), AI can show the best-fitting offers and substance. Another factor is the message pop-ups that can be explicit to singular clients, conveying them the perfect message at the perfect time.

5) NLP Content Curation

Natural Language processing plays a pivotal role in the content curation of the marketing material. As known for its great accuracy many NLP models are developed to understand the sentiment of the customers and precisely recommend better content personalized to the user. Some of the best examples where intelligent content curation could be widely used are Business Descriptions, Advertisement for Marketing Content.

6) Intelligent Chatbot System

From style to wellbeing to protection, AI chatbots are giving marginal enchantment client assistance. Also, now and again, they're greater at making customized content than people. Chatbots approach a large number of client-focused information focuses. They can likewise total area explicit solicitations to distinguish designs, spot dull issues, and foresee what's causing issues for a specific client.

7) Automated Image Recognition

Picture acknowledgment could mean better match up between online substance and store visits. Numerous stores utilize facial-acknowledgment programming to follow clients' in-store visits and connect these recordings to their clients' profiles. The information assembled from in-store facial acknowledgment includes another layer – a huge layer – to alter the substance experience for your store guests. Realizing how the individual shops empower you to make and convey much more focused on one-on-one informing. Facial acknowledgment programming additionally can be utilized as an estimation instrument.

8) Churn Prediction & Customer Engagement

AI calculations likewise can help recognize withdrawn client sections that are going to stir or leave for a contender. Artificial intelligence controlled devices in this class can help assemble information, fabricate a prescient model, and test and approve that model on genuine clients. That data can demonstrate what phase of agitating the individual is in. While speedy beats (clients who desert an item soon after beginning to utilize it) are hard to reconnect, late-stir clients (the individuals who have a dependable connection with your image) can be boosted to continue utilizing your item. At the point when joined with customized content creation, AI-fueled stir expectation helps keep a greater amount of your clients drawn in, prompting higher lifetime worth and benefits. As the agitated expectation is extraordinary to each item and friends, the AI calculations should be balanced for your organization or worked from the beginning. With that data, you can make a more successful substance to be conveyed to separated clients.

D. Phase IV

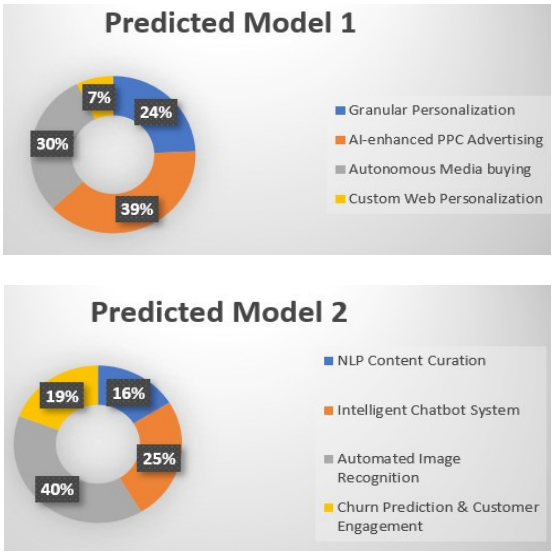

Fig 2. Representation of the predicted model

After going through the rigorous strategy finding the model would then output a result that is a form of multiple processes that could produce a greater strategy using different AI models and processes and deal in getting a greater accuracy and attracting customers. The output is usually shown in the form of 3 or more accurate process that could help the business boost its business by using the said AI strategies. The models also show at what percentage that particular AI should be used to receive the best outcome and could help in determining the correct usage.

IV. Conclusion

In conclusion, it is time and again proved that the use of AI in marketing benefits the business in one or the other way. The model proposed in the research directly aims to help businesses not capable of making their own decisions as well as business that are already into AI marketing but are unsure of how and what strategies to proceed with. With a unified result of multiple strategies and properly analyzing the business specification and comparing it with the existing case studies, the model is efficient enough to recommend the best possibilities for the business. In an analysis to understand the revenue benefits of business in the light of AI in marketing, the below graph (Fig.3) clearly depicts that there has been a steady increase in the revenue markets once the use of AI is implemented and intelligent marketing is done. [6]

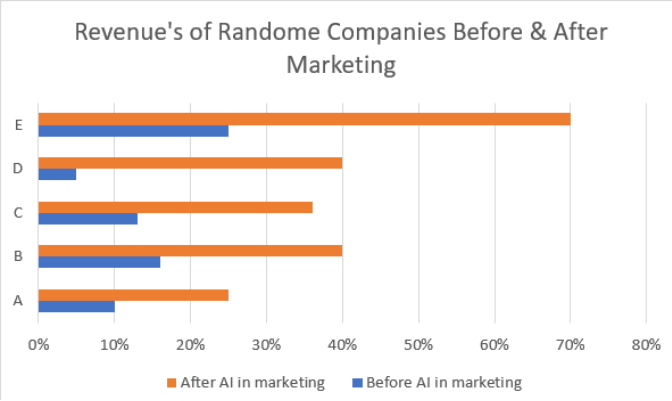

Fig 3. Bar Chart depicting the difference in revenues before and after use of AI

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An Introduction to AWS – EC2 (Elastic Compute Cloud)

Rahul Saini[1], Rachna Behl[2]

[1]*Research Scholar, MRIIRS Faridabad, Haryana, India*
[2]*Asstant Professor, MRIIRS Faridabad, Haryana, India*
[1]rahulhbc@yahoo.in , [2]rachnabhel.fet@mriu.edu.in

***Abstract*—Most recent two decades IT is following conventional methodologies for dealing with its framework since the beginning of Cloud administrations, for example, Amazon Web Services, Google Cloud Platform, IBM Cloud and a lot all the more giving on the web foundation administrations. Associations have acknowledged an adjustment in their working model, if an association searches for an extension to expand its registering power, they just get it online by starting a virtual machine on the cloud. Virtual machines can be immediately propelled and shutdown through programming interfaces, offering adaptability to the client rather than customary methodologies.**

There were times when one was restricted by the boundaries of a machine e.g.; a data scientist has a large scale of data and would like to perform some analysis, however, encounters an error as below while uploading this data.

```
> data <- read.csv (file='no_of_bug.csv')
Error: cannot allocate vector of size 500.0 Mb
```

The error is the result of the unavailability of the RAM since the operating system does not have enough RAM available as there are many solutions available of such problems following the traditional approach one should upgrade the RAM of the machine with the restriction to the RAM up-gradation limit to the machine's compatibility. However, there is another way by introducing the concept of virtualization in the could with more RAM and CPU.

This paper explores the concept of Virtual machines on AWS EC2 as they are called instances with many advantages few of them includes being highly scalable (one can choose instances with more CPU and RAM etc.) most reliable and scalable easy to use for users as pay for what being used also allows a selection of different platform (OS) as an outcome of this paper will create an understating of the working fundamental of AWS EC2.

***IndexTerms*—Amazon EC2, Cloud Computing, Elastic Compute Cloud**

I. Introduction

ITS impression has been altogether changed since the distributed computing idea being presented as a pay-more only as costs arise administrations. To have an application utilizing Amazon Web Service's (AWS) Elastic Compute Cloud carries numerous progressions to the improvement, sending and upkeep forms as these progressions might be extremely gigantic for certain associations anyway EC2 guarantees expanded adaptability, simplicity of organization, versatility and the huge help for the outsider administrations in contrast with the conventional methodologies.

A couple of years back a help administrations association expected to have and keep up its Incident Management System with an immense venture including programming buys. As the Cloud processing stage has caught the market so broadly now association can undoubtedly move their product benefits all the more safely to the web.

Right now, will dive into the working key of AWS's Elastic Compute Cloud (EC2) as the working basics are fundamentally unique concerning the conventional methodologies, for example, inhouse framework the board that is generally acknowledged anyway these distinctions may prompt inventive sort of changes and requires various instruments to pick up perceivability basic the cloud base foundation.

National Institute of Standard and Technology defined Cloud Computing:

"Cloud Computing concept enables on-demand network access to a shared pool of configurable computing resources such as (e.g. servers, storage, application, network, and services) that can be rapidly conducted and released with minimal management effort or interaction with the service provider. This cloud model promotes availability and is composed of five essential characteristics, three service models and four deployment models." [3]

II. What is Amazon EC2

Foundation as-an administration customers are offered a wide assorted variety of Cloud assets from numerous, circulated Cloud suppliers (e.g., Amazon EC2 [5], and RackSpace [6], IBM Smart Cloud[7]) provided at various hourly cost rates. Besides, comparable Cloud assets might be valued diversely by each Cloud supplier. Besides, Cloud buyers may demand heterogeneous arrangements of Cloud assets that may not be accessible in a solitary Cloud supplier. Along these lines, self-rulingly completing asset assignment from numerous and self-intrigued Cloud suppliers while testing hourly cost rates related to Cloud assets is important to give proficient (i.e., with low portion costs) asset allotment administrations to purchasers in a unique way. This burdens the requirement for the operator worldview. Operators are self-governing issue solvers that can demonstrate and work together deftly and self-interestedly among one another.

A famous methodology in cloud-based administrations is to permit clients to make and offer virtual pictures with dif-

ferent clients. For instance, a client who has made an inheritance Linux Debian Sarge picture may choose to make this picture open so that different clients can undoubtedly reuse it.

Notwithstanding user shared pictures, the cloud specialist organization may likewise give redone open pictures dependent on the regular needs of their clients (e.g., a Ubuntu web server picture that has been pre-arranged with MySQL, PHP and an Apache). This permits the clients to just launch and start new servers, without the problem of putting in new programming themselves.

Amazon Elastic Compute Cloud (AWS EC2) provides scalable computing capacity in the Amazon Web Services cloud. Using AWS EC2 eliminates the need to invest in hardware so that one can develop and deploy applications faster. Amazon EC2 can be used to launch as many or required virtual machines as per need with security configuration and networking and storage management.

For example, AWS powers the biggest website in the world which is Netflix example.

- EC2 is one of the most popular of AWS offering
- It mainly consists in the capacity of:
  - Renting virtual machine (EC2)
  - Storing data on virtual devices (EBS)
  - Distribute load across machines (ELB) Elastic Load Balancer
  - Scaling the services using an auto-scaling group (ASG)
- Renting a virtual server on cloud is the key to understand how the cloud works

In this thesis, we are going to learn more about Amazon Web Services EC2.

EC2 is the main service to provide machines on-demand and nearly all AWS accounts use EC2 instances to a various extent knowing EC2 is the key thing to understand how the cloud works.

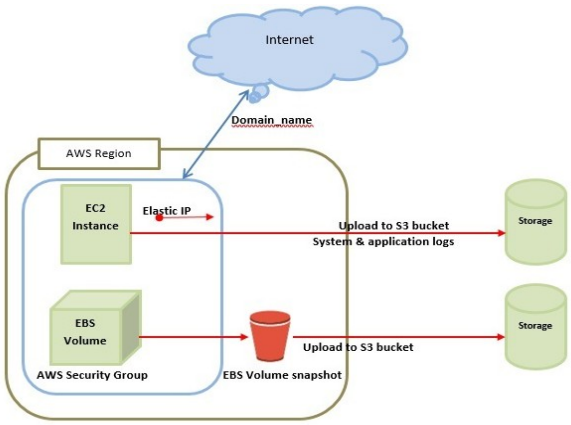

Fig 1: Simple Storage Services (S3) Diagram

Amazon Elastic Compute Cloud (Amazon EC2) gives an adaptable processing limit in the Amazon Web Services (AWS) cloud. Utilizing Amazon EC2 takes out your need to put resources into equipment in advance so that you can create and convey applications quicker. You can utilize Amazon EC2 to dispatch the same number of or as not many virtual servers as you need, design security and organizing, and oversee capacity. Amazon EC2 empowers you to scale up or down to deal with changes in necessities or spikes in prominence, lessening your need to gauge traffic.

EC2 permit clients to utilize virtual machines of various setups according to their prerequisite. It permits different setup alternatives, mapping of individual servers, different valuing choices, and so on.

We will talk about these in detail in the AWS Products area. Following is the diagrammatic portrayal of the design.

It permits clients to store and recover different sorts of information utilizing API calls. It doesn't contain any figuring component.

Amazon EC2 (Elastic Compute Cloud) is a web administration interface that gives a resizable figure limit in the AWS cloud. It is intended for engineers to have unlimited authority over web-scaling and processing assets.

EC2 examples can be resized and the number of cases scaled up or down according to our prerequisite. These occasions can be propelled in at least one geological areas or districts, and Availability Zones (AZs). Every area involves a few AZs in particular areas, associated with low inertness arranges in a similar locale.

III. In-Depth with Amazon Elatic Compute Cloud

A、 Classification of Elastic Compute Cloud

Amazon EC2 gives a wide determination of case types advanced to fit distinctive use cases. Occurrence types involve differing blends of CPU, memory, stockpiling, and systems administration limit and give you the adaptability to pick the fitting blend of assets for your applications. Each occurrence type incorporates at least one example sizes, permitting you to scale your assets to the prerequisites of your objective remaining task at hand.

1. Different type of EC2 instances

Amazon has thought of a wide scope of Instances that are intended to satisfy the wide assortment of necessities of an

	Type	Description	Mnemonic
General Purpose	A1	Good for scale-out workloads, supported by ARM	**a** is for ARM processor - or as light as **A1** steak sauce
	T-family: T3, T3a, T2	Burstable, good for changing workloads	**t** is for **tiny** or **turbo**
	M family: M6g, M5, M5a, M5n, M4	Balanced, good for consistent workloads	**m** is for **main** or happy **medium**
Compute Optimized	C-family: C5, C5n, C4	High ratio of compute to memory	**c** is for **compute**
Memory Optimized	R-family: R5, R5a, R5n, R4	Good for in-memory databases	**r** is for **RAM**
	X1-family: X1e, X1	Good for full-in memory application	**x** is for **xtreme**
	High memory	Good for large in-memory databases	High memory is for high memory
	Z1d	Both high compute and high memory	**z** is for **zippy**
Accelerated Optimized	P-family: P3, P2	Good for graphics processings and other GPU uses	**p** is for **pictuers**
	InF1	Support machine learning inference applications	**Inf** is for **inference**
	G-family: G4, G3	Accelerate machine learning inference and graphics-intensive workloads	**g** is for **graphics**
	F1	Customizable hardware acceleration	**f** is **FPGA** or **feel** as in hardware
Storage Optimized	I-family: I3, I3en	SDD-backed, balance of compute and memory	**I** is for **IOPS**
	D2	Highest disk ratio	**d** is for **dense**
	H1	HDD-backed, balance of compute and memory	**H** is for **HDD**

Fig 2: Different types of EC2 instances

association. We have recorded distinctive AWS EC2 occurrence Types underneath with the highlights. How about we find a workable pace each EC2 example type in a superior way.

This diagram shows a brisk rundown of the EC2 instances, below there is a short description of each category of the EC2 instances.

2. Issues with EC2 performace

I. EC2 instances can be optimized with effective utilization and effective services used however in how the resources are delivered and utilized, EC2 instances can be optimized.

II. This is the original EC2 architecture, you see everything is on the server, Network, Storage, Management, security, and monitoring which means it is taking the resources from the server.

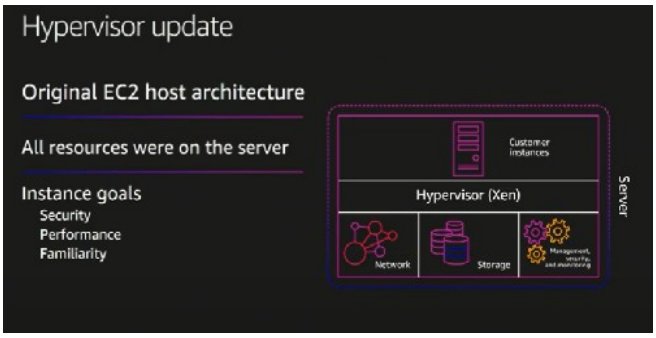

Fig 3: EC2 Architecture

That means that we can utilize the resources in such a way where we can make some of the instance free.

"Launching new instance and running tests in parallel is easy however there is no substitute for measuring the performance of your full application."

III. Choosing a right AMI plays an important role in the performance of the EC2 instances since the AMI includes such information about the launching environment of the instance that may disrupt the performance of your EC2 instance such as template of the root volume which includes (operating system, application), launching permission that control which AWS account to be used and block device mapping that specifies volume to attached to the instance.

Some of the tips to choose the right AMI and OS, choose the latest OS level your tool or application supports
The kernel should be at 3.10 or higher

- As much as 40% performance management
- Should not be using a 2.6 or older kernel

Minimum recommended OS*

- The most recent version of Amazon Linux 2 or Amazon Linux AMI
- Ubuntu version 16.04 or latest LTS release provided by AWS
- Red Hat Enterprise Linux version 7.4
- CentOS 7 version 1708_11
- SUSE Linux Enterprise Server 12 SP2
- FreeBSD 11.1 or later (does not support F1 instances)

IV. Processor state control also important to improve the performance of the EC2 instances there are two types of state control instances

C-state - entering the deeper idle state, allows active cores to achieve higher clock frequency, but the deeper idle state requires more time it exit may not be appropriate for latency-sensitive workloads, Windows: no option to control c-state

P-state - controls the CPU's ability to change frequency, including enabling or disabling Turbo boost

V. Amazon Elastic Compute Cloud (AWS EC2) provides scalable computing capacity in the Amazon Web Services cloud. Using AWS EC2 eliminates the need to invest in hardware so that one can develop and deploy applications faster. Amazon EC2 can be used to launch as many or required virtual machines as per need with security configuration and networking and storage management.

3. Challenges with EC2 instances

We have studied EC2 instances performance depends upon multiple factors in the cloud architecture. Our objective is to identify the factors which may impact the performance of the instances.

- Storage Latency

The problem that we faced more frequently with the EC2 instances such as Storage latency, In AWS EC2 there are two types of storage volume in Elastic Block Storage (EBS) as Standard volumes and Provisioned volume the basic difference between these volumes is provisioned volume perform much faster than the standard volume for e.g: an operation demands a throughput at the rate of 10,000 IPOS (input/output per second), considering the several bands only provisioned volume can get you that.

Increasing the IPOS may lead to other issues such as EBS do not support the given rate of the IPOS, the tasks many begin to queueing up or application may get fail.

To handle such issues we should keep track of IPOS, there is a feature in AWS called VolumeQueueLength which tracks the number of IOPS operations in the queue.

- EM2 Memory Leaks

There is a high probability that instances may run out of memory. The chances are high as EC2 instances may not include the swap volumes resulted unable to free the memory with applications at the time it is being allocated to the new application. Such cases can be considered a good example during the heavy traffic on the application, the instances may freeze the memory while the application is going through with the peak load, therefore, the purpose of EC2 instances are defeated in the first place.

Such scenarios are difficult to handle however adding up more EC2 instances may get beneficial to optimize the performance of your application, however, on the other hand, killing these processes may help however increases the risk or a failover of your application as a vital process may get killed. Adding more EC2 instances could be expensive however this is one of the better ways of doing it.

- Idle EC2 Instances

At launch all the EC2 instances are idle or the scenario could be anything for e.g: an instance having an average CPU utilization less than 2% in last week or the network I/O is less than 10 MB last week so defining a threshold of an instance to consider an idle instance depends upon the configuration of the instance or the need of your organization.

There is a tool that has been launched with the new features that provide the recommendations to optimize the EC2 instances. The main purpose of the tool to monitor the utilization of your EC2 instances upon defining the thresholds of the instances any breaches to the set values such as CPU utilization is lower than 1%, the toll suggests to terminate the instance since this is no longer active.

IV. Conclusion

This paper elaborates an overview of Amazon EC2 instances which cover the types of EC2 instances as described in Fig:2 and major performance issues with EC2 instaces are effective utilization, creating and using an EC2 instances AMI plays vital role in performance of an instances.

Challenges with EC2 instances is explained, a practitioner to consider which contributes effectivtly to improve the performance of EC2 instacnes.

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Truth Detection in Social Media Posts using Jaccard Algorithm with SRTD and Word Net Concept

Priyanka Sangwan[1], Rachna Behl[2]
[1]*Research Scholar, MRIIRS Faridabad, Haryana, India*
[2]*Asstant Professor, MRIIRS Faridabad, Haryana, India*
[1]er.priyankas1993@gmail.com , [2]rachnabhel.fet@mriu.edu.in

***Abstract*—Counterfeit news has gotten an essential subject of exploration in an assortment of solicitations including semantics and programming building. In this work, clarification of how the issue is drawn nearer from the point of view of fundamental language managing, with the objective of building a framework to subsequently see misdirection in news. The rule challenge in this line of examination is gathering quality information, i.e., occasions of phony and true reports on a sensible dispersing of subjects. In this paper, a novel truth acknowledgment system with near words thoughts is added to the versatile and overwhelming truth disclosure structure used previously. By the use of practically identical words thoughts, the controlled fake news can be recognized with much basic and snappier. The features add up same meaning words which are compared using Jaccard algorithm in the main algorithm to detect a greater number of fake news with reliability score. The reliability score is calculated by combining independent score, attitude score and uncertainty score. The implemented software is found to be having better accuracy and results compared to existing truth detection methods.**

***Index Terms*—Truth; big data, SRTD; Jaccard; Data Mining**

I. Introduction

ONLINE media is critical these days. It is the best medium used for getting out the word which may be substantial or counterfeit. There is such a propensity for using web-based life arranges these days among people. [1] The substance introduced is normally related to ongoing advancements around people. [2] Sometimes misdirection may hurt the organization as it may be fundamental and may have horrendous results. In huge datasets it is hard to recognize talk or fake news. Thusly, it is imperative to execute web-based systems administration identifying structures and programming for disclosure of talk or double-dealing for real truth distinguishing proof in micro blogs containing huge data assessment. [3] This sets up the guideline focus of this paper to develop an item using sensible stage for disclosure of versatile truth-based news or any post using a fact score figuring. [4] Reality score in a general sense contains assessment of a score subject to free score, weakness score and air score examination of the post. [5] This is essentially the correct presently existing figuring which is named as adaptable and generous truth exposure computation used for examination of fake news in immense data distinguishing applications. [6] Current truth disclosure strategies don't thoroughly address the "confusion spread" issue where a noteworthy number of sources are spreading hoax data by methods for online frameworks organization media.[7] Many current truth exposure rely vigorously on the particular assessment of the devoted idea of sources, which reliably requires a sensibly enormous dataset. [8] Existing truth exposure plans don't thoroughly investigate the adaptability part of reality disclosure issue. [9] Therefore, it is needed to improve the at present existing truth disclosure computation for talk or fake new area in structure precision, capability, execution and execution of the proportionate in speedier speed. The essential objective of this paper is to perceive the assessment opening for truth disclosure estimations as explained here. Similarly, to improve the at present existing (Scalable and Robust Truth Discovery) SRTD count by changing the figuring to process reality score in such a way to improve reality distinguishing proof exactness and execution in gigantic data identifying applications. In Fig. 1, the customer case graph of the SRTD count for truth acknowledgment. In the enlightening assortment is moved, by then express scores are resolved to run the SRTD estimation with the help of the scores decided it will describe the posts given in dataset as clear or false with the execution time taken.

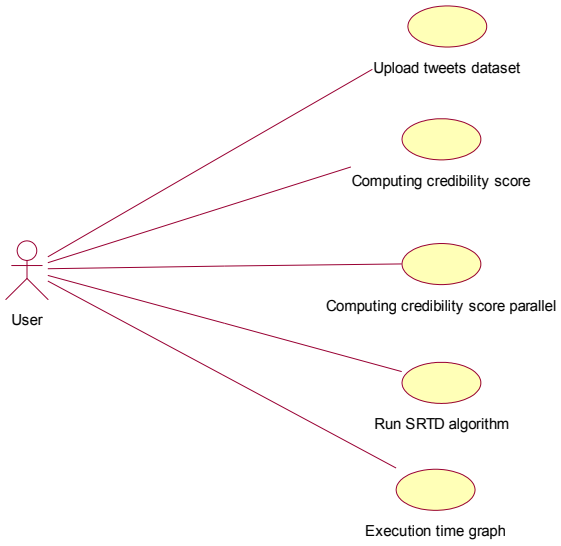

Fig.1. Use Case Diagram of SRTD Algorithm for Truth Detection

There exist a few specific challenges to join the subject importance feature of cases into the truth disclosure courses of action. [10] To start with, Twitter is an open information duty stage where the source steadfastness (the likelihood of a source to report right cases) and the source point care (the likelihood of a source to report subject critical cases) are much of the times darken from the prior. [11] Second, it isn't immediate to recognize a predefined set of catchphrases (e.g., the hashtags on Twitter) to undeniably organize theme relevant cases from the point unnecessary ones considering the way that: the predefined watchwords may not so much appear in all point appropriate tweets (e.g., different words can be used to portray a comparative event on Twitter); subject unessential tweets can similarly contain the predefined catchphrases (e.g., to secure open thought). [12] Creator uses a truth disclosure-based convolution neural framework model for envisioning the legitimacy of Quora questions informational index. [13] The issue is that given a dataset of Quora questions one needs to recognize the toxic substance in the substance and gathering them into genuine request or not a bona fide request. Hurtful or misleading substance in the above issue is to perceive questions that have objective tone, stigmatizing information or isn't grounded really. [14] Recognizable evidence and portrayal of such substance is our essential models. Information agents in coherent, government, present day, and business zones face the trial of adjusting to rapidly creating volumes of information that are assembled in different applications. [15]

In this work, procedure to develop a Scalable and Robust Truth Discovery (SRTD) plan to address the lie spread, information sparsity, and adaptability challenges in huge information online life identifying applications. For truth detection, the basic algorithm generally uses only feature matching, which consists of words related to fake news and also, the generation of information is taken into consideration. Sometimes fake news is published using different words which have the same meaning, which was considered fake in the truth detection system. The existing system cannot detect this kind of information. The need to solve this problem is essential as the power of social media has become to produce any news; fake news may result in bad consequences as seen in the existing issues of the country. This problem is addressed in this thesis by adding word net concepts, which detects all kind of synonyms for feature matching algorithm, including the reliability score detection through sentiment, credibility and various other scores. Parallel execution is also implemented for the execution time improvement in the current work.

II. Implementation

The current algorithm cannot completely detect true news, because there is no knowledge of words or dictionaries, where the tweet includes a synonym of the same word. In order to overcome this, word net combinations are applied to the existing algorithm to increase its efficiency and address current algorithm problems with a reliability score with three scores independent, uncertainty and attitude score. By parallel execution of the ratings, the execution time can also be increased.

In this area, execution ideas of the application programming are clarified. A methodology is made to distinguish truth in social average tweets in huge information ideas, in view of a truth revelation calculation. The endeavor is to for the most part improve the execution time of handling of the information. A calculation is executed in particular adaptable and hearty truth disclosure SRTD to recognize the truth factor in the tweets. This relies upon a few score factors like unwavering quality, autonomous score, etc. Here there are three ideas from which truth can be find, for example, deception spread (people groups adding to bogus cases), information sparsity (deficient proof from huge dataset) and SRTD Algorithm.

Over two focuses can be determined utilizing 'Processing Credibility Score' and this score comprises of three sections
1) Attitude Score

2) Uncertainty Score

3) Independent Score

Attitude Score: utilizing opinion examination we can check whether tweets contain any negative estimations and if contains we will relegate less score, for example, - 1 and on the off-chance that no negative feelings, at that point will dole out 1 score.

Uncertainty Score: on the off-chance that two tweets are comparable, at that point tweets guarantee to be truthful and can relegate high score as 1 and not comparative methods - 1 will appoint. Similitude will be check utilizing Jaccard separation and every single comparative tweet will be in same article.

Independent Score: on the off-chance that tweet just duplicate and retweet, at that point it will consider as reliant tweet which implies client isn't adding anything to its and will consider or guarantee as untruthful and will allot less score - 1 and every single autonomous tweet will have 1 score as its created by client by including some substance and guarantee it.

With all score a grid will frame up and this lattice will summarize to get unwavering quality score utilizing SRTD calculation, on the off-chance that dependability is high, at that point tweet is genuine in any case bogus. The work is effectively actualized utilizing java.

In this proposed function as EXTENSION, utilizing WORDNET to extricate comparable ideas from a word, comparable ideas mean discovering equivalent of given word, at some point in tweets people groups will utilize complex words whose significance might be don't know to certain clients and they discover hard to track down truth of tweets, this application additionally in propose work not utilizing any equivalent words coordinating to remove truth from tweets.

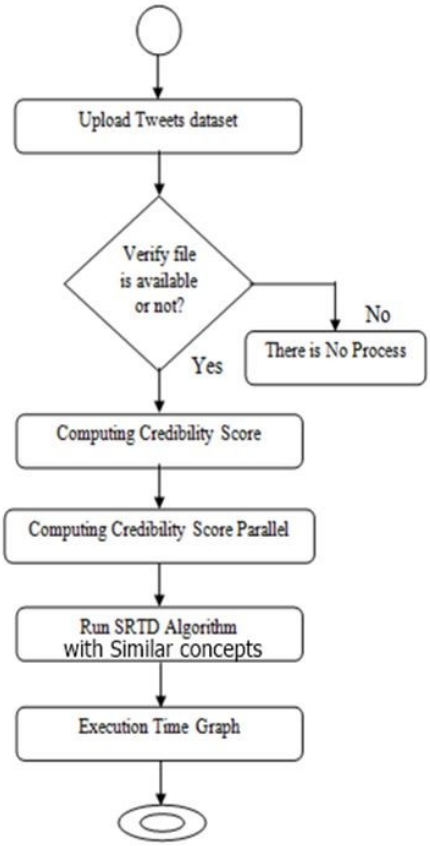

Fig. 2: Proposed Algorithm Activity Diagram

For instance, 'red' word is likewise called as 'dark red' and by utilizing ordinary compatibility or by applying notion application can't anticipate assessments appropriately and by giving interchange comparable words we can grow application expectation of truth in better manner.

'Pooch' comparative word is 'canine'

Like above model anybody can get comparable expressions of each word from tweet

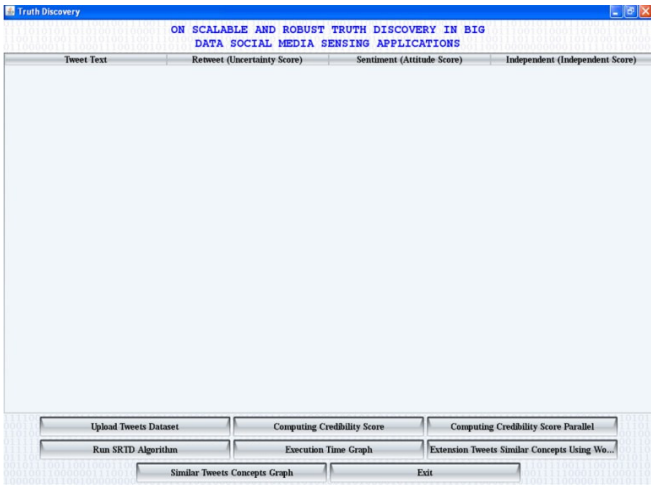

Fig.3: Software Screenshot main GUI Proposed

So to defeat from this issue in augmentation we included comparative idea extraction of given word utilizing WORDNET to get every single comparable word so client can comprehend accurate importance of complex words from given comparative words. WORDNET checks every comparative word and exactness of the current approach is expanded essentially. Fig 2: Shows the action chart of the progression of venture.

III. RESULTS

In this section, the results are mentioned for the implementation discussed in the previous section.

In above screen Fig.3, run all modules then click on 'Extension Tweets Similar Concepts Using Wordnet button to extract similar words from all tweets. See below screen shots.

Fig.4: Similar Tweet Dataset

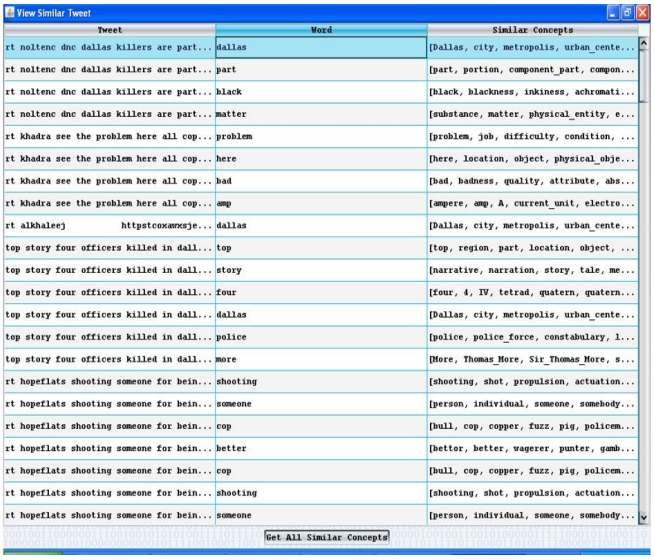

Fig.5: Selection of tweet

In above screen Fig.4 first column contains entire tweet and second column contains word from that tweet and third column contains all similar words of that second column word. In above screen we can for word Dallas the similar word can be city also. If one wants to see whole list of words then select any row from above screen table and click on 'Get All Similar Concepts' button to view complete list. See below screens

In above screen Fig.5, selection of first row through mouse now click on button to get below screen

Fig.6: Similar Words Concept Screen

In above screen Fig.6 we can see all similar words for given word Dallas.

Now click on 'Similar Tweets Concepts Graph' button to view graph which show number of similar word found for each tweet which detects the truth better.

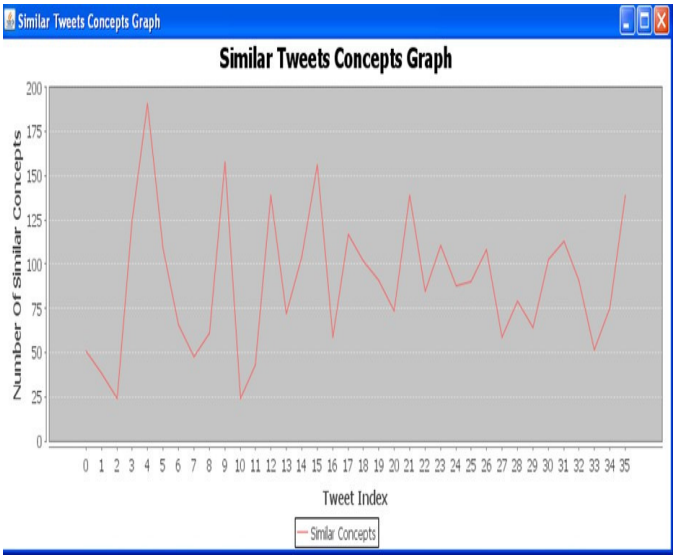

Fig.7: Similar Tweet Chart

In above graph Fig.7, x-axis represents tweet id and y-axis represents number of similar words for that tweet.

While adding the similar concepts to the existing truth detection scheme, the reliability score is improved and is better in case of the proposed work. The similar tweet detected also identifies the posts which were not earlier detected as the false posts as synonyms are used and thereby improving the accuracy of the existing system. This is also shown in figure 7.

IV. Conclusion

The role of truth detection in big data using Java was implemented in this thesis. A new strategy is being suggested for the tweeting using WORDNET dictionary to take into account related terms in a score improvement that helps to find truth better. This approach can also be used to enhance the exploration of reality by similar terms. A number of selected tweets display similar characteristics in relation to fake news using a similar definition. In the current process, the execution time is also increased by introducing a parallel running programmed instead of performing and scores normally.

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Correlates of Talent Management: An Empirical Analysis

[1]Ravindra Sharma, [2]Geeta Rana, [3]Shivani Agarwal

[1]Assistant Professor ,Swami Rama Himalayan University, Jolly Grant, India
[2]Associate Professor, Swami Rama Himalayan University, Jolly Grant, India
[3]Assistant Professor, KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India
[1]ravindrasharma97@gmail com

***Abstract*—This paper attempts to measure talent management in India industry, using a standard questionnaire (Jayaraman et al. 2018). The data was obtained from a randomly drawn group of 378 managers from India's IT, telecommunication, power and Banking industries. The current study reports important co-relations among managers and talent management of age and hierarchy. ANOVA reported a significant difference in talent management between businesses and companies (technology and ownership) although the organisational life cycle position wasn't significant. This study concludes with implications for practioners and explores areas for further research.**

***Index Terms*—Talent Management, Organizational Attractiveness, Prestige, Career Development, Economic Rewards, Indian Industry.**

I. Introduction

THE LACK of clarity at the talent level necessary to sustain performance is not precisely what companies need to succeed in today's competitive and challenging market climate. However the best differentiator between performance and loss would be a meticulous, cyclical and continuing procedure of talent management. Organizations are blank shelf lacking abilities. When there is a company of consistent talent management strategies, it goes to the precipice. Lawler (2008) points out there are no way to achieve the pace of transition, the degree of creativity and consumer attention expected without concentrating on human resources across a growing array of companies." He adds that business strategy should be focused on talent factors which should contribute to human resource management strategies in turn. This suggests that companies finding excellence in creativity, quality consumer care, fundamental systemic reform and other sectors involving large numbers of people ought to re-think their skills management strategy. Different reports describe important corporate performance drivers. Nategh (2005), for example: argues that the success of organisations involves creativity, speed, stability and incorporation. As companies encounter reductions in standards of output and low-quality goods and services, they reverse these deficits by handling talent (Alsakarneh & Hong, 2015). Undoubtedly, organisations must have best practices in talent management if they want to succeed in this hyper dynamic and ever more nuanced global economy. An company is known to be an effective instrument for its achievement and sustainability, to recruit, participate, improve and maintain its workers with the correct skills and capabilities at all stages (Rana & Sharma, 2019). The consistency and high quality of the employees of another company is challenging, if not difficult for an organisation to precisely duplicate. However a company is virtually willing and cheaply imitated to introduce a new offering. An company may still chase a competitive demand or lower the costs of its goods. In the modern age of globalization, creativity and analytical strength thus becoming the primary currency (Shahai & Srivastava, 2012). In this dynamic market climate, most companies, in specific workers, understand that they have a strategic edge in terms of intangible assets (Chabault et al. 2012). Both of these arguments stress the important role played by talent management in corporate performance and sustainability and why modern companies should pay critical attention to the strategies of talent management. It is such a shame that most companies in the 21st century are now creative poachers rather than talent creators. They would recruit skilled people and achieve comparative edge (Sharma et al. 2018). They would enjoy something. This is in accordance with Michaels et al. 2001 proposal that the 'fight for talent' will continue for the next two decades owing to the lasting economic and social influences. In order for companies to survive this battle and remain before the extreme global rivalry, it is therefore necessary to use better practises for talent growth in this modern business age.

It is in this context, that talent management practices assumes importance (Paul, 2013) this requires acquisition, recruiting, growth, retention and support when fulfilling the needs of the company simultaneously. The current study aims at the measurement of talent management, through an indigenous scale, and further attempts to link contextual factors to the talent management. The paper moves on to the theoretical framework of the construct, to a working definition of talent management, the research questions, the theoretical model to be tested, methodology, instrumentation used, and finally results and discussions.

II. Literature Review and Hypothesis Development

Talent management is a process that is essential for businesses to ensure that their existing and future market goals are satisfied with the quantity and quality of people (Wellins, Smith, & Erker, 2010) Talent management is a holistic human capital maximisation approach that helps an organisation to build community, engagement, expertise and ability by streamlined talent acquisition, development and implementation processes in accordance with the company's goals for short-and long-term performance. Essentially, the purpose of talent acquisition would be to ensure that the required talent is needed at the appropriate time and place to meet the company's strategic objectives. Implementation of adaptive approaches or processes aimed at optimising the training and development of people and retaining the required skills and readiness to respond to current and future business demands (Sparrow et al.2015; Sharma et al 2019; Rana & Goel 2017). Talent management thus works in a proactive, inclusive and profound way. This can be told by the sense in which the corporate leaders of a company take into consideration the value of talent for the productivity of their business (Krishnan et al 2017; Rana et al. 2012).The HR divisions of small medium-sized companies, with individual employees in several countries are generally smaller and often more operational than political. Hunt, 2014 emphasised that TM is not only a traditional HRM, but that it incorporates modern knowledge and ideas in order to fulfil the goals and objectives of the organisation. HRM's emphasis on the development of general staff and its concentration on equality have become the primary difference between HRM and TM, whereas TM focuses on a particular group of employees identified as high-potential performers. Latukha,2018 concluded that the slowdown of the global economy and the subsequent labour loss market will clearly reduce the pressure on companies to manage talent. They also echoed the presence of a limited future pool of extremely trained administrators. It is possible to claim that big MNCs are increasingly deploying TMS to help locate their talent (Rana et al. 2016). Compared to Human Resource Information Systems (HRIS) and may in turn, become part of the ERP, TMS is often applied and used. Various publications have demonstrated the increasing importance of these TMS in talent management (Stahl, 2012; Rana et al. 2012)).

The talent management strategies of an organisation, where staff are involved, motivated and satisfied, therefore help to minimise turnover rates. It also benefits the organisation in that Talent Management allows the company, where certain positions are vacant, to prepare for the most possible candidate. In-house development is also a systematic solution to talent management in terms of succession planning. It is also important for companies to attain its goals in a competitive world in order to motivate and encourage their employees to carry out their duties and responsibilities properly. The present study reflects on this disparity in analysis and attempts to relate talent management practices to the company size, organisational type and life-cycle of the enterprise. Data were obtained from line managers and HR managers, as were background changes in age, race and educational skills. Hierarchical levels of top, middle and lower levels and their linkages to talent management practices were also established.

III. Research Questions

This study address the following research questions

1. What are the relationship between the variables of TMP (Jayaraman et al. 2018) and the contextual variables of firm size, firm organizational life cycle stage and firm type?

2. What are the relationship between background variables of managers and TMP? Whether gender, age and educational qualifications differ in the perception of TMP.

IV. Research Design

The author used a survey approach to respond to the study concerns. The technique was defined by Kerlinger (1973). Two sampling procedures were necessary. In the first point, Indian organisations have been selected by random choice from India's national capital region from the A+ business school database accessible in New Delhi. To complete the questionnaire, either HR or line, 567 top, medium and senior managers of these 20 organisations was contacted at random. The sampling method of 567 managers comprised 378 questionnaires. The 87 questionnaires were either incomplete or refused by the managers.

V. Instrumentation

A large amount of studies have concentrated on talent management practices and various researchers have various dim for connecting talent management practices (Chen, 2012; Hung, 2013; Yu et al. 2004). The tools embraced by such researchers have several parallels with respect to subjects, and the original version of the TMP may be said to have been applied to a large extent with little variation in factor structure. Jayaraman et al. 2018 modified this scale in Indian culture, and some items were removed, and 26 items were included in the final instrument in Indian culture. The scale identifying four dimensions such as Identifying critical positions (4 –items), Competence training (6 items), Development (5 items), Reward management (11 items). The reliability coefficients for these dimensions are .81, .87, .86, and .85, respectively. Participants were asked to respond on a 5-point Likertscale.

VI. Data Analysis

To answer the first two research questions Person's correlation and ANOVA were calculated while to answer

the third objective, stepwise regression analysis was selected. Inter-item and Cronbach alpha were also calculated.

VII. Results and Discussion

When we examine table 1, which depicts the correlation analysis, we find the hierarchical level of the managers and age of the managers to be significantly correlated to the TMP (.17 and .26 respectively). Interestingly age and TMP have a perfectly negative relationship, i.e. if age goes up, TMP will come down (Thunnissen, & Buttiens, 2017). The rest of the variables were not significant at p = .001 level. There was a non significant difference of gender, educational qualification and of HR manager may be attributed to this.This result does not fufilled the need for Ulrich's partnership role to move on to the line function and Ends like the skill and potential of an organization (Rana & Rastogi, 2015). HR practitioners are focusing on ensuring that the strongest people get the correct certification in the right position at the right time. Talent rivalry rages and is projected to persist in an increasingly global knowledge economy (Rana & Sharama, 2019). HR professionals also collaborate with line managers to identify and build capacities such as company speed, innovation, collaboration, connectivity, quick change and cultural management. On the other hand TMP was found to be the highest in IT sector (M=142.8), while lowest in the automobile sector (M=100.5). When we refer to table 2, we find that the ANOVA between TMP and nature of industry is significant (F= 1.234567, df = 107, 271, F probability= .000) whereas table 3 depicts a significant ANOVA of type of ownership (F= 1.6783456, df = 123, 255) as also between the three groups of public, private and Multinationals organizations is significantly different, as also between the eight industrial sectors formed from the 12 organizations. The results of this analysis are supported by the Rout & Satpathy (2020) report, in which the ANOVA of various Indian companies showed a large difference.

Table 1: Pearson's Co-relation between Background Variables and TMP

	Hierarchical Level	Managerial Type	Gender	Age	Educational Qualification	Technical Sector	TMP
Hierarchical Level	1						
Managerial Type	.02	1					
Gender	.11**	.05	1				
Age	.47**	.02	.17**	1			
Educational Qualification	.18**	.01	.13**	.03	1		
Technical Sector	.28**	.03	.04	.26**	.07	1	
TMP	.17**	.09	.09	.21**	.003	.26**	1

Correlation is significant at the .01 Level (2-tailed)

Table 2 Summary of One Way ANOVA of Variable of TMP and Nature of Industry

Source	Sum of Squares	df	Mean Sqaure	F	Sig
Between Gropus	823.38672	107	7.975622	1.234567	.000
Within Gropus	9861.23416	271	5.673212		
Total	2341.64523	378			

Table 3: Summary of One Way ANOVA of variable TMP and Type of Ownership (Public sector, Private Limited and Multinational Firms)

Source	Sum of Squares	df	Mean Square	F	Sig
Between Gropus	66723.15678	107	7.975622	1.6783456	.000
Within Gropus	342987.13256	208	5.673212		
Total	234151.76231	378			

ANOVA was significant for TMP and organization size. (F= 1.28, df= 170, 208, F= probability = .012). This result is well supported by the study of Latukha, and Anna, 2019). If an organisation has to survive indefinitely, it has to invest money on development. Not just tangible objects, but also individuals. Each business is the mover to lift the valuation of the firm. Employees must constantly improve their talents, knowledge and experience to fulfil this idea. Only those jobs may represent flexible human resources, while new methods and technological developments often require more with any job position (Rana et al. 2019). That is why creative approaches to developing talent-based human resources are required in management processes. Many profitable companies have used talented carrier training systems to guarantee that the company develops. Sufficient money, desire and time are required for the development of structural talent. With the guidance of the management talented people need and want to take charge of their own development (Järvi et al. ,2020).

Further, when examine the TMP and organizational life cycle stage, we find the ANOVA resultto be insignificant (F= 1.29864, df = 106, 272, Probability= .012). This supports the findings of (Latukha and Veselova 2018). The acquisition of talent is a way of improving the productivity of human resources of each enterprise, regardless of its size. More research papers (Bˇrezinová and Vaiman et al. 2012; Collings et al. 2019; Rana, 2010). Study has studied the scale of business as an important element in the control of human resources. However, none of the analyses explored the relationship of talent acquisition and organisational size to our best understanding, as much of the results of the analysis apply to large multinational companies (Morley et al. 2015; Festing et al. 2013).

VIII. Conclusion and implications

To conclude, the current study lends credence to measuring TMP in Indian organizations, examine the management and business attributes that improve TMP, the nature of ownership and type of the industry, the organisational life and organisational life cycle stages, as well as the demographic variables of age, sex, HR or line managers. This is the rare Indian study that has empirically tried to relate the above variables to TMP, although there are philosophical connections. The research disadvantages exist since only the sectional specifics were concentrated in the survey. Future study will examine demographic data and establish TMP case studies. Future experiments may research several samples across cultures. In the case of talent management interventions, practical outcomes must be generated and constantly evaluated and questioned as to whether talent development takes place at the individual, team or organisational level. For a company to be able to continue for a longer period of time, it needs to expend its resources on expansion. Each business is the mover to lift the valuation of the firm. Employees must constantly improve their talents, knowledge and experience to fulfil this idea. Only such a person may represent a flexible human force, as different techniques and technological developments continue to improve the requirements for each work. Talent management is one of the important tools for nurturing human capital in majority of the industries. This study reveals that talent management practices has done in many sectors specially in banking sectors. It also found that innovative practices of talent management has practiced in service sectors like education sectors, hospitality sectors, IT service, hotel industries etc. Service sector gives more emphasis on talent management compared to manufacturing industry. Within a particular industry, talent management practices greatly vary. Most of the research has done in international perceptive so more research should be done in an Indian context.

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REGA: Real-Time Emotion, Gender, Age Detection Using CNN—A Review

Dibya jyoti Sharma[1], Sachin Dutta[2], Dr. Dibya jyoti Bora[3]
[1,2]Student, School of Computing Sciences(IT), The Assam Kaziranga University, Jorhat, Assam ,India
[3] Assistant Professor, School of Computing Sciences(IT) ,The Assam Kaziranga University, Jorhat, Assam, India
[1]cs19mscit002@kazirangauniversity.in, [2]cs19mscit004@kazirangauniversity.in, [3]dibyajyotibora@kazirangauniversity.in

***Abstract*—In this paper we describe a methodology and an algorithm to estimate the real-time age, gender, and emotion of a human by analyzing of face images on a webcam. Here we discuss the CNN based architecture to design a real-time model. Emotion, gender and age detection of facial images in webcam play an important role in many applications like forensics, security control, data analysis, video observation and human-computer interaction. In this paper we present some method & techniques such as PCA,LBP, SVM, VIOLA-JONES, HOG which will directly or indirectly used to recognize human emotion, gender and age detection in various conditions.**

***Index Terms*—Face detection, Emotion detection,Gender and age classifications, Convolutional Neural Network (CNN)**

I. Introduction

ONE OF the most active areas in facial technology is facial features such as age, gender and emotion recognition. A lot of research has been done using deep learning methods such as ANN, CNN to determine age, gender estimation and emotion detection. Human Facial expression depicts human feelings. Human tends to change feelings, perhaps due to their mental or health conditions, in the course of lifespan. Although people are brimming with various feelings, modern psychology characterizes six basic facial expressions: happiness, sadness, surprise, fear, disgust and anger as widespread feelings. Facial muscles exercise to assist with perceiving individual's feelings. Fundamental facial consideration features are eyebrows, mouth, nose and eyes. An architecture based on the convolution Neural network (CNN) proposed here for age, gender and emotion classification. This is one of the well known deep artificial neural networks. Convolutional Neural Network based design models are broadly utilized in classification task because of their remarkable execution in facial investigation and emotion detection. The Convolutional Neural Network includes Feature extraction which extracts Features corresponding to age, gender, emotion. Furthermore CNN includes Feature classification which classifies facial images into the correct age group, gender and emotion such as happy, sad, angry, neutral.

(I) Gender and Age Classification

Gender and age classification is the facial features that play a significant role in social interaction. Age and gender classification in face images play important task in much savvy application, for example access control, low authorization, visual observation and so on.

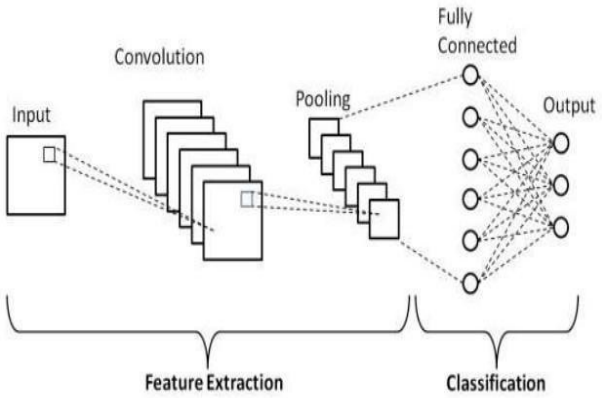

Fig. 1 Basic CNN architecture

(II) Emotion Detection

Emotion detection on face images can communicate and impact individual's feelings. It is intriguing and to basic comprehend the feelings passed on by the images and how the visual content of the image implies emotion.

II. Literature Survey

In the past few years, several papers have successfully solved the problem of facial expression recognition So far, several tasks have been completed for real- time emotion, gender, age classification. So, Some state of artwork relevant to the proposed work is discussed in this section.

Md jashim uddin Dr. paresh Chandra Barman, khandaker Takdir Ahmed et al.[1] proposed a detection system using CNN model which can achieved 95% accuracy rate in age, gender detection with IMDB-WIKI dataset and 66% accuracy achieved in emotion detection with FER dataset.

Thakshila R.kalansuriya and Anuuja T. Dharmaratne et al. [2] proposed a age gender detection system Using artificial neural network which achieved 70.5% accuracy rate. where FERET and FGNET datasets are used.

M.R Dileepa and Ajit Dantib et al.[3] proposed a age gender prediction system using Neural network and sigma control limit which achieved 95% accuracy rate.

Sepidehsadat et al. [4] suggested that the utilization of Gabor filter will make it simpler for the network to focus on the face , because the output direction is perfectly matched with facial wrinkles, and wrinkles will become the input of CNN. The network focuses on providing useful features with 7% age accuracy and 2% gender accuracy.

Imane et al. [5] proposed a face detection system using HAAR cascade, CNN based on FER13(KNN) for normalization and emotion detection and Gabor binary pattern histogram sequence is used for pattern scanning .The model use for different machine learning technique (SVM, KNN, random forest and classification, regression tree) and uses KNN and SVM algorithm to obtain a high accuracy rate which reaches 70%.

A better proposition is done by Rajesh et al [6] Here proposed real- time emotion detection used CNN with 9 layers for training and categorizing 7 different types of emotions which gives an accuracy of around 90.

The emotion and gender detection system using CNN proposed by Md Abdullah-al-Imran et al.[7] which achieved for emotion detection 66% with FER emotion recognition dataset and with IMDB-WIKI dataset achieved 95% for gender detection.

S L happy and Auobinda Routray et al. [8] proposed an automatic emotion recognition system using LBP classifier.Which achieved 94.39% with CK+ dataset and the system achieved a 92.22% with JAFFE dataset .

Ramin Azarmehr , Robert Laganiere , Won-Sook Lee et al.[9] proposed a system using EDA achieved 99% and for better accuracy and performance use support vector machine (SVM) and demographic classification strategies.

Jang-Hee Yoo, So-Hee Park and Yongjin Lee et.al[10] proposed a age gender detection system achieved 72.53% for age detection and 98.90% for gender detection.

Octavio Arriagal and Matian Valdenegro –Toro and paul G Pl oger et al. [11] propose a Real –time emotion gender classification system using CNN which achieved 66% accuracy on emotion classification on FER-20133 dataset and with IMDB dataset achieved 95% for gender classification.

Eran Eidinger ,Roee Enbar, Tal Hassner et al. [12]

proposed a system using LBP+FPLBP which achieved accuracy 50 % on age ,gender Estimation of unfiltered faces.

Ajit.P Gosavi, S.R Khot et al.[13] proposed a recognition system which achieved accuracy 91.63% on JAFFE images using principal component analysis and 91.63% precision rate obtained in case of PCA.

Sidhart Nair, Dipesh Nair et al. [14] proposed a system using CNN model with HOG, adaboost algorithm and haar cascade classifier achieved 70.47% on FER- 2013 dataset for age gender and emotion classification.

Rekha N, MZ Kurian et al.[15] proposed a real time face detection system using histogram oriented gradients (HOG) and it detects the face from +90 degree to -90 degree with high accuracy rates.

Tanner Gilligan , Baris Akis et.al[16] proposed a real - time emotion detection system using LeNet and AlexNet model which achieved 97% accuracy rates.

III. Proposed Methodology

The primary objective of the proposed methodology is to recognize the gender and age range with emotion from the human face images utilizing the set of facial features in real-time application. Feature extraction from face images is an important part of this method. In here, Fig-1 represent to show the flow of step to this methodology.

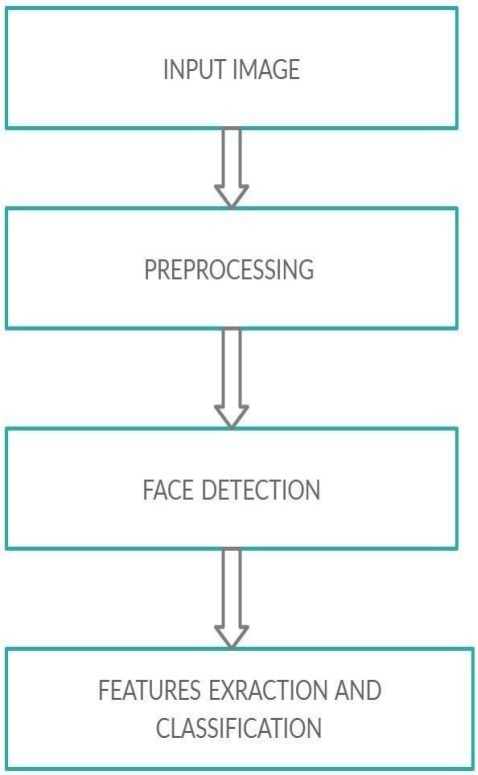

Fig-2: Flow chart of proposed methodology

(I) PRE-PROSSESSING

The pre-processing stage can improve the quality of the input image and find the data of interest by eliminating noise and smoothing the image. It eliminates image redundancy without image details. Pre-processing also includes filtering and normalizing the image to produce a uniform size and rotated image.

(II) FACE DETECTION

The face detection process is to extract the face area from the background of Input images with various lighting conditions and complex backgrounds can be confusing and fail to recognize these expressions. It involves segmentation and extraction of facial features from the uncontrolled background.

(III) FEATURE EXTRACTION

In object detection feature extraction plays important role. Here, it includes shapes , movement, color , the texture of the facial image. It extracts meaningful information of a image compared to the original image. Feature extraction greatly reduces information of image, which has advantages in storage.

(IV) FEATURE CLASSIFICATION

The classification stage recognizes facial images and group them according to certain classes and helps them

skilled recognition. Classification is a complicated process because it can be playing role in many areas. It classification stage also can called feature selection stage, which is deals with exchanges the retain essential information and connect them in certain parameters.

IV. Popular Feature Extraction and Classification Method

A. SVM

It is a machine learning algorithm which is used for classification and regression. But usually, they are used for classification problems. SVM was first introduced in the 1960s ,but it was perfected in 1990 . Compared with other machine learning algorithms, SVM has its unique implementation.

The model is basically a representation of different classes in a hyper plane of a multidimensional space . SVM will generate hyper planes in an iterative manner, which can minimize errors. The goal of SVM is to divide the data set into several categories to find the maximum edge hyper plane (MMH).

B. LBP

The Local Binary Pattern was used for texture classification, later it was applied in other application. LBP assigns image pixel by the neighborhood (p) each pixel values within the radius (R), represented by (gp) taking the central value (gc) as the threshold and converting its threshold into a given decimal number label by eq. The main property of LBP is its computational simplicity, which make it analyzing possible a image in real-time.

$$LBP_{p,R}(X_C, Y_C) = \sum_{p=0}^{p-1} s(g_p - g_c) \quad where,\ s(x) = \begin{cases} 1, & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

C. HOG

Histogram of oriented gradient is feature descriptor. Feature descriptor is representations of images or Image patches, which simplify the process of extracting useful information from images and discarding redundant information. Which was proposed for object detection in various machine learning application also computer vision. HOG descriptor mainly focused on the structure of an image or object by counting the localized portion.

It is a feature extraction dense method for images. Dense means that it extracts features from all positions in the image (or regions of interest in the image),instead of only key points like SIFT in the local neighborhood.

D. PCA

PCA algorithm is an eigenvector method to model linear variation of high dimensional data. Principal component analysis (PCA) is the most popular appearance-based statistical method used mainly for dimensionality reduction in compression and recognition. The PCA technique is introduced by Kirby and Sirovich in 1988.This technique are used for eliminate the dimension of a face space data. The reduction of dimension helps to remove the non- essential information from input images to recognize the face. The main face images can be introduced as a feature vector or weighted sum of the Eigen's faces and stored in one - dimensional array. The PCA requires full frontal face image to be presented each time to give the good performance. The advantage of PCA is it can reduce the required data to identify individuals to 1/1000 of the displayed data.

E. Viola-Jones Algorithm

The viola-Jones algorithm mainly used for object detection work that can supply a competitive rate of object detection in real-time application. Also it can be trained to detect the object classes also face detection. Three major contributions/phase of this algorithm are feature extraction, classification using boosting , Multi- scale detection algorithm . The main advantage of viola-jones algorithm, it is extremely fast feature computation & effective feature selection.

V. Conclusion

Based on this study a complete survey of the state of the art technique for age, gender and emotion classification has been reviewed and discussed via face images. Face images have become important in recent decades primarily due to their promising real-world application in several emerging fields. In this paper, various algorithms and various data set have been proposed by their researcher. Also, a summary of the published paper in this field of study was done, including the method used, their performance, and limitation. The result of this study indicates that for Real- time age, gender, and emotion HOG+viola-jones algorithm (70%) has good accuracy rates in FER13 datasets. For only age, gender EDA (72.53% and 98.90%) has good accuracy rates. Only for emotion using the CNN model (97%) has the highest accuracy rates. An overall study of the contribution made on gender, emotion classification, and age estimation used to solve the real-time application problems and its application areas are forensic, security, face detection synthesis, lie detection music for mood, automated tutoring systems. In this paper most of the research work is done is in Convolutional Neural Network and algorithm like - AdaBoost, HOG, HAAR, LBP, PCA, FPLBP, and LDA which are used for age, gender and emotion recognition. By using these classifiers or algorithms we can build a system that can be claimed to be highly accurate.

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Future of Social Media Marketing in tier III cities of Maharashtra

Kandekar Tanmay
Associate Prof, NIFT Mumbai
tskandekar@gmail.com

***Abstract*—With rise of technology and disposable income consumers from smaller cities are also showing tendency to buy fashion and lifestyle products. Especially the young consumers, who are more tech-savvy and trend follower would be looking for the experience of having a fashionable product. As the products are not available in the small city market, they visit the nearest big city market or try to go online to purchase product. The advertisements on social media help them to know the latest offerings in the market, hence they look forward to such promotions. The brand marketer needs to make sure that the advertisement on social media should be a proper combination of factors like pricing, discounts, quality, celebrity endorsements and language along with cultural & religious consideration.**

***Index Terms*—Social Media Marketing, SM promotions, Tier III, Fashion and Lifestyle.**

I. Introduction

THE growth in the retail sector in India is very much evident from last few years. As per the IBEF report in March 2019, the retail market size is estimated to grow by 60% and expected to reach at US$ 1.1 Trillion by 2020-21. This growth is led by the increase of domestic retail companies (Big, Bazar, pantaloons, westside etc.) as well as the entry of the international players like (Walmart, Max, H&M, Zara etc.). The benefits the customers get is the high quality and better variety products. The presence of multinational companies makes the business very competitive and companies strive further to improve the quality of the product as well as the after sales-service. With the country life India, which is culturally and geographically diverse, it would be very challenging for the companies to market their product. The skill of marketer is evaluated with the reach of the concept of the product to the consumers. And in such cases technology plays a crucial role. Most of the brands are very dependent on creating a buzz through social media as it is considered to be the cheapest advertisement medium which has widespread reach than the traditional way of marketing especially for the fashion and lifestyle products.

With the surge in the disposable income of the Indian consumers, and with higher literacy rate, people are more conscious about what they purchase. Apart from the items coming under the daily needs, another category which is showing higher momentum is the lifestyle category. Demand for these products is increasing and it is clear through the growth of the mall culture in the metro and tier I cities. The presence of cheaper smartphones and availability of the Internet makes it easy for the consumers to connect to the brand easily.

In this paper, an effort is made to study whether the social media advertisement makes any impact on the consumers of tier III cities of Maharashtra. A survey is conducted to check the awareness about the fashion and lifestyle products and to find out the factors which impacts their buying behaviour. This study will be helpful for the marketer to create an advertisement campaign on social media for the tier III cities of Maharashtra.

II. Objective

The objectives of the research are focused on the consumer responses from the tier III cities of the Maharashtra state.

- To study the fashion consciousness of customers
- To study the awareness of consumers about the social media advertisement.
- To find out whether social media advertisement makes an impact on the purchase behaviour of the consumers of tier III cities.

III. Review of Literature

The various initiatives by the government in recent past makes the Indian retail sector showing a steep upward curve. For example, the allowing of FDI in retail and the uniform tax structure (GST) making it easier for the companies to do business. During last 4-5 years, there is lot of positivity in the Indian business scenario. India's rank in Ease of Doing Business was hovering around 130 among of 190 nations till 2016. But after the strong steps taken by government, it rose to 100 in 2017 and in 2018 it was 77. The result is there is a growth of the organized retail sector from 9% to 12% with in the span of last 3 years. It is expected that the organised retail sector will reach to 18 % of the total retail, while the e-commerce will occupy 8 % as compared to 74 % of unorganised sector till 2021, which is the significant improvement by organised sector. The World Economic Forum report 2019, states with respect to Indian economy that

- 60% of the domestic consumption leads to higher production possibilities
- 22% of the income is saved in various instruments, which is very good indicator

- Working population is very young (median age of 28 years)
- Simplicity in tax filing and allowance of FDI in single brand retail
- Make in India campaign to give boost to local production
- Improvement in the infrastructure facilities (better rails and roads, smart cities, industrial corridors etc.)
- Simplified business approvals improving the ease of doing business

Indian consumers are more aware about the gamut of product variety and he has become more experimental in the selection. Gone are the days where only one product in a category is available but now, the range has products offering are increased manifolds. All this information is available to consumer with a click of a button, be it in a metro city or tier II and tier III cities. The presence of smartphone and the high-speed internet made it possible to connect the small city consumer with the new arrivals in the market. As per report published in statista.com, there will be more than 760 million smartphone users in India by 2021 (Asher 2020). With young population is more literate and they have risk appetite, they try to buy online.

Fashion & lifestyle is the most sought-after product in the online commerce. The category contents fashion garments, jewellery, wrist watches, sportswear, luxury bags and belts and sunglasses. In the world of fast fashion, a study conducted by The State of Fashion (2019) revealed that almost 1 in every seven persons does not want to be photographed in the same garment again and more than 30% consider it old after wearing two or three times.

The new age marketing has a little edge over the traditional one in the era of technology. One such tool, that most of the marketers are using is the social media marketing. It involves the promoting the product on Facebook, Instagram, Pinterest, Twitter etc. it helps consumers to get all details and they can purchase it online through various e-com platforms like Flipkart, Jabong, Amazon etc. These companies are claiming that the business from such smaller towns has reached to almost 50% of their total sales.

As per the India Internet report (2019), there are more than 450 million, which is increased to 700 million (Statista, 2020) users of internet and those are existing in both rural and urban parts of India. The entertainment sites are surfed by more than 52% of tier II and tier III cities users and the number of social media user are 326 million (Keelery, 2020).

IV. Research Methodology

In order to study the impact of social media marketing in tier III cities a questionnaire survey was done. The objective of the survey to find out the fashion consciousness, availability of lifestyle products and how they perceive the social media advertisements and their online purchase behaviour. The area of study was selected as Maharashtra state only. The sampling technique was convenient and survey was conducted in 2019. The sample size came out to be 570.

V. Findings and Data Analysis

Out of the 570 respondents, 44.2% were females and 55.8% were male. A total of 87 cities of Maharashtra state have participated in the survey.

The findings of the survey are as follows:

With respect to the fashion consciousness, 70.5% (75.5% of males and 64.3% of females) of respondents said they are fashion conscious. The availability of the fashion and lifestyle products is quite critical for the business, hence upon asking them about the availability of the products, most of the respondents said that the product is not available in bulk in their nearby market.

Table 1: Availability perception of fashion & lifestyle products

Sr no	Items	% of respondents
1	Fashion garments	48%
2	Branded watches	37.9%
3	Branded leather bags and belts	44.9%
4	Branded Shoes	40.3%
5	Branded Jewellery	35.1%
6	Branded Sunglasses	44.6%

As the products are not available widely, 73.5% of the respondents are purchasing it online through various e-commerce websites, out of which 48.1% people are satisfied with the purchase and only 36.8% will do the repeat purchase. The reason for non-satisfaction mentioned by respondents are size and price mismatch, occurrences of fake/defective products, deceptive claims, not comfortable with online payment system, return policy, and privacy issue.

Table 2: Responses towards the social media promotions

Sr no	Parameters	% of respondents
1	Awareness about the SM advertisement	74.7%
2	Inclinations towards SM advertisement	56.2%
3	Like to go through it	55.4%
4	Click on the link	50.2%
5	Get influenced by it	36.1%
6	Trust the claim	31.6%
7	Buy it online after the market survey	41.4%

The perception of the respondents with respect to the social media is studied on following points:

- Awareness about the promotion done on social media (SM)
- The impact it creates among the users

The table clearly indicates that the people are aware about the social media advertisements (74.7%), but only 41.4% actually buy the products online, this means that there is a huge scope for the brand marketers to do better advertising. The lower level of trust indicates that the with respect to tier III city consumers, the advertisement has to be more realistic and the factors responsible for the purchase should be focused on. The 7 factors responsible for the consumer buying are studies for tier III city. The lower number indicates the higher preferences.

TABLE 3: RANKING OF FACTORS BY RESPONDENTS

Rank	Factors	Mean
1	Price	2.11
2	Quality	2.28
3	Guaranty/Warranty	3.77
4	Discounts	4.05
5	Brand name	4.37
6	Proximity of Store	5.52
7	Celebrity Endorsement	5.91

From the table it is evident that, price plays very important role in purchase of products. This indicates that the tier III market is very price sensitive. The lower rank of celebrity endorsement indicates that, even though customers like to watch the promotional advertisement which involves celebrities, but they purchase a product with lower price points.

VI. CONCLUSION & FUTURE SCOPE

Not only the customer from big metro cities but people from smaller cities are also aware about the new brands and their features, thanks to the technology and social media. More and more young consumers are using social media for various of purposes, be it a photo or message shearing, browsing/surfing or trying to learn new things. Brands should use social media to connect to consumers by understanding their aspirational needs. The social media marketing with appropriate price points, product/size variation, promotion in local language, cultural beliefs, use of local celebrities will definitely help the brand to acquire the higher market share in tier III cities. The perception of the brand managers can be added to these findings for formulating the strategy of the social media promotion. The study from other states to know the perception of consumers in that areas will help to create the national-wide strategy for the marketers.

VII. LIMITATIONS

The research is only limited to the tier III cities of Maharashtra. The study is only focused on the fashion and lifestyle products.

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Relationship between Employer Branding and Corporate Social Responsibility

Jyoti Tomar[1], Dr Shivani Agarwal[2], Dr. K. R. Chaturvedi[3]
[1]Research Scholar, Dr. A. P. J. Abdul Kalam Technical University, Lucknow, India
[2]Assistant Professor, KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India
[3]DR A. P. J. Abdul Kalam Technical University, Lucknow, India
[1]jyotinehra30@gmail.com, [2]jindal.shivani24@gmail.com, [3]kr_chaturvedi@rediffmail.com

***Abstract*—Employer branding defines an employer's reputation as a potential employer, an employee's value proposition, as opposed to a general brand name and value proposition for consumers. Employer branding is an effective tool for the purpose of creating competitive advantage. It facilitates the treatment of employees as internal clients and also presents the image of the organization as a desirable place to work. Thus, attract the most talented workforce. In recent times, corporate social responsibility (CSR) has developed into a vital part of business. Companies must integrate public obligations towards internal as well as external stakeholders in their operations. For any organization, human resource is the most important stakeholder group. Thus, employers should focus on improving the employer-employee relationship. This study is conducted to determine the how the social responsibility of the company supports the employer branding in companies and what CSR communication methods are used by the companies to improve employer attractiveness. The research process includes literary analysis and empirical research and is based on content analysis to find out relationship between social commitment and employer branding.**

***Index Terms*—Employer Branding, Stakeholders, Employer Attractiveness, public obligations.**

I. Introduction

With the development of the global economy, there is a growing need for companies to acquire and retain excellent talent to fulfill their desire to grow. According to Manpower Group study "54 percent of companies reported skills shortages. Businesses in 36 of the 44 countries find it harder to attract more talented talent than in 2018" [1]. To compete in this new war of talent it's time for leaders to focus on strengthening of their organizations' employer brand. In 1996 Ambler and Barrow incorporated the term "employee symbol" into the field of HRM research. Employer branding refers to applying marketing techniques to the recruitment process and retaining employees [2]. They suggested that internal marketing of employer brand helps to build greater level of employee motivation and thus achieve enhanced customer satisfaction.

Just as a business name makes a commitment to its consumers about a product or service, an employer brand makes a commitment to its current and prospective employees about the experience and opportunities they will have in that organization. In theory all employers have a brand, but all of them do not successfully participate in efforts to brand themselves as employers. Employee branding is one of the many important factors that helps the company to have competitive edge against the competitors.

In modern times with a growing interest in sustainability and corporate responsibility companies incorporate these things into their operations and communication. Now, companies are considered as a part of communities where they operate. Each organization has a financial, environmental and social responsibility towards its stakeholders. The main stakeholders of the company are employees. Therefore, it is important that company should invest in human capital, which returns in gain in terms of employees, company and society collectively. When an organization considers its employees as an asset, it results in a constructive effect on employees' motivation, performance and loyalty. Motivated employees improve the performance of the entire company and lay a solid foundation for the type of employer.

Corporate social responsibility (CSR), related to people and social well-being, of any company should begin from within the organization and it should be communicated externally in same manner. CSR has a positive impact on employees' physical and emotional well-being. It also reflects how the company is considered as an employer by the outside people and potential employees. Thus we can deduce that a company can use CSR to improve employer brand value in both ways internal and external.

Prospective employees notice about the organizational values and culture and check if they are matching with their beliefs [3]. If they observe the features of the organization positively, they identify themselves with the company, so they are most likely to be associated with the company [4].

A positive CSR image can enhance jobseekers' interest because of the pride that is expected from being associated with a responsible organization, apparent value fit with the organization, and expectations about how the organization treats its employees [5]. The paper is trying to determine the extent to which social responsibility of the company supports the employer branding and what CSR

communication methods can be used to improve employee attractiveness.

II. Literature Review

The term 'Employer Branding' was given by Simon Barrow and Tim Ambler in 1996 at London School of Business. They defined employer branding as: "Employer branding is the package of functional, economic and psychological benefits provided by employment and identified with the employing company" [1]. Another definition says, "Employer branding is the process of building an identifiable and unique employer identity" [4]. Definition given by Richard Mosley defines employer brand as a part of strategic human resource process and for its functioning there should be cooperation among different functions of the company: "Employer branding is an effective commercial bridge between HR, internal communications and marketing" [6]. The given definitions give a quintessence of employer branding. Different business leaders have also explained employment brand in their words. As per Melanie Lundberg, AVP, Talent Management and Corporate Communications, Combined Insurance, Chicago "An employer brand is the reputation a company has in the marketplace as a place to work. It is how a company is perceived by both current and future employees." In words of Liuka Lobarieva, Brand Manager, Sigma Software "Employer branding is how companies say we are different" [7].

With recent research in field of CSR, its needs and impacts various scholars have also included the CSR perspective to the employer branding. Research shows that a firm's socially responsible image influences stakeholder engagement positively [8]. CSR practices of the organization positively impact the employees and it can be seen as increase of identification, association and commitment towards the organisation, organizational citizenship behavior and meaningfulness of work [9]. CSR improves employee commitment and productivity. Thus, it has positive impact on organizational performance [10]. According to global organization for CSR, 'Business for Social Responsibility', including CSR in business operations offers several advantages in terms of improved investor appeal and enhanced brand positioning. It also increases employee attraction, retention and motivational levels [11]. This means that CSR has positive impacts on both company and individual. A strong social responsive brand emerges as a strong employer brand. Not only best HR policies and competitive compensation, concern for society and socially responsible behavior is also a budding component of employer brand [12]. While studying attitudes of millennial job seekers' towards CSR, Klimkiewicz & Oltra found that millennial job seekers are engrossed by the CSR-based employer image [13]. The social responsible behavior and CSR initiatives of the companies improve the trustworthiness of the employer [14]. Thus, it can be deduced that along with organization culture and best HRM policies.

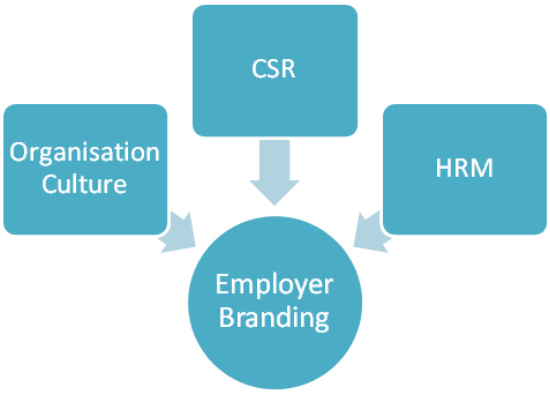

Fig. 1. Determinants of Employer Branding

III. Proposed Work

In order to determine how CSR activities improve employer branding and how they affect the organization culture, an empirical case study of three Indian companies was carried out. The companies identified for the study are three Indian companies that are recognized among the best employers over a period of time, namely TATA Group, Infosys Ltd, and ITC Group [15]. These companies have huge employee base thus they largely depend upon skills of workforce and they also need to focus on employer brand value to make their employees motivated [16]. Content of websites of these companies was analyzed to study about the communication of CSR activities of the company. The content analysis was focused on content related to organization culture, values and employee engagement.

IV. Result And Discussion

A. Observations

Tata Group: The Tata Group is one of the oldest and biggest business groups of India. They are engaged in different CSR initiatives for a long time. They initiated labor welfare programs before it was endorsed by law. The values come from within the organization. The core value identified by the Tatas is 'Diversity and Inclusion'. The website mentions that the company is committed towards being an equal opportunity employer [19].

"At the Tata group, we encourage and nurture all forms of Diversity. We respect differences that are fundamental to an individual's identity such as age, gender, ethnicity, race, physical ability, mental ability, sexual orientation as well as latent and invisible differences that shape our perspectives like, education, work experience, parental status, etc. We are committed to being an equal opportunity employer, maintaining dignity and respect for all."

Another factor identified is safety and health policy for employees. The Tata Group promises for providing a safe and healthy working environment for all employees and an injury and illness-free work place. As per company equitable safety and health protection measures will be provided to all employees. The company aims to be world leaders and to be considered as a benchmark in safety and health performance in their respective business sectors [18].

The Tata group carries out CSR activities in different areas such as Health, Education, Empowerment and Environment [20]. The group provides opportunities to current and retired employees to participate in voluntary activities for the community. **Tata Volunteering Week (TVW)** is celebrated every year in month of March and September. It brings together Tata employees, family members and retired Tata employees around the world to participate in different volunteering activities. **ProEngage** is a skill-based volunteering format designed to bring together non-profit organizations and motivated professionals. It is developed to help non-profits build and sustain their capacity by utilizing volunteers' professional and personal skills and rich experience. Under ProEngage, Tata group provides volunteering projects in areas such as HR, finance, business planning, IT, web design, social media and marketing, mentoring and coaching to help non-profits build and maintain their capacity. Tata Group has launched **Engage+**. It is a platform where employees with the required professional skills and experience, can be awarded a full-time delegation for up to a period of 6 months, to lead and successfully complete an important non-profit project [17].

Such opportunities provide motivation and sense of recognition to the employees that they can make meaningful contributions to the community, in addition to just financial contributions. The Tata group has high employee motivation and employer brand, this is also identified in recent Harvard Study about 26/11 Mumbai Taj attack. None of the Taj employee left the hotel during the tragedy but stayed right through. They helped the guests to safely come out of the hotel and in process many employees lost their lives. Such commitment towards the workplace can only be achieved by having highly motivated staff and a strong employer brand [21].

Infosys: Infosys is one of the largest IT companies of India. Infosys is flag bearer of values and ethics in business. The company associates itself in the culture of inclusiveness and openness, and a mindset of exploration and applied innovation. The company provides ample opportunities to employees to upgrade their skills and get trained in different technologies [22]. The dedicated Education and Research (**E&R**) department organize training of employees in different technologies and domains. These trainings help employees in achieving new challenges and taking up for future roles. Infosys values diversity and inclusion, and is committed to the principles of equal employment opportunity. Infosys has been an early adopter of a strong CSR agenda. Infosys has separate CSR arm, Infosys Foundation, to manage CSR programs. Sustainable development of communities where the company operates is an essential part of their CSR vision. Infosys CSR programs are focused in areas of education, healthcare, destitute care, and rural development, including building community empathy through employee volunteerism. Infosys aggressively support employee volunteering efforts [23]. The company provides different platforms to employees to work together and form volunteer groups. Different fields for voluntary activities provided to employee are Education, Health, Nutrition and Environment. Infoscions are provided with one year of paid sabbatical for up to one year to work for designated Indian NGOs on community projects [24]. **SPARK** program is designed for IT training and mentoring of government teachers and young students of rural areas. Infosys is in collaboration with more than 400 colleges to enhance the curriculum of technical education and making students industry ready. Infosys largely depends on solar power for its energy needs and usage of water recycling and rainwater harvesting is practiced in each campus [25]. Through these initiatives the employees feel attached to the society and this improves the association of employee with the organization.

ITC Group

ITC group put forwards its vision of '***Sab Sath Badhe***' through its website. ITC projects itself as an organization that values integrity, creativity and passion [26]. Their focus is on continuous value addition to develop competencies. The company provides different training platforms for employees to improve their skill set. The company is proud to be Indian and provides wide range of world class products in Indian market. ITC's practices of sustainability and CSR are motivated by its vision to put the 'Nation First' [27]. ITC is one of the leading spenders on CSR in India. In year 2019 ITC is ranked as 7th highest spender on CSR [28]. ITC continuously assess its contribution along three dimensions of the 'Triple Bottom Line' - economic, environment, and social. As a model contributor to the Triple Bottom Line, for five years in a row ITC has been 'Carbon Positive', for eight years in a row it is 'Water Positive' and for three years in a row it is 'Solid Waste Recycling Positive' [29]. ITC's CSR initiatives have created positive impact in 188 districts in 25 states/ union territories in India. ITC has a partnered with NITI Aayog to improve the agriculture and allied sector in selected 27 Aspirational Districts of 8 states [30]. The employees of ITC group value the CSR initiates take by company and value the change bought about in the society by their organization [31].

B. Comparison between the companies

All the three companies follow approaches for employer branding. The companies illustrate that the employees are a part of their CSR activities. The Tata group focuses on diversity, inclusivity and health and safety of the workforce. They have shown commitment towards work life balance and voluntarism in employees. Infosys has focused in strengthening employees' capabilities through training and innovation. It has also shown its interest in reducing carbon foot prints and working towards sustainability. The ITC group is keeping its ideas of '*Nation First*' in its functions and inculcates a sense of association with nation growth with the employees. All three has shown that their CSR activities are committed towards development of society where the company operates and working towards environment and sustainability. Tata Group and Infosys are focused on giving opportunities to employees for enhancing their skills and also putting their expertise to betterment of society through paid voluntary sabbatical. Tata Group and ITC Group both have diversified presence in different sectors; both have a large number of people that are impacted by their value chain. Thus, they have shown a huge commitment towards the communities where they operate. The companies are using their website as a means to put forward their CSR activities and voluntary work done by the employees, thus, showcasing them as better place to work.

V. Conclusion and Future Work

The study shows that the CSR activities of the company develop a sense of identification and association in company. The companies have identified importance of CSR in branding process and they have aligned the CSR functions along with HRM processes. Through employee voluntarism the companies motivates employees to work towards society along with their jobs. This gives job security as well as purpose of work to the employee. The employee friendly and social oriented culture of the organization strengthens the employee brand. For harvesting optimal branding benefits the internal functions and the CSR activities need to be communicated outside too. This can be achieved through websites, annual reports, short features etc.

Future studies can be carried out to find out various CSR initiatives that impact Employer branding in a positive manner. Also, there is scope of quantitative studies to ensure the impact of CSR initiatives of particular organization in terms of profit gained.

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Monetary Reward System and Employee Motivation: Empirical Evidence on Management Institution in NCR

Dr. Annu Tomar[1], Sarthak Sengupta[2]
[1]*Assistant Director (HR), Adbrrigade Marketings Pvt.Ltd.*
[2] *Research Scholar, Indian Institute of Information Technologuy- Allahabad, Prayagraj*
[1]*annutomar27@gmail.com*, [2]*sarthak388@gmail.com*

***Abstract*—The reason to conduct this research study is to demonstrate the direct link of the various incentives to the employees for their motivation and also to know to what extent various rewards or incentives are utilized in the private and public organizations to motivate the employees. This study reveals the relationship between incentives such as participation in decision making, favorable climate, salary, bonus, etc. and employees' motivation in any organization. To realize the objectives of this paper, a survey study was administered on the teaching staff of various management institutions in NCR. The relevance of this study is very much attractive and going to be popular for academia because monetary rewards are the best majority of people and one and only common incentive for all employees to attract and retain. In the methodology, a structured questionnaire used for data collection instruments. Both descriptive and exploratory statistics were used to analyze and interpret data of around 100 samples collected through random and convenience sampling. On the basis of previous research and current findings, a triangulation model on the employer branding process has been developed and presented.**

As indicated by the aftereffects of the examination, a large portion of the representatives imagine that the degree of usage of the fiscal impetuses in their association is lacking. Likewise, the discoveries recommend that the estimation of financial motivating forces as much as non-money related motivators. Along these lines, inside the confinements of the study, it might be presumed that financial impetuses or prizes can possibly build the inspiration of faculty in general society and private association. It is additionally discovered that among all the money-related impetuses or prizes 'reward and motivators' is the most significant motivating force to rouse the representatives in the association.

***Index Terms*—Incentives, Motivation, monetary rewards (Bonus and Incentive).**

I. Introduction

MOTIVATION is that force in any organization which can convert the passive employees in an active form. At present, every organization believes in hiring and maintaining the talent in the organization by providing them various incentives and appreciation instead of firing the employees immediately. The objective to conduct the study is to identify the impact of various rewards used by various management institutions to motivate the employees in the National Capital Region. The study also attempts to assess the relationship between monetary and non-monetary motivational rewards and to know the most effective rewards to motivate the employees. The survey and analysis provides a panoramic view of the monetary reward system and employee motivation in management institutions of NCR region.

II. METHODOLOGY

In the methodology, a structured questionnaire was used for data collection instruments. Both descriptive and exploratory statistics were used to analyse and interpret data of around 100 samples collected through random and convenience sampling.

The hypothesis behind this is to show a direct correlation of financial incentives and employees encouragement in any organization.

III. Analysis and Findings

The findings of this research are focused on the primary collection of data to analyze the questionnaire of 100 respondents. The data collected from the respondents on the percentage of incentives are given in Table 1. An incentive or reward which motivates the employees more in any private or public organization is the result to be pondered upon and found.

Table 1: Percentage of Incentives (Collected from Respondents' data)

S.NO	INCENTIVES	PERCENTAGE
A	Professional development	25
B	Bonus and incentive	48
C	Salary	25
D	Flexible work schedule	02

As we know that there are two main factors to motivate the employees in any of the organizations, i.e., monetary factor and non-monetary factor. So in the analysis of the above-mentioned question, it is observed that maximum percentage (48%) of employees is saying that bonus and incentive is the most appropriate method to motivate the employees in the organization. The immediate next percentage goes to the professional development and salary i.e. (25%) and at last, the least scoring percentage (2%) goes to the flexible work schedule. Figure 1 shows the percentage of incentives' histogram plot of the data collected from the re-

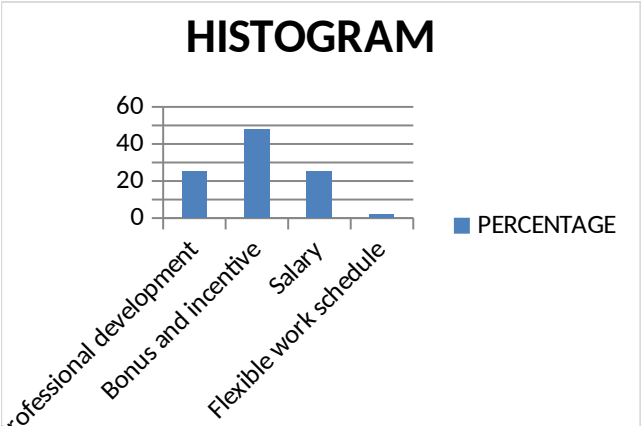

Figure 1: Histogram Plot of the Incentives' Percentage

spondents. This is the result of overall employees in the teaching fraternity of private and public organizations.

IV. CONCLUSION

To conclude the result and findings of this paper and the above study, it is observed that "bonus and incentive" is one of the best motivational factors in monetary terms. After doing the depth study of the various questionnaires it is further observed that employees are not always motivated by providing various fringe benefits in terms of non-financial rewards instead of financial which is also as crucial as non-financial rewards. Monetary and non-monetary both rewards move simultaneously. So, based on the above-mentioned table and pie chart, it is totally clear that bonus and incentive is one of the best methods to motivate the employees in any organization. Each and every employee needs and demands more and more bonuses and incentives in the organization to give a high level of output and productivity and also to maintain the organization's goodwill. So, in that case, monetary rewards especially the bonus and an incentive is a crucial role player in the life of each employee and enterprise as well.

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Implementing Cyclic Redundancy Check asError Correction Technique in HDLC

Shardeep Kaur Sooch[1], Dr Meenu Gupta[2], Dr Rakesh Kumar[3]
Chandigarh University Punjab, India
[1]*shardeep.sooch@gmail.com*, [2]*meenu.e9406@cumail.in* , [3]*rakesh77kumar@yahoo.com*

***Abstract*—Any successful communication is governed by some set of rules to manage the flow control of the transmitted data. One such protocol is High-level Data Link Control (HDLC) which is a bit-oriented protocol used for communication over the point to point or multipoint links. Residing in the data link layer (layer 2) of Open System Interconnection (OSI), this protocol transmits data in frames. HDLC can be used for detecting the errors in the data which are induced during the transmission from sender to receiver. This paper focuses on not only detecting the error but also correcting it by using Cyclic Redundancy Check (CRC). Cyclic codes are a special type of linear Block Codes in which one codeword can be cyclically shifted to obtain another codeword. The CRC generator is modulo-2 added with the data in the information frame of HDLC and the remainder is obtained. When this data is sent over any transmission channel, there are high chances of data being erroneous due to interference of unrequired signals in the channel. When data reaches the receiver end, a similar modulo-2 addition is carried to obtain another remainder. This remainder is compared with the remainder transmitted by the sender. The two compared remainders detect the location of the error bit which is corrected by flipping that specific bit. This reduces the need for Automatic Repeat Request (ARQ) mechanisms to obtain the correct information as the data can be self-corrected at the receiver end.**

***Index Terms*—HDLC, Frame Check Sequence, Cyclic redundancy Check, Xilinx, Automatic Repeat Request**

I. Introduction

WHEN any data is sent through a communication channel from the transmitter to the receiver, the data usually gets corrupted due to various reasons. The errors may be introduced in the data because of noise during data transmission, hardware failure or data read operations from memory. For the efficient and error-free transmission Error Detection and Coding technique (EDAC) is required [1]. Many codes and techniques can be implemented depending on the type of data, type of error occurring, and channel used for transmission. The basic aim for the EDAC codes is:

1. Networks must transmit data from one point to another without corrupting data with errors.
2. Error induced in the data must be detected and corrected for efficient communication.
3. Detection and correction of error are done at either the data link layer or transport layer of the Open System Interconnection (OSI) model.

Automatic Repeat Query (ARQ) is usually used as an error-control mechanism that re-transmits data in case the corrupted data is received at the receiver end. This mechanism uses the concept of acknowledgment and timeouts for better data transmissions. But for every erroneous data transmission, ARQ may not be feasible. So error correction techniques are required at the receiver end. Here CRC is being used as error detection and coding technique at transmitter and receiver. HDLC protocol, a short term coined for high-level data link control, is the most commonly used protocol for transmission as it shows high efficiency and powerful error detection. It is a bit-oriented protocol which means that it sends the information as a sequence of bits. The frames are used as a transport mechanism to transport data and contain error checking information that ensures error-free transmission. The HDLC embeds the information in the frame that allows the correction of errors and controls the data flow.

A. HDLC Frame Format

The HDLC Frame is composed of the following fields [2]:

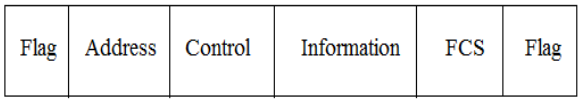

Fig. 1. HDLC format

Fig 1 shows the HDLC frame format consisting of 6 different fields. Each frame has a different length to serve its respective purpose as following:

- Flag field is an 8-bit sequence that identifies the beginning and the end of a frame. It serves the purpose of synchronization.
- Address field varies from 1 byte to several bytes long and holds the address of the secondary station.
- Control field is a 1 byte or 2-byte field that serves the need for flow and error control.
- Information field contains the actual data to be transmitted by the sender. This data should be correct when received by the receiver.

- Frame Check Sequence (FCS) field can be 2 to 4 byte long and is used for error detection. This field can also be used for error correction.

B. Use of CRC

Cyclic Redundancy Check (CRC) is based on cyclic error-correcting codes. It requires CRC generator polynomial which becomes the divisor in the polynomial division process where the message is treated as the dividend, the quotient is discarded and the remainder is the result. CRC finds a check value which is a fixed-length binary sequence that can be sent with the data, stored or appended to that data. This codeword is generated at the transmitter as well as the receiver. In the case of HDLC, the CRC generator is of the same length as that of the message bits in the information field. Hence the polynomial division process can be used as an addition (without carrying) between the message bits and the CRC generator. The change in the remainder calculated at the receiver shows that the received message bits are corrupted and the comparison of the remainders of transmitter and receiver helps to correct the received bits.

II. Literature Review

HDLC is one of the major protocols in the communication system. FCS field of the HDLC frame has been normally used for the detection of the error in the data [3]. HDLC procedures have been implemented on hardware based on Field Programmable Gate Arrays (FPGAs) [4] [5]. Frame Check Sequence of the HDLC frame has been generated using FPGAs [6]. For high performance, the HDLC controller is developed for data-oriented, switched, and non-switched packet transmission. HDLC protocol has been designed and implemented based on FGPA in Train Communication Network [7].

In [8], the technique of an encoder and decoder is used as error detection and correction code. A fault-tolerant memory system is produced which can tolerate errors, and also support logic operations such as encoding and decoding. But such methods employ coding of data in ‘write’ operations and decoding of data in ‘read’ operations. It leads to the accumulation of data which depends on the frequency of reading and writing application requests. To avoid accumulation, extra logic is used to constantly detect and correct bits in all coded data.

In [9], the Horizontal vertical diagonal (HVD) method is employed to detect and correct RAM errors. HVD help in making the device power efficient in single-error correcting, double error-detecting checker circuits. 2-d parities are used to calculate parity for each row, column, and diagonal. The parity bits are calculated at both transmitter and receiver, and these parity bits are compared to detect errors. The code at the receiver corrects the corrupted data.

In [10], the Horizontal vertical diagonal (HVD) parity check has been used for detecting and correcting errors in HDLC. The four directions in the data part use parity codes to make sure that data is reliable and error bits are detected. It provides a high detection coverage and correction of up to three bits can be done. But if the parity bit is erroneous then the process to detect error becomes complicated. This method can be used in combination with other detection and correction methods to provide high correction coverage.

In [11], the HVD code is used in the HDLC protocol to detect and correct errors. This method employs the use of horizontal (H), vertical (V), and two directions diagonal (D) parity bit to increase detection ability. Based on the calculated parity bits of each dimension, an additional parity bit is computed. For implementing this, the data and, parity bits are considered as a whole world that can be viewed as a 3-dimensional array. To correct the error bits, the first step is to mark the candidate bits that are located where at least two to four erroneous parity lines intersect. The candidate bits are checked to find corrupted bits among candidate bits. The candidate bit where four lines intersect is termed as error bit otherwise the bit is marked correct. To correct the data, all the error bits are flipped.

In [12], the hamming code is used to detect the error in the whole word which consists of data bits as well as parity bits across the length of the array. When the error is found, it is detected whether the error is in the data bit or parity bit. Some extra data is sent with the message, which is used to check the consistency of the received message and correct only 1-bit data.

In [13], the hamming method detects a 2-bit error but corrects 1-bit error only. It is helpful in error detection in case of a few random mistakes or errors. It uses the logic operation of Exclusive-OR to detect the error. Depending on the length of the data, multiple pieces of check bits are inserted into the data. The Hamming code must be at least 4 bits and input and output data must be of 2n power with n greater than the Hamming code.

In [14], the hamming code is implemented in the HDLC protocol to improve the performance of data correction. The Hamming parity technique for HDLC can be optimized using a Hamming parity calculator and an 8*8 RAM. In this method, the data to be transmitted is read from a stored RAM location and parity bits are added to it to create an HDLC frame generator. At the receiver end, the frame is passed through a Hamming parity calculator which first checks the parity of the data and stores it in parity storage. This results in error correction up to 8 bits and bit overhead and code rate of 50% and 66.6% respectively.

In [15], CRC error detection methods have been used in Wireless Sensor Networks. Five CRC divisor bits of CRC-4 are used to enhance the error detection capability in WSN where 100000 frames of 32 bits each show a minimum undetected erroneous frame when the divisor bit used is 10011 in CRC-4.

Fig 2 compares some of the error detection and correction models used for various protocols. It contains the author’s name, the technique followed in the research paper, and some important points related to that particular research.

Author	Technique	Advantages	Limitations
VM Rama Priya [8]	Encoder and Decoder	Fault-Tolerant memory system which is capable of tolerating errors	Increase in redundant data
Narinder Pal Singh [9]	HVD Implementati-on for RAM errors	Less Computational Complexity, Large combination of multiple faults can be corrected	Can correct only single error in a particular code line
Mostafa Kishani [10]	HVD against soft errors	Correction up to 3 error bits	Larger computing operations required to correct and detect error bits
Shubham Fadnavis [11]	HVD based error detection and correction in HDLC protocol	Reduced complexity and requires simpler calculations	Less data correction rate
Dr. Anil Kumar Singh [12]	Error detection and correction using Hamming Code	Less complexity	Correction of only 1 bit error
Varinder Singh [14]	Hamming method implementati-on in HDLC protocol	Enhancement of code rate and reduction of bit overhead, error correction up to 8 bits	More complex architecture
Michael O. Ezea [15]	CRC in Wireless Sensor Network	Has lowest undetected erroneous frames	Increased computation-al and architectural complexity

Fig. 2. Comparison of different error detection and correction models

This proposed model focuses on not only detecting the error in the information field but also correcting it by using CRC to compare the remainders and making a high efficiency error correction technique in HDLC.

III. Proposed Sytem

Fig 3 presents the flowchart of the algorithm used to correct errors in the data. Before the actual transmission of the information, some steps are taken at the transmitter side to achieve the required data sequence to be sent as FCS. This frame not only serves the purpose of detecting the errors in the data if any but also correcting them by comparison process.

The data to be transmitted in the HDLC frame is XORed with the CRC generator to create a remainder which is a result of addition (without carry) of the former two. This remainder is sent in the FCS field of the HDLC frame along with the information to be transmitted. The transmission via any media may result in the insertion of bits, flipped bits, and lost bits. Before processing the information received at the receiver side, it is determined whether the data is correct or not. This is done again by XORing the received data by the predefined CRC generator used by the sender. If the remainder of such operation is the same as the remainder sent by the transmitter, it means that the data is correct. But any change in the received data will compute a different remainder.

When this remainder is compared with that present in the FCS frame, it will point to a specific location where the bit change in the remainders has occurred. This not only informs us about the data being incorrect but also locates the bit which was changed during transmission. Knowing the location of the changed bit in the two remainders helps to correct the data by simply flipping that specific bit. Such a method corrects the data without requesting the transmitter for the ARQ mechanism [16] [17].

IV. Simulation Results

Xilinx-9.2i is used for synthesizing the proposed system and the simulation is done in Xilinx ISE Simulator. An internal signal is used to induce an error in the transmitted data. This makes sure the data received at the receiver is not the data transmitted. It results in the remainders of the transmitter and receiver to be different. A comparison of these remainders will point out the bit that has been corrupted which is solved by simply flipping that particular bit.

A CRC can be used not only for detecting but also locating the error bit in the received data in HDLC protocol. Such a method focuses on correcting the data at the receiver without sending any ARQ to the transmitter. So there is no need of sending the data again even when the data received is incorrect. Such incorrect data can be corrected by the receiver using CRC.

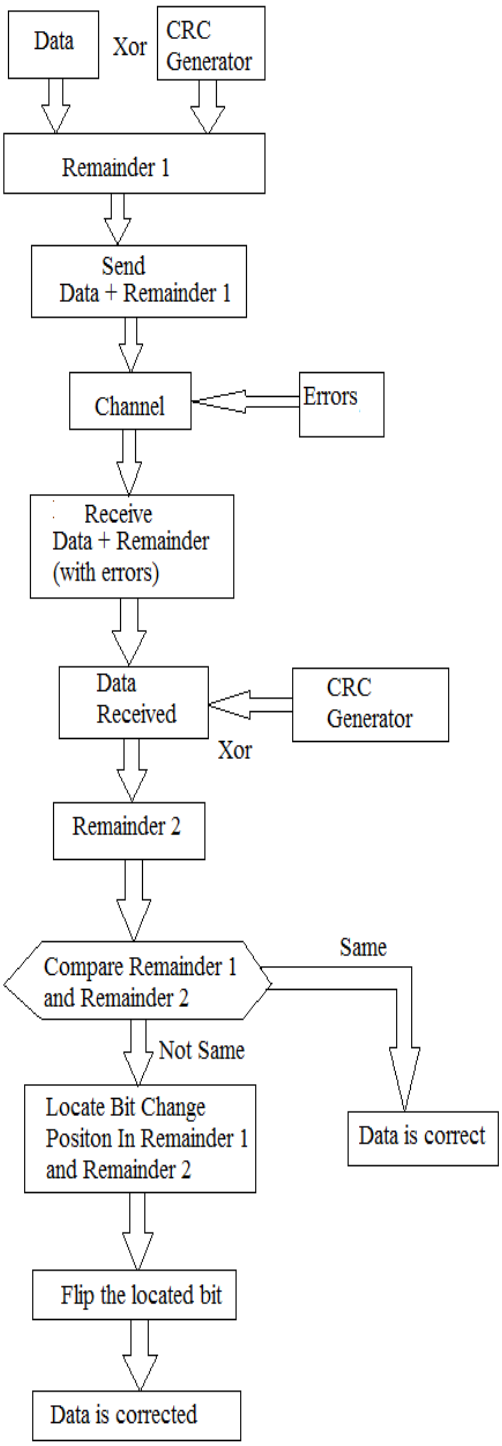

Fig. 3. Algorithm for CRC based HDLC error correction

Fig 4 shows the test bench waveform of the proposed algorithm produced in the Xilinx simulator at 1000ns. It is a graphical environment that includes an input, a stimulus, and the test bench length. It consists of 8-bit input data represented as 8'hCB and 8 bit CRC (8'hA3) which generates a remainder of 8 bits. An internal signal is used to induce an error in the data which is observed in 'Data received'. This

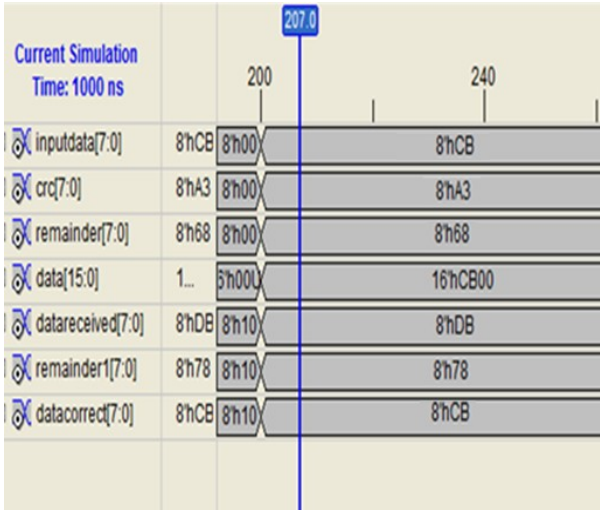

Fig. 4. Test Bench Waveform in Xilinx Simulator

will change the remainder calculated at the receiver. 'Data correct' in fig 4 represents the correction of data even when an error is induced in the original data. Such a mechanism leads to different remainder such that the remainder at the transmitter is 8'h68 while at the receiver is 8'h78.

For the hardware implementation of such a system, it requires a definite number of components. The device utilization summary shows how much area is required by such an algorithm. Fig 5 represents the device utilization summary of the proposed system defining the number of slices, number of 4 input look-up tables or the LUTS and number of bonded input-output blocks (IOBs) required for hardware implementation. Within 5 slices a total of 10 look-up tables are used from 3840 to implement the function generators in Configurable Logic Blocks. 64 IOBs are utilized to implement the input-output functions of such a system.

Fig 6 defines the Register-Transfer Level (RTL) schematic which is the graphical representation for such an algorithm defining the hardware implementation. It shows different blocks, their inputs and, outputs used to implement such a system in a practical environment. It models the flow of digital signals in the hardware and how logical operations are performed on those signals. The input data of 8 bit is passed through a CRC generator to create a CRC remainder which is also 8 bit. The input data is then induced with errors to create corrupted data. This corrupted data is also sent through the CRC generator to generate the CRC remainder at the receiver. Each bit in data has a different block assigned to it that helps to check if the data is correct or not and perform the logical operations on the binary data. Each block has 3 inputs, one for erroneous data, and one for CRC remainder at the transmitter, and one for CRC remained at receiver. For each bit, the CRC at the transmitter and receiver are compared and in case of different remainders, that particular corrupted bit is flipped. If the remainders are the same no changes will be made to the input bit. At the output end, all the bits from the logical blocks are combined together to form the correct data at the receiver end. By this

Device Utilization Summary (estimated values)		
Logic Utilization	**Used**	**Available**
Number of Slices	5	1920
Number of 4 input LUTs	10	3840
Number of bonded IOBs	64	141

Fig. 5. Device Utilization Summary in Xilinx Simulator

method, errors up to 8 bits are detected and corrected as CRC is 8-bit long.

V. Conclusion And Future Scope

A CRC can be used not only for detecting but also locating the error bit in the received data in HDLC protocol. Such a method focuses on correcting the data at the receiver without sending any ARQ to the transmitter. So, there is no need of sending the data again even when the data received is incorrect. Such incorrect data can be corrected by the receiver using CRC. Errors up to the length of CRC can be detected and corrected by this method. For 8 bit CRC, errors up to 8 bit can be corrected. If the length of the CRC is long, the error correction rate will increase linearly. But longer CRC code can also increase the computational and architectural complexity.

Methods can be developed to break the information into blocks so that the CRC generator used can have less length than the information sent. Such methods can be of great use in those systems where the data rate is high. Breaking the information into blocks not only makes the system faster but also reduces the memory requirements for storing the CRC as the length of the generator is reduced. Similarly, CRC codes can be implemented in different communication protocols according to our requirement to correct the data at the receiver end. CRC codes can also be implemented with other correction techniques to achieve a higher performance rate.

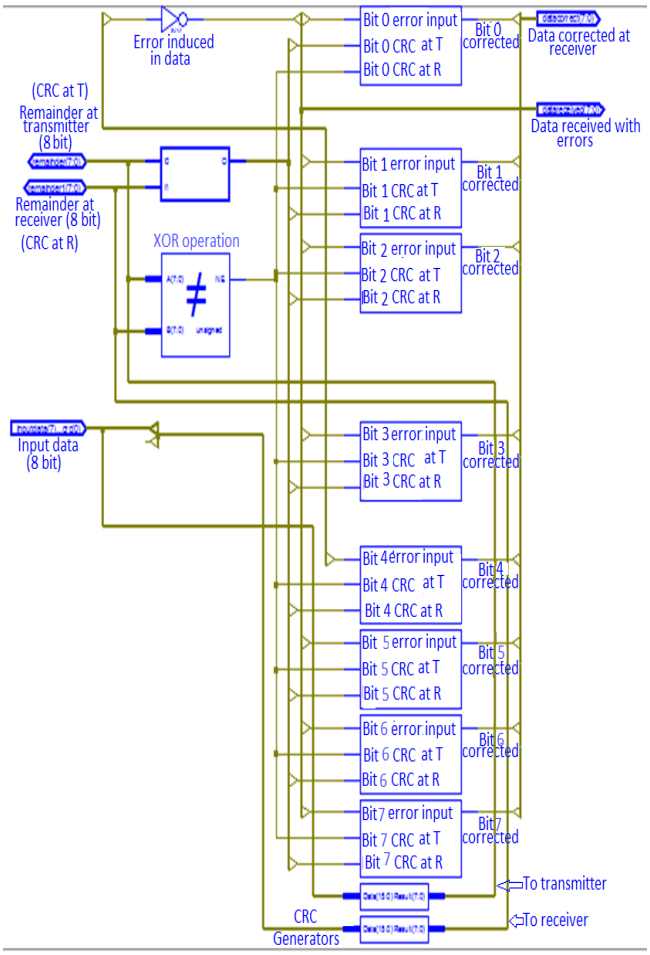

Fig. 6. RTL Schematic in Xilinx Simulator

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A Perspective On The Intersection Of Information Security Policies And IA Awareness, Factoring In End-User Behavior

S. Raschid Muller, Ph.D., MBA
Assistant Professor of Cybersecurity
Capitol Technology University Laurel, MD, USA
Email - srmuller@captechu.edu
https://orcid.org/0000-0002-1742-7575

***Abstract*—In 2017 Executive Order 13800 was enacted for all federal entities to use the NIST Cybersecurity Framework to report on FISMA compliance. According to GAO-19-545 report sixteen agencies were identified as failing to successfully implement FISMA regulations rooted in information security policies (ISPs). This paper will introduce the link between information assurance awareness with the prescribed actions and its direct influence on information security policies. While organizations are conscious of the federal rules and regulations, most continue to fail to successfully implement and comply with the guidelines due to a sincere lack of information assurance and awareness, which ties directly into human behavior. A discussion on the intersection of information security awareness and behavior will be presented. The UTAUT theory measures and informs the researcher on factors that influence the end-user. Conclusively, recommendations will be offered on why organizations need to invest in a mechanism that measures these factors, which increases information awareness to change behavior, thus achieving better compliance with their organizational ISPs.**

***Index Terms*—ISPs, IA awareness, IT Governance, UTAUT, Behavior**

I. Introduction

IN 2002 as part of the E-Government Act, Congress enacted FISMA legislation to ensure that federal agencies begin to strengthen policies and practices. According to the GAO-19-545 Report [1] to Congress, sixteen agencies were identified as failing to implement FISMA regulations following the law successfully. The NIST Cybersecurity Framework was enacted in 2017 under Presidential Executive Order 13800 to report on FISMA compliance. The NIST Cybersecurity Framework has five core security functions: identify, protect, detect, respond, and recover. NIST requires these five functions to run concurrently to provide the necessary protections for federal agencies to manage their respective security measures continually.

This paper will focus on the information awareness aspect of the first core security function of Identify. Within this category, to comply, the agency must "develop and understand the organization's ability to manage Cybersecurity risks to systems, people, assets, data, and capabilities" [1]. As denoted in Figure 1 below from the 2019 report, 15/16 agencies failed to implement the first step of the five core security functions, which draws the question: If 93% of the audited agencies can't effectively implement the first of five core steps of NIST Cybersecurity Framework, then how effective will the agencies be in implementing the remaining four steps? Also, what conclusions can be drawn about the simple adoption of a policy that can be made about accepting the regulation as a whole? Is there a general sense in the federal space that Cybersecurity is not that important? Why aren't the agencies taking the mandatory regulations seriously and implementing the security controls required by the law? If employees are paid to implement security controls according to the law and aren't effective, why? The FISMA mandate is the foundation on which federal agencies need to focus on its information security governance. The general purpose is to develop the importance of understanding how human behavior contributes to organizational security policies' noncompliance.

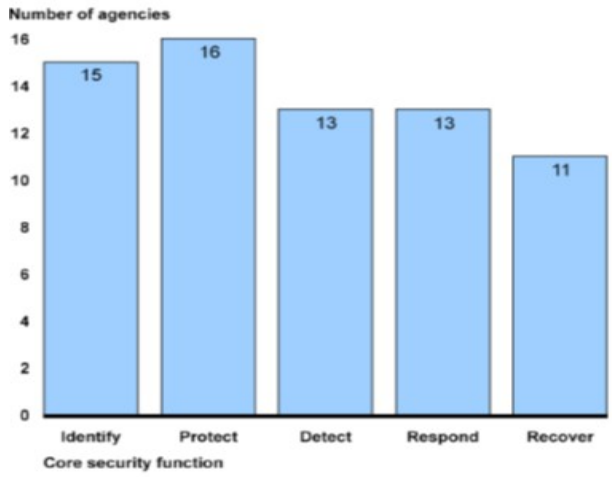

Fig 1. A graphic depicting how the sixteen agencies within the report were NOT in compliance with the five core security functions with the NIST framework [1]

There are several recognized academic theories in the information technology sector that address the behavior. The

paper will review peer-reviewed literature in the information security policy area. First, it must be understood those ISPs are the backbone of a solid security governance structure within any organization. Consistent adherence to the ISPs ensures the security and functionality of an organization are IT assets used for business and communication mediums. ISPs must also be continually reviewed, changed, adjusted, and adopted to address cyber threats' evolving nature.

These evolving cyber threats contribute to another significant part of information security governance within an organization: awareness. The concept of information assurance awareness plays a significant role in maintaining a security posture from the human perspective. NIST [2] often cites that humans pose the most considerable vulnerability to information system security. NIST SP 800-39 [2] offers a federal perspective and set of recommendations for information security leaders to be aware of the various threats to IT systems. NIST suggests that organizations develop, train, and maintain information security governance through continual monitoring and vigilant awareness.

Conclusively, the manuscript will seek to offer background on the chosen theory of behavior in the latest case studies. This research looks to extend the Unified Theory of Acceptance and Use of Technology (UTAUT) [3] to the federal sector. The UTAUT seeks to explain human behavior with the intent of using information systems by the end-user. Summarily the article will identify the importance of organizations studying and identifying end-user behavior in shaping future security policies that can be followed to provide better informational security governance.

II. Literature Review

A. GAO report - Highlights

The 2019 GAO report takes a detailed look at the several areas where the sixteen agencies are measured for effectiveness against the NIST Cybersecurity Framework for implementation following the information security program required by FISMA. The eight elements of the information security program are periodic risk assessments, cost-effective policies and procedures, subordinate plans for providing security, security training, periodic testing and evaluations of controls, remedial actions process, incident responses, and continuity of operations.

In Figure 2, 11/16 agencies failed to implement cost-effective policies and procedures, and 13/16 were unable to implement adequate security training, which is of great concern to the research conducted. Effective and iterative information security governance seems to allude to the various agencies at significantly high rates, which is unacceptable according to the GAO reports. The policies are required by law to be implemented as a baseline security standard.

As the baseline is often stress-tested with adversarial attacks from internal and externals threats, the information security policies must always be flexible and adaptive to the

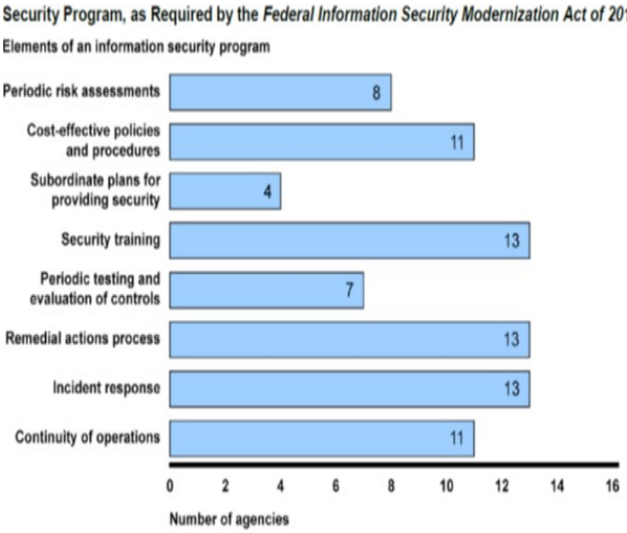

Fig 2. A graphic depicting how the sixteen agencies within the report were NOT in compliance with a FISMA information security program's eight elements [1].

environment when new vulnerabilities are introduced. In the same fashion where the Microsoft software platform provides continuous updates to vulnerabilities found that can compromise an operating system, the information security policies must have the same elasticity level for adaptation. Figure 3 below reflects report security incidents to US-CERT from 2009 – 2018. Note that the significant decrease in Cyber incidences in 2016 was reflective of a policy change, i.e., a shift in dollars invested in minor cyber incidences that could be adjudicated with the new concept of mandatory "continuous monitoring" that reflected low-level incidents like sniffing or probing networks that produced false positives on enterprise network defense commercial programs.

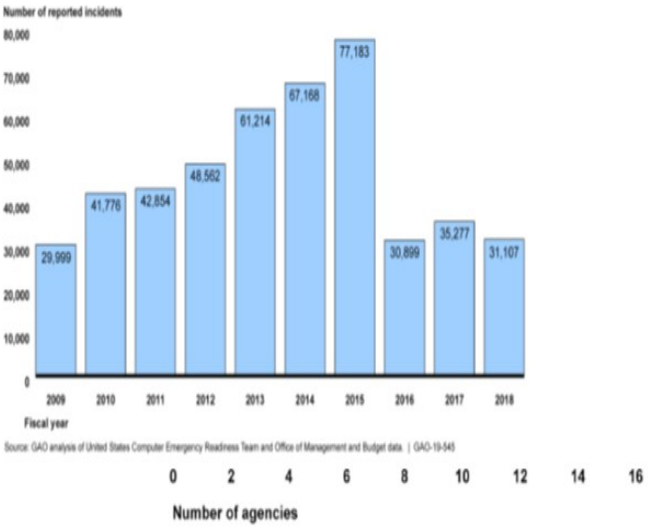

Fig 3. A graphic depicts federal agency reporting Cyber incidences from 2009 – 2018 [1].

B. Information Security Policies

The research literature on ISP compliance indicates that a general problem exists among employees who do not comply with prescribed information security policies [4]. It is also known that employees can be the most significant security threat to company information when they participate in risky behaviors such as accidentally installing viruses on company computers or using specific programs without prior knowledge [5]. Finally, Miller and Gregory [6] assert that consideration should be given to human behavior when authoring organizational policy. However, it is not known what human factors predict employees to not comply with existing corporate policies [7].

Employees are the major obstacle to the inadequate implementation of ISPs. In many cases, employees' security behaviors result in inadequately designed security policies [8]. Frequently, ISP methods focus on changing employees' behaviors because employers consider those behaviors unreasonable or erroneous, but compliance problems can result from inaccurate or inflexible ISPs. A few studies have shown that ISPs that do not reflect current work practices can also contribute to non-compliant security behaviors [9]. Kostadinov [10] asserts that information security policies (ISP) with an organization as a set of standards should be implemented for all end-users to gather compliance for information systems. Improved organizational, informational security factors are identified by research on ISP compliance conducted by various researchers and practitioners who seek explanations for the expected outcome [11]. Organizational information assets gain significant protections from the strict adherence to these ISPs in the form of complied governance.

Peltier [12] states that for organizations to achieve full compliance, the development, and delivery of effective policies must follow a sound and investigative strategy. However, Etsebeth [13] states that ISPs and security infrastructures are ineffective if the employees tasked with maintaining security do not understand data security expectations and demands. Developing structurally sound ISPs might be the most cost-effective action that organizations need to prevent information security breaches and incidents while not heavily relying upon its IT security staff when networks and information systems are being compromised [15].

This mandate can be achieved when every employee within the organization takes the fundamental responsibility or complying with ISPs and takes an active role in protecting data within the information system. Summarily, ISPs are needed in organizations so that researchers and practitioners can understand the expected outcomes of an awareness initiative and why this occurs [16].

C. Information Security Awareness

Ahlan, Lubis, and Lubis [17] define IT awareness as "a mental state where end-users recognize, comply, practices, and embed the prescribed organizational security policies into their work routine regularly." Consistent information security awareness is achieved when the organization's culture adopts the security policies achieving a higher rating in compliance and governance.

Research has shown that information security awareness can significantly impact security compliance behavior [18]. Haeussinger and Kranz [18] conducted a study examining the mediating effect of awareness on security behavioral compliance. The researchers also studied the institutional, individual, and environmental antecedents of information security awareness. Haeussinger and Kranz collected survey data from 475 employees and used the data to test their empirical model. Their model explained a substantial proportion of the variance of information security awareness (.50) and behavioral intention to comply (.41).

The results of Haeussinger and Kranz's study indicated that an organization's use of an ISP and employees' knowledge of information systems were the most influential antecedents of information security awareness. Haeussinger and Kranz also found that an employee's information security awareness alters the relationship between the antecedents of information security awareness and its behavioral intentions. Haeussinger and Kranz noted that the findings support the use of ISPs to encourage employees to engage in compliant behavior. Although information security managers often have limited resources to handle security demands, awareness and training programs can help managers and information assurance professionals to do their jobs more effectively [19].

Information systems database breaches that make the news are usually external threats versus internal [20]. While those breaches can be too costly, outsider threats are generally addressed using traditional security measures. Some organizations attempt to avert information security issues by focusing on technical solutions. Still, Yildirim [19] acknowledged that the effective management of information security requires an organization to address human factors. Yildirim recommended that managers take several security countermeasures that combine technical and social interventions using an integrated, systematic process.

The research on information security is extensive, yet while most concepts regarding information security have been reviewed and discussed in the existing literature, some critical areas remain unaddressed [21]. For example, few studies examined information security awareness training [17]. Conclusive empirical evidence showing the effectiveness of security awareness training or awareness campaigns is not available [22]. Pahnila et al. [22] noted that evidence does exist to support the effectiveness of training activities and informational campaigns in other fields. As a result, there is scholarly interest in assessing the value of information security awareness training and ISP compliance.

Because of the difficulty in teaching general users about complex security issues and users' tendency to be inattentive to security concerns, users may not always apply what they know about their organizations' security standards [23]. Figure 4 contains an illustration of how security

awareness training translates into actual security behavior. In Step 1 of the security awareness process, users undergo security awareness training. Users are exposed to information security materials showing correct and incorrect actions. These security behaviors are referred to as explicit behaviors.

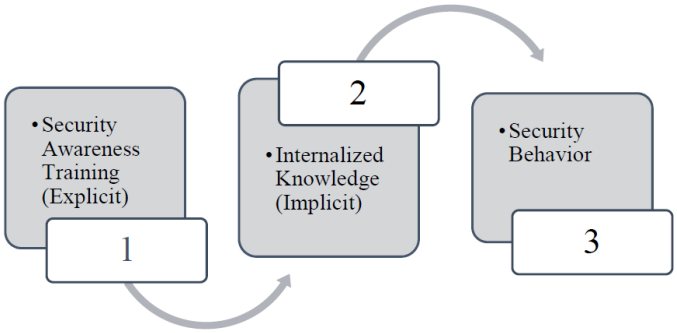

Fig. 4 A theoretical model of how security awareness training affects behavior [23]

In Step 2, after being presented with the information security awareness material, users must complete a short test measuring the extent of the internalized message. The internalized knowledge is referred to as implicit behavior. Finally, in Step 3, employees' actual behavior is measured to test whether information security behaviors changed due to awareness training and whether appropriate behaviors require internalized understanding [23]

Employees can be the most significant security threat to company information when they participate in risky behaviors [24]. An abundance of recent research has focused on employees' risky behaviors [25]. Examples of those behaviors include accidentally installing viruses on company computers and using questionable software programs without permission or prior knowledge. IT systems are dependent on employees' behavioral compliance with security requirements [23]. Without information security awareness training and a commitment to compliance, people's intentional and unintentional actions cause adverse consequences that negatively impact organizations [26].

Deepa [27] states that many organizations utilize information security awareness training to support information assurance professionals' use of advanced information security technology. Organizations do not always offer information security awareness training to regular users, and the lack of focused training makes employees the weakest link in any organization [27]. While many organizations recognize people as their primary asset and risk, some organizations do not adequately address insider threats and vulnerabilities, nor do they assess the security practices of third-party partners and supply chains [28]. Training is often needed to maximize the benefits of human assets and minimize risks. In addition to training, another way to maximize human assets and reduce information security risk is to implement ISPs that provide employees with guidelines and structure when dealing with information security.

D. UTAUT2 and Behavior

Scholars have proposed many theories and frameworks to understand and predict users' behaviors regarding technology acceptance, adoption, and use [7]. The many different frameworks represent evolving perceptions of the drivers of users' attitudes toward technology. One of the more recent models proposed to explain technology-related behavior is the UTAUT2 [14].

Venkatesh et al.'s [14] UTAUT2 was an extension of the original UTAUT. The UTAUT2 framework was designed to explain the interaction between seven intrinsic and extrinsic variables and users' behavioral intentions regarding technology [14]. The present study examined four intrinsic factors included in the UTAUT2 as predictor variables: performance expectancy, effort expectancy, hedonic motivation, and habit. The present study examined three additional extrinsic factors included in the UTAUT2 as predictor variables: social influence, facilitating conditions, and price value. Researchers have used UTAUT2 as a predictive framework [7]. As such, the UTAUT2 was deemed an appropriate tool to examine factors that might predict end-users' behavioral intentions to comply with ISPs. Figure 2 presents the relationships between the variables in the UTAUT2 model.

Figure 5 illustrates Venkatesh et al.'s [14] addition of hedonic motivation, price value, and habit as predictors of behavioral intentions and user behavior. The causal networks of the influence matrix in the UTAUT2 are based on dimensions and criteria that demonstrate the perceived usefulness, complexity, social factors, perceived behavioral control, interest, quality, past behavior, service quality, and usage time on behavioral intention [14]. Perceived behavioral control "reflects perceptions of internal and external constraints on behavior and encompasses self-efficacy, resource facilitating conditions, and technology facilitating conditions" [3]. In Venkatesh et al.'s [3] research, performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit had the highest impact as predictors of behavioral intentions to accept and use technology.

Venkatesh et al. [14] stated that facilitating conditions depends on the users' perception of technical support when using technology. Subsequent research has shown that hedonic motivation also remains a significant factor in the acceptance and use of new technology [29]. Hedonic motivation has not been thoroughly explored in the context of ISP compliance, highlighting a need for the present study. Additionally, Arenas-Gaitán, Peral-Peral, and Ramon-Jeronimo [30] noted that price value creates doubt about an end-user's role in adopting technologies when making financial decisions. Arenas-Gaitán et al. [30] also argued that habit, one of the UTAUT2 factors, directly and indirectly, affects end-user's behavioral intention to comply with ISPs in organizations.

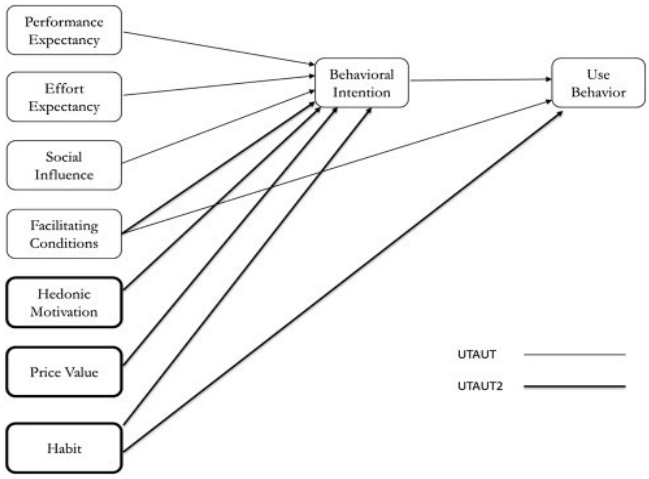

Fig 5. UTAUT and UTAUT2 factors [14].

Thus, the use of the UTAUT2 in the present study addressed a gap in the research literature and contributed to knowledge about end-users' behavioral intentions to comply with ISPs [31].

Lebek et al. [11] suggested that a theory of ISP awareness is needed for researchers and practitioners to understand awareness initiatives' expected outcomes. The UTAUT2 [14] theoretical framework can help scholars and practitioners understand how and why information security awareness initiatives influence end-users' behavioral intentions [23].

III. Conclusion and Recommendations

Scholars have acknowledged that employees' noncompliance with ISPs could result in inadequate information security [9]. Furthermore, the information security threats' scope requires information security and information assurance professionals to focus on protocols and processes that can offer protection against those threats to develop effective ISPs [32]. Developing a better understanding of the behavioral factors that influence ISP compliance among employees might improve organizational data security [33]. Continual training programs and policy guidelines explicitly designed for end-users may be more effective if structure and routine are emphasized rather than benefits associated with performance benefits, ease of use, technical support systems, social expectations, or cost considerations. Such an approach would work to highlight the importance of developing compliance habits.

Studies frequently focus on behavioral intentions to comply instead of observed ISP compliance behaviors [34]. The use of the behavioral intention construct means that the link between technology adoption factors and observed compliance behaviors has not been thoroughly investigated. By designing a study that allowed employers to tracked compliance behaviors, the need to make assumptions about some variable relationships would be reduced. Studies could also be conducted that determine the importance of information security awareness by measuring employees' attitudes and behaviors both before and after information security awareness training. Such research would necessitate a quasi-experimental approach, as multiple measures would be administered [17]. Studies investigating the effectiveness of security awareness training or awareness campaigns are not readily available. As a result, researchers must make assumptions about awareness factors that influence employee attitudes and self-efficacy beliefs about information security.

Summarily, in reflecting upon the theories and research to address the lapses reported by the 2019 GAO report, it is recommended that outside of the routine federal OMB directives with Congressional oversight, that the federal government take an approach of offering assistance in bringing the agencies up to speed with a corrective plan of action. This plan would take an in-depth analysis of the process and the employees entrusted with the security of the information systems and associated processes. Stricter laws and regulations in accountability that require the forfeiture of fines and criminal/civil penalties could be implemented. Conclusively, after the Office of Personnel Management records breach in April of 2014, the federal agencies are still not correctly performing the necessary steps to safeguard information systems directly tied to national security and the intelligence apparatus. Hopefully it won't take the losses of livelihoods from an economic perspective or, more importantly, American lives from a national defense perspective before agencies align with following the directives set forth by OMB.

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Dr. S. Raschid Muller is a Senior Cybersecurity SME with the Department of Defense (DoD) at Fort Meade, Maryland. He teaches Cybersecurity at the undergraduate and graduate levels at Arizona State University, University of Maryland Global Campus, and Capitol Technology University. Dr. Muller is a 2020 Brookings Institute Fellow (LEGIS) currently serving on the House Committee for Homeland Security assigned to the Cybersecurity, Infrastructure Protection, and Innovation subcommittee in the United States Congress. He will attend U.C. Berkeley's Executive Leadership Academy in 2021 as a Fellow in the Goldman School of Public Policy. He is a member of IEEE, ISACA, NDIA, and AFCEA.

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Impact of Conflicts on Productivity at Workplace

Dr Bhakti Parashar[1], Ravindra Sharma [2]
[1]*Assistant Professor, VIT-Bhopal University, Bhopal, India, e-mail: sharma.bhakti@gmail.com*
[2]*Assistant Professor Swami Rama Himalayan University, Dehradun, India, e-mail: ravindrasharma97@gmail.com*

***Abstract*—Employee's productivity is the most important and pressurising issue in the organization which is now a days a very normal and natural part in this global competition with the differences in culture, values and ethics. As the world trade is operating under one umbrella people comes from different backgrounds and work style are taken together for shared business purposes, so conflict may take place in any type of association. Organizations generally tries to make their employees to work together and conflicts start when people with variety of workstyle, goals, motivations and process work together with different priorities. There can be many repercussions of such conflicts such as insults, non-cooperation, bullying, aggression and many a times fighting and harming other physically due to ego classes. People with such surroundings may be affected with stress even if they are not a part of that conflict because such conflicts create unhealthy working environment. Majority of people come with the solution that not to put those people in the same team who are creating conflicts, but this is the biggest misstate generally an organization does, because such decision may result in communication gap, lack of understanding, wrong perception. Neither we can separate people involved in conflict and let them stop communicating with each other nor can we leave them on their own because unresolved conflicts may lead to feeling of insult, hopelessness, dissatisfaction, unhappiness and so on. The extreme outcome of unresolved conflicts is work disruption, decrease productivity, project failure, absenteeism, turnover and termination.**

However if resolved properly it may result in better understand, ideas, working conditions and relationship and finally increase in productivity and profitability. Thus, this paper attempts to find out the possible outcomes of conflicts on the productivity of an employee and what can be effective solution for such conflict for retention of employees and their productivity.

***Index Terms*—Employees, productivity, conflicts, workplace**

I. Introduction

WORKPLACE environment is one of the most significant factors now a days, when it comes to workplace specially private organization are giving special privilege to retaining talented employees, where the employer knows these talented employees are highly demanded in the market. In contrast adverse workplace environment creates negativity and decrease productivity of workers. Nevertheless conflict at workplace is unavoidable especially at large scale organizations, where if managed properly will give you substantial change and can put positivity and the sense of competitiveness among employees which may improve performance, which is very rare, because instead of giving stress at moderate level to employees to convert into eustress employer does not know when it has converted into distress, as there is a very thin line between estruses and distress. With this the confusion of getting positive impact of competitiveness and improvement in productivity employer generally ignore the workplace conflict and unintentionally conveys the message that inappropriate workplace behaviour and inadequate work performance is happily accepted in the organization. In addition to this, corporate culture has become so complex and complicated with the people of different culture, values, interest and expectations. By way of all this workplace complication generally the efficiency and productivity of employee's decreases and dissatisfaction, employees' turnover, adverse workplace environment, poor performance and frustration increases.

Conflict is a natural thing generally happened in most of the organization, it occurs when one person perceives his/her interest is being declined or opposed. There are basically two types of conflicts ***Vertical*** that is between different hierarchy levels whereas the ***Horizontal*** one occurs between the individual at the same level. Conflict can also be interpersonal or intrapersonal, when there is a conflict between two or individuals that is called interper-

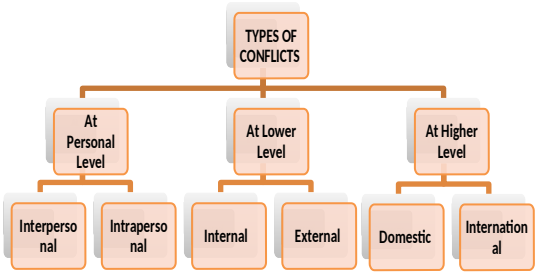

Fig.1 Types of Conflict
Source: - Authors own

sonal and when it arises between one or two groups then that will be considered as intra-personal conflict. It may be internal or external and it may be at micro level or macro level. An internal conflict happens within the organizational people and external one takes place with the people or group outside the company. Similarly, a micro level or conflict at national level can be described when conflict arises with the people who resides within the domestic territory of the country, but when this conflict extended and reaches to international front or with foreign country people it will be called macro-level conflict or international conflict.

The above graph summarises the types of conflicts, where the conflicts start from interpersonal level and extended to international level if it is a multinational organization dealing with other countries as well.

Nowadays, business particularly a large scale one tries to hire people not with only good intelligent quotient but with emotional quotient as well. Since all organizational people knows very well the conflict very soon leads to non-productivity, negatively affect the performance of team, defame and ultimately loss to the company or may result to shut down.

Instead of giving distress, depression, frustration, loss of interest, hypertensive diseases to the employees due to ignorance of conflict at workplace which leads to the ultimate loss to the organization, one should look after the solution to get rid of such conflicts.

II. REVIEW OF LITERATURE

Knippen and Green(1999) says that the best possible way to tackle conflicts empirically is that one should follow six process that explains the conflict situation to others, asking the other party how he look into the conflict situation, reacting in the manner the other party looks into this situation. Combining these two and deciding how to resolve this problem of conflict and making commitment to resolve by summarizing action taken by each party to solve it and promising to be committed in future to continue resolving it which might arise.

Moore (2007) has correlated employee's performance with the performance criteria that has a set of standard for employees behaviour at workplace which include more of how an employee does the work than that of what is the employee's work Workers are evaluated on the basis of how good they are at their job measured with certain set of standards fixed by the employer. Performance of employees is basically related to the performance appraisal to compare employee's goal achievement with the set of standards.

Dontigney (2012) also favours that conflict may decline trust on the employer by employees that can slow or stop progress of project implementation, loss of trust and slow progress can be the negative impact .Consequently, customer dissatisfaction, failure in completing deadlines for delivering goods and services, fall in service quality will be ultimate outcome.

Rana, G., Sharma, R. (2017), organization culture play pivot role in managing conflict situation in an effective way in the organization**.**

Kelly (2012) opined that there is a need to acknowledge organisational conflicts and its existence along with opening the options for systematic solutions by business leaders. An adaptable organization should be encouraged which can copes efficiently with the dynamism in modern business. This is the most contemporary, functional view which treats organizational conflict as positive and productive force.

Sharma (2019) postulated that engaged employee are less involved in organizational conflict. Therefore organizations should ensure proper engagement of employees in workplace.

Rana (2017). Organizations have adopt multiple approaches to deal with workplace conflict. Efficient management control can also prove important in dealing with workplace conflict.

Olu OJO& Adensubomi Dupe Abolade (2014) emphasised on the trailing and retraining of the employees in the field of conflict management which will help to create a healthy working environment. For that efficient and effective communication should always be there between all the employees at all level. It's the responsibility of management to make such policies which can ensure people that the conflict which occurs within the organization will be resolve with a fast pace.

Bellet, Clement and De Neve, Jan-Emmanuel and Ward, George (2019) analysed that employee's happiness is most important and more closely related to sales, there are so many extensive margins of happiness the frequency of workforce supply like attendance and breaktaking. The study concluded that if the employees at workplace are happy their productivity and efficiency will be more.

Rana G., Sharma R., Goel A.K. (2019), Effective conflict resolution mechanism in the organization improved business performance.

Rasool Faiz Samma, Maqbool Rashid, Samma Madeeha, Zhao Yan and Amna Anjum (2019) determined how an unhealthy toxic environment at workplace can directly and indirectly influence the employees productivity and may go to the extent of depression ,toxic workplace environment is inversely proportion to workers productivity because of multiple reasons like harassment, bullying, ostracism and incivility, all are the consequences of severe conflicts at workplace and due to which repercussion like insomnia, more absenteeism, social dysfunction, headaches, heart related health issues like blood pressure and diabetes are obvious.

Rana, G. and Sharma, R. (2019), said technology helps in minimizing work related conflicts as through

technology work allocation can be done in a transparent way.

Eke John, Chika Ebere, Akintokunbo, Odunayo Oluwarotimi (2020):-Conflict can be constructive, but it has always been seen as evil, but the constructive one that is conflict management is a high point for any working environment. Conflict management in an organization can create a very good and conducive workplace environment which can be free from violence, resentment, incivility and can be prevented from financial, psychological or physical loss of employees and employer.

III. Reasons Behind Confilct

These days due to globalization and cut-throat competition employees productivity and performance is the priority of a standard organization which put lot of pressure on the employer as well as the employee which may end with distress and conflicts at workplace, a worker cannot work with good productivity under lot of pressure and definitely if he works with such circumstances will result in distress ,conflicts and loss of productivity and ultimately he will leave such organization and a company will lose efficient, highly productive and talented employee as tolerance level is different from person to person.

Basic reasons behind conflicts at the work place can be:-

- Diversify values, customs, attitude personalities and perception is one of the common reason behind conflicts, people from same place, gender or religion makes their group on the basis of their compatibility and doesn't gel with other group.
- People with different needs, expectations and communication find difficulty working together in a team.
- Any organization tries to maximize their profit on the cost of minimizing cost and that can be possible by limiting the resources and time which makes worker tensed and stressed, with such circumstances employee generally loses temper and there are chances of ***vertical conflict***.
- When some ambiguous kind of roles and responsibilities are given to employees, lot of confusion arises and conflicts too.
- Unclear administrative procedure and sometimes reward structure and decision making strategy makes organization's work culture more complicated and confusing.

IV. Impact of Conflict

If conflict at workplace continuously be ignored by the employer, it may lead to the serious problem and ultimately some serious outcomes company has to face. It is the responsibility of an HR to settle any kind of conflicts at initial level otherwise the whole blame will come to him by ignoring such conflicts. Some of the major impact of conflicts at workplace can be:-

- The first most impact is company's reputation which can be harmed by the people who are involved in the conflict and their conflict has not been resolved. When a company is in bad books, it's very difficult to find talented people to hire.
- Unsettled conflicts or the presence of conflict at workplace creates unnecessary tension and stress among the employees which affects their efficiency and productivity. People cannot work in such environment with full dedication and concentration.
- Biased resolution of conflicts create dissatisfaction among the employees besides loss in productivity and efficiency results in project failures, high absenteeism, loss of interest and ultimately loss of customers and profit.
- Unresolved conflicts often accomplish with frequent arguments and may be fight which creates negativity at workplace, even those who are not involved in the conflict may be affected from it.
- Poor communication and misunderstanding affects employees moral which demotivates them to continue with the present job, more employees turnover will happen with such conditions.

V. Suggestions

Workplace conflict first of all should not be taken lightly, if a person is well worse with good HR practices and supported by the higher level management people then the chances of conflicts at workplace is least. An organization must embark with HR policies which should be formulated in such a manner so that occurrence of conflict is minimized. Even though conflict occurs it should be resolved immediately without biasness, else biased resolution results in more frustration and demotivation among the employees and will convey wrong message to the employees who are not involved in such conflicts. Some kind of training is also required at initial level in the form of an orientation program or an induction program to let new joiners know that conflict kind of things are not acceptable at this place. If someone found guilty and reason behind any conflict should be penalized immediately to let other employees learn from it. Conflicts between workers and management should be resolved with the common concern, since employee oriented workplace generally exploits employees.

VI. Limitation

The study is purely qualitative not the quantitative one and it considered only one aspect of conflict on employees but not the employer's effort to minimize it. The analysis was a generalized one which may vary from sector to

sector, such as conflicts at banking sector may be very different from the education one i.e., in schools and colleges and so on. Thus, the types and strategy to handle conflicts vary from sector to sector.

VII. CONCLUSION

Conflict at workplace is a common thing happens in every organization but it's the employer's job to not let the organization be affected from it. If the organization is already prepared to handle any kind of conflict without fail, the consequences could also be avoided. Its whole sole employer's competency that how he is able to tackle conflicts at workplace without affecting the productivity of the employees. Hence, unbiased, quick resolution is the most effective tool to settle conflict at workplace.

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Green Human Resource Management: A Conceptual Study

Swati Tomer[1], Dr. Geeta Rana[2]
[1] *Research Scholar, Swami Rama Himalayan University, Jolly Grant,*
Dehradun, Email: swatitomer06.tomer@gmail.com
[2] *Associate Professor, Swami Rama Himalayan University, Jolly Grant,*
Dehradun, Email: geetaphd@rediffmail.com

***Abstract*—As we are moving towards industrialization it increases business production, technology and other business activities. Increment in number of industries had given rise to the use of machinery and other heavy equipments - which in turn, used fuels as source of energy, which is the reason for environmental degradation. To save our environment from hazards and to achieve environmental sustainability by adopting green practices it is a high time to become aware about the green concept. The paper tries to explain about Green HR Concept, its importance, its meaning, what are the reasons for greening, ways to make Human Resource functions green and some previous studies on Green HRM conducted by various researchers. The paper will enhance knowledge, awareness, better understanding about the green management idea.**

***Index Terms*—Green Human Resource Management, Greening, and Environmental Sustainability**

I. Introduction

GHRM is a novel concept & is considered a crucial part of HRM. It is a revolutionary concept in the academic world as well as the practical world of HRM (Stojanoska, 2016). The term "Green HRM" was coined by Wehrmeyer in 1996. Majority of people don't know about this concept and those who know they have very less knowledge about it. There are some developments with respect to GHRM concept but they are not related to Indian context. Since Green HRM is considered a new & emerging field in Management domain & specifically HRM literature there is need for more research to create deep understanding & awareness on GHRM.

This paper will solve the purpose of providing a fundamental comprehension of GHRM. In this paper we have attempted to address the following questions:

- What is Green?
- What are the reasons for Greening?
- What is GHRM?
- What is the importance of GHRM?
- What are the ways by which we can make HRM functions Green?
- What are the outcomes of some research studies conducted on Green HRM?

A. Green:-

'Green' means environmental. Green today has become a buzz word only due to the corporates & the individuals understanding & awareness that the consumption levels of resources made by them are higher than what is available. This led to emergence of the concept of "sustainability & greening".

"Going green" has four major implications regarding HRM- Opatha (2013); & Opatha & Arulrajah (2014)

1. Protecting the natural environment.
2. Maintaining the natural environment.
3. Environmental pollution reduction.
4. Creation of natural heritage.

B. Why is Green?

Govt. & firms uses natural resources generously for producing various consumer products without thinking about the future generations. Environmental issues like:- global warming, environmental pollution, environment degradation is in existence. Due to which the concept of Green Management emerged. Going green means implementing determined life style changes which helps everyone to live in sustainable way. Adopting green practices, green behavior, green actions will help to achieve environmental sustainability and will contribute a positive impact on environment.

C. Green Human Resource Management

Concern for the environment already started since 1990s. Organizations, businesses have taken action to reduce waste, pollution by establishing approaches & system for Environment Management like:- use lesser contaminated materials, product design, reduced packaging & energy efficient (K.-L. Wong et al., 2013). There were several studies K.-L. Wong; (2013); C.J.C. Jabbour et al. (2012) which have focused on HRM & Human capital towards environmental sustainability & environmental concerns. As mentioned by Hussain (2018) Human Resource field plays an important role in chasing green practices, HR plays major role in hiring skilled talents who can implement and adopt green practices in the organization & can enhance environmental sustainability.

Some of the definitions provided by the scholars of HRM are:-

Wikhamn (2019) stated that "GHRM" is the adoption of HRM practices and strategies which help in achievement of social, financial & ecological goals, with providing a positive impact to an organization over a longer time horizon. According to (Al Mamun, 2019) GHRM is about

making the employees green by adopting environmentally-friendly HRM practices, policies so that society, businesses, individual, & ecology can be benifited by this . Green HRM will shrink the carbon footprint by adopting green initiatives like: electric filing, teleconferencing, recycling, ride sharing, tele-commuting, virtual meetings, e-learning & paperless offices(M. Mampra; 2013). GHRM practices are very important in order to boost employee morale, providing him job-satisfaction which helps company to achieve better employee engagement, involvement (J. Cherian & J. Jacob; 2012).

D. Importance of GHRM

Subsequent benefits are:-

1. Reduction of climate change concerns.
2. Growth of business firms.
3. To avoid harms to animals.
4. To avoid health diseases caused by pollution.
5. It provides maximum contribution of employee on each of the four roles ie.-:
   - Naturalist
   - Environmentalist
   - Cleaner
   - Maker

GHRM is a part of a broader framework of Corporate Social Responsibility which includes application of environmentally-sound strategies & policies for promoting utilization of natural assets in a sustainable way & supporting ecology.

II. MAKING HRM FUNCTIONS GREEN

HR dept. plays major role in translating green policies into practices as stated by (Renwick, 2008) & creating renewable environment within the company (Harmon et al, 2010), as a result green goals will help in achieving green missions all over the HR process from entry-exit stage (Dutta, 2012). Developing HRM function green includes adaptation of policies, procedures, which guarantee that the organization hires right person at the right time & at the right place. We tries to seek out to show some ways how to make some major HRM functions green in this paper.

Functions of Human Resource Management	Possible Ways to make HR functions green
Staffing	Assimilation of green values in the recruitment messages. Paper less work can be followed by practicing & hiring through online means.
Hiring/ election	Selecting applicants who have green morals & responsibilities towards ecology. Selecting applicants who practice & pursue Green agendas to save environment.
Analysis of job/ job design	Incorporating element of environmental sustainability in Job Description. Incorporating Green abilities in Job Specification.
Coaching	Communicating awareness about Green concept to employees through learning programs. Including role analysis & needs of employees.
Measurement of performance	Evaluating employees' task performance according to Green-related criteria. Measuring employees environmental behavior through key performance indicators.
Reward Management	Providing intrinsic & extrinsic awards to employees for their green roles.

III. RESEARCH IN GREEN HUMAN RESOURCE

Following table contains contemporary studies done by various researchers:

Author	**Article Title**	**HRM Functions**	**Data Type**	**Outcomes**
Liaquat Ali Rahoo et al/ 2020/	Analysis of Green Human Resource Practices in IT Industries of Pakistan	Staffing & selection, Green performance measurement, green learning & coaching programs	Descriptive- survey, questionnaire	Results revealed that firms are not providing effective training programs, not hiring green employees & not providing results based performance system

Author	Article Title	HRM Functions	Data Type	Outcomes
Ibraheem A. M. Aburahma/ 2020	The Relationship between Green HRM Practices and Organizational Performance at Gaza University	Green hiring, green instructions, green compensation, job performance,	Descriptive and quantitative	This study revealed that there is a positive relationship between Green practices and organizational objectives
Aktar & Islam/2019	Green HR strategies & Employee Engagement: Empirical evidence from RMG sector	Green tutoring, green employee involvement, green performance appraisals, green incentives	Descriptive-questionnaire	Results revealed that green employee participation & green training & development showed positive relationship with employee engagement
Al Mamum/2019	An Analysis of Employee Awareness on GHRM Practices: Evidence from Bangladesh	Personnel planning, staffing, orientation, green instructions, appraisals, reward management, employee self-control management, employee relations	Combination of both quantitative & qualitative research	Findings of this study are that majority of the HR managers from diff industries are aware of GHRM. However, proper green activities are not yet practiced in the organization
Reshma Dingra & Padmavathy/2019	GHRM – A leap towards sustainability	Green hiring & staffing, green learning, green measurement of performance	Case study	Author suggested green initiatives for minimization of environmental pollution
Patil & Sarode/ 2018	Green HRM : Role of HR Managers To Achieve environmental sustainability	green enrollment, green results based management, green professional development, green remunerations and involvement	Systematic Review	Study focused on prevention of pollution
Tang et al./ 2018	Green HR practices: scale development and validity	Green staffing, training & learning, green management for results, green salary system, participation	Exploratory analysis & factor analysis	Developed a GHRM scale

Author	Article Title	HRM Functions	Data Type	Outcomes
Seyed Javadin et al/2017	GHRM: an investment and sustainable development approach	green selection and recruitment, green training, reward system.	Qualitative, content analysis	Results revealed identification and development of characteristics of GHRM

IV. Conclusion & Future scope

Aim of this paper is to deepen the consciousness about GHRM concept. By adopting green practices firms can achieve environmental sustainability. This is only possible by effective implementation of GHRM strategies and practices within the organization. Offering Green HR practices will help in attracting skilled & potential talents & executing these practices will enhance employee green behaviors, green focus in the organization. There is need to provide insights about GHRM & empirical verification. GHRM can develop motivation, social identity, commitment to employees to contribute their efforts. Green HRM efforts resulted in improved retention rate, improved public image, improved productivity & efficiencies, improved work-life harmony, cut rates, improved labour productivity, business opportunities & sustainable use of resources. In addition, various variables like: organizational support, environmental consciousness, employee commitment, staff participation, organizational learning capabilities and perception of employees could be used in future exploration.

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Impact of Banking Sector wise differences on High-Performance Work Practices

Preeti Vats[1], Shivani Agarwal[2]
[1]*Research scholar, Dr. APJ Abdul Kalam Technical University, Assistant Professor (Kamal Institute of Higher Education and advance technology)*
[2]*Corresponding Author, Assistant Professor, KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India*
[1]*preetivats2515@gmail.com*, [2]*jindal.shivani24@gmail.com*

***Abstract*—The objective of this research paper is to comprehend the aspects of High-Performance Work-Practices pertinent to Government Undertaking public sector banks vis-à-vis their counterpart of private sector banks. The sample consists of 800 people, out of which 400 were public sector bank and 400 were from private sector banks. High-Performance Work Practices was measured through a four-dimensioned scale developed by Delery and Doty (1996). Significant differences regarding High-Performance Work Practices after data collection were tested using t-test. The findings reported noteworthy variance in the demonstration of many of the influencing factors of High-Performance Work Practices between the studied groups. The insights gained through this paper can be utilized to improve the level of High-Performance Outcome Work-Practices among the Government owned-public sector bank and privately owned-private sector banks. This study represents the data and delivers insights of the dimensions of High-Performance Outcome Work-Practices of the workforce.**

***Keywords*—High-Performance Outcome Work-Practices, Sector-wise differences, Public sector bank and Private sector banks**

I. Introduction

ALL KIND of Banks are motivated to nurture and maximize their performance matrix in twenty-first century. Every Bank with different financial holding pattern, private or publicly funded of diverse size, sector and geography works onto increasing their quantitative and qualitative part of Banking performance matrices. Banks are focusing more on workforce parameter to improve their performance in all ways of their business operations as it is more leveraged on services sector. Banks are progressively directed on providing and assessing Workforce commitment, fulfilment and confidence to shoot any Bank to next level of Banking performance but also consider such features as Banks end result. Lot many manhours have gone into HPWPs since classical theorists to augment efficiency of workforce iteratively, which hypothesized scientific means of bank administration, banking values of administration and exercise of controls. Even today the emphasis is floated towards neo-human relation and neo-behaviorists thoughts. One of classical theorist Taylor and Fayol paved the way for supplementary structural feature of a Banking organization. They were of belief system that a methodically consequential and premeditated effort matrix encompassing the standard principles of administration will meaningfully add to upsurge the productivity of workforce having favourable impact on workforce confidence and fulfilment, which results in influencing the productivity and hence self-sufficient administration exercise would result into a high-level outcome performing enterprise. Weber established same and preferred balanced and lawful authority to increase an organizations performance. He expounded that fixed pre-known set of rules and protocols, meritocracy, accountability, tenure, unbiasedness and impartiality will lead an organization of future to its performance maximization route.

II. Conceptualizing the Variables

Numerous researches are conducted for High-Performance Outcome Work-Practices system, their inference, their comparative standing to Banks, but the current paper is for the baselining that silhouettes High-Performance Work Outcome system is considered on four constraints explicitly work-specification, Training, work-participation and work-security. A grading scale postulated by Doty and Delery (1996) is positioned to rate the workforce involvement of HPWPs in this paper. All the four scopes of dimension that were projected by Delery and Doty are represented underneath. All these extents are labelled in element to provide a better knowhow of HPWPs. The dimensions are as under:

2.1 Training: Training is used as tool great usability tool for organizations that empowers a worker associate to a level where they can finish the assigned job to them - properly, thoroughly and effectively. Training is medium by which a staff's information and skillfulness for completing a particular work item. This denotes as a tool which can be used in all kind of Banks to bridge the know how gaps among standard protocols and actual performance appraise basis. In this paper numerous parameters are explicit to factor training in gauging or measuring the workforce experiment of HPWPs. This includes factors like how often training programs are rendered to workforces so that workforces can best utilized them. Widespread training program tools are undertaken to enhance the skills and know-how of the workforce when focus come into play in the Banks. This also signifies the reputation of training conferences delivered to the workers to augment their promotability in the Banks.

2.2 Job participation: This parameter is demarcated with envisioning that a workforce engrossment offers workers a

chance to get inspired and wherever fitting, permits them to aggressively be involved as a decision maker in the organization operational processes which impact their immediate work. This alters the mutual cognizance amid staffs and the organization administration. In this current paper numerous variables are considered and taken into interpretation to safeguard work participation of workforces comparable if the occasions are informed to the workforces to endorse the improvements in regard to ways of working as is currently completed. It regulates the degree of contribution of a workforce in organization verdicts taken by controller manager. It encompasses the amount of free communiqué between immediate supervisor and worker subordinates with respect to the professional apprehensions.

2.3 Job Specification: A determination of staff physiognomies and schooling prerequisite compulsory for suitable recital of certain responsibilities and work item tasks encircling a explicit job function or work item function. Job specification is subsequent from the work scrutiny. Job specification assumes the personal, physical, mental and behavioral social topographies of the job staff. Job Specification sets the yardsticks of the know-how, capabilities and craftmanship that are essential to do a certain job efficiently. It regularly comprises structures like schooling, emotional behavior, training, corporeal skillset, communiqué skills, physical exertion undertaking and decision making etc.

2.4 Job security: The work security is a necessity or reliance that a staff will endure to deliver the job work without endangering of becoming unemployable or un-employed. In deprivation of such job work security at work place signifies to a state in which a staff with a regular work item sees a greater probability of becoming unemployed in coming future. Job security typically be contingent on predominant baking business scene, economic situation and the individual working capacity. Job security usually follow from the details of the engagement contract, labor legislations or shared arrangement that prevents arbitrary dismissal of services of a workforce or workforce redundancies.

III. Literature Review

Applebaum et al. (2000) pondered plentiful multinationals connected to the manufacturing of steel melting, apparels, medical devices and apparatus's. From worker assessments, seminars with administrators and union legislatures and steel plant site co-visits, they founded that high-performance outcome work businesses are just more productive with competence but also more and more staffs openhearted accept changes and relate to greater work item satisfaction and pledge towards the job amongst its workforce. They did not ascertain any signal of high-performance outcome workplace practice system tempt any negative side-effect on workforce job related stress level. Workforce who have options to participate are not probable to label that they regularly have annoyances on their work or that more work is bestowed to them to what can be delivered.

Thompson (2000) preached that habitually urbane deduction for aerospace with 20 per cent of United Kingdom airline enterprises using the High-Performance Outcome Work-Practices to a prominent standard. Thompson additionally highlighted many point-to-point for the HPWPs to progress as a part of any organization and even true for every Bank. The writer appealed that despite vigorous signals of hopeful impacts, corporations are not fundamentally persuaded by the enactment of high outcome procedures is expected to give results for their companies or banks or find the accepting HPWPs too arduous. This is also understood with discrete business vertical example different banks have different acceptance.

Cappelli and Neumark (2001) set foundation that work-rotation and procedural training bestowed to workers are surely associated to their current level of performance in examples of both Italian as well as British corporations. With their examination, they recognized that British corporations are fairly more productive then their Italian counterpart. The unlike methods by adjudging them to shop-floor methods, skillset and workforce relations amounted to 40 per cent of the variance. In both explanations, the initiation of team co-operation principles proposes a moderately noteworthy chapter along the restructuring procedure of companies and service sector. Thus, discrepancy in the technique of espousal of the high-performance outcome work systems observes impact their effectiveness for a establishment even in-service sector.

Lepak and Snell (2002) found that certain high-performance innate matter such as training the workforce and their skillset advancement and enhancing the delivered service quality are an domineering portion in the forthcoming events as it was in the history for all corporations as well as Banks. Technology in history and in future as well will transform the way HRM outcome practices are steered these days. HR workforce need to understand new and forthcoming generations view of work and so; they need to develop and rely on new tools and mechanisms for HRM outcome practice implementation to be imagined via HPWPs. In today's situation where outsourcing is an industry norm and way of resource engagement, deliberated human resource planning and high-outcome work practices are in the sun rise time in front of them to add banking value to future Banks performance. Supplementary, for healthcare segment the resolute of HRM of the hospitality trading will have to reflect several propensities and will be susceptible by local regulations.

Ethira et al (2005) measured research on the Dublin hotels that showed some of the people centric work methodologies associated to superior work standard recital implementation and practices. They detected partial concentrations of worker influence, intellectuals deal with the same and are the actually the foundations of high-outcome based HR work-practices.

Obeidat, et.al., (2016) has directed a research paper to highlight the affiliation amid (HPWP) high-performance work practices and Banks and Organization performance with a more than one dimensional mechanism of the affiliation amid HPWP and their performances, this hypothesizes HPWP conferring to the capability, inspiration and opportunity framework.

Odiaka, K., & Chang, K. (2019) deliberates the implication of HPWPs High-Performance Work Practices and examines its bearing to workforce rendezvous and performance in the country Nigeria. Conclusions illustrates that when workforces sense more allegiance to their work item or services, they are highly susceptible to buttress the HPWPs, knowing its reputation and signifying inspired performance. The affiliation amid HPWPs and performance consequences is reinforced by decision-making trust in workforce's competence and gratefulness for the work completed.

IV. Research Methodology

Sample Size: The entire sample comprises of 800 workforces employed at managerial levels from banking sector. Out of the total sample 400 each workforce fit into public and private sector bank correspondingly. Questionnaire was circulated over HR of the bank branches with previous consent from the Banking companies elucidating the resolve of the study. The questionnaires entail of demographic factors as: Name; Marital Status; Age; Educational Qualification; Gender; Rank; Duration of work experience; and the Wage (as voluntary).

A. Research questions:

Check if the variables of High-Performance outcome Work Systems impact the Private and Government owned banks contrarily?

B. Objectives of the Study:

The aim of the paper is to understand the variable factors impact on High-Performance Work Outcome Practices pertinent to public and private sector banks.

C. Hypotheses:

The hypothesis identified for this paper as trails:

H1: There exist a significant variance amid factors of HPWPs in public and private sector banks.

H1a: There exist a significant variance amid factors of Training in public and private sector banks.

H1b: There exist a significant variance amid factors of Job Participation in public and private sector banks.

H1c: There exist a significant variance amid factors of Job Specification in public and private sector banks.

H1d: There exist a significant variance amid factors of Job Security in public and private sector banks.

V. Methodology

A. Instruments and Scoring

Instruments: Subsequent questionnaire was entrusted for conducting this paper:

High-Performances Outcome Work Practices is gauged on a eighteen items scale, basically rationaled on four facets explicitly: Training, Work Specification, Work Participation and Work Seurity this was initially industrialized by Delery and Doty (1996) with twenty three items which later-on revised by Longzeng Wu, et.al. (2011). Contributors were requested to answer on a 7-point Likert-scale oscillating from 1= strongly disagree to 7= strongly agree. The general reliability co-efficient of this scale was instituted to be comparatively high at 0.84.

Scoring and Analysis: The manual directives defined the scoring. The further scrutiny was conducted by T-Test by computing the Mean and SDs. For the detailed analysis of collected data SPSS V. 20.0 was deployed.

VI. Results And Interpretations

The t-test was considered to identify the variances amid the four variables and total HPWP of Public and Privat banking workforce. The results display that there is a significant variance exist amid the two banking groups amongst the different dimensions of HPWP. The resultant p-value (.05) demonstrates that variance exist between the sample population.

Table 1 specifies the significant variance exist in the demonstration of HPWPs ($t= 3.88$, $p < 0.05$). The mean score as well at 183.70, which is on higher level in evaluation to that of Public sector banking workforces ($M= 162.44$), thus this explains that the private bank workforces display higher levels of HPWP in operations.

Additional to this, Table-1 designates the significant variances in the proportions of HPWP. The temperament of training is sophisticatedly higher (t-value= 2.436, $p < 0.05$), as the mean score of Public sector banking workforces is higher ($M= 29.52$) in comparison to the mean score of private sector banking workforces, at 26.61. Thus, a significant variance in the Job Participation of Public and private bank workforces at t-value computed as 3.60, $p < 0.05$. This is seeming that the demonstration of Job Participation is higher for private sector banking workforces as $M= 35.93$ and that of Public sector banking workforces at $M= 29.89$. A significant variance is found in the Job specification of Public and private banking workforces (t-value = 3.95, $p < 0.05$), this highlights that this variable factor is voiced more in private banking workforce with $M = 29.52$ with assessment of Public sector banking workforce of mean score as 26.61. There is significant variance in the Job Security of Public and private banking workforce with the computed t-value as 2.88, $p < 0.05$. It is clear from the result that Job Security is more in case of Public sector banking workforces as $M= 15.67$ and in private sector banking workforces as $M= 13.57$. As in full, the result table specifies that

TABLE 1
T-TEST STATISTICS: HPWP

Variables		t-Value	Df	Mean	Std. Deviation	Std. Error Mean	P value
Training	Publics	2.436	798	29.52	4.793	.508	0.03
	Privates			26.61	4.748	.425	
Job Participation	Publics	3.60	798	29.89	8.711	.779	0.02
	Privates			35.93	4.562	.484	
Job Specification	Publics	3.95	798	26.61	5.586	.500	0.01
	Privates			29.52	4.902	.520	
Job Security	Publics	2.88	798	15.67	4.798	.525	0.03
	Privates			13.57	4.723	.408	
HPWPs	Publics	3.88	798	162.44	23.245	2.079	0.02
	Privates			183.70	19.171	2.032	

Note: Public and Private Banking Sector

the HPWPs of private sector banking workforces is higher compared to Public sector banking workforces.

VII. DISCUSSION

An assessment amid Public and Private banking companies was one main purpose of this research paper. It was pertinent, consequently, to witness previously relating the two different types of banking sector, to check if the government sector and privately held banks are affected by the perceptions vis-à-vis HPWP variables. The reaction of the workforce queries to a greater degree, be suggestive of the work environment, policies and or operational procedures that occur among the Banks. These are in addition to these procedures and policies which shape the HPWPs.

Hypothesis-1 of this paper projected to calculate the variances concerning the four variable dimensions to total HPWPs deployed in Public and private banking workforces.

The outcome from isolated t-test proves the above stated variance in mean is noteworthy in case of HPWPs, workforce of privately held banks has described greater overall HPWP practices (table 1) that to Public sector banks. Seemingly the likely motive in NCR region based private-sector bank has adopted more pragmatic approach in deploying HPWPs when compared to their Public-sector banking counterparts. One of the HPWP variable "training" is reported to be on higher side in government owned banks when compared to privately held banks. This hints due to the fact that in government owned establishments training is compulsory part for the Banks before an staff starts to spend efforts on. The next HPWP variable "Job participation" is testified highly in privately held banks when compared to Public sector banking establishment, the outcome may be ascertained to private banks provide autonomy to staff to deliver the services which are connected to more involvement at the work item. The Third HPWPs variable dimension "Job Specification" is reported at higher levels in private banks when matched against the Public sector banking, this could be ascertained to Public sector bank at recruitment, the KSA of workforce was checked and then the workforce's recruitment process starts. On the other hand, in private banks, specification of job takes emphasis while practically orientation of workforce started. The last variable dimension of HPWP "job security" is reported on higher level in Public sector banking when tested against the private banks. In NCR region workforces are more protected work in government owned banks with no distress of losing someone's work. However, in privately held banking sector, insecurity prevails remains.

VIII. CONCLUSION

The present study has examined the significant differences among the different dimensions of HPWP. For gauging HPWP, Longzeng Wu, et.al. (2011) scale was utilized. Whereas a evaluation amid the public and private sector banking is the fundamental core of the paper. Perception is also examined of public and private sector banking for HPWPs. The sample size consisted of 800 Workforces.

Following conclusions resulted out here are:

- HRM practices based on HPWPs of privately held banking sector are reasonably healthier to the government held banking.
- Government held banks are doing good for the variable dimension 'training' due to higher budget authorized by government of India for training tenacities.
- Private sector banking is doing well when compared to Public banks for the variable 'job participation' ascertained to work culture of private sector banking in

India. The level of contribution in job by workforce is more in private sector banking ascertained to fear of laying off by the private banks on non-performance.

- Private sector banks are doing better when faired to Public sector banking in job specification because of amiable HR practices offered by private banks.
- Public sector banking is delivering better in comparison to private banks on the job security front because of an environment of security for the long-term job within public sector banks in India.

IX. Limitations and Recommendations

There are certain limitations which need to be addressed. The sample was choosen from a specific NCR, India region. It could be highly proper and motivating to choose a varied sample from different part country and socio-economical class clearly depict the results among the Banks. It is suggested to research a sector wise differences of HPWP in these results can be protracted to other specialists and non-professionals working in other businesses. Future research should be performed on the same sector after this new mergers and joint ventures which is going to be implemented by April 2020 which gives interesting findings to the researchers. It is also suggested to do the longitudinal research which could let scholars to advance their insights into the sector-wise variances of HPWP. Expectedly, this paper on baking sector will serve as a insight for such research.

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