

Assessment of Knowledge-Sharing Role in Innovation (Case Study: Isfahan R&D Scientific Small City)

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Abstract

This study develops a research model that links knowledge sharing and firm innovation capability. this study applies the structural equation modeling (SEM) to investigate the research model. Additionally, the current study contributes to knowledge sharing research by further clarifying which factors are essential for innovation effectively. the findings of this study provide a theoretical basis, and simultaneously can be used to analyze relationships among knowledge sharing and firm innovation capability. From a managerial perspective, the findings of this study can improve understanding and practice of organizational management of knowledge sharing. Specifically, this study identified several factors essential to successful knowledge sharing, and discussed the implications of these factors for developing organizational strategies that encourage and foster knowledge sharing.

Keywords: Knowledge Sharing, Innovation, Structural Equation Modeling, Isfahan R&D Scientific Small City

Introduction

Knowledge sharing creates opportunities to maximize organization ability to meet those needs and generates solutions and efficiencies that provide a business with a competitive advantage (Reid, 2003). Knowledge sharing can define as a social interaction culture, involving the exchange of employee knowledge, experiences, and skills through the whole department or organization. Knowledge sharing comprises a set of shared understandings related to providing employees access to relevant information and building and using knowledge networks within organizations (Hogel et al., 2003). Moreover, knowledge sharing occurs at the individual and organizational

levels. For individual employees, knowledge sharing is talking to colleagues to help them get something done better, more quickly, or more efficiently. For an organization, knowledge sharing is capturing, organizing, reusing, and transferring experience-based knowledge that resides within the organization and making that knowledge available to others in the business. A number of studies have demonstrated that knowledge sharing is essential because it enables organizations to enhance innovation performance and reduce redundant learning efforts (Calantone et al., 2002; Scarbrough, 2003).

A firm can successfully promote a knowledge sharing culture not only by directly incorporating knowledge in its business strategy, but also by changing employee attitudes and behaviors to promote willing and consistent knowledge sharing (Connelly and Kelloway, 2003; Lin and Lee, 2004). Moreover, various studies focused on the relationship between knowledge sharing enablers and processes (Van den Hooff and Van Weenen, 2004a; Van den Hooff and Van Weenen, 2004b; Bock et al., 2005; Yeh et al., 2006), while others have focused on the relationship between knowledge sharing enablers and innovation performance (Calantone et al., 2002; Syed-Ikhsan and Rowland, 2004).

Knowledge sharing (KS) refers to the process by which team members share ideas that are task-related, information, improvements as well as suggestions with one another. Knowledge, whose validity has been recognized through testing, has emerged as a strategically significant resource of firms (Liebeskind, 1996). Therefore, knowledge management has become an important factor to gain and sustain a firm's competitive advantage. More importantly, KM is the process of capturing, sharing, storing and using knowledge. As such, a major management issue is the method used to convert individual knowledge into organizational knowledge, since organizational knowledge is essentially created and inherently resides in individuals.

Besides that, the other issue concerns the combination and control of organizational knowledge resulting in successful organizational performance.

Knowledge sharing is normally supported by knowledge exchange through information technology (Liao et al., 2007). The ability of information technology to enhance knowledge access to employees and facilitate collaborative work would help SMEs to enhance productivity in addition to promoting knowledge sharing. In addition, collaboration with other SMEs and stakeholders would be invaluable in improving knowledge sharing capabilities in SMEs (Dyer, 1997; Inkpen and Beamish, 1997). By integrating knowledge in different parts of the firm, reduced redundancy, a more consistent representation, and better efficiency can be realized (Davenport and Klahr, 1998; Grant, 1996)

The role of knowledge management in innovation

Knowledge and knowledge management fulfils a myriad functions in the innovation realm. The first major role that knowledge management plays in innovation is enabling the sharing and codification of tacit knowledge. Tacit knowledge sharing is critical for organizations' innovation capability (Cavusgil et al., 2003). According to the authors, firms with high innovation potential employ a learning-by-doing effect that makes it difficult for competitors to buy this know-how in the market and also makes it difficult to replicate. According to Cardinal et al. (2001), replication of knowledge-based competitive advantage is inhibited by two factors. Causal ambiguity leads to specific practices or inputs (e.g. knowledge) for replication being unknown. Secondly, social complexity or unique firm history that produces the knowledge makes it difficult to replicate. Getting tacit knowledge from customers and

suppliers is a valuable source for organizations' innovation programs due to scarcity of such knowledge that can be used as input for innovation. The authors also indicate that collaboration between organizations plays a significant role in sharing of tacit knowledge, which in turn positively impacts innovation capability (Cavusgil et al., 2003). The role of collaboration will be discussed in more detail later in this section. The sharing of tacit knowledge as resource for innovation is especially important in developing fields where not a lot of explicit knowledge exists, such as biotechnology. Innovators in these fields combine partially codified knowledge with complimentary resources such as cross-functional teams or learning-by-doing capabilities, which leads to new product and process innovations (Cardinal et al., 2001).

Cardinal et al. (2001) indicate that, in situations where a lot of tacit knowledge is used for innovation, collaboration between cross-functional teams is essential. Such interactions produce the routines that create new "recipes". However, the knowledge in these "recipes" is not necessarily codified, but often stays within the innovation and operational teams' routines and skills. Knowledge management can assist in the accessibility of such tacit knowledge and the codification thereof.

The author is of the opinion that the fact that knowledge is not available in explicit format makes knowledge sharing and the application of knowledge in the innovation process difficult. Organizations are firstly not aware of the stocks of tacit knowledge available to them, and furthermore have no formalized way to access it. Knowledge management can make tacit knowledge accessible through an understanding of what tacit knowledge is available, e.g. through utilization of a database indicating people's expertise. It can also assist in codifying tacit knowledge to make it explicit, in order for it to be more readily available application in future innovations. Knowledge management can play a major role in facilitating collaboration, which can assist in the sharing of tacit knowledge.

The second major role that knowledge management plays in the innovation process is related to explicit knowledge. Although explicit knowledge does not play such a dominant role as tacit knowledge in the innovation process due to the fact that explicit knowledge about innovations is easily accessible to competitors, explicit knowledge is also an important component of innovation. In developed science processes, explicit knowledge features quite strongly in the research and development process with a rich exchange with tacit knowledge taking place. This process requires the capability to convert tacit and explicit product and process knowledge into explicit models. Whilst the knowledge from upstream research and development discoveries are usually tacit in nature, knowledge downstream in the value chain is largely explicit and codifiable in nature. It is important for organizations to build resources and capabilities that will allow them to capture and codify knowledge and product development routines, to ensure knowledge transfer can take place adequately (Cardinal et al., 2001; Scarbrough, 2003).

Rodan (2002) also argues that if one views the confluence of tacit and explicit knowledge elements that create a new idea as probabilistic, increasing the opportunities for the said confluence of knowledge elements should raise the frequency of new combinations occurring, thus positively impacting innovation

Methodology

Current study is descriptive-survey based on methodology and research- applied based on the goal. Since this study examines the impact of KM on **Innovation** success, it is practical

based on the goal. Descriptive statistics was used for analyzing descriptive data and structural equations model was used for testing hypotheses with the help of SPSS and Amos software.

To collect literatures, English and Persian papers, journals and available books were used. Questionnaire was used to collect data. It should be noted that a standard questionnaire of was used. All questions were classified on a scale range of five-option Likert (from completely disagree = 1 to completely agree = 5). The questionnaire had two parts of demographic questions including age, gender, education, and the organizational position.

Validity and Reliability

The concept of validity answers to this question that to what extent measuring instrument gauges the desired option. Data accuracy cannot be reliable without knowledge of the validity of measuring instruments. There were several methods such as content validity method for validation. If questions represent special characteristics and skills which a researcher wants to measure, the test will have content validity. In this stage, the necessary corrections about the research made during different interviews with experts and professors; therefore, it ensured that questionnaire measure the desired option.

Reliability is one of technical features of measuring instruments. This shows that measuring instruments to what extent obtains the identical results in the same situation. To determine the validity of the test, Cronbach's alpha was used. It is used to calculate the internal coordinating of measuring instrument that measure different feature. Therefore, reliability coefficient with Cronbach's alpha was calculated using data Obtained from questionnaires and SPSS software. Cronbach's alpha coefficient of Knowledge-sharing (0.81) and innovation (0.85) were obtained. These numbers indicates that the questionnaire had reliability. The 90 questionnaires distributed between staffs in Isfahan R&D scientific small city.

Analysis of the structural model

We assessed the overall goodness-of-fit using the chi-square test. The chi-square test assesses the adequacy of a hypothesized model in terms of its ability to reflect variance and covariance of the data. Due to its tendency to be sensitive to sample size, other fit indices (e.g., GFI, AGFI, CFI, NFI, and RFI) were considered in conjunction with the chi-square. For the statistical significance of parameter estimates, t values were used. The results of structural equation modeling obtained for the proposed conceptual model revealed ratio of chi-square to the degree of freedom (χ^2/df) of 1.92 ($p < 0.05$), goodness-of-fit index (GFI) of 0.94, adjusted goodness-of-fit index (AGFI) of 0.90, comparative fit index (CFI) of 0.93, and root mean square error of approximation (RMSEA) of 0.05. Generally, fit statistics greater than or equal to 0.9 for GFI, and CFI indicate a good model fit (Bagozzi, Yi and Phillips, 1991). Furthermore, RMSEA values ranging from 0.05 to 0.08 are acceptable; therefore, the RMSEA suggested that our model fit was acceptable. Other fit indices, indicated that our proposed model obtained an adequate model fit

Table1:

Overall Index of Proposed Model

Index	innovation	Knowledge-sharing
CMIN	12.309	50.394
DF	8	35
P	0.138	0.05
CMIN/DF	1.539	1.445
RMR	0.057	0.032
GFI	0.971	0.939
AGFI	0.924	0.886
TLI	0.960	0.954
CFI	0.979	0.771
RMSEA	0.035	0.029

Table 2:

Overall Index of Path Analysis

Index	CMIN	DF	P	CMIN/DF	RMR	GFI	AGFI	TLI	CFI	RMSEA
Value	2.133	2	0.344	1.066	0.006	0.993	0.949	0.997	0.999	0.023

A structural equation modeling (SEM) approach was adopted in our data analysis (Bagozzi et al., 1991). Fig. 2 and 3 presents the results of the structural model. innovation in this study was jointly predicted by Knowledge-sharing ($\beta = 0.94$, $p < 0.05$). As a result, all Hypotheses were supported.

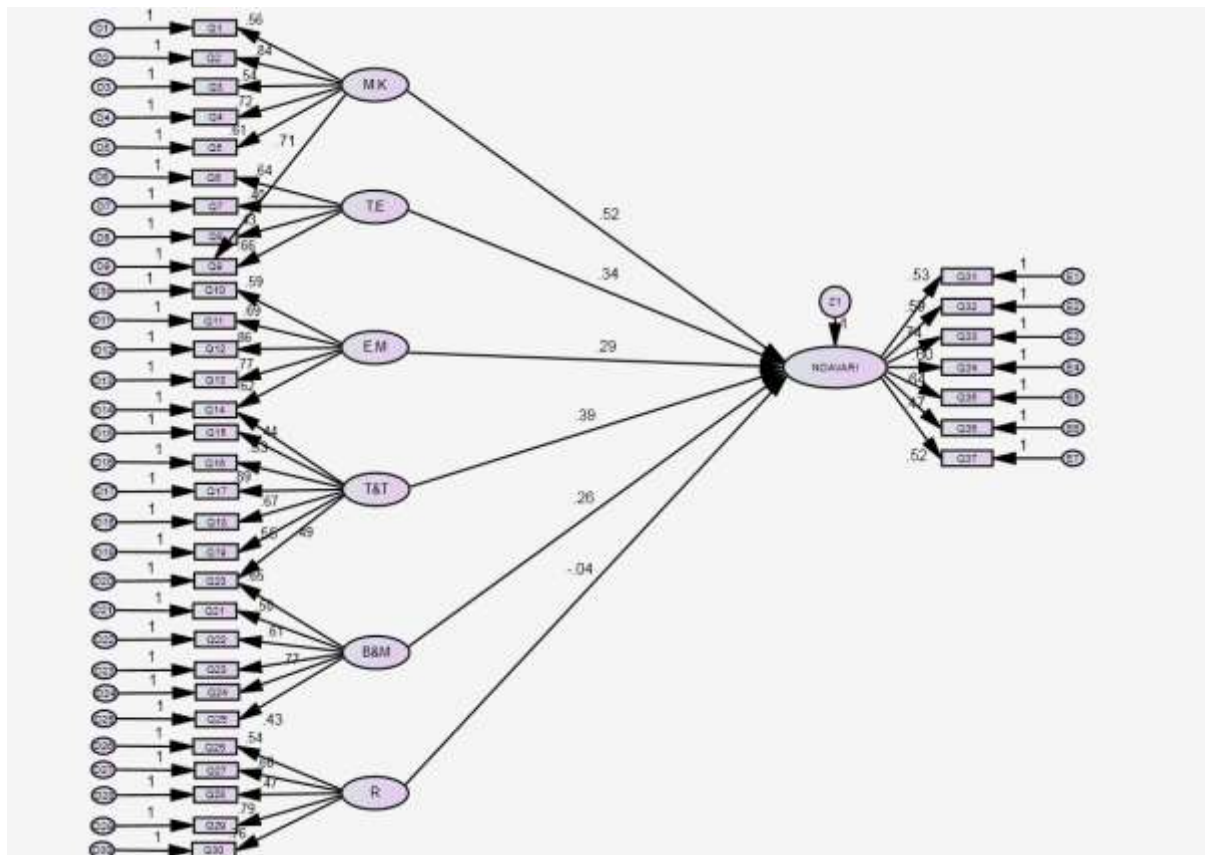


Figure1:AMOS out put

Table 3:
The Result of Hypotheses Testing (Regression Weights)

hypotheses	Description	Estimate	C.R.	P
1	Knowledge-sharing ---> innovation	0.63	8.703	0.000
2	participation ---> innovation	0.52	6.873	0.000
3	Conflict ---> innovation	0.39	5.02	0.010
4	Risk ---> innovation	-0.04	1.12	0.07
5	Delegation ---> innovation	0.34	4.25	0.00
6	Trust ---> innovation	0.29	4.12	0.000
7	Discussion and collaboration ---> innovation	0.26	4.01	0.000

Discussion

From the empirical study, Knowledge-sharing variables fit positively affects innovation. It can be seen that the Knowledge-sharing variables can handle business issues for user. This study was set out to explore the factors affecting innovation. Followings are descriptions of the

limitations encountered for this research: Overall representation and stability may not be sufficient, since the authors acquired KM user data from only some companies in Isfahan city. This research model is synthesizing two variables. Therefore, except for KM, this model may be employed for other relative researches, in order to observe differentiations between acceptance and behavioral intention in relevance of using various information systems. In spite of these interesting results, our study has a series of limitations that must be taken into account. The sample used is composed of firms from the technology sector. Future studies could analyze another kind of organization to study the effect of knowledge on the organization's innovation.

For future researches, the authors could also combine with other theory, or expand research scope, in order to experience with broader references and directions. The authors can use another industry, which can be explored and compared. Also Future research could explore both the manufacturing and the service sectors to compare knowledge sharing activities development within the two sectors. This could provide more information on knowledge sharing attitudes and intention among employees.

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