

The Relationship Between Knowledge Management Practices And Innovation Level In Organizations: Case Study Of Sub-Companies Of Selected Corporations In The City Of Esfahan

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ABSTRACT

The purpose of this paper is to examine the relationship between knowledge management practices and innovation levels in organizations. Through a questionnaire, required data were gathered in sub-companies of three corporations in the city of Esfahan. Seventy-four questionnaires were given to top and middle managers of these companies and 36 were returned (49.65% response rate). Correlation analysis was used to check the relationship between the variables. The researchers found a strong, positive and significant relationship between knowledge management practices and innovation levels in these companies. The result is related to a small number of companies in Esfahan. It is not easy to generalize the result of the current study to other contexts. Knowledge management is one of the hottest issues among academicians, but it is still difficult to justify managers about its importance in organizations. This study tries to provide some empirical evidence in order to support the role of knowledge management in enhancing innovation. There is not sufficient empirical evidence to prove the role of knowledge management practices in the search of innovation.

Keywords: knowledge acquisition, knowledge dissemination, responsiveness to knowledge, innovation

INTRODUCTION

A problem with linking organizational forms to economic performance is that it is difficult to develop valid and reliable indicators, both for organizational forms and for economic performance. One way to overcome this problem is to link innovation, learning, and knowledge creation with each other (Lundvall & Nilsen, 2007).

Defining knowledge management is not a simple issue. It is not a technology, although technology should be exploited as an enabler. It is not a directive, although strategic leadership is imperative to successful knowledge management. It is not a business strategy, although one aligned with the tenets of knowledge management must exist. It requires a culture that promotes faith in collectively sharing and thinking; but culture alone will not render a vital knowledge management practice. Perhaps it is the lack of a singular definition that has delayed the more wide-scale deployment of knowledge management. Put succinctly, Frappaolo (2006) writes:

“Knowledge management is the leveraging of collective wisdom to increase responsiveness and innovation.”

As mentioned in this definition, increasing innovation can be one of the major outcomes of effective knowledge management. It is especially important because innovation of products, processes, and structures has

been assessed as a critical component in the success of new-age firms. The new products and services resulting from the interaction of knowledge and technology bring profound changes in the way businesses operate and compete in the new economy (Handzic, 2004).

Innovation has been demonstrated to be a key value creator for organizations, in both times of cost cutting and in times of growth. As such, it stands out as one excellent objective of management activity, in general, and knowledge management specifically (Ruggles & little, 1997).

Typically, innovative organizations focus on both new knowledge and knowledge processes. They constantly engage and motivate people, creating overall enabling context for knowledge creation. These organizations take a strategic view of knowledge, formulate knowledge visions, tear down knowledge barriers, develop new corporate values and trust, catalyze and coordinate knowledge creation, manage various contexts involved, develop conversational culture, and globalize local knowledge (Nanaka and Nishiguchi, 2001).

In this paper, the authors try to revisit the work of Jenny Darroch (2005). She tried to examine the role of effective knowledge management in two ways. First, the suggestion that effective knowledge management supports the conversion of all other resources into capabilities was examined. She minds that since capabilities underpin the long run survival of a firm, firms with effective knowledge management behaviors and practices are likely to make better use of resources and so will exhibit superior outcomes, such as more innovation and superior financial performance. Second, her paper examined the direct contribution of effective knowledge management to two outcomes of interest: innovation and performance. She found a relationship between knowledge management practices and innovation to support the view that a firm with a capability in knowledge management is also likely to be more innovative.

In this paper, superior financial performance - as an outcome for knowledge management - is not considered, but innovation - the other possible outcome of effective knowledge management - is the key variable that the authors try to consider knowledge management practices as its major enhancers. On the other hand, they try to repeat Darroch's examination in a very different context. To do so, quite a small population, including three corporations, is selected. These corporations are Samangostar, Tukafoolad and Qaem Reza. They include several sub-companies and act nationally and internationally, but their head offices are located in Esfahan.

LITERATURE REVIEW

The importance of knowledge management for organizational performance has been widely recognized and acknowledged in management literature. In general, knowledge management is assumed to create value for organizations by applying their accumulated knowledge to their products and services outputs. These ensure organizational survival or advancement. Knowledge management can impact organizational performance in a number of different ways (Von Krogh et al., 2000). Innovation is one of the major outcomes of knowledge management.

Swan et al. (1999) formulated two distinct perspectives on knowledge management for innovation; namely, the cognitive and community models. The community model is formulated as a critique of the predominant cognitive perspective within the technology-driven research field. The cognitive model denotes a perspective where valuable knowledge is conceived as being captured and codified (Sørensen & Lundh-Snis, 2001). Table 1 summarizes the main characteristics of the cognitive and community models:

Table 1: Two Contrasting Views of the Knowledge Management Process (Sawn et al., 1999)

Cognitive Model	Community Model
Knowledge for innovation is equal to objectively defined concepts and facts	Knowledge for innovation is socially constructed and based on experience
Knowledge can be codified and transferred through text: information systems have crucial role	Knowledge can be tacit and is transferred through participation in social networks including occupational groups and teams
Gains from knowledge management include exploitation through existing knowledge	Gains from knowledge management include the recycling of exploration through the sharing and synthesis of knowledge among different social groups and communities
The primary function of knowledge management is to codify and capture knowledge	The primary function of knowledge management is to encourage knowledge sharing through networking
The critical success factor is technology	The critical success factor is trust and collaboration
The dominant metaphors are the human memory and the jigsaw (fitting pieces of knowledge together to produce a bigger picture in predictable ways)	The dominant metaphors are the human community and the kaleidoscope (creative interactions producing new knowledge in sometimes unpredictable ways)

The following three models from literature are presented, which try to describe the link between knowledge management and innovation.

GREENHOUSE METAPHOR

Ruggles and Little (1997) developed a model to describe the link between knowledge management and innovation. In this model, they take advantage of a metaphor, which is explained as follows:

The environment in which new ideas are created can be seen as a greenhouse or garden. Within this greenhouse, gardeners (i.e., managers) try to create conditions that will least inhibit the growth of a prize-winning (high value) flower. That is, greenhouse gardeners can change the light, moisture, food mixture, etc. in the hope of beneficial results, but they cannot actually make the plants grow. Similarly, management has the ability to influence certain factors; i.e. capital resources, physical surroundings, and employee skill levels, for example, but the actual creation of new ideas is uncontrollable.

In this model, the “soil” and the “food” is composed primarily of 1) disseminated organizational knowledge, 2) personal knowledge and experience, 3) capital resources, such as tools, equipment, etc., all of which feed the people. People are the seeds from which new concepts sprout and are therefore the central ingredient of the innovation process.

While the gardener can provide an ample pot, rich soil, and plentiful food, water, and sunlight, development hinges upon the absorptive capacity of the seed. Similarly, the absorptive capacity of the people involved determines the ability to apply knowledge, capital resources, etc. to a given problem. Learning is the process by which people absorb these resources.

After an idea has been sufficiently developed, it can be taken to market and implemented. This implementation step is what transforms an idea into an innovation. Diffusion occurs when new products and services begin flowing deeper within their initial markets or to areas different from the one(s) in which they were originally introduced. For instance, a new process for order fulfillment, established in one segment of an organization, may become used in many other segments over time, sometimes purposefully, though often randomly. Diffusion occurs in a botanical sense when plants scatter their seeds or spread their pollen, leading to the potential spreading of their genome. This process can be actively encouraged, although there is no guarantee that a diffused innovation will take hold in its new market area, just as there is no guarantee that pollen transferred from one flower to another will actually cause fertilization. However, a certain amount of diffusion can occur inadvertently without any intervention on the part of management.

The final element of this model is feedback. This is not actually a stage, but a continuous cycle by which lessons learned from experience enter back into the innovation process. This kind of feedback is represented both by

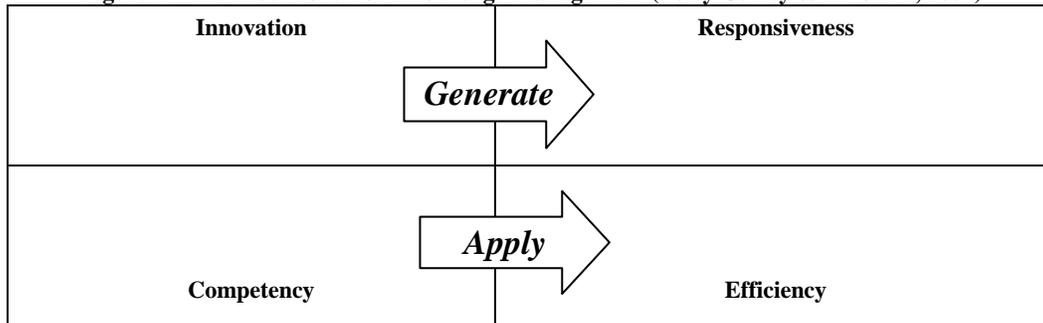
the gardener who, based on his prior horticultural experience, grows heartier plants by using more effective fertilizers and creating more conducive greenhouse environments, and by the genetic evolution of the seeds and seed types over time. Organizations interested in generating, developing, implementing, and diffusing valuable new ideas need to encourage and leverage such feedback.

THE RICE MODEL

There are four areas in an organization which cover all of the different ways in which an organization can use knowledge to be successful. These areas are responsiveness, innovation, competency and efficiency. Responsiveness concerns how the company takes in vital information from its surroundings: its customers, competitors, suppliers, and others who affect and are affected by the company's performance. Innovation concerns how the company uses ideas and information to change what it does and how it does it. Competency concerns the skills people and teams need to deliver products and services. Efficiency concerns how well the processes for product and service work.

If the company is in business in which being able to consistently deliver the same high-quality products and services at a competitive price is the path to success, it should focus on "applying" knowledge to improve the competency of people and the efficiency of the processes. On the other hand, if the company is in business in which developing and delivering new products and services that reshape markets, or create entirely new ones, lead to success, it should focus on "generating" knowledge by hearing what the marketplace is saying and enabling its employees to communicate with each other, using that knowledge to innovate. Figure 1 shows the described model.

Figure 1: The Rice Model for Knowledge Management (Foley Curley & Kivowitz, 2001)



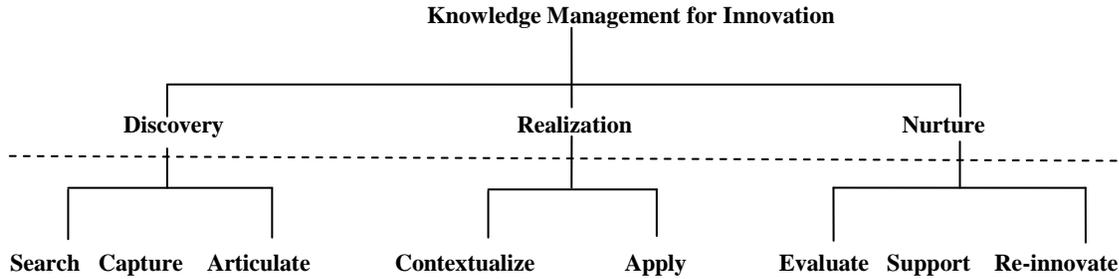
Most companies, of course, must use both kinds of knowledge management to thrive. They have current products and services to maintain in the marketplace and they are developing the next generation of offerings to build a position in tomorrow's marketplace (Foley Curley & Kivowitz, 2001)

HIERARCHICAL PROCESS MODEL OF KNOWLEDGE MANAGEMENT FOR INNOVATION

Tranfield et al. (2006) proposed a model to show knowledge management capabilities for enhancing innovation. They are interested in looking at innovation as a staged process within the firm. Thus, these researchers identified three distinct phases of activity from the literature, which they have termed discovery, realization and nurture.

Discovery emphasizes the need to scan and search environments (internal and external) and to pick up and process signals about potential innovation. The realization phase is concerned with issues surrounding how the organization can successfully implement the innovation, growing it from an idea through various stages of development to final launch as a new product or service in the external marketplace, or a new process or method within the organization. The suggested hierarchy can be seen in Figure 2.

Figure 2: The “D-R-N” Process Model of Innovation (Tranfield et al., 2006)



Searching includes the passive and active means by which potential knowledge sources are scanned for items of interest. Capturing contains the means by which knowledge search outcomes are internalized within the organization. Articulating involves means by which captured knowledge is given clear expression. Contextualizing consist of the means by which articulated knowledge is placed in particular organizational contexts. Applying includes the means by which contextualized knowledge is applied to organizational challenge. Evaluating contains the means by which the efficacy of knowledge applications is assessed. Supporting involves the means by which knowledge applications are sustained over time. Re-innovating consists of the means by which knowledge and experience are re-applied elsewhere within the organization.

HYPOTHESIS DEVELOPMENT

As Darroch did in her study, the following major hypotheses were assumed:

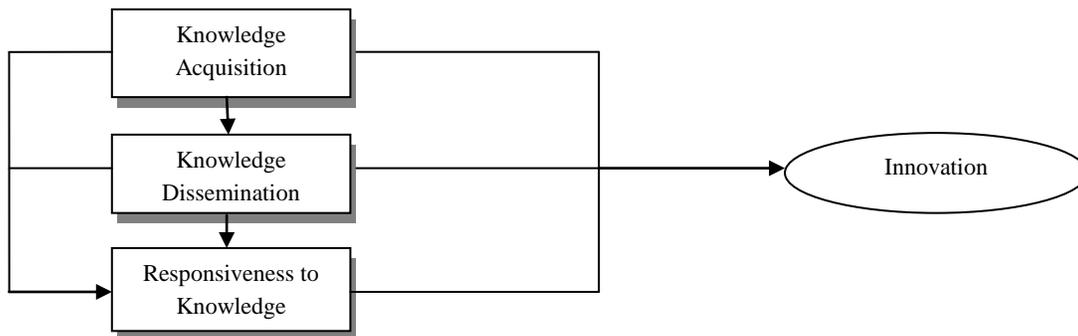
- H1.** There is a relationship between knowledge management practices with each other.
- H2.** There is a relationship between knowledge management practices and innovation.

In order to examine the mentioned links, the following sub-hypotheses were also assumed:

- H1.1** There is a relationship between knowledge acquisition and knowledge dissemination.
- H1.2** There is a relationship between knowledge acquisition and responsiveness to knowledge.
- H1.3** There is a relationship between knowledge dissemination and responsiveness to knowledge.
- H2.1** There is a relationship between knowledge acquisition and innovation.
- H2.2** There is a relationship between knowledge dissemination and innovation.
- H2.3** There is a relationship between responsiveness to knowledge and innovation.

Figure 3 provides an illustration of the links between the mentioned variables in this paper:

Figure 3: The Relationship between Variables (Darroch, 2005)



RESEARCH DESIGN

Data

The researchers have used a Persian translation of a questionnaire designed by Darroch to examine the same relationship between knowledge management practices and innovation in a group of organizations based in New Zealand and Australia.

Related data were collected through a questionnaire from a sample of sub-companies in Esfahan. The sample was selected randomly. Cronbach alpha was calculated to prove the reliability of the applied questionnaire (91.46%), but the validity is not examined because Darroch had still done it before. Seventy-four questionnaires were distributed, but only 36 were useable. The mentioned questionnaire includes two sections. The first section contains a letter which explains the purpose of the research and thanks the respondents for their collaboration. The respondents should also answer a number of general questions in this part. The second and main section includes 22 questions which were asked to gather the required data in order to examine the assumed links in this research.

Definition of Variables

Knowledge Management Orientation

Darroch(2003) developed three scales to measure behaviors and practices for each of the components of knowledge management: knowledge acquisition, knowledge dissemination and responsiveness to knowledge. Knowledge acquisition is captured by seven factors: 1) valuing employees attitudes and opinions and encouraging employees to up-skill, 2) having a well-developed financial reporting system, 3) being market focused by actively obtaining customer and industry information, 4) being sensitive to information about changes in the marketplace, 5) employing and retaining a large number of people trained in science, engineering or math, 6) working in partnership with international customers, and 7) getting information from market surveys. Five factors describe the knowledge dissemination construct: 1) readily disseminating market information around the organization, 2) disseminating knowledge on the job, 3) using techniques (such as quality circles, case notes, mentoring and coaching to disseminate knowledge), 4) using technology (such as teleconferencing, videoconferencing and groupware) to facilitate communication, and 5) preferring written communication to disseminate knowledge. Lastly, responsiveness to knowledge was described by the following three factors: 1) responding to knowledge about customers, competitors and technology, 2) being flexible and opportunistic by readily changing products, processes and strategies, and 3) having a well-developed marketing function.

Innovation

The original Booz Allen Hamilton (1982) typology of innovation is used in this paper. Here, innovations are categorized as new to the world, new products to the firm, additions to existing product lines, improvements or revisions to existing product lines, cost reductions to existing products, or repositioning of existing products. New to the world innovations are typically characterized as radical innovations, while the other categories are incremental innovations.

RESULTS AND DISCUSSION

Tables 2-4 provide the result of the correlation analysis which is done in this research. Tables 2 and 4 use summated scores for each knowledge management component and innovation type while Table 3 provides more detail by showing six types of innovation. Table 2 shows correlation coefficients between the three knowledge management practices which are significant with 99% confidence.

Table 2: Correlation Coefficients between the Three Knowledge Management Practices with Each Other

	Knowledge acquisition	Knowledge dissemination	Responsiveness to knowledge
Knowledge acquisition	1	0,799	0,725
Knowledge dissemination	0,799	1	0,768
Responsiveness to knowledge	0,725	0,768	1

Therefore, based on the correlation analysis, it can be claimed:

- There is a strong, positive and significant relationship between knowledge acquisition and knowledge dissemination.
- There is a strong, positive and significant relationship between knowledge acquisition and responsiveness to knowledge.
- There is a strong, positive and significant relationship between knowledge dissemination and responsiveness to knowledge.

And finally:

“There is a strong, positive and significant relationship between knowledge management practices with each other.”

Table 3 provides correlation coefficients between the three practices of knowledge management and six types of innovation separately.

Table 3: Correlation Coefficients between the Three Knowledge Management Practices and the Six Types of Innovations

	Knowledge acquisition	Knowledge dissemination	Responsiveness to knowledge
New to the world	0,586**	0,453**	0,533**
New to the firm	0,371*	0,340*	0,364*
New products to existing ranges	0,327	0,275	0,327
Improve existing products	0,391*	0,275	0,451**
Change products to reduce costs	0,425**	0,470**	0,385*
Reposition existing products	0,572**	0,490**	0,636**

Note: **result significant at $\alpha < 0.01$, *result significant at $\alpha < 0.05$

As it is shown in Table 3, the relationship between radical innovation and knowledge management practices is stronger than the relationship between such practices and other types of innovation. It means that the result is not consistent with the findings of Darroch’s research. Her findings sound much more logical because "when a firm develops a new product or service for which it lacks the scientific or business expertise, a capability in knowledge management may not be helpful. By contrast, firms developing incremental innovations (and so are working within the boundaries of existing scientific and business expertise) tend to have well developed knowledge management behaviors and practices".

This paper tries to consider the relationship between knowledge management practices and innovation as a single variable (without examining the link between the mentioned practices and the various types of innovation). Therefore, the single value of innovation is calculated by using the mean value.

Table 4 represents correlation coefficients between the three knowledge management practices and innovation that are significant with 99% confidences, which indicates a relatively strong and positive relationship between knowledge management practices and innovation.

Table 4: Correlation Coefficients between the Three Knowledge Management Practices and Innovation

	Knowledge acquisition	Knowledge dissemination	Responsiveness to knowledge
Innovation	0,717	0,641	0,706

Therefore, based on the correlation analysis, it can also be claimed:

- There is a strong, positive and significant relationship between knowledge acquisition and innovation.
- There is a strong, positive and significant relationship between knowledge dissemination and innovation.
- There is a strong, positive and significant relationship between responsiveness to knowledge and innovation.

Since there is a strong correlation between knowledge management practices with each other, it is reasonable to deal with knowledge management as a single variable too. Therefore, by calculation an average value, it is possible to investigate the relationship between knowledge management and innovation as the major variables in this research. By doing so, the correlation coefficient between knowledge management and innovation is calculated as 0.717, which denotes a strong, positive relationship between the two variables. This value is also significant with 0.99% confidence. Therefore, it can be said, *“There is a strong, positive and significant relationship between knowledge management practices and innovation in organizations.”*

RESEARCH LIMITATIONS

Like many other similar studies in the field of management, the findings of this research face a serious challenge, which is the limitation of generalization. It means that while a few sub-companies with unique circumstances were sampled for the study, the results can be generalized as different types of organizations. Therefore, while making judgments on the results of the study, a very prudent attitude should be taken.

IMPLICATIONS FOR THE OTHER RESEARCHERS

In this research, a very small sample was investigated. Therefore, as mentioned above, it can be a big challenge to generalize the findings to other cases with different conditions. Thus, the following are recommended to other researchers in order to get better results:

- Try to produce and localize a relevant questionnaire on your own (as the applied questionnaire in this research was a Persian translation of Darroch’s questionnaire).
- Try to involve a larger number of managers from various companies that are active in different environments and industries.

IMPLICATIONS FOR MANAGERS

Based on the findings of this research, it is highly recommended to:

- Foster each of the three mentioned practices in order to improve the other practices at the same time (as the results indicate a positive relationship between knowledge management practices with each other).
- Foster knowledge management practices in order to enhance innovation (as the results denote, a positive relationship between knowledge management practices and innovation). For doing so, based on the 16 knowledge management items that are considered by the applied questionnaire, the following are recommended to the managers:

1. Value employees' attitudes and opinions
2. Establish well developed financial reporting systems
3. Be sensitive to information about changes in the marketplace
4. Develop science and technology human capital profile
5. Work in partnership with international customers
6. Get information from market surveys
7. Disseminate market information throughout the organization
8. Disseminate knowledge on the job
9. Use specific techniques to disseminate knowledge
10. Use technology to disseminate knowledge
11. Prefer written communication
12. Respond to customers
13. Develop well-developed marketing function
14. Respond to technology
15. Respond to competitors
16. Be flexible and opportunistic

AUTHOR INFORMATION

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