Proceedings of the Federated Conference on
Computer Science and Information Systems pp. 1149–1153

ISBN 978-83-60810-51-4

From Knowledge Worker to Knowledge Cultivator-Effective Dynamics

Gulgun Kayakutlu
Istanbul Technical University
Industrial Engineering Dept.
Macka 34367, Istanbul
Turkey
Email: kayakutlu@itu.edu.tr

Eunika Mercier Laurent
IAE University Jean Moulin,
Groupe MODEME
Lyon
France
Email: eunika@innovation3d.fr

***Abstract*—Increasing complexity in the business world causes changes in the concept of value creation, measures for success and sustainability. More attention is given to the critical human resources for reducing the risks of managerial decisions. The right knowledge worker in the right place is not anymore just accumulating, sharing and using the knowledge. As the technology evolves and the ecological risks increase critical role integrates the individual and collaborative skills to learn and innovate by converting the social network connections and feedbacks into value. This study analyses the skills and expectations of these critical roles and proposes a discussion on success measures of the Knowledge Cultivator. The suggested frameworks will facilitate evaluating the performance of Knowledge Cultivator. This new vision will be beneficial for managers, human resource experts, and educators.**

***Index Terms*—Knowledge Worker, Knowledge Management, Knowledge Cultivator, Innovation Ecosystems, Corporate Social Responsibility**

I. Introduction

NEW economic definitions include sustainability of created value based on financial, knowledge and ecological resources. Politicians, CEOs and Managers are warned to have new mechanisms to institutionalise organisational systems and are invited to be rational on the critical resources rather than following the footprints of brand owners [1]. Economists suggest solutions by focusing on systems innovations instead of technology and product innovations [2]. Attention is drawn to knowledge risk management, criteria of which are related to positioning, performance measuring of the knowledge workforce and focusing on knowledge management activities [3]. The need for integrating the worker participation and the organisational performance is replacing the separate human resource performance studies [4].

Wider range of skills is to be recognized and supported for knowledge workers in new business models. The impact of intellectual quality is to be enhanced [5]; person-to-person skills or soft skills are to be developed [6]. Individual knowledge facilitators are to be motivated and retained in order to achieve effective collaboration [7]. As an impact of all these improvements, not only individuals will be more innovative but the entire system within a company, within a city, a region or nation as Helbrecht [8] has stated. Hence, as main organisational asset that create a sustainable competence [9], the knowledge workforce is to be accepted and managed as Knowledge Cultivators [10].

This paper aims to propose a conceptual framework to start a discussion on measures of expectations for the knowledge cultivator. The framework considers the skills and a capacity to innovate for the knowledge cultivator who will be evaluated in accordance with the internal and external strategies of the company where he/she works.

This paper is so organized that the next section will define the skills and drivers. The third chapter will present the proposed framework. Final section will be the conclusion and suggestions for further studies.

II. Background

A. Definition of Knowledge Worker and Knowledge Cultivator

The term Knowledge Worker was first used by Peter Drucker in his 1959 book, *Landmarks of Tomorrow* to identify the workers in the information technology fields. Today, anyone who works for a living at the tasks of developing or using knowledge is named to be a knowledge worker. Davenport has summarised the background and the operations of the post: "Knowledge workers have high degrees of expertise, education or experience, and the primary purpose of their jobs involves the creation, distribution or application of knowledge. One third to two thirds of any company workforce is included in this definition" [11]. This definition includes several tasks and services in addition to transformation and commerce of data, information and knowledge. Hence, a knowledge worker is a participant of the knowledge economy where intangible products are as important as the tangible objects with raw material and physical goods.

Three years before Drucker's book was published artificial intelligence (AI) was founded [12]. AI has influenced the way of using the human and nature intelligence by empowering the devices like microprocessors, robots, smart phones, game console and web. Hence, to create, produce and disseminate intangibles, knowledge workers are expected to have the skills to absorb and use the knowledge. Greene [13] adds characteristics like high cognitive power and abstract reasoning. Gurteen [14]

mentions the self-motivated features. Therefore, knowledge skills are to include the ability to work in symbiosis with an intelligent assistant (computer), the art to choose the right technology to solve problems using mental flexibility, individual and collective knowledge, experiences and intelligences.

They are to become ***Knowledge Cultivators***, able to define their own visions of the future, the right goals at the right place and time in order to innovate in collaboration. They are also expected to share feedback from experience, to transfer the social network connections into values, and to think without borders (between domains). Knowledge Cultivators are expected to solve difficult problems. They use the technological tools effectively to design solutions. They use the knowledge support to take decisions. Furthermore they are to be smart, creative, productive, efficient and effective to prove to be assets but not costs for the business and society.

B. Expectations at Operational Level

Knowledge workers including engineers and medical doctors will start the work life at the operational level where they are expected to accomplish efficient knowledge processes in addition to professional performance. Knowledge-intensive and task-based environments such as research laboratories, consulting firms and high education workers are expected to fully reuse the knowledge assets in process of achieving the goals of business tasks [15].

First knowledge operation, *Knowledge Acquisition* is gaining new knowledge from either inside or outside the organisation. It includes addition of new knowledge to the existing one by making the accumulated knowledge accessible. In any organisation, the challenge is to accept that not all knowledge is in a form to be readily shared, diffused, or implemented [16]. Second operation, *Knowledge Development* is the effective use of the knowledge accumulated in order to increase the organisational competence. This is a process that depends on workers' readiness to use and share individual knowledge. Creating knowledge repositories through collaboration of different teams will allow improvements in using the *existing knowledge* [17]. Third and last operation, Knowledge Dissemination includes knowledge sharing, knowledge diffusion and knowledge marketing. It is the process that changes a lot when the workers change [18]. Effective knowledge sharing is not only dependent on the skill of knowledge workers; but it requires cultural change, new management practices and investment in network technologies. Knowledge workers however are expected to be well equipped with the appropriate cultural values to facilitate the exploitation of knowledge in line with the business objectives [19].

C. Expectations at Team Level

Knowledge work is typically project based defined by memos, contracts or agreements for different activities. An engineer works in a team to develop a new product; a chirurgical doctor works with a team in each surgery; an information technology expert works in software, hardware or network projects. Knowledge workers are to be leaders as well as team workers simultaneously. That is why they have to be evaluated process specific, team based and firm specific [20].

Knowledge teams are expected to be structured with definite purposes within the organisation's business mission [21]. To make teams perform well, cross-functional interactions, communities of practice, communication evolution are to be realized while group performance appraisal and incentive programs are to be activated [22]. The performance of knowledge teams are measured in the team and among the teams of different projects [23].

D. Expectations at Organizational Level

Liebowitz [24] stated that an organisation's accumulated value is found in the intellect, knowledge, and experience of its workforce. Firm specific power is the essential basis for sustainable competitive advantage. Required organisational synergy is created if financial and knowledge investments are combined [25]. In order to maximize the value of combined resources the work force of the collaborators should have qualities above average [26].

The innovation process that is unavoidable for today's industries, need knowledge collaboration of the work force in initiation, development and implementation phases. Making knowledge workers collaborators in the work environment will benefit entire organisation. Green [27] has enlightened the organisational studies by giving a broad list of employee based factors influential on performance. Green's work specifies both features of employees (competencies, education, experience, relationship, productivity, profitability) and organisational drivers for the workers (assignment, retaining position, motivation, training, and turnover) among the intellectual factors. A range of technology applications are used for investigations, collaborations and communications to develop the organisational learning. It is integrated with the knowledge processes, but to be articulated in terms of the business needs and to be designed as embedded with business performance. The effect of employees on business collaboration is studied by different authors [28][29] [30].

E. Expectations at Inter-Organizational Level

Strategic alliances in the global supply chains are focused on knowledge based collaborations. Business models are designed to emphasize personal interactions that bind companies in the same industry and other industries together. Interactions in terms of information creation, knowledge improving and knowledge feed are defined and simplified in the knowledge map model of Arthur et al. [31]. Comprehensive and flexible strategies are to be developed to create learning and sharing culture in the value chain [3][30]. Virtual teams of knowledge workers play an important role in trust building. This important role requires the abilities of critical thinking, ethical problem solving, stakeholder analysis, and comprehensive expression [32].

Although multinational companies play the key role to accumulate an immense volume of knowledge, there is more need to expand specialised knowledge customised to the region or industry. That is why independent knowledge work-

ers will have a growing importance for the performance of the value chains even in agricultural industries [33]. Small and medium size companies are also in search for the knowledge workers in order to establish the innovative collaboration [34].

III. Knowledge Cultivator Dynamics

Organisational effectiveness of the knowledge workforce is to be managed to increase the firm performance mainly in the supply chain. As Ramachandran [35] suggests technology diffusion in the information society, improving the knowledge usage to feed into a knowledge society and culture development are the key impacts in the supply chain. In order to realize these impacts, a new mindset is enabled by pro-active strategies and enabling human knowledge cultivators in the chain as an investment. Moreover externalisation of the collaborative knowledge worker has to contribute for the society as well as the value chain [36] and all contexts he/she is a part of [37].

Unlike the collaborators in the value chain, independent knowledge cultivators should accept themselves as connectors. If the innovation cycle is to be managed effectively there exists a new challenge for managers and leaders as to take greater risks with the new skill set [38]. In parallel to the growth of network business and value chains, relational skills have become as important as the rest. Gao [39] says knowledge for innovation in products, processes and systems is more important than general scientific knowledge. This definition gives a general idea about focused education requirement for any knowledge cultivator.

As knowledge is mobilized, the cost benefit analysis of social ties is given a growing importance. A knowledge worker takes responsibility of tasks which consists of relation with all the stake holders, with an influence on other employees and peers, on customers, on competitors and on partners [27]. It is business critical to balance the economic values created and to strengthen the social network [40]. Hence *knowledge cultivator* is expected to be adaptable to any time, any place and any team therefore **adoptive.**

Knowledge Cultivator is highly **motivated** to attract and influence the others with his/her creative, innovative capacities, learning in the same time from others. He/she is expected to be creative, inventive and intuitive producing ideas individually and collectively besides answering the existing needs even anticipating them [12]. They are the ones connecting the right people, ideas and organisations with the right **decisions**.

[41] defines nineteen features among which we can see learning in all situations, by sharing, without geographical limitation. Curiosity for the new technologies and systems allows him to experiment. Moreover, he/she takes advantages from the failure. These could be classified as **learning**.

IV. Framework Evaluating The Performance Of A Knowledge Cultivator

Prepare Knowledge worker is always defined to be highly skilled, but it is not always necessary. However the difficulty to define these skills increases as the requests grow, especially in the transition period to Knowledge Economy. As stated above the expectations are diverse and immense. To avoid the expectations to reach a point that a knowledge manager will create a rabbit in an empty hat, the uprising in performance measures should be applied. In large companies managerial performance is linked to the business success rather than individual performance as in Toyota [42]. This measure without any doubt includes employing the right person for the right job to ensure the organisational competence.

This study allowed designing a new framework that uses the skills of the knowledge worker, to reduce mistakes in engagement, team building, collaboration and success of knowledge workers. The skills requested are to be translated into the drivers expected from the knowledge cultivator. The cultural influences are also to be clustered so that the evaluation can be performed by predicting the societal impact of the cultivator. As it is shown in Figure 2, the framework combines drivers and culture but the measures or the tools that should be used in measure are not yet defined.

The drivers are classified in five groups to include all expectations from the knowledge cultivators:

Education and life-long learning ability will not only include the scientific education that finalizes with a degree but it has to continue with training and the general culture which would help in the networking. The most important is to learn how to learn and why.

Learning and ability to learn in real time needs to be curious and integrate the good or bad feedback from the experience.

Flexibility in adopting the learned knowledge to new states and/or cases is a necessity when coping with the agility.

Collaborative ability is to collaborate with everybody anytime and anywhere. The power around the cultivator should not be a challenger. It is also about mental flexibility.

Motivation will include both self motivation and motivating the people to collaborate and valuing them for doing things. It has been emphasized before that it can be with creativity, intuition and interaction which result in influences. Skills in communication and in psychology may help.

Problem solving ability and decision taking is one of the most requested skills:

Decision is to be given on time, tool, network and ideas by evaluation and taking into account all context knowledge that may influence. *IQ* is part of decision success which is currently captivated as the imagination quotient.

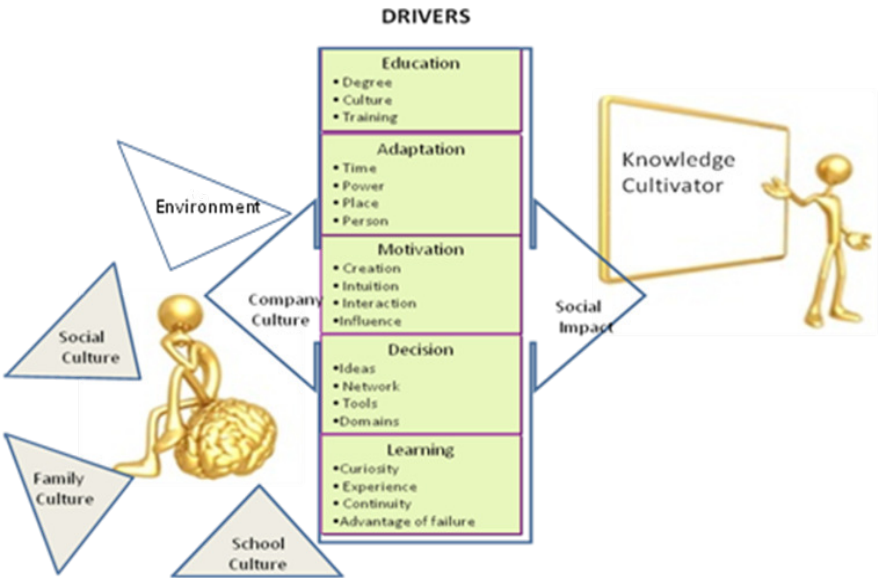

Figure 1. Framework for knowledge cultivator performance evaluation

Capacity to innovate consists of capabilities to create new ideas and propose changes continuously

Environmental impact is the attitude and capacity to estimate the impact of activity (using simulators if needed).

These drivers should be evaluated in the specifics of family, school, social and company culture. Besides, social and economic impact will be measured as to results obtained by the knowledge cultivator.

Knowledge cultivator can be considered as a holon able to adapt and influence all context as a part of the holonomy defined from the individual to the society.

Application of the framework proposed in Figure 1 will provide the following benefits in any industry without being specific to technology people : i) employing the right people; ii) ability to determine the salary and the benefits as critical people; iii) balance the performance measures in the company; iv) reduce turnover by starting retaining strategies and v) facilitate managerial success.

V. Conclusion

High-performing enterprises are now building their competitive strategies around data-driven insights that in turn generate impressive business results. The secret weapon is defined to be analytics. That is why knowledge cultivators are given an increasing value for the improving role in innovation. In a world where knowledge is a quality introduced, created and developed by the employees, the right person in the right position has more importance. In a tough economy of reducing work durations, income depends on the worker's position relative to the peers in the same knowledge level.

This study starts a discussion on a new framework to evaluate the requested abilities and impacts of the knowledge cultivators. The firm in search for the talent for more innovation is to find the right skills and know to keep them in the company for a long enough time to benefit. Intellect, wisdom and ideas can be converted to economic and competitive values only by the impact of knowledge cultivators.

Future works will include the validation of the framework with a variety of measures and test application of the framework in different industries. Ligamen[1] tools are some trials to be improved.

References

[1] A. Arvidsson, " The ethical economy: Towards a post-capitalist theory of value", *Capital & Class,* vol. 97, 2009, pp.13-30.

[2] G. Mavrotas, A. Schorrocks, A. Sen, *Advancing Development : Core Themes in Global Economics*. Palgrave Macmillan, 2007.

[3] M.Jafari, J. Rezaeenour, M. Mazdeh, A. Hosshmandi A. **"**Development and evaluation of a knowledge risk management model for project-based organizations**",** *Management Decision*, vol. 49, no. 3, 2011, pp. 309-329.

[4] JK. Looise, N Torka, J.E. Wigboldus, J.E. "Understanding Worker Participation and Organizational Performance at the Firm Level: In Search for an Integrated Model", *Advances in Industrial & Labor Relations*, vol. 18, 2011,pp.87-113.

[5] B.Cope & M.Kalantzis, "Signs of Epistemic Disruption: Transformations of the Knowledge,**"** *System of the Academic Journal*, vol. 14, 2009, pp.4-6.

[6] C.Warhurst, "The knowledge economy, skills and government labour market intervention" *Policy Studies*, vol.29 no. 1 2008, pp.71 – 86.

[7] B.C.Garcia "Working and learning in a knowledge city: a multilevel development framework for knowledge workers", *Journal of Knowledge Management*, vol.11, no.5, 2007, pp. 18-30.

[8] I.Helbrecht, "Bare Geographies in Knowledge Societies – Creative Cities as Text and Piece of Art: Two Eyes, One Vision", *Creative Cultural Knowledge Cities*, vol.30, no.3, 2004, pp. 194-203.

[9] C.Livanage, Q. Li, T. Elhag, T. Ballal, "The Process of Knowledge Transfer and Its Significance in Integrated Environments**",** *AACE International Transactions*, Morgantown: 2008, pp.61-69.

[10] E.Mercier-Laurent "Brain Amplifier for Holistic Knowledge Management using New Generation of AI", Invited talk ISAI 2006, Beijing.

[1] http://ligamen.fr

[11] H.McKellar, "The knowledge (worker) economy", www.kmworld.com/Articles/Column/From-The-Editor/The-knowledge-(worker)-economy-14264.aspx , 2005, accessed: 05.05.2009.
[12] E. Mercier-Laurent, *Innovation Ecosystems*, Wiley, 2011.
[13] W.Greene, "Growth in Services Outsourcing to India: Propellant or Drain on the U.S. Economy?", *Office of Economics Working Paper, U.S. International Trade Commission*, no. 2005-12-A, January 2006.
[14] D. Gurteen, "The Gurteen perspective: Taking responsibility", *Inside Knowledge*, vol.10, no.1, 2006, pp.1.
[15] D-R. Liu, I-C. Wu, K-S. Yang, "Task-based support systems: disseminating and sharing task-relevant knowledge", *Expert System with Applications*, vol.29, no.2, 2005, pp. 408-423.
[16] R. Magnier-Watanabe, D. Senoo, "Organizational characteristics as prescriptive factors of knowledge management initiatives", *Journal of Knowledge Management*, vol. 12 no.1, 2008, pp.21-36.
[17] D. Delen and S. Al-Hawamdeh, "A Holistic Framework For Knowledge Discovery and Management", vol. 52, no. 6, 2009, pp 141-145.
[18] N-T. Huang, C-C. Wei, W-K. Chang, "Knowledge management: modelling the knowledge diffusion in community of practice", *Kybernetes*, vol.36 no.5, 2007, pp.607-621.
[19] B. Norhani, "The Acculturation of *Knowledge* Workers in Malaysian Industries", *International Journal of the Humanities*, vol.6 no.1, 2008, pp.63-68.
[20] J. Swart, "Intellectual capital: disentangling an enigmatic concept**",** *Journal of Intellectual Capital,* vol.7 no.2, 2006, pp.136-150.
[21] D. H. Henard&M.A. McFadyen, "Making Knowledge Workers More Creative", *Research Technology Management*, vol.51no.2, 2008, 40-47.
[22] E. F. Cabrera & A. Cabrera, "Fostering knowledge sharing through people management practices", *The International Journal of Human Resource Management*, vol.16 no.5, 2005, pp.720 – 735.
[23] P. A. Gloor, M. Paasivaara, D. Schoder, P. Willems, "Finding collaborative innovation networks through correlating performance with social network structure" *International Journal of Production Research*, vol.46 no.5, 2007, pp.1357 – 1371.
[24] S. J. Liebowitz, "Pitfalls in Measuring the Impact of File -sharing on the Sound Recording Market", *CESifo Economic Studies*, vol. 51, no.2-3,2005, pp.439–477.
[25] M. Osterloh & B. S. Frey "Shareholders should welcome knowledge workers as directors", *Journal of Management and Governance*, vol.10 no.3, 2006, pp.325–345.
[26] S. Knoll, *Cross-Business Strategies*, Dissertation-Universitat St Gallen, Germany, Springer, 2008.
[27] A. Green, "Business information-a natural path to business intelligence: knowing what to capture. *Vine*, vol. 37 no.1, 2007, pp. 18-23.
[28] A. L. Sherwood, T. Saxton, A. Inkpen and I. Holzinger, "An Empirical Examination of the Relationships between Alliance Trust, Reputation and Performance", Conference Presentation in 10th International Conference on Reputation, Image, Identity and Competitiveness, 2006.
[29] C. Margoluis, "Healthy Relationships: Examining Alliances Within Population – Health – Environment Projects", *World Wildlife Fund Report*, 2008.
[30] D. Yuhas, "Sharing the Wealth (of Knowledge): Cumulative Cultural Development May Be Exclusively Human", *Scientific American*, 2012, pp.264-267.
[31] M. B. Arthur, R.J. DeFilippi, V.J. Lindsay, "On Being a Knowledge Worker", *Organizational Dynamics*, vol. 37 no.4, 2008, pp.365-377.
[32] K. R. T. Larsen & C.R. McInerney, C.R. "Preparing to work in the virtual organization", *Information & Management*, vol.39 no.6, 2002, pp. 445-456.
[33] K. Nicolopoulou & M.Karatas-Ozkan, "Practising knowledge workers: perspectives of an artist and economist; professional insights", *Equal Opportunities International ,* vol.26 no.8, 2007, pp.872-878.
[34] Y. Lee, J. Shin and Y. Park, "The changing pattern of SME's innovativeness through business model globalization", *Technological Forecasting and Social Change,* vol. 79 no.5, 2012, pp.832-842.
[35] R. Ramachandran, "Measuring Knowledge Development and Developing Official Statistics for the Information Age", *International Statistical Review / vol.* 71 no.1, 2003, pp.83-107.
[36] C. Ehin, "Un-managing knowledge workers", *Journal of Intellectual Capital* , vol.9 no.3, 2008, pp.337-350.
[37] M. D. Amidon, P. Formica, E. Mercier-Laurent, *Knowledge Economics: Emerging Principles, Practices, Policies*, University of Tartu Press, 2005.
[38] M. Terziovski & J.P. Morgan "Management practices and strategies to accelerate the innovation cycle in the biotechnology industry", *Technovation*, vol. 26 no5-6, 2006, pp.545-552.
[39] F. Gao, M. Li, S.Clarke, "Knowledge, management, and knowledge management in business operations**"** *Journal of Knowledge Management,* vol.12 no.2, 2008, pp.3-17.
[40] A. Fliaster & J. Spiess, "Knowledge Mobilization Through Social Ties: The Cost-Benefit Analysis", *Schmalenbach Business Review: ZBF*, 60, 2008, pp.99-118.
[41] C. Cobo, "Skills for a Knowledge/Mind Worker Passport (19 commandments)", www.educationfutures.com/2008, accessed: 18/05/2009.
[42] T. H. Davenport & J.G. Harris, *"Competing on Analytics: The New Science of Winning*, Harvard Business School Press, 2007.