



Research Article

Knowledge management approaches and processes to enhance innovation: case of IT projects in developing countries

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Submitted: 06 December 2021

Revised: 15 March 2022

Accepted: 22 March 2022

ABSTRACT

Nowadays, organizations continuously improve their performance through refining the knowledge where the study focuses on Knowledge Management (KM) processes and approaches to increase innovation quality. KM is important as firms are progressively competitive, and the rate of innovation is rising. The purpose of the study is to investigate how KM affects innovation and describe how social network channels are used to communicate and exchange knowledge with each other in Information Technology (IT) projects. The data were collected from 208 analysts of IT companies in Pakistan through Google form. After the reliability analysis, the data were analyzed through descriptive and multiple regression analysis. The analysis outcome showed that the relationship of knowledge management process and approaches has a significant and positive impact on innovation, which ascertains that KM Process develops relevant expertise for encouraging innovation.

Keywords: Knowledge; Organization; Knowledge Management Process; Approaches; Innovation

1. INTRODUCTION

The concept of KM is increasing day by day, and innovation is central to improving all organizations and can affect individuals, institutions, entire economic sectors, and countries in multiple ways. It is a fact that most organizations use knowledge as a weapon for achieving competitive advantage during the past few years. However, the concept of knowledge Management has rapidly increased in the 21st century, and it is used as an electromotive force for educational advancement, economy, and business world. The importance of KM is due to technological changes, globalization, and changing demands. KM is supportive of utilizing the proper knowledge to the right person at the right time at the right place to make organizations better for achieving competitive advantage. According to Riege (2007), knowledge and knowledge management are essential features for organizational survival. The key to understanding the successes and failures of KM within organizations is identifying resources that allow organizations to recognize, create, transform and distribute knowledge. Organizations that effectively manage and transfer their knowledge are more innovative and perform better.

Lundvall and Peter (2007) stated that KM is an older phenomenon, but if combined with organizational capabilities, it improves the performance of the firms. According to Senge et al. (2007), the ongoing progress century depends upon innovation, information, knowledge, and an organization's success is based on experience, employee creativity, knowledge, and qualification. In the quick-changing environment of the business world, innovation growth has become the prominent corner of it. Economic expansion has been increased through innovation Cavusgil et al., (2003). The concept of knowledge, management, and innovation are very close to each other because innovation cannot occur without knowledge. According Tannenbaum & Gorge. (2000) Innovation depends on knowing whether the proper knowledge and right decision insure by KM, which is necessary for the organization's performance. KM is focused not only on innovation but also on the conducive and most accessible environment for innovation. The structured approach is the KM approach, which allows planning, managing, and sharing the knowledge to enhance product quality and service. KM is the mechanism used to create, manage, and control the knowledge sequence to efficiently and effectively ensure the organization's long-term advantage (McNaughton and Darroch (2002). Either knowledge has based on two ways the explicit way and the tacit way. Using the tacit way is more beneficial for the innovation process because it is not easy to assess for competitors than explicit knowledge Cardinal et al., (2001). Existing knowledge remake with new ideas and new features in the product and service generally belongs to innovation. In this process, KM plays an ideal role in providing explicit knowledge, which recombines with the explicit knowledge in a new way. Since explicit knowledge is utilized as an input for innovation procedure, KM also finds the gap in the explicit knowledge, which negatively affects the firm's innovation procedure Scarbrough et al., (2003).

KM provides a platform for accessibility and availability of knowledge and fosters innovation through the process, tool, and technology. Whether the KM importance tragically increases due to the customers' changing demand, either it considers the beneficial parameter for the organization improvement (Zack, 1999; Mehta, 2008). Innovation is considered the dependent element that directly affects KM activities and examines to gain the competitive advantage for the knowledge-creating companies (Takeuchi, 1995; Nonaka, 1994). According to various researchers, innovation is scrutinized as a critical success factor, and knowledge exploitation and exploration are essential elements to gain a competitive advantage (Gupta et al., 2006; Wong, 2004). KM is based on five primary processes, mainly used to acquire, share, code, maintain the knowledge, and finally apply that knowledge in the organization Lee et al., (2003).

KM progressively plays an essential role in organizations because knowledge is a significant asset that generates a sustainable competitive advantage. KM is a procedure that helps to utilize tacit or explicit knowledge effectively. It also enhances the KM processes through which we create new knowledge and transmit employee's knowledge all over the organization. According to all the previous history, Processes of knowledge Management are used to hold up all the organizational strategies and operations, which is helpful in the service innovation and achieve competitive advantage for the marketplace Niqresh, M. (2021).

The IT-based Project organizations heavily adopt investment in information technology to obtain their user's loyalty in the Business world for this knowledge Management Process. The KM processes are the acquisition of knowledge, sharing of knowledge, creation, codification, and utilization used to create existing tacit knowledge and explicit knowledge in a practical way which gives back to the success of innovation that leads to customer loyalty. According to Wang and Wang (2012), the moral of the subject is that KM and innovation both have a direct relationship with each other; each knowledge dimension improves the performance of a firm's innovation while explicit knowledge has a significant result on financial performance, and tacit knowledge has effective results on quality of innovation

2. LITERATURE REVIEW

2.1. DATA, INFORMATION AND KNOWLEDGE

Data: "A collection of facts, such as numbers, words, measurements, observations or just descriptions of things." Data is a raw material, and it is found in any shape, either useable or not useable, but it does not have meaning itself. However, it is discrete, objective facts about events Gene Bellinger et al., (2011). Data is unrefined, unfiltered, and basic information Anthony Liew June, (2007).

Information: The Information is organized or classified data, which has some meaningful values for the receiver. It is the data that must be processed helpfully. Information is based on data that contain some relevant "Meaning," implication, or input for decision and/or action Gene Bellinger et al., (2011). The information data is filtered and refined with some meaning used for analysis Anthoy Liew (June 2007).

Knowledge: Knowledge is a familiarity, awareness, or understanding of someone or something, such as facts (propositional knowledge), skills (procedural knowledge), or objects (acquaintance knowledge). Knowledge is neither data nor information, but although it is related to both, many factors involved transferring data into information and information into knowledge Laurence Prusak and Thomash, (1997). According to Bell (1999) that data, information, and knowledge these three basic concepts are arranged on a single continuum that depends on human involvement and actions. Knowledge is required data, information, and experience that involves the theory of application, which allows knowledgeable decisions Nick Milton, (1999).

Knowledge is a valuable asset that today's organization can utilize to overcome the complexity of innovation procedures, improve their competitive advantage, and consider everyone in the firm who knows how to use the knowledge very well Powell and Ambrosini et al., (2012). According to Andreeva et al. (2012), knowledge's importance increases day by day in organizations. It has a positive impact on improving competitive advantage and innovation, leading the organization to superior performance. "Knowledge is the fluid mix of framed experience, values, contextual information, and expert insight that provide a framework for evaluating and incorporating new experiences and information." Tom and Laurence, (1998).

Knowledge is considered a key source of competitive advantage because it has increasing importance in organizations to simplify all activities and enhance decision-making (Samina et al., (2015). Hamel & Green et al. (2007) stated that today's organization depends on employees' knowledge of their experience and creativity, which leads to success. In the organization, current knowledge is considered a prerequisite for innovations. Therefore, the organization needs to identify and create new knowledge and move it into innovations Liu and Tsai et al., (2007). When knowledge manages the organizations, it will become a high level of quality. It increases efficiency and productivity. The knowledge advantage is also sustainable because it generates good benefits and returns (Laurence Prusak and Thomash, (1997). There are two significant types of knowledge which include explicit knowledge and tacit knowledge.

Tacit knowledge is a valuable source for an organization's innovation, which is getting knowledge from customers and suppliers due to insufficient knowledge that can be used as input for innovation. In tacit knowledge sharing face to face, interaction is the primary element Steven, Sanjib et al., (2007).

The second type of knowledge is "explicit knowledge which is publicly and most widely known and the conventional form of knowledge that can be found in books, journals and mass media such as newspapers, television internet etc." Explicit knowledge can be communicated in a "language" embodied in the form of code, and as a consequence, it can be verbalized, communicated, processed, transmitted, and stored relatively easily. It is the sort of knowledge we are aware of using, and it can be shared in the form of data, scientific formulae, manuals, and such like Kikoski and Kikoski, (2004)

Explicit knowledge sharing is easy to capture, codified, transmitted, and it is more common in the workplace. Management mechanisms, such as handbooks, information technology systems, procedures, and formal language, promote employees' willingness to share their explicit knowledge (Huang, Davison, & GU, 2010 and Coakes, 2006).

2.2. KNOWLEDGE MANAGEMENT

Managing knowledge in the firms is crucial, although the firm has to define what type of knowledge and how to acquire this knowledge to apply it effectively and efficiently to attain and gain a competitive advantage Denford et al., (2013). Unembodied knowledge cannot generate a productive value without using management activities and processes (Teece et al., 1997; Lee et al., 2013). According to research, "Knowledge Management is a systematic and dynamic management process for knowledge resources used to create knowledge, manage knowledge flow and ensure that knowledge is effectively used." Ferreira, et al., (2018). KM shared, maintained, and institutionalized the intellectual capabilities of the organization Tannenbaum & Gorge (2000).

Hislop (2013) defines KM as "an umbrella term which refers to any deliberate efforts to manage the knowledge of an organization's workforce. That can be achieved via a wide range of methods including directly, through the use of particular types of ICT, or more indirectly through the management of social processes, the structuring of organization in particular ways or via the use of particular culture and people management practices".

According to Palacios (2008) & Terziovski and Gloet (2004) “Knowledge Management is a management tool characterized by a set of principles along with a series of practices and techniques through which the principles are introduced, the aim of which is to create, convert, disseminate and utilize knowledge. An umbrella term for a wide variety of interdependent and interlocking functions consisting of knowledge creation; knowledge valuation and metrics; knowledge mapping and indexing; knowledge transport, storage and distribution; and knowledge sharing.”

KM deals with various resources that can be used in the decision-making process because it considers as the critical factor in the organization's performance Keen, (1991). Knowledge management plays an essential role in understanding value creation and innovation in the firm Grant et al., (1996). The approach of Knowledge Management allows more actively collectivizing knowledge, which is spread across the firm (Scarborough et al., 2003). Individuals and groups create, share and retain, knowledge through the utilization of KM Argote et al., (2013). KM in the innovation process facilitates collaboration and helps to flourish a knowledge-driven culture that fosters innovations (Samina Nawab et al., (2015).

The primary purpose of KM is to ensure that the right knowledge is applied at the right time and the right place, leading to the right decision (Scooti et al., (2000). KM used to acquire the knowledge and shape itself effectively for the organization that generates business value for customers Donate and de Pablo (2015).

2.3. KNOWLEDGE MANAGEMENT PROCESS

Baloh et al. (2011) define processes, another KM component, as mechanical and logical artifacts that guide how work is conducted in organizations. Processes govern work in the organization and so are critical to the functioning of the organization. Five basic knowledge management processes play an important role in organizations to ensure that they acquire, share, create, codify, and utilize the firms' possible knowledge to increase innovation. (Ling et al., 2009; Lin et al., 2012; Tiwana, 1999). The KM Processes include acquisition, sharing, utilization, creation, and codification. The knowledge society is moving very fast in modern society; hence, knowledge is an excellent source for gaining competitive edge in most organizations.

2.4. KNOWLEDGE ACQUISITION

The first step of the knowledge Management process is knowledge acquisition. In this process, knowledge must be captured or acquired in some helpful way. The primary purpose of knowledge acquisition is applied for searching, identifying, collecting, organizing, and mapping information. Pinho et al., (2012). According to Tiwana “knowledge acquisition is the process of development and creation of insights skills and relationships. Choo (2003) also describes that knowledge generation or acquisition as the activities that increase the stock of organizational knowledge”. According to Molina et al. (2014), “the process by which organizations obtain knowledge is knowledge acquisition.”

2.5. KNOWLEDGE SHARING

Cao and Xiang (2012) and Connell et al. (2014) stated that “The mutual exchange of tacit knowledge between individuals is Knowledge sharing.” The Purpose of Knowledge sharing is important because it helps the organizations to reach its business goals and also give the ability to individuals that generate and share ideas, experiences and documents by expressing themselves without any constraints where the new knowledge is spread easily over the organization which is an essential feature to generate successful innovations Dotsika et al., (2007). The role of Knowledge sharing is that the knowledge that already exists can be used by the person or organization who needs it, which is called sharing of knowledge. However, knowledge sharing is “POWER” Tiwana (1999). Knowledge sharing is the process that makes knowledge available to individuals and promotes the diffusion of knowledge, which is captured through different resources and converted into a form that quickly absorbs, understand, and is used by other individuals within the organization Lee et al., (2004).

2.6. KNOWLEDGE CREATION

According to Nonaka (1998), knowledge creation generally begins through socialization and interaction between individuals created and accumulated social capital. The purpose of Knowledge creation is to transfer, combine, and conversion of different kinds of knowledge. Knowledge creation depends on the interaction of human initiative and social structure, which affects the contradiction between resources and environment in the Firms. Organizations continuously need to create knowledge that makes the firms more innovative Ferraris et al., (2017). According to Takeuchi and Nonaka that knowledge cannot create without individuals in organizations. However, individuals can also share with other individuals and groups, which has a limited impact on organization effectiveness.

2.7. KNOWLEDGE CODIFICATION

The role of knowledge codification is to convert knowledge into a form that makes it easy, applicable, and describe, simulate, and map it for those who use it. Codification means moving knowledge into code and making it an organized form that is easy to understand as great as possible Thomash Davenport and Laurence Prusak (1998).

2.8. KNOWLEDGE UTILIZATION

The purpose of knowledge utilization is to “applying and using knowledge for organizational or business processes to perform activities that can achieve explicit results (Pasha and Pasha, 2008). Knowledge utilization is using and applying knowledge to produce a commercial value for the customer Azzam, (2010). Utilization of existing knowledge used for problem-solving reduces complex interactions between many individuals and groups Ducan (1972).

2.9. KNOWLEDGE MANAGEMENT APPROACHES

There are two approaches of KM one social network approach and the second is personalization approach.

2.10. SOCIAL NETWORK APPROACH

The Social network approach can influence learning processes, provide opportunities for problem-solving, and establish new ideas. Thus, they can foster synergy, bring together essential resources such as the know-how of participating actors, and promote innovation diffusion. Social networks can promote innovation processes and expand learning opportunities. Social networks remove uncertainties, lack of confidence, and the fear of a loss of reputation can prevent actors from sharing information and knowledge. Results of SNP help us to identify weaknesses in the knowledge transfer process.

2.11. PERSONALIZATION APPROACH

The personalization approach is closely tied to the person who has developed it and is shared mainly through direct person-to-person contacts. This is a 'person-to-person' approach that involves sharing tacit knowledge. The exchange is achieved by creating networks and encouraging face-to-face communication between individuals and teams by means of informal conferences, workshops, brainstorming, and one-to-one sessions. The Personalization approach also plays a vital role in the innovation process, which generates individualized content for each customer getting knowledge face-to-face from their ideal person.

2.12. INNOVATION

Innovation is the knowledge of constituents, linkages between components, methods, processes, and techniques that go into an artifact. Innovation is never a one-time phenomenon but a long and cumulative process of many organizational decision-making processes, ranging from the generation of a new idea to its implementation phase. The changing environment of the business world wants innovation, which is the essential element of today's organizations. Describe the innovation in terms of product and service. Innovation is a process where knowledge is acquired, shared, and assimilated to create new knowledge, which embodies products and services also state that innovation is the adoption of an idea or behavior that is new to the organization. The innovation can be a new product, a new service, or a new technology. Innovation is related to change, which can be radical or incremental Herkema (2003). The main purpose of innovation is to modify the existing product, service, and process by which new outcomes occur Gloet and Terziovski (2004).

2.13. KNOWLEDGE MANAGEMENT AND INNOVATION

KM and innovation are two basic activities for firms. KM plays an important role when persons apply innovation and makes creativity in their firms. KM reduces complications in the innovation process because innovation is based on knowledge. The chances of

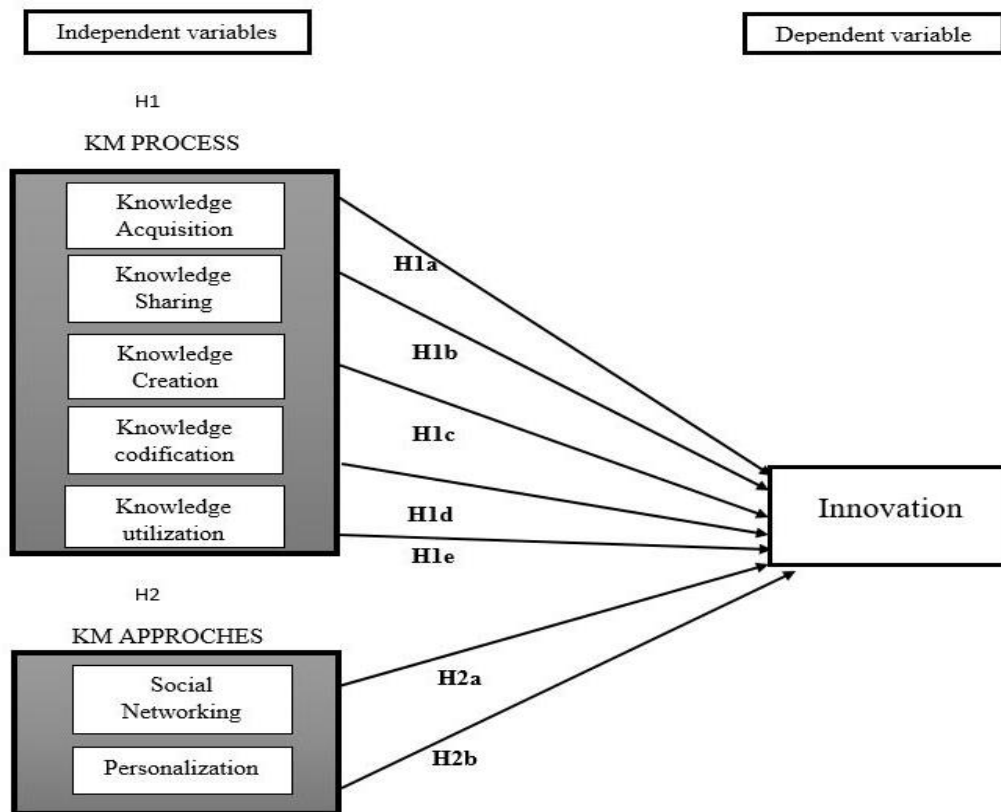
complexity increased by the explosion of knowledge richness and reach, that complexity is resolved and managed by knowledge Management Adams and Lamont *et al.*, (2003). KM is the way to address the innovation complexity from time to time. It is also used to manage new knowledge created through innovation and handle existing knowledge used as input in the innovation procedure Cavusgil (2002). KM is the part of innovation where an organization creates, builds, and maintains competitive advantage through the right utilization of knowledge and collaboration Practices. The main focus of Knowledge Management on the innovation process is integrating both internal and external knowledge to make it more accessible and available. Lamont and Adams (2003) describe innovation and KM mechanisms depend on each other. Darroch (2005) stated that successful knowledge management acts as a coordinating mechanism to enhance both innovation and organizational performance

3. RESEARCH METHODOLOGY

The study's objective was to investigate the effect of Knowledge Management processes, and Knowledge Management approaches on innovation in IT firms of Pakistan. The nature of the research explains the impact of five KM Processes and two approaches on innovation. We use the quantitative approach to investigate the association in the middle of KM and innovation. Our target areas for research were IT firms and Analysts of Pakistani organizations. The IT firms generate IT projects. IT projects divide IT professionals into six groups who make the IT project (Project Manager, IT Analyst, Back end Developer, Front end developer, Quality engineer, and Tester). In our case, we choose IT analyst because the role of IT analyst is essential at the starting stage of the project where acquire Requirements from the clients. IT analyst uniquely delivers value for the product in the development process, including all attributes. IT analysts and Knowledge Management Process both acquire knowledge from others and share it in a documented form. IT analysts properly apply knowledge Management Processes in the requirement gathering phase, so the project meets the end product more successfully.

3.1. RESEARCH MODEL

The dependent and independent variables for the study are taken from previous research of different researchers. Knowledge Acquisition, Knowledge Sharing, and knowledge utilization were developed by (Li, 2009; Lee et al., 2004), where codification and personalization items were developed by Tiwana (1999). As developed by Fong and Choi (2009), knowledge creation and social network items were based on Ambrosini and Powell (2012).



Conceptual Framework (Bader Yousef Obeidat and Mai Maher Al-Suradi, 2015)

3.2. THE HYPOTHESIS OF THE STUDY

H1: Knowledge Management Process has a positive impact on innovation.

H1a: Knowledge Acquisition has a positive impact on innovation.

H1b: Knowledge Sharing has a positive impact on innovation.

H1c: Knowledge creation has a positive impact on innovation.

H1d: Knowledge codification has a positive impact on innovation.

H1e: Knowledge utilization has a positive impact on innovation.

H2: Knowledge Management Approaches have a positive impact on innovation.

H2a: Knowledge of social networking has a positive impact on innovation.

H2b: Knowledge Personalization has a positive impact on innovation.

3.3. DATA ANALYSIS

To analyze the hypotheses of the study, we use primary data. The data for the research was collected through questioners on a five-point Likert scale were from 306 IT analysts of the Pakistani organizations. The mode of collection of data was Google form and email. We get back 208 complete responses which are 68% of our sample size. The reliability of the data was checked using Cronbach's alpha which was more than 0.70 for all the variables shown in table1 which indicates that our data is reliable.

Table 1. Reliability Analysis

Variables	Cronbach's Alpha
Individual Performance	0.768
Team Performance	0.723
Project Performance	0.813
Project Management Tools	0.911
Project Management Practices	0.869
Project Management Support	0.711

The descriptive analysis of the data is given in the following table 2. It showed that the mean value of the KM process is 3.50 with a standard deviation of 0.74, the mean value of KM approaches is 3.44 with a standard deviation of 0.78. In contrast, the mean value of innovation is 3.48, with a standard deviation of 0.74, indicating that data is uniformly distributed and has no abnormality.

Table 2. Descriptive Statistics

	KA	KS	KC	KU	KCD	KMP	PA	SN	KMA	IN
Mean	3.644	3.522	3.458	3.456	3.430	3.50	3.431	3.467	3.44	3.483
SD	0.727	0.729	0.784	0.756	0.710	0.74	0.725	0.834	0.78	0.744

The relationship of KM process and approaches on innovation descriptive statistics, correlation, and multiple regression analysis techniques were applied through software SPSS.

Table 3. Correlation Analysis

	KA	KS	KC	KU	KCD	PA	SN	IN
KA	1							
KS	0.398**	1						
KC	0.492**	0.543**	1					
KU	0.434**	0.440**	0.565**	1				
KCD	0.496**	0.437**	0.582**	0.540**	1			
PA	0.408**	0.429**	0.476**	0.542**	0.538**	1		
SN	0.320**	0.320**	0.388**	0.390**	0.457**	0.457**	1	
IN	0.499**	0.508**	0.626**	0.559**	0.586**	0.469**	0.454**	1

The correlation of the variables given in table 3 showed that all the variables in the study are significantly and positively correlated with each other, which means that any increase or improvement in one variable causes a similar upturn to the other variable.

Table 4. Regression Analysis (Model validity)

	df	R-sq	F-statistics	Sig
Regression		0.53	33.158	.000
Residual	200			
Total	207			

The results given in table 1 show that 53% variation in innovation is explained by independent variables KM process and KM approaches which are on the higher side and also significant with F value 33.158 at p-value 0.000. This validates the model fitness, which means that independent variables significantly explain the dependent variable innovation.

Table 5. Regression Analysis (Hypothesis testing)

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	.140	.236			.596	.552
KA	.128	.060	.125		2.125	.035
KS	.137	.061	.135		2.248	.026
KC	.235	.065	.248		3.615	.000
KU	.157	.064	.160		2.456	.015
KCD	.181	.071	.173		2.553	.011
PA	.001	.066	.001		.022	.983
SN	.118	.051	.132		2.322	.021

The regression results shown in the table above indicate that the KM process's beta value, Knowledge creation, and codification, are significant at a 1% alpha value. At the same time, Knowledge acquisition, sharing, utilization, and social network approach are significant at a 5% significance level. These results validate that our hypotheses H1a, H1b, H1c, H1d, H1e, and H2b are accepted means that KA, KS, KC, KU, KCD, and SNA positively promote innovation while the KM personalization approach is insignificant that H2a is not accepted means PA has a negligible positive impact on innovation

3.4. BROAD IMPACT OF KNOWLEDGE MANAGEMENT PROCESS AND APPROACHES ON INNOVATION

The following table exhibited regression analysis of knowledge management approaches and knowledge management processes with innovation

Table 6. Regression of KMP and KMA on Innovation

	B	SE	t-value	Sig
Constant	.071	.229	.312	.755
KMP	.832	.081	10.235	.000
KMA	.145	.070	2.077	.039

Results in table 6 indicate that KMP influences innovation directly as one unit change in KMP causes 0.83 units expansion in innovation which is significant at 0.1%. Similarly, KMA also significantly impacts innovation at a 5% alpha level; hence H1 and H2 are accepted.

4. CONCLUSION

The focus of the study was to investigate the impact of Knowledge Management on innovation that simplifies how to apply knowledge to the innovation process, which removes the complexity and makes the process easier. It has accomplished that knowledge got an authoritative position in the economy, and KM practices are obligatory for the business's success. Knowledge Management applications can bring insurrection in the business field of Pakistan's organization. Epetimehin and Ekundayo (2011) reveal that KM efforts help organizations to share valuable organizational insights, to reduce redundant work, to avoid reinventing the wheel, to reduce training time for employees, to retain intellectual capital as employees' turnover in an organization, and to adapt to changing environments and markets. Our results display that all the knowledge

management processes positively and significantly impact innovation in IT firms. Results describe that all the KMP develop expertise that is relevant for the innovation process. According to du Plessis (2007), the association between staff and employees will enhance the KMP, successively improving innovation procedures. The results indicate that knowledge acquisition is essential for innovation, which makes sense as tacit and explicit data will generate new innovative ideas when combined with existing data. Likewise, acquiring a KM process is a good source for gaining expertise in employees rather than hiring a new employee in the firms. The results show that knowledge sharing between staff and employees will lead to a sustainable competitive advantage. It also reduces time, improves brainstorming, and helps the other employee gain new knowledge. The analysis demonstrates that knowledge creation has a positive and significant impact on innovation, which is rational. When knowledge transfers from tacit to explicit, it is easy to comprehend and assessable for employees who develop innovative understanding. The codified knowledge has an important impact on innovation because it is documented and stored in a database to secure the knowledge in complex form, which is understandable for the employee. The last and most important process is Knowledge utilization, which is apprehensive with applying the existing knowledge. The employee showed that they seek to utilize the available knowledge in improving their consulting services comprehensively. In brief, project success depends profoundly on knowledge acquisition and knowledge sharing, social network approach, and innovation. The research benefits IT professionals and managers to take the initiative and keep shared information up to date.

4.1. LIMITATION OF THE STUDY

Due to the lack of resources and time, the range of data collection was not broad, and analysis was based on the responses of only one country that may be unsuitable for generality. However, results can be generalized to those areas where socio-economic conditions are similar to Pakistan. There is a need for comprehensive, systemic, integrated approaches to deal with the continuously increasing complexity of organizations. This was one of the reasons behind the founding of this research. The three elements of people, processes, and technology must be balanced appropriately to deliver effective KM. The research found out how to tackle tacit knowledge of client and convert it into explicit and makes the innovation process easier.

Reference:

- Adams, G.L. and Lamont, B.T. (2003). Knowledge management systems and developing sustainable competitive advantage. *Journal of Knowledge Management*, Vol. 7 No. 2, pp. 142-54. <https://doi.org/10.1108/13673270310477342>
- Andreeva, T. and Kianto, A. (2012). Does knowledge management really matter linking knowledge management practices, competitiveness, and economic performance. *Journal of Knowledge Management*, Vol. 16 No. 4, pp. 617-636. <https://doi.org/10.1108/13673271211246185>

- Anthony Liew (2007). Understanding Data, Information, Knowledge and Their Inter-Relationships. *Journal of Knowledge Management Practice*, Vol. 7, No. 2
- Argote, L. (2013), *Organizational Learning: Creating, Retaining and Transferring Knowledge*, 2nd ed., Springer, New York, NY.
- Azzam, A. (2010). The effect of knowledge management on incremental product innovation in the Jordanian pharmaceutical industry”, *Unpublished MBA thesis, The University of Jordan, Jordan*. <https://doi.org/10.1108/MRR-09-2015-0214>
- Bellinger, (2011). Data, Information, Knowledge, and Wisdom. Online available at: <http://outsights.com/systems/dikw/dikw.htm>
- Baloh, P., Desouza, K. C. and Paquette, S. (2011). The concept of knowledge. In: K. C. Desouza and S. Paquette (Eds.), *Knowledge Management: An Introduction* (pp. 35-71). New York: NY: Neal-Schuman Publishers, Inc.
- Cao, Y. and Xiang, Y. (2012), “The impact of knowledge governance on knowledge sharing”, *Management Decision*, Vol.50 No. 4, pp. 591-610. <https://doi.org/10.1108/00251741211220147>
- Cardinal, L. (2001), “Technological innovation in the pharmaceutical industry: the use of organizational control in managing research and development”, *Organization Science*, Vol. 12, pp. 19-36. DOI: 10.1287/orsc.12.1.19.10119
- Cavusgil, S. T., & Zhao, Y. S. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31, 515–524. [https://doi.org/10.1016/S0019-8501\(01\)00203-6](https://doi.org/10.1016/S0019-8501(01)00203-6)
- Cavusgil, S.T., Calantone, R.J. and Zhao, Y. (2003). Tacit knowledge transfer and firm innovation capability. *Journal of Business & Industrial Marketing*, Vol. 18 No. 1, pp. 6-21. <https://doi.org/10.1108/08858620310458615>
- Choo, C.W. (2003), “Perspectives on managing knowledge in organizations”, *Cataloging & Classification Quarterly*, Vol. 37 Nos 1/2, pp. 205-220. https://doi.org/10.1300/J104v37n01_14
- Coakes, E. & Smith, P. A. (2006). Storing and sharing knowledge: Supporting the management of knowledge made explicit in transnational organizations. *The Learning Organization*, 13(6), 579-593. DOI: 10.1108/09696470610705460
- Connell, J., Kriz, A. and Thorpe, M. (2014). Industry clusters: an antidote for knowledge sharing and collaborative innovation? *Journal of Knowledge Management*, Vol. 18 No. 1. <https://doi.org/10.1108/JKM-08-2013-0312>
- Denford, J.S. (2013). Building knowledge: developing a knowledge-based dynamic capabilities typology. *Journal of Knowledge Management*, Vol. 17 No. 2, pp. 175-194. <https://doi.org/10.1108/13673271311315150>
- Donate, MJ and de Pablo, J.D.S. (2015). The role of knowledge-oriented leadership in knowledge management practices and innovation. *Journal of Business Research*, Vol. 68 No. 2, pp. 360-370. <https://doi.org/10.1016/j.jbusres.2014.06.022>
- Dotsika, F and Patrick, K. (2007), “Knowledge sharing: Developing from within”, *The Learning Organization*, Vol. 14 No. 5, pp. 395-406.
- Du Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management*, 11(4), 20–29. <https://doi.org/10.1108/13673270710762684>

- Ducan, WJ (1972), "The knowledge utilization process in management and organization", *Academy of Management Journal*, Vol. 15 No. 3, pp. 273-287. <https://doi.org/10.2307/254853>
- Darroch, J. (2005), "Knowledge management, innovation and firm performance", *Journal of Knowledge Management*, 9(3), pp.101-115. <https://doi.org/10.1108/13673270510602809>
- Epetimehin, F. M. and Ekundayo, O. (2011). Organisational knowledge management: survival strategy for Nigeria insurance industry. *Interdisciplinary Review of Economics and Management*, 1(2), 9-15.
- Ferraris, A., Santoro, G. and Dezi, L. (2017), "How MNC's subsidiaries may improve their innovative performance? The role of external sources and knowledge management capabilities", *Journal of Knowledge Management*, Vol. 21 No. 3, pp. 540-552. <https://doi.org/10.1108/JKM-09-2016-0411>
- Ferreira, J., Mueller, J. and Papa, A. (2018). Strategic knowledge management: theory, practice and future challenges. *Journal of Knowledge Management*, Vol. 24 No. 2, <https://doi.org/10.1108/JKM-07-2018-0461>
- Gene Bellinger, Durval Castro, Anthony Mills (2011). Data, Information, Knowledge, and Wisdom. Online available at: <http://outsights.com/systems/dikw/dikw.htm>.
- Gloet, M. and Terziovski, M. (2004). Exploring the relationship between knowledge management practices and innovation performance. *Journal of Manufacturing Technology Management*, Vol. 15 No. 5, pp. 402-409. <https://doi.org/10.1108/17410380410540390>
- Grant, R. M. (1996). Knowledge and the firm: Overview. *Strategic Management Journal*, 17, 5-9. <https://doi.org/10.1002/smj.4250171103>
- Gupta, A., Smith, K. and Shelley, C. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, Vol. 49 No. 4, pp. 693-706. <https://doi.org/10.5465/amj.2006.22083026>
- Hamel, G. & Green, B. (2007). *The Future of Management*. Boston: Harvard Business School Press.
- Herkema, S. (2003), "A complex adaptive perspective on learning within innovation projects", *The Learning Organization*, Vol. 10 No. 6, pp. 340-6. <https://doi.org/10.1108/09696470310497177>
- Huang, Q., Davison, R. M., Liu, H., & Gu, J. (2010). The impact of leadership style on knowledge sharing intentions in China. DOI: 10.4018/jgim.2008100104
- Hislop, D. (2013). Knowledge management in organisations: A critical introduction. 3rd Ed. UK: Oxford University Press.
- Keen, P.W. (1991), Every Manager's Guide to Information Technology, *Harvard Business School Press*, Boston, MA
- Kikoski, C. K., & Kikoski, J. F. (2004). The Inquiring Organization: Tacit Knowledge, Conversation, and Knowledge Creation Skills for 21st Century Organizations. London: Greenwood publishing group.
- Laurence Prusak and Thomash (1997). *Working Knowledge: How organization manage what they know*. Information School of Management DOI: 10.1145/348772.348775
- Lee, H. & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20, 179-288. <https://doi.org/10.1080/07421222.2003.11045756>

- Lee, K.C., Lee, S. and Kang, I.W. (2004). KMPI: measuring knowledge management performance", *Information & Management*, Vol. 42 No. 3, pp. 469-482.
- Lee, V.H., Leong, L.Y., Hew, T.S. and Ooi, K.B. (2013). Knowledge management: a key determinant in advancing technological innovation? *Journal of Knowledge Management*, Vol. 17 No. 6, pp. 848-872. <https://doi.org/10.1108/JKM-08-2013-0315>
- Lin, R., Che, R. and Ting, C. (2012). Turning knowledge management into innovation in the high-tech industry. *Industrial Management & Data Systems*, Vol. 112 No. 1, pp. 42-63. <https://doi.org/10.1108/02635571211193635>
- Ling, C.W., Sandhu, M.S. and Jain, K.M. (2009). Knowledge sharing in an American multinational company based in Malaysia. *Journal of Workplace Learning*, Vol. 21 No. 2, pp. 125-142. <https://doi.org/10.1108/13665620910934825>
- Liu, Pang-Lo; Tsai, Chih-Hung (2007). Effect of Knowledge Management Systems on Operating Performance: An Empirical Study of Hi-Tech Companies using the Balanced Scorecard Approach. *International Journal of Management; Poole Vol. 24, Iss. 4, 734-743, 823.*
- Lundvall, B. and Nielsen, P. (2007) Knowledge management and innovation performance. *International Journal of Manpower*, Vol. 28 No. 3/4, pp. 207-223. <https://doi.org/10.1108/01437720710755218>
- McNaughton, Darroch, J., & (2002). Examining the link between knowledge management practices and types of innovation. *Journal of Intellectual Capital*, 3(3), 210-222. <https://doi.org/10.1108/14691930210435570>
- Mehta, N. (2008). Successful knowledge management implementation in global software companies. *Journal of Knowledge Management*, Vol. 12 No. 2, pp. 42-56. <https://doi.org/10.1108/13673270810859505>
- Molina-Morales, F.X., Garcia-Villaverde, P.M. and Parra-Requena, G. (2014). Geographical and cognitive proximity effects on innovation performance in SMEs: a way through knowledge acquisition. *International Entrepreneurship and Management Journal*, Vol. 10 No. 2, pp. 231-251.
- Nick Milton (1999). *Knowledge Management for teams and Projects*. Business & Economics
- Niqresh, M. (2021). The Reality of Applying Knowledge Management Practices and Its Impact on Achieving the Quality of Higher Education in Jordan. *Journal of Educational and Social Research*, 11(1), 9. DOI: <https://doi.org/10.36941/jesr-2021-0002>
- Nonaka, I (1994). *A dynamic theory of organizational knowledge creation*. *Organization Science*, 5(1), 14-37. <https://doi.org/10.1287/orsc.5.1.14>
- Nonaka, I. and Konno, N. (1998), "The concept of 'ba'", *California Management Review*, Vol. 40 No. 3, pp. 40-54. <https://doi.org/10.2307/41165942>
- Obeidat, B. Y., Al-Suradi, M. M., Masa'deh, R., & Tarhini, A. (2015). The impact of knowledge management on innovation. *Management Research Review*, 39(10), 1214-1238. <https://doi.org/10.1108/MRR-09-2015-0214>
- Palacios, D., Gil, I. and Garrigos, F. (2008), "The impact of knowledge management on innovation and entrepreneurship in the biotechnology and telecommunications industries", *Small Business Economics*, Vol. 32 No. 3, pp. 291-301. DOI 10.1007/s11187-008-9146-6

- Pasha, S. and Pasha, M.A. (2008). Innovators knowledge services. Available at: www.innovators.edu.pk/node/198 [accessed 28 June 2012]
- Pinho, I., Rego, A. and Cunha, M. (2012). Improving knowledge management processes: a hybrid positive approach. *Journal of Knowledge Management*, Vol. 16 No. 2, pp. 215-242. <https://doi.org/10.1108/13673271211218834>
- Powell, T.H. and Ambrosini, V. (2012). A pluralistic approach to knowledge management practices: evidence from consultancy companies. *Long Range Planning*, Vol. 45 Nos 2/3, pp. 209-226. <https://doi.org/10.1016/j.lrp.2012.02.005>
- Riege, A. (2007), "Actions to overcome knowledge transfer barriers in MNCs", *Journal of Knowledge Management*, Vol. 11 No. 1, pp. 48-67. <https://doi.org/10.1108/13673270710728231>
- Samina Nawab, Tahira Nazir, Muhammad Mohsin Zahid, and Syed Muhammad Fawad (2015). Knowledge Management, Innovation and Organizational Performance. *International Journal of Knowledge Engineering*, Vol. 1, No. 1
- Scarbrough, H. (2003), "Knowledge management, HRM and the innovation process", *International Journal of Manpower*, Vol. 24 No. 5, pp. 501-16. <https://doi.org/10.1108/01437720310491053>
- Senge, P. (2007). Pátá disciplína – Teorie a praxe učící se organizace. Praha: Management Press. <https://www.booktook.cz/p/pata-disciplina-teorie-a-praxe-ucici-se-organizace-teorie-a-praxe-ucici-se-organizace/>
- Steven, P. E., Sanjib, Megan Lee, K. C., & Intakhab, A. (2007). Tacit knowledge sharing, self-efficacy theory, and application to the Open Source community. *Journal of Knowledge Management*, 11, 92.
- Takeuchi (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation?* New York: Oxford University Press.
- Tannenbaum, S. I., & Alliger, G. M. (2000). *Knowledge management: clarifying the key issues. International Association for Human Resource Information Management (IHRIM).*
- Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533 [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Tiwana, A. (1999), *Knowledge Management Toolkit*, 1st ed., Prentice Hall, PTR.
- Tom Davenport and Laurence. P, Working Knowledge (1998). *How Organizations Manage What They Know*. Harvard Business Press. DOI: 10.1145/348772.348775
- Wang and Wang, (2012). Knowledge sharing, innovation and firm performance. *Expert Systems With Applications*, 39 (2012), pp. 8899-8908 <https://doi.org/10.1016/j.eswa.2012.02.017>
- Wong and He, P-K. (2004). Exploration vs exploitation: an empirical test of the ambidexterity hypothesis. *Organization Science*, Vol. 15 No. 4, pp. 481-94. <https://doi.org/10.1287/orsc.1040.0078>
- Zack, M. (1999a), *Knowledge and Strategy*, Butterworth-Heinemann, Boston,