

Knowledge Management, ICT and Innovation

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Abstract

The concept of innovation and knowledge management were reviewed in this paper. Their impact on organizational competitiveness also analysed. In this paper, the concept of knowledge management is expanded to productive knowledge where valuable knowledge is identified to fulfil organizational needs and employee talent pool. This paper has a goal to explore role of knowledge to create innovations and organizational competitiveness. Through productive knowledge, organization can understand the new trend of market demand set new policy to facilitate effective knowledge management practice in their organization. The analysis result showed the steps as the effort taken to start knowledge management initiative to nurture productive knowledge. In conclusion, organizational performance needs organisation adaption o productive knowledge to reach the higher innovation through productive knowledge policies.

Keywords: innovation, knowledge management, organizational competitiveness, productive knowledge, policy

1. Introduction

Many management professionals claimed that innovation is one of the guarantees for the improvement of organizational competitiveness (Davenport, 2013). The statement was widely supported by some empirical evidences (Zhu, 2012, Ambec, *et al*, 2013). Various indicators suggested that the lack of innovation driver and other relevant factors could lead to a relatively backward state of economic development (De Martino, *et al*, Kin, *et al*, 2012) and welfare of its people (Camisón & Villar-López, 2014). But how to respond and anticipate the backward of innovation is not an easy answer.

Many studies considered that Development of innovativeness in organization is as a key factor for maintaining competitiveness (BolíVar-Ramos, *et al*, 2012). In order to innovate, knowledge from various sources is required in order to understand market demand especially for new markets (Fraj, *et al*, 2015). In new industrial sectors, company should be able to manage the knowledge flow and knowledge transfer (Handoko, *et al*, 2014). Thus, the contribution of the knowledge effort to the various partners is essential in order to effectively and efficiently transfer the business idea to partners and stakeholders.

Knowledge is the key to success at management level in a competitive environment (Shoham, *et al*, 2012). Organizations need to find new approaches to address the increased global competition through cost optimization, resource utilization, higher efficiency, manpower training and performance stability (Hussein, *et al*, 2014). These factors shape the organizational culture which then transferred to the community of work (Abdullah, *et al*, 2014).

The knowledge of innovation is likely to be obtained and distributed in the enterprise network (Chuang, *et al*, 2014). It is true for the new technology which needs in-depth collaboration, concerning not only the agreement on common objectives and exchange information on a regular basis (Lerro, *et al*, 2014), but also on the innovation of the human resource practice, production and marketing (Sankowska, 2014)

The next step is the knowledge must be managed in enterprises (Kowalik, 2014). In the context of this innovation, knowledge management must be in line with HR management and organization management itself (Ferreira, *et al*, 2013). Knowledge management is a set of business processes where valuable knowledge is identified (Dalkir, 2013), collected created, organized or stored, distributed, managed, and implemented on an issue or project (Becker, *et al*, 2013).

Knowledge management, in short, means doing strategic effort of the knowledge resources to reach organizational goal (Rollett, 2012). In the context of the organizational goal, knowledge management has been the conceptual standard for systematic process or practice of acquiring, capturing, sharing and using productive knowledge by manager (Holsapple, 2013) and employee to improve their learning and performance in the organizations (Jones & Sallis, 2013). There are literature evidence (Rollett, 2012; Holsapple, 2013; Jones & Sallis, 2013) suggested that organizations tend to pursue the performance in instant manner by recruiting new employee. However, these methods seem not-matched between organizational needs and employee talent pool (Holtshouse, 2013). In this case, the knowledge management initiatives can bridge and link both spectrum side (Hoang, *et al*, 2014) especially on the humans personalization and system codification approach (Rao, *et al*, 2012).

Such personalization and system codification will improve organizational movement toward performance (Wiig, 2012). The productive knowledge can be generated by implementing suitable technologies (Botha, *et al*, 2014). This technology would require a new set of skills of the employees. Learning to use new

technologies will be critical to successful knowledge management practice (Earl, *et al*, 2012). Therefore, integrating technology especially internet has been the main concept which important for organization to use the knowledge and upgrading the employee knowledge into productive knowledge (Rasula, *et al*, 2012).

As productive knowledge must be mastered by employee and talent pools (Rollet, 2012), then, company must build suitable environment in order to improve employee adaptability toward productive knowledge (Holsapple, 2013). To operate in their environment, the organization must proceed with the strategic human resources to support knowledge and information and communication technology (ICT) (Holtshouse, 2012). Since productive knowledge requires adequate focus in overcoming the problems of the organization, they must understand how role of knowledge and competitive advantage bring a result of quality innovation (Hoang, *et al*, 2014).

b. Problem background

Based on the above background, it shows that innovation is a guarantee of the company to improve competitiveness. In addition, innovation requires productive knowledge to make it sustainable (Rao, *et al*, 2012). From the above statement it can be formulated the problem statement of how role of knowledge can create innovations to shape the organizational competitiveness?

c. Purpose

The paper has a goal to explore the knowledge management as an important element for an organization to create sustainable innovation.

d. Theoretical review

The concept of innovation has a long history (Dalkir, 2013) and various understanding mainly based on the new creation and competitiveness faced by many organization and their unique and different strategies to fulfil market demand better (Lee, *et al*, 2012). In addition, Lee, *et al* (2012) explained that co-innovation, collaboration and co-creation impacted on organizational values toward knowledge management practices. Furthermore, the information culture and its structure on strategic flexibility during business model innovation have driven organization to improve their collaborative innovation project (Vick, *et al*, 2015).

Josef Schumpeter' theory of innovation often regarded as the first economist (Schumpeter, 2013) who gives attention to the importance of innovation toward organization. In 1949 Schumpeter mentions that innovation is composed of five elements (Edison, *et al*, 2013): (a) introducing a new product or changing the quality on existing products, (b) introducing a new process to industries, (c) opening new markets, (d) developing new supply sources of the raw materials or other inputs, and (e) changing in industrial organization.

The concept has expanded the innovation understanding especially about the innovation process which not limited to create new ideas or thought (Fuller, *et al*, 2012). This also must be implemented through adoption process (Abecassis - Moedas, 2012). The decision to adopt certain innovation result is the best decision to make which determine the future of the organization in their competition (Chesbrough, 2012). The innovation adoption process is a major concern that must be integrated to the organizational strategy. Since decision process sometimes has various steps and factors, then understand the implementation and adoption process needs decision process of innovation.

Research on productive knowledge and knowledge management has included in many disciplines (Zhou, *et al*, 2012). The knowledge management has many spectrums which spread from discipline of economics, information systems, organizational behaviour, psychology, strategic management, and sociology. This diversity has contributed to the rapid progress of research in specific areas of inquiry that investigating different aspects of organizational learning and knowledge management practice (Zhou, *et al*, 2012).

Knowledge management which aimed to gain productive knowledge sometimes defines as the best practice and conceptual process that started by Mintzberg publication in the 1990s (Dastaviz & Jamshidy, 2014). Two major problems that become the main driver or knowledge management and productive knowledge have been the evident in today's issues (Skarzynski & Gibson, 2013): (a) knowledge is an important resource which starting to replace the needs of traditional resources such as land, machinery, or capital (Pfeffer & Sutton, 2013) and (b) organizations are generally less successful to work in conventional method since market only demanded new trend and innovative product (Chesbrough, 2012). Therefore, the organization must pay more attention to create, provide, share, use and expand their knowledge and innovativeness and improve the trend-based organizational performance (Grimaldi & Ripa, 2011).

The current definition of productive knowledge reflects a variety of viewpoints (Chiaroni, *et al*, 2011). The following definition is relatively broad approach as it covers a wide range of phenomena such as productive values, realistic insights, and updated information (Jaskiewicz, *et al*, 2013). Therefore, productive knowledge is the characteristic of trend-based organizational performance which related to project success (Botha, *et al*, 2014). It is a mixture of experience in diversity, values of multicultural that shaped the updated information (Battistella,

2012). In addition, it also a channel come from the realistic professional and expert insight that provides a framework for evaluating and incorporating new experiences and updated information to understand market trend. It derived and applied in the minds of the employees (Becerra-Fernandez & Sabherwal, 2014). In organizations, they often embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms to support better project management strategy (Pemsel & Müller, 2012).

Pemsel & Müller (2012) has linked customer Knowledge Management with the productive knowledge which impact on the successful project management which combined three objectives as follows (Noh, *et al*, 2014):

- a) to make the knowledge visible as productive factor and show the role of knowledge in an organization, especially through maps, yellow pages, and hypertext tools (Ku, *et al*, 2015);
- b) to develop a knowledge-intensive culture by encouraging and incorporating behaviors such as sharing of knowledge (as opposed to hoarding) and proactively seek and offer knowledge to understand the new trend and integration to new market (Wæhrens, *et al*, 2015);
- c) To build infrastructure-based knowledge, not only a system of technical knowledge, but the network of relationships between people of diversity across space, time, tools, and encouragement to interact and collaborate (Ehlen, *et al*, 2013).

The factors can be shaped easily when the organization seeks for and continuously build innovation in technology of communication and computer (Spring & Araujo, 2014). As widely known that information and computer technology (ICT) led to the evolution of industries and markets (Rooke, *et al*, 2012). Therefore, the dissemination of information and knowledge acquisition need organizational adaptation and productive knowledge strategy since the updated information is a vehicle to bring the organization to enter modernized method of work (Abraham, 2014). This proves that ICT improve the learning process to gain productive knowledge.

In addition, Davenport (2013) argued that the process of knowledge management and use of information technology can reduce the cost of information use. Zhu (2012) and Ambec, *et al* (2013) argued that information technology will increase knowledge flow speed. From the literature review above, it is clear that ICT plays an important role in the acquisition of productive knowledge (De Martino, *et al*, Kin, *et al*, 2012) and there are many benefits of introducing ICT in the process of gaining productive knowledge (Camisón & Villar-López, 2014).

e. Discussion

The attention to knowledge management has been more important than ever. It showed that the today's global business environment has changed rapidly. Organization has been challenged to increase their productive knowledge in order to understand the market trend and the new demand. This has been explained in this paper that organization must expand their ability to survive in competitive environment. This paper also explained the steps to reach the competitive advantage. However, the organization sometimes faced internal barriers from their organizational environment due to the knowledge management and intellectual capital is unbalanced. This paper can be a framework to understand how organization can build impact and use their resource to gain higher productive effort especially on productive knowledge. It is productive knowledge that can be valuable strategic resources that help the organization to survive.

Since knowledge management is considered important source of the organization, many effort must be allocated to support the practice. As knowledge are the main component of competitive advantage (Bolívar-Ramos, *et al*, 2012), then organization must drives their knowledge management into adaptation process (Fraj, *et al*, 2015).

Furthermore, the success of KM practice sometime becomes driver of higher organizational performance (Handoko, *et al*, 2014). It has three factors that KM Practice can be considered success, e.g., higher level of efficiency, adaptation and innovation of the employee to be involved in the process of productive knowledge. The productive knowledge is the driver of efficiency of the organization which reducing costs while increasing productivity (Shoham, *et al*, 2012). The access to the expertise and know-how enabled collaboration, knowledge sharing, learning and continuous improvement among employee and organization to understand market trend (Hussein, *et al*, 2014)

After the productive knowledge is processed, then the organization is ready to enter to the second phase of productive knowledge (Abdullah, *et al*, 2014):

- a) The organization has established an exploration group or committee to expand their KM practice into reality (Chuang, *et al*, 2014);
- b) The executive sponsor within the organization supports further exploration of KM to entire department and branch (Lerro, *et al*, 2014);
- c) The group, section or division within the organization understand how to establish successful relation with stakeholders to collect the productive knowledge and trend technology associated with market demand and trend

(Sankowska, 2014);

d) Part or IT department has the ability to actively support the initiative and implementation phase and then combine KM strategies with organization's business model (Faeni, 2015).

KM strategy which integrated with business opportunities needs the initiative to form the task force for implementation (Kowalik, 2014). In forming the task force of KM, it is important to use core group that has been formed during the advocacy phase. This task force should also be cross-functional comes from different divisions or sections of the organization. The members diversity of task force is important because it will identify multiple opportunities and set the wide-scope standard throughout the initiative (Feirreira, *et al*, 2013).

It also supported by Becker, *et al* (2013) that higher performance need understanding especially to reach the strategy. Some members of the task force must be high experience enough in the top management in order to bring relevant result. In addition, the staff participation must be improved through training and assesment. It will impact on the successful relation with entire organization stakeholders (Holsapple, 2013).

The next step is to meet and coordinate with the concerned division or section to identify and allocate resources to support the task force (Jones & Sallis, 2013). Since organization is faced with limited resources, both human and financial, the highest priority resource must to facilitate the initiative (Rollett, 2012; Holsapple, 2013; Jones & Sallis, 2013). The task force is authorized and licensed to focus time and effort on the proposed initiative. Since the goal is to improve the productive knowledge, then, the information and communication technology, both hardware and software, must be prioritized through procurement of infrastructure either existed or modified (Rollett, 2012).

Integration of knowledge through knowledge management platforms can therefore facilitate reflection and dialogue to enable the staff and executive to do organizational learning and innovation. Their ability to understand the process of KM in producing the knowledge will bring organization a step forward to get the effective activities to support innovation in the organization (Holtshouse, 2013). The purpose of innovation is to produce better product and service that impact on the process and implementation of knowledge management. In addition, it must be based on the methods and facilities especially on the technological process as the indicator of effective KM (Hoang, *et al*, 2014). Taking into account the component, then the KM system can be established in the conceptual model as below.

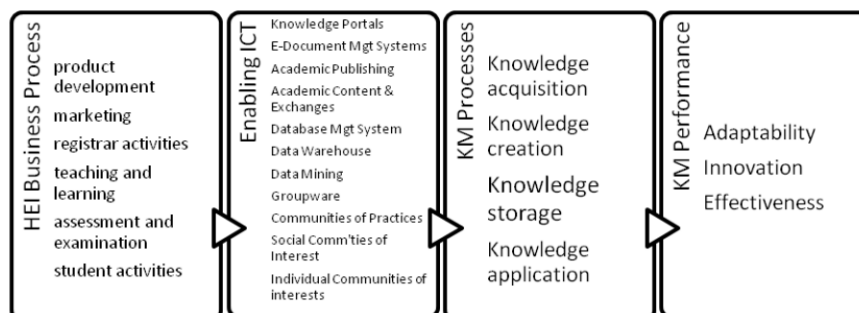


Fig.1. Model ICT and KM to Enhance Competitiveness (source: Earl, *et al*, 2012)

Various recent studies have explored the effect of information technology on organizational competitiveness. According to Rao, *et al* (2012), the information technology has related to the budget and finally competitiveness. Therefore, the utilization of ICT on management only efficient if the organization implements best practice of management concept (Wiig, 2012). In addition, there are many factors to explain the performance difference (Botha, *et al*, 2014). The study by Earl, *et al* (2012) showed that the use of technological process can boost performance including time efficiency and better decision making. However, (Rollet, 2012) argued that organizational practice of ICT toward innovation is unstable due to the executive turn over and finally innovation and ICT must be based on the political decision making between executives and employees (Holsapple, 2013). Even through many professional HR suggested that performance has related to technology and facilities, however, higher performance need higher productive knowledge to pace the innovation.

Since technological innovation impact on the work complexity, higher costs, and risks as the business environment changes (Holtshouse, 2012), then, the executive and managers must be recruited from people with competitive mindset that understand the rapid change of the technology and the benefit to organization and customers (Hoang, *et al*, 2014). The rapid change of technology is an essential resource and a sub-system of the organization (Lee, *et al*, 2012). Thus, the technology implementation must be based on the long-term competitiveness and benefits (Vick, *et al*, 2015). To survive and excel in the competitive market, the technological innovation must be balanced to capture the opportunities and business strategies and finally improve organizational operations and services (Schumpeter, 2013). In this case, the success of an organization or company is partly determined by the responsiveness and adaptability to technological innovation (Edison, *et al*, 2013).

Since the organizational decision making always started from the introduction of ICT at the highest level, e.g., executives and managers, then, the organization must start the KM initiative through following situations (fuller, *et al*, 2012): (a) the KM initiative must be started as a topic of interest among executives (b) executives and managers have been exploring the benefits of KM for the organization (c) there are main driver or pilot that facilitating the interest in developing KM initiative (d) the entire executive and manager must create a vision of KM.

Advocacy is the next step to define KM and the link of productive knowledge. Entire manager and executive must be trained to understand how to capture new trend opportunities and then develop a support group of KM. Opportunity should be given to the staff to learn more through various activities such as seminars and workshops. It also supported by Abecassis-Moedas (2012) that advocacy and learning stage is important to make the concept of KM truly implemented for others in the organization.

The next step is to identify the members of the team that will support the development of KM strategy to help identify by looking at the activities of the organization to nurture productive knowledge. In addition, entire organizational members must share their productive knowledge in a certain way either in formal and informal manner. Through this way, the team can develop better KM strategy (Zhou, *et al*, 2012).

The next step is to learn from the experiences of other organizations and look for an opportunity to discuss the benefits of productive knowledge and how to integrate into organizational goal (zhoe, *et al*, 2012). In this pursuit, there is a need to utilize the Internet and seek assistance from the IT department to provide the tools (Dastaviz & Jamshidy, 2014). The last two steps involve gaining broader support for productive knowledge (Skarzynski & Gibson, 2013). For example, people from the IT department are a potential support to advocate for the emergence of information technology since their familiarity with aspects of knowledge transfer (Pfeffer & Sutton, 2013).

However, the successful implementation of productive knowledge policy comes from the effort to integrate the people resource (human capital) with suitable technology facilities (Chesbrough, 2012). Through ICT as a driver, organization can develop their human skill effectively by adopting productive knowledge from other organization or through training (Grimaldi & Rippa, 2011). If the public and private sector employees do not have sufficient capability in ICT development, their performance will degrade (Chiaroni, *et al*, 2011) because they can afford for understanding the change in the market trend and finally their ability to seize market opportunities will reduce (Jaskiewicz, *et al*, 2013). Therefore, IT sector and the development of human skills must be integrated (Botha, *et al*, 2014) with productive knowledge policy and the effectively adopted and utilized (Battistella, 2012).

IT is a valuable source of business innovation because they provide business gains (Becerra-Fernandez & Sabherwal, 2014). Pemsel & Müller (2012) argued that ICT makes it possible to reduce transaction costs, improve business processes, facilitate coordination with suppliers, process along the value chain fragments even the organization work in different geographical locations through wide-scope diversification (Noh, *et al*, 2014).

Each improvement provides potential opportunity for innovation (Ku, *et al*, 2015). For example, automated IT systems link the employees to deeper knowledge and become business-enabled staff to be more responsive to customer needs. Similarly, a technology that allows staff to communicate and collaborate more effectively throughout the wider region will encourage more competitive management strategy and more flexible external relations (Wæhrens, *et al*, 2015). The collaboration involves various types of innovative activities.

Most of the practices in knowledge management seems focused on content and knowledge. However, to reach more productive knowledge gain (Ehlen, *et al*, 2013). Since the practice must be based on the system of knowledge, nurturing knowledge served as the basic concept to be communicated to entire organization through certain policy, e.g., knowledge policy (Spring & Araujo, 2014). The policy must be integrated into organizational goal in order to gain the right information to the right people at the right time (Rooke, *et al*, 2012).

Given the role of ICT in transferring and increasing the productive knowledge, the task force must explore, adopt and use knowledge (Ku, *et al*, 2015) to create a knowledge community that includes people who sharing the information in-depth (Abraham, 2014). They use the story and narrative forms to enrich professional colleagues. Cultural, organizational, and market trend are the main issues to be considered in the productive knowledge policy. But the main issue is the productive knowledge creation and innovation which empirically not easy to understand. The process was dynamic, both in internal and external environment. Wæhrens, et al (2015) stated that there was relationship between learning, innovation and creation of knowledge, as shown in the following figure.

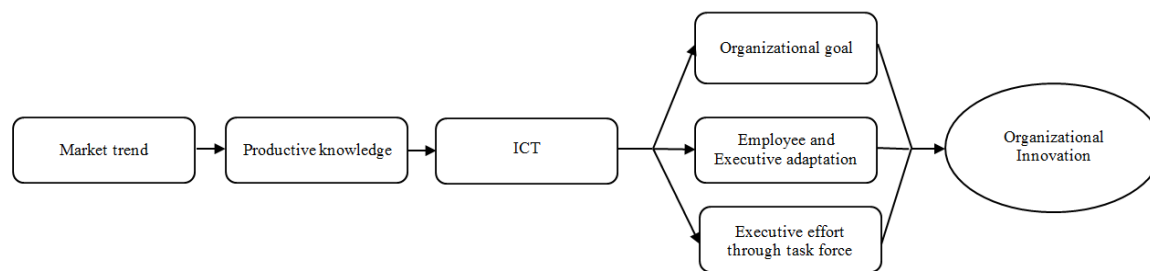


Fig.2. productive knowledge, ICT and innovation

From Fig.2., the process of innovation needs productive innovation and organizational goal to reach organizational innovation. In addition, it also needs employee and executive adaptation to the knowledge policies and task force to achieve higher innovative power position than the previous period. In addition, the process should involve every component organization and include activities in the value chain of performance and production process (Ehlen, *et al*, 2013).

f. Conclusion

Intellectual capital and knowledge management is closely associated with the development of information technology that has driven globalization or free trade. Information technology can be seen as a tool or medium to obtain knowledge and information and business process (Spring & Araujo, 2014). In running the business, there are two perspectives as the basis e.g. acquisition and application of information technology. In addition, for organization can apply the knowledge management into their business processes (Rooke, *et al*, 2012) they must consider productive knowledge as the main capital for the company to push the pace of innovation. Since the goal of innovation is improving the organizational performance, then, adaption of innovation must be based on the productive knowledge scheme as explained above. Through productive knowledge, organization can understand the market trend and business indicator to create higher competitiveness. This also supported by Abraham (2014) that improved efficiency in the use of ICT will provide an opportunity for innovation. For example, automated IT systems link leads to a leaner business processes and enable staff to be more responsive to customer needs as they can absorb new information. Similarly, a technology that allows staff to communicate and collaborate more effectively throughout the wider region will encourage management strategy and more flexible external relations. This strategy will involve various types of innovative activities and productive knowledge policies.

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