

## Knowledge management capacity and innovation performance

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### ABSTRACT

The aim of this paper is to study relationship between knowledge management capacity and innovation performance. Knowledge management capacity includes knowledge sharing, knowledge application, and knowledge acquisition. For innovation performance, author considers the most important indicators including administrative innovation, product innovation, and process innovation. According to research model, 9 hypotheses are developed and the results show that there is not any positive relationship between knowledge acquisition and administrative innovation.

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## 1. Introduction

In current era with dramatically changing environment and dynamic markets, knowledge is recognized as strategic approach for creating competitive advantages. Facing this speedy change, enterprises should adapt and update their knowledge to create and maintain their sustainable competitive advantages (Rademakers, 2005). Treating knowledge as an important organizational resource, studies in the area of knowledge management (KM) have grown dramatically over the last decade (Hislop et al., 2000; Feng et al., 2004). Particularly, KM has become the focal point for debates on mechanisms to facilitate firms acquiring greater competitive edge in the emerging global information economy (Clarke & Turner, 2004; Huang et al., 2011).

Reviewing previous literatures, many researchers conducted various researches to understand the link between KM and innovation in organizational context. Under the fierce competition, companies are compelled to innovate in order to be successful even to survive in the global market. It is reported that successful companies produce 75 percent of their revenues from new products or services, which did not exist five years ago (Smith, 2006). The competition based on knowledge and innovation as an effective strategy is highly valued by companies. Therefore, knowledge and innovation are

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considered as the crucial sources for sustaining the competitive advantage of a company (Nonaka & Takeuchi, 1995). The proposed study of this paper explores the relationships between KM and innovation in knowledge-based environment.

## **2. Literature review**

### *2.1. Knowledge Management capacity*

#### *Knowledge sharing*

In today's knowledge-based economy, people's knowledge has a momentous role in driving the organization value. By virtue of knowledge sharing behavior, the most valuable personal knowledge can be directed to multiple individuals, expanded throughout an organization, and finally it can contribute to organizations to reach its success (Gazor et al., 2012). Also Gazor in an unpublished work pointed out that knowledge sharing is the essential tool through which employees contribute to innovation and ultimately the competitive advantage of the organization. Knowledge sharing (KS) refers to collective beliefs or behavioral routines associated with the spread of learning among various individuals or units within an organization (Moorman & Miner, 1998).

KS implies the new combination of knowledge, which has previously been existed separately and it possibly would result in process improvements or novel products. Since knowledge exists within different individuals and various levels of the organization, organizational members are required to share it in order to establish new routines and mental models (Galunic & Rodan, 1998). When individuals are interested in sharing and exchanging knowledge, they can generate collective learning and synergistic benefits from the processes of exchanging knowledge and resource (Nonaka & Konno, 1998). Innovations come about when organizational members share their expertise and convert them into explicit forms of products or services (Von Krogh, 1998).

#### *Knowledge acquisition*

Knowledge acquisition entails the search for, recognition of, and assimilation of new knowledge, from outside organizational boundaries (Gunsel et al., 2011). It provides opportunities for organizations to recombine current knowledge and create new knowledge. The newly acquired knowledge interacting with the existing knowledge can modify organizational knowledge stock (Nonaka & Takeuchi, 1995) and enhance the breadth and depth of knowledge available to the firm, thereby increasing the potential for new innovative outcomes (Yli-Renko et al., 2001). The knowledge-based view recommends that knowledge acquisition activities will enhance a firm's capability to efficiently perform its role (Grant, 1996). Firms with good capability to acquire external and internal knowledge would reduce uncertainty and achieve a greater number of administrative and technological distinctiveness (Sarin & McDermott, 2003). Customer knowledge can establish a competitive advantage for the organization through increased organizational learning and innovation. The competitive advantage gained through knowledge acquisition can either be temporary, as other competitors will follow and learn the new skills, processes, products, and so forth, or it can be more permanent if the competition is prevented from gaining this knowledge. Customer knowledge can be a barrier to knowledge acquisition for the competition by building a good relationship with the customer, which cannot be duplicated (Paquette, 2006).

#### *Knowledge application*

Knowledge application is an idea for the implementation of knowledge in a particular context. This involves applying knowledge, which incorporates retrieving and using knowledge to support decisions, actions, and problem solving. It can also create new knowledge and refers to taking the shared knowledge and internalizing it within one's perspective and worldviews. Knowledge

application is a focal element in knowledge management capacity. From the knowledge-based view, the value of individual and organizational knowledge resides primarily on its application because of stickiness of the knowledge. New product development and innovation needs the application and combination of specialized knowledge inputs from various perspectives (Chen & Huang, 2009). A deeper application of knowledge enables firms continuously to move their organizational expertise into embodied products (Weisberg, 2006). By effectively applying knowledge, individuals might make fewer mistakes or improve their efficiencies (Grant, 1996; Gold et al., 2001). Organizations might be able also speed up new product development and create more innovative production processing technologies and administrative systems (Sarin & McDermott, 2003).

## *2.2. Innovation performance*

Organizational innovation, entailing the development of new products or services and new administrative systems is emerging as a momentous source of sustainable competitive advantage (Hurley & Hult, 1998). The innovation process involves the acquisition, dissemination, and implementation of new and existing knowledge. An organization's innovativeness is closely associated with its ability to utilize its knowledge resources (Subramaniam & Youndt, 2005). This investigation studies the aspects of innovation scope emphasizing the three most frequently studied innovation capabilities including product innovation, process innovation, and administrative innovation:

### *Administrative Innovation*

Administrative innovation refers to changes in organizational structure or administrative processes, such as the recruitment of personnel, the allocation of resources, and the structuring of tasks, authority, and rewards (Damanpour, 1992). It is involved when an organization adopts innovations and includes the implementation of new methods for distributing responsibilities and decision making among staff for the division of work within and between firm activities and organizational units. It also covers new concepts for the structuring of activities, such as implementation of an organizational model, which integrates the initiatives to manage the organization's knowledge into its workers' daily activities (Davenport & Prusak, 2000; Amalia & Nugroho, 2011).

### *Product Innovation*

New product innovation is considered mostly in terms of technological innovation, but whereas new technology does not necessarily have to be part of design innovation, most new technologies cannot be implemented without it. Innovative design however, still seems to contain more market risk than innovative technology (Jerrard et al., 1999; VIII). Product innovation is the development and introduction of a new product to the market or the modification of existing products in terms of function, quality consistency, or appearance (Liao et al., 2007). McKee (1992) considered product innovation as an organizational learning process and stated that directing the organization towards learning could support innovation effectiveness and efficiency. External factors of the company, which activate the company for product innovation are culture, competition and users, and internal factors are management & human resources, technology and company values (Jerrard et al., 1999).

### *Process Innovation*

Process innovation involves creating and improving the method of production, and the adoption of new elements (e.g. input materials, task specifications, information flow, and equipment) to the firm's production process (Damanpour, 1996). Process innovation (aligning resources and capabilities) improves the management system by improving technologies, products, and processes and by reducing or eliminating redundancies and problems (Rainey, 2006). Process innovation normally

includes examining the technologies used to create and produce the products for opportunities for improvements. Process innovation also includes developing the tools for deploying the improvements.

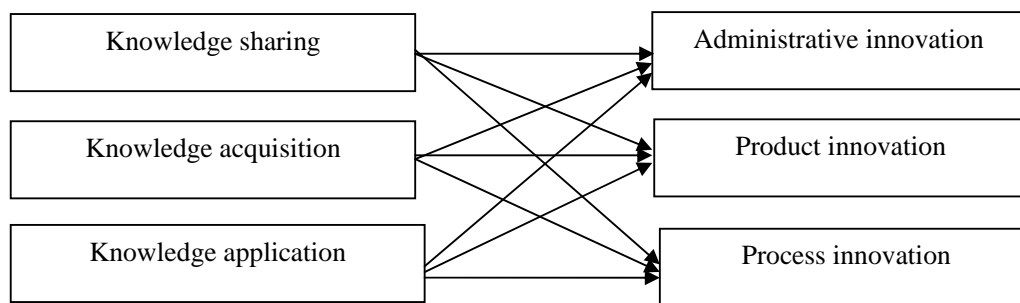
### 2.3. Knowledge management and innovation

Many research programs on KM have been carried out from various points of view: economics, management, technology and engineering (Liebowitz, 1999). Since innovation was first introduced by Schumpeter (1934), it has been studied from different aspects such as management perspectives (Drucker, 1993), of creativity (Amabile, 1996), of technology evolution (Althshuller, 1988) and recently of information and engineering with a focus on computer aided innovation (Leon, 2009). It is clear that knowledge, as an important asset in a company, must be managed in order to foster more innovation (Xu et al., 2010). Knowledge management is an approach of more actively leveraging the knowledge and expertise to create value and enhance organizational effectiveness. Firms exhibiting a greater level of knowledge management capacity experience a learning effect, which can improve their capabilities in reducing redundancy, responding rapidly to change, and developing creative ideas and innovation (Gold et al., 2001). Effective knowledge management facilitates knowledge communication and exchange required in the innovation process, and further enhances innovation performance through the development of new insights and capabilities (Nonaka & Takeuchi, 1995). Therefore, knowledge management capacity plays an essential role in supporting and fostering innovation. The knowledge is a key component of all forms of innovation and it is widely accepted principle of modern innovation management (Chapman & Magnusson, 2006). Knowledge is more regarded as an essential capital and the main source of the competitive advantage of a company. Because innovation is not a one-act drama for companies (Nonaka & Takeuchi, 1995), the process view on KM and innovation is prevalent in the domains of engineering and management. Thus, from the process perspective, numerous models, processes and frameworks of KM have been proposed to unveil the nature of KM (Holsapple & Joshi, 1999; Alavi & Leidner, 2001).

### 2.4. Research model and hypotheses

According to mentioned-above literature, and developed conceptual model, the following hypotheses are represented for the proposed model of this paper.

- H<sub>1</sub>: knowledge sharing has a positive and significant impact on administrative innovation.
- H<sub>2</sub>: knowledge sharing has a positive and significant impact on product innovation.
- H<sub>3</sub>: knowledge sharing has a positive and significant impact on process innovation.
- H<sub>4</sub>: Knowledge acquisition has a positive and significant impact on administrative innovation.
- H<sub>5</sub>: Knowledge acquisition has a positive and significant impact on product innovation.
- H<sub>6</sub>: Knowledge acquisition has a positive and significant impact on process innovation.
- H<sub>7</sub>: Knowledge application has a positive and significant impact on administrative innovation.
- H<sub>8</sub>: Knowledge application has a positive and significant impact on product innovation.
- H<sub>9</sub>: Knowledge application has a positive and significant impact on process innovation.



**Fig. 1.** Research conceptual model

### 3. Methodology

#### Data collection and questionnaire

The primary objective of this paper is to study relationship between knowledge management process and innovation. We have identified 20 private Iranian firms, which are engaged in information technology (IT) and information and communication technology (ICT) industry with 3,000,000 million Rials net profit annually. Top managers, executives, and middle managers were selected as respondents for research questionnaire. Finally, 73 questionnaires were completed. A questionnaire was developed with 20 items for measuring 2 main variables (6 sub-variables). A 5-point Likert scale (1= totally disagree, 2= disagree, 3=neutral, 4= agree, and 5= totally agree) was used to measure the variables (table 1). 5 academic experts and 2 top managers of IT and ICT industry confirmed reliability of tools. For validity, Cronbach's Alpha is obtained 0.79 which confirms the scale reliability.

**Table 1**  
Research questionnaire

Variable	Sub-variables	Items	Researcher(s)
knowledge management capacity	Knowledge sharing (KS)	Knowledge was shared between supervisors and subordinates	Chen & Huang (2009)
		Knowledge was shared between colleagues	
		Knowledge was shared between units	
	Knowledge application (KAP)	Effectively managing knowledge into practical use	
		Effectively utilizing knowledge into practical use	
	Knowledge acquisition (KAC)	Knowledge was obtained from customers	
innovation performance	Administrative innovation (AI)	Responsiveness to environmental changes	Chen & Huang (2009); Lin et al., (2010)
		Innovative administration in planning procedures	
		Innovative administration in process control systems	
		Innovative administration in integrated mechanisms	
	Product innovation (PI)	Our company engages in organizational reconstruction for pursuing operational efficiency	Lin et al., (2010)
		Our company launches new products	
		Our company extends numbers of product lines	
		Our company launches customized products according to market demands	
	Process innovation (PRI)	Our company imports new process technology	Lin et al., (2010)
		Our company obtains process technology patents	
		Our company adopts advanced real-time process control technology	
		Our company imports advanced automatic quality restriction equipment/software	

### 4. Results

Table 2 shows demographic data of respondents. More than 80% of them were male.

**Table 2**  
Demographic data of sample

		Number	%		Number	%	
Organizational position	Top management executive	6	7	Education	Graduate	33	45
	Human resource manager	15	21		Master	29	40
	Finance manager	18	25		Ph.D.	11	15
Sex	Middle managers	16	22	Income monthly (Rials)	< 8,000,000	9	13
	Male	18	25		8,000,000 – 10,000,000	13	17
Age	Female	60	82		10,000,000 -12,000,000	18	25
	<25	13	18		12,000,000 – 14,000,000	22	30
	26-30	15	21		>14,000,000	11	15
	31-35	24	33	Background (year)	<5	13	17
36-40	16	22	5- 10		11	15	
>40	5	7	10 -15		25	34	
		13	17	15-20	9	13	

As Table 3 shows, item KS2 (Knowledge was shared between colleagues) has the highest mean. This indicates that sharing knowledge is an essential item in research population. In addition, this proves that there is a strong trust within organizations. Note that trust is a one of main factors of sharing knowledge among individuals.

**Table 3**  
Statistics for items of questionnaire

No.	items	Freq.	Mean	Std. dev.	Coe. of variation
KS1	Knowledge was shared between supervisors and subordinates	73	3.8	1.053	0.263
KS2	Knowledge was shared between colleagues	73	4.6	1.044	0.25
KS3	Knowledge was shared between units	73	3.05	1.02	0.26
KAP4	Effectively managing knowledge into practical use	73	3.12	1.056	0.29
KAP5	Effectively utilizing knowledge into practical use	73	4	1.044	0.23
KAC6	Knowledge was obtained from customers	73	4.12	1.07	0.287
KAC7	Knowledge was obtained from partners	73	3.56	1.028	0.3
KAC8	Knowledge was obtained from employees	73	4.05	1.099	0.21
AI9	Responsiveness to environmental changes	73	3.64	1.004	0.277
AI10	Innovative administration in planning procedures	73	2.94	1	0.203
AI11	Innovative administration in process control systems	73	2.76	0.87	0.196
AI12	Innovative administration in integrated mechanisms	73	3.61	1.22	0.13
AI13	Our company engages in organizational reconstruction for pursuing operational efficiency	73	2.22	0.99	0.101
PI14	Our company launches new products	73	4	1.095	0.211
PI15	Our company extends numbers of product lines	73	4.02	1.022	0.37
PI16	Our company launches customized products according to market demands	73	3.55	1.031	0.294
PR117	Our company imports new process technology	73	4.1	1.059	0.31
PR118	Our company obtains process technology patents	73	3.99	1.099	0.32
PR119	Our company adopts advanced real-time process control technology	73	3.97	1.034	0.298
PR120	Our company imports advanced automatic quality restriction equipment/software	73	3.76	1.070	0.21

Table 3 also indicates that investigating of customers demand and their mind map impact on where organizations is located. It is important to note that in today's dynamic market, considering customer knowledge has influenced on upcoming firms' products and services, severely. Among the items of questionnaire, administrative innovation has the least mean value.

**Table 4**  
Mean for sub-variables

Rank	Sub-variables	Value
1	Knowledge sharing	3.97
2	Knowledge acquisition	3.81
3	Knowledge application	3.77
4	Product innovation	3.75
5	Process innovation	3.56
6	Administrative innovation	2.41

As Table 4 shows, administrative innovation has the least value (2.41), which indicates that in populated organizations there are weak attentions to issues such as giving authority to personnel, organization structure, changes of organizations, and problems in human resource management such as creating reward system, structure of payment to staffs, etc. Table 5 shows the results of hypotheses.

**Table 5**  
Results of hypotheses testing

Hypotheses	Correlation	Results	Hypotheses	Correlation	Results
H <sub>1</sub> : knowledge sharing has a positive and significant impact on administrative innovation.	0.764	Accepted	H <sub>6</sub> : Knowledge acquisition has a positive and significant impact on process innovation.	0.584	Accepted
H <sub>2</sub> : knowledge sharing has a positive and significant impact on product innovation.	0.645	Accepted	H <sub>7</sub> : Knowledge application has a positive and significant impact on administrative innovation.	0.232	Rejected
H <sub>3</sub> : knowledge sharing has a positive and significant impact on process innovation.	0.674	Accepted	H <sub>8</sub> : Knowledge application has a positive and significant impact on product innovation.	0.663	Accepted
H <sub>4</sub> : Knowledge acquisition has a positive and significant impact on administrative innovation.	0.564	Accepted	H <sub>9</sub> : Knowledge application has a positive and significant impact on process innovation.	0.732	Accepted
H <sub>5</sub> : Knowledge acquisition has a positive and significant impact on product innovation.	0.803	Accepted			

Testing different hypotheses has indicated that we can reject  $H_7$ . After investigating relationship between two main variables as indicators, we observe that there is a positive link between knowledge application and administrative innovation. All other hypotheses are accepted. The highest value of coefficient of correlation belongs to link between knowledge acquisitions and product innovation (0.808).

## 5. Conclusion

In this survey, we have attempted to investigate the relationship between knowledge management and innovation performance. Three more-mentioned indicators of innovation performance were selected including administrative innovation, product innovation, and process innovation. The proposed model considered 9 hypotheses. In summary, the results show that knowledge sharing can improve innovation in organizational structure and authority and change in rewarding system (administrative innovation). It enhances product quality for better satisfaction of customers. In addition, knowledge sharing can change workflow in organization's levels and better communication among employees. When employees share their personal experiences, this creates trust atmosphere. How employees acquire knowledge of together is an important process, which can create innovation in routines and procedures of organizations. Knowledge acquisition can also improve customer satisfaction level from product perspective. The way in which employees deploy their hidden and obvious knowledge could influence on product and process innovation. The more better knowledge application, the more process and product innovations. However, our findings have not provided any link between knowledge application and administrative innovation.

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