

# **An Investigation into the Effect of Knowledge Creation Process on Organizational Innovation in Hospitals of Mashhad by Mediating Organizational Learning Capability**

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## **Abstract**

Delivering healthcare to patients is a very complex endeavor that is highly dependent on information. Healthcare organizations need to gather and analyze data and transform it into information and knowledge to make useful decisions. Furthermore, the hospital is one of the most interactive working environments and includes interaction between nurses and patients, nurses and doctors, and doctors and patients. All these interactions can lead to human learning and experimentation. Knowledge management and organizational learning play an important role in organizational innovation, so that innovation based on knowledge and organizational learning is evident. This study was performed to investigate the effect of knowledge creation process on organizational innovation in Mashhad hospitals by the mediating role of organizational learning. In this cross-sectional descriptive analytical study in 2016, the data gathering method was library-fieldwork. Statistical population of this study was the staff of five Mashhad hospitals (two public hospitals and three private hospitals) which include practitioners and nurses in various sections of hospitals. To determine the sample in this study, the stratified random sampling was used and the sample size based on Cochran's formula was 113. Data analysis was performed with Smart PLS and for statistical analysis, structural equation modeling and T-value test were used. The results indicated that knowledge creation process had a structural and significant positive impact on organizational innovation and an indirect impact on organizational innovation through organizational learning capability). Furthermore, that knowledge

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creation process had a structural and significant positive effect on organizational learning and organizational learning had a structural and significant positive impact on organizational innovation. Regarding to the research results, it is expected that organizations can develop the innovation and knowledge creation process by the help of the development of social networks, work teams and knowledge creation process.

**Keywords:** Hospitals, knowledge creation, Mashhad, organizational innovation, organizational learning.

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## Introduction

Today's world has a growing complexity, rapid pace of change, a growing trend of technology, and intensive competition in industries and organizations. The coordination and adaptation of organizations with this complex environment requires the transformation of organization and technology as well as the supply of new products and services that can be achieved through innovation and entrepreneurship (Molla-Hosseini and Fathi, 2010).

Nowadays, innovation and creativity are the main engine for generating revenue and they are considered to be a competitive advantage in organizations; thus, a successful organization is the one whose basis for movement is innovation. In other words, organizations must be dynamic and their managers and staff must be creative and innovative in order to adapt the organization to developments and meet the needs of the community. Knowledge management literature considers innovation as a critical factor for organizations to create value and maintain competitive advantage in a highly complex and dynamic environment today (Bose, 2004). To this end, learning is seen as a stimulus for innovation, because it challenges the old perspectives toward the market to strengthen the organization's capabilities (Baker and Sinkula, 1999). The importance of learning is evident with respect to the role of knowledge in an organizational environment that has characteristics such as increasing globalization and cultural, social and economic differences (Aydin and Ceylan, 2009). Creation of knowledge is a process that helps to increase intuition, motivation, expertise and insight of individuals (Tiwana and McLean, 2005). Creation of knowledge is achieved through continuous interaction between tacit knowledge of individuals and explicit knowledge of the organization (Nonaka, 2007).

Today's organizations need to be dynamic to keep their lives alive, and their managers and staff should be creative and innovative in order to adapt the organization to these needs and meet the needs of society, because in the global economic system and increasing competition, creativity and innovation are the key to the survival and success of organizations (Bose, 2004). Considering this in service units, especially the healthcare sector, seems necessary due to its rapid changes in a country like Iran. The healthcare

sector in Iran should pay more attention to the creativity and innovation of individuals and provide the ground for staff creativity and innovation (Sadeghi et al., 2015).

Therefore, considering what was just mentioned about the importance of innovation and the process of creating knowledge as one of the innovation tools in hospitals, as well as the role of organizational learning as the main driving force for innovation, the present study deals with the impact of the process of creating knowledge on organizational innovation with respect to the role of organizational learning.

## Research Methodology

From the perspective of the goal, this research is practical and paradigmatically it is quantitative. Also, the nature of the data is qualitative and it lies in the category of descriptive-correlative research, which is conducted through a survey. The statistical population of the study consists of 380 employees—all recruitment staff of five hospitals in Mashhad, namely, Ghaem, Dr. Sheikh, Sina, Imam Hossein (AS) and Razavi—including physicians and nurses in different parts of these hospitals. To determine the sample size of this study, Cochran's limited formula has been used.

$$n = \frac{Nt^2(p * q)}{Nd^2 + t^2(p * q)} \quad n = \frac{380 * (1.96)^2 * 0.5 * 0.5}{(380 - 1) * (0.05)^2 + (1.96)^2 * 0.5 * 0.5} = 94/08 \\ \cong 95$$

N: Number of community members (380 people)

t: The normal value of the standard unit, which is equal to 1.96 at 95% confidence level.

P: The ratio of the attribute in the community. If it is not available, it can be considered as 0.5. In this case, the variance reaches its maximum value.

q: Percentage of people who do not have that attribute in society;  $q = (1 - p)$

d: Allowed error value equal to 0.05

n: sample size

Based on the sampling formula of the limited population and at the error level of 0.05, 95 people were calculated as the suitable sample for research. The questions of creating organizational knowledge are based on Hgel and Scholes' questionnaire (2006), which includes 16 items, organizational innovation questions from Ahmad and Wang's questionnaire (2004), including 20 items and organizational learning questions from Tohidi et al. (2012), including 23 items, which are all graded based on the Likert range of 1 to 5 (Totally Disagreed to Totally Agreed). To collect the required data, 150 questionnaires were distributed. 113 questionnaires were answered. Therefore, this number was the basis for analysis.

In this study, visual and content validity were used to determine the validity of the questionnaires. To this end, the questionnaires were submitted to the guiding and counseling professors, as well as management professors and specialists, to provide their comments and suggestions on the questionnaire in line with the research goal. After some modifications, they were approved. In addition, a confirmatory factor analysis will also be used to ensure more confidence.

In this study, Cronbach's alpha coefficient was used to measure the reliability of data collection tools. In this regard, 30 questionnaires were distributed among different units and then, using SPSS software, Cronbach's alpha coefficient was calculated. According to the output tables of the software, the rate of this coefficient for the questionnaires is shown in the table 1.

Table 1. Cronbach's alpha coefficient of questionnaires

The concept under consideration	Dimensions	Cronbach's alpha coefficients	Variable alpha condition
Creating organizational knowledge	Socialization	%78	High reliability
	Externalization	%86	High reliability
	Combination	%77	Acceptable
	Internalization	%74	High reliability
Cronbach's alpha coefficient for organizational knowledge creation questionnaire: 80%			High reliability
Organizational Innovation	Product innovation	%81	Acceptable
	Market innovation	%90	Acceptable
	Process innovation	%87	Acceptable
	Behavioral innovation	%77	Acceptable
	Strategic innovation	%79	Acceptable
Cronbach's alpha coefficient for organizational innovation questionnaire: 86%			Acceptable
Organizational learning capability	Management commitment and empowerment	%74	High reliability
	Experimentation	%78	Acceptable
	Risk ability	%72	High reliability
	Openness and interaction with the external environment	%76	High reliability
	Knowledge transfer and integration	%86	High reliability
Cronbach's alpha coefficient for organizational learning questionnaire: 77%			High reliability

The method of analyzing information in this research is to use a confirmatory factor analysis to examine the validity of the tool and to use structural equations modeling in hypothesis testing. To test the subject of research, four hypotheses were proposed that the third and fourth hypotheses were sub-assumptions of the research: (1) the process of

creating knowledge has a direct, positive and significant effect on organizational innovation; (2) the process of creating knowledge has an indirect, positive and significant effect on organizational innovation through organizational learning capability; (3) knowledge creation process has an indirect, positive and significant effect on organizational innovation through organizational learning capability; and (4) organizational learning has a direct, positive and significant effect on organizational innovation. Also, the conceptual model of this study is shown in Figure 1. Data analysis was done with Smart PLS software. For statistical analysis, structural equation modeling and T-value test were used. The significance level was less than 0.05. Therefore, if the factor load observed with T-value test is less than 1.96, then there is no significant relationship.

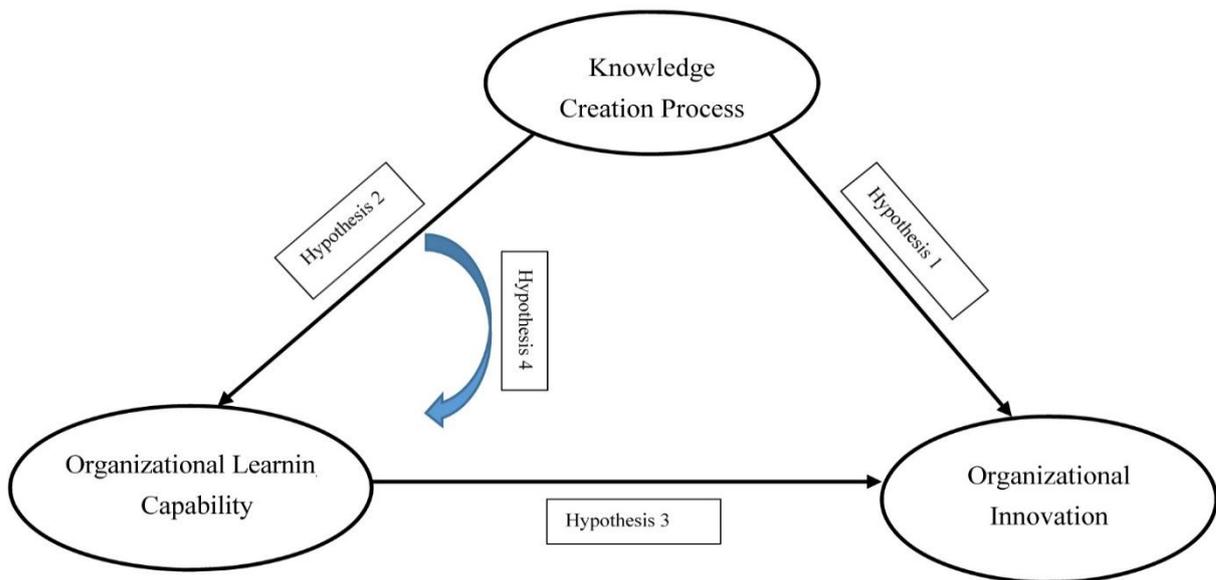


Figure 1. Conceptual Model (research model based on the knowledge creation model (Hügel and Scholes, 2006), Innovation (Ahmad & Wang, 2004) and Learning (Tohidi et al., 2012))

## Results

113 personnel of five health centers—Ghaem, Dr. Sheikh, Sina, Imam Hossein (AS) and Razavi—completed the research tool. 50.4% of the respondents were male. In terms of education, most of the participants were graduate and higher (57 people). The work experience of most people was over 15 years (42.5%) (Table 2).

Table 2. Demographic data of the population studied

Variable	Quantity	Percentage
Sex		
Female	56	49.6
Male	57	50.4
Education		
Associate's Degree	7	6.2
Bachelor	49	43.4
Master and higher	57	50.4
Work experience (years)		
<5	14	12.4
5-10	30	26.5
10-15	21	18.6
>15	48	42.5

Normality of the three variables was evaluated based on the Kolmogrov-Smirnov test.

*Normality test (Kolmogorov-Smirnov) for the variable of organizational knowledge creation:*

H0: Data is normal (data is from normal society)

H1: Data is not normal (data is not from normal society)

IF Asymp. Sig. (2-tailed) >  $\alpha = 0.05 \Rightarrow H_0$

IF Asymp. Sig. (2-tailed) <  $\alpha = 0.05 \Rightarrow H_1$

The data is normal: Asymp. Sig. (2-tailed) = 0.135 >  $\alpha = 0.05 \Rightarrow H_0$

Since the value of the significant level (Sig) is greater than the error value ( $\alpha$ ), the H0 assumption is confirmed and the data is normal.

*Normality test (Kolmogorov-Smirnov) for organizational innovation variable:*

H0: Data is normal (data is from normal society)

H1: Data is not normal (data is not from normal society)

The data is normal: Asymp. Sig. (2-tailed) = 0.154 >  $\alpha = 0.05 \Rightarrow H_0$

Since the value of the significant level (Sig) is greater than the error value ( $\alpha$ ), the H0 assumption is confirmed and the data is normal.

*Normality test (Kolmogorov-Smirnov) for organizational learning variable:*

H0: Data is normal (data is from normal society)

H1: Data is not normal (data is not from normal society)

The data is normal: Asymp. Sig. (2-tailed) = 0.068 >  $\alpha = 0.05 \Rightarrow H_0$

Since the value of the significant level (Sig) is greater than the error value ( $\alpha$ ), the H0 assumption is confirmed and the data is normal.

The investigation of the reliability or internal consistency of each of the items—factor load of each item and significance of the factor load of each item—and the composite validity of each of the structures were examined in accordance with Tables 3, 4 and 5.

Table 3. Investigation of the factor load in each item

	Process of creating knowledge	Organizational learning capability	Organizational innovation
Experimentation		0.805	
Socialization	0.744		
Knowledge transformation		0.770	
Market			0.792
Externalization	0.878		
Combination	0.892		
Commitment		0.811	
Internalization	0.633		
Strategic			0.738
Behavioral			0.798
Risk ability		0.527	
Process			0.818
Openness		0.690	
Product			0.837

Table 4. Significance of the factor load in each item

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Experimentation	0.805	0.804	0.041	19.633	0.000
Socialization	0.744	0.738	0.072	10.351	0.000
Knowledge transformation	0.770	0.764	0.056	13.654	0.000
Market	0.792	0.788	0.041	19.102	0.000
Externalization	0.878	0.880	0.020	44.269	0.000
Combination	0.892	0.887	0.030	29.649	0.000
Commitment	0.811	0.809	0.035	23.387	0.000
Internalization	0.633	0.626	0.095	6.660	0.000
Strategic	0.738	0.737	0.038	19.360	0.000
Behavioral	0.798	0.795	0.046	17.383	0.000
Risk ability	0.527	0.516	0.117	4.501	0.000
Process	0.818	0.813	0.047	17.357	0.000
Openness	0.690	0.687	0.065	10.632	0.000
Product	0.837	0.837	0.023	36.131	0.000

Given the numbers in Table 3, all factor loads are greater than 0.3, so they need not be deleted.

Table 5. Composite validity of each of the structures

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Process of creating knowledge	0.798	0.837	0.870	0.630
Organizational learning capability	0.772	0.793	0.847	0.531
Organizational innovation	0.856	0.856	0.897	0.636

The numbers in the Composite Reliability column represent the reliability of a combination of constructs, of which more than 0.7 is acceptable, and in this study, these numbers are more than 0.7. The numbers in the column (AVE) represent the proper validity of the measuring instruments where the appropriate amount should be more than 0.5, and in this study, these numbers are more than 0.5.

The significance of the obtained coefficients and parameters indicates the measurement model of the path analysis of knowledge creation process, organizational innovation, and organizational learning capability. All the coefficients obtained are significant, because the significance was checked at the error level of 0.05 and the T-value was more than 1.96 in the dimensions of all variables (Fig. 2). The significance of

these numbers suggested the significance and confirmation of the factor analysis for analyzing the path of knowledge creation process, organizational innovation, and organizational learning capability. Therefore, the results of implementation of measurement models for analyzing the path of knowledge creation process, organizational innovation, and organizational learning capability represent the confirmation of the conceptual model of the research.

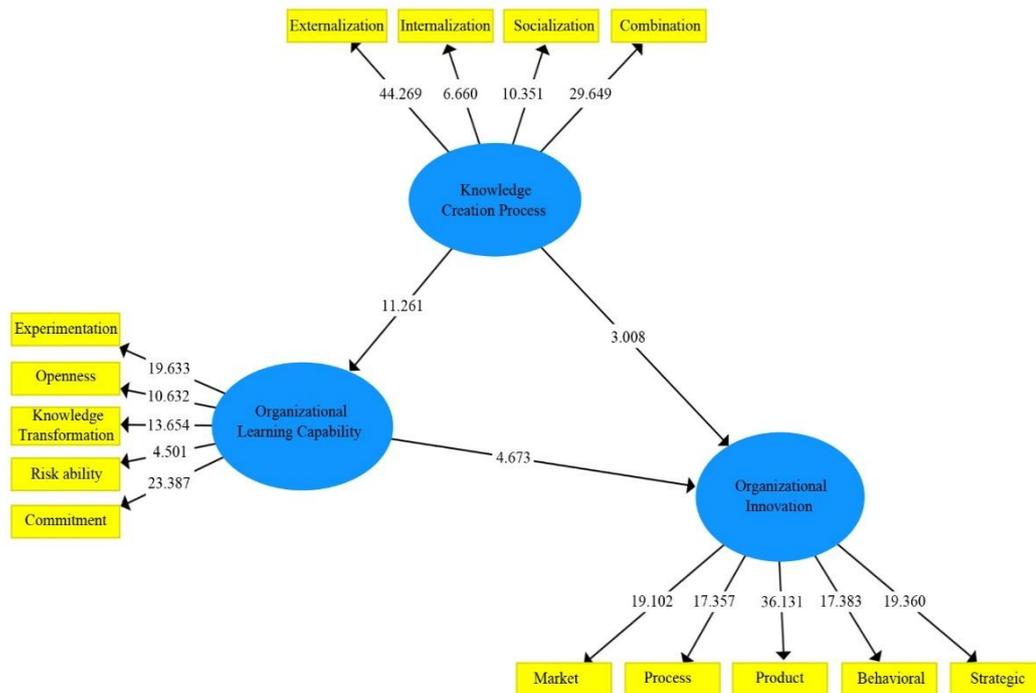


Figure 2. Significance of the relationship between variables

According to Table 6, the value of T in the four hypotheses under consideration was more than 1.96 and the factor load was also sufficient. As a result, knowledge creation process has 0.361 positive and significant structural effect on organizational innovation with 95% confidence, and knowledge creation has 0.399 indirect effect on organizational innovation through organizational learning capability with 99% confidence. Moreover, knowledge creation process has 0.732 positive and significant structural effect on organizational learning with 99% confidence and organizational learning has 0.546 positive and significant structural effect on organizational innovation with 99% confidence.

Table 6. Test results of research hypotheses

Hypothesis	Standard estimate	T quantity	Test result
Knowledge creation process has a direct, positive and meaningful effect on organizational innovation.	0.361	3.008	Confirmed
Knowledge creation process has an indirect, positive and significant effect on organizational innovation through organizational learning capability.	0.399	11.261	Confirmed
Knowledge creation process has a direct, positive and significant effect on organizational learning.	0.732	11.261	Confirmed
Organizational learning has a direct, positive and significant effect on organizational innovation.	0.546	4.673	Confirmed

### Conclusion

The results of this study showed that the knowledge creation process has a direct, positive and significant effect on organizational innovation and this effect was also confirmed through organizational learning. The Liao & Wu study in 2010 showed that knowledge management is an important input for the organization and organizational learning has a mediating role. In fact, knowledge management has a significant impact on organizational innovation, but through organizational learning, the impact of knowledge management is more (Liao and Wu, 2010). Also, the findings of Gonsel et al. (2011) showed the key role of knowledge management cycle in better innovative performance. In addition, organizational learning processes include key elements that enhance the productivity of knowledge. In other words, organizational learning serves as a complement to knowledge management in achieving innovative goals. In fact, learning ability can well fill the gap between knowledge management and innovation.

The findings of this study showed that organizational learning has a direct, positive and significant effect on organizational innovation, which were consistent with Tohidi et al. (2012) which stated; the positive effect of organizational learning capability on innovation provides a scale to measure organizational learning capability.

Attention to and emphasis on creating knowledge and innovation will improve the performance of organizations and help them fulfill their duties and well respond to the demands of the stakeholders as much as possible. Identifying the factors affecting the creation of knowledge in organizations is an important step in developing the knowledge policies of the organization. According to these results, it is expected that using the development of the knowledge creation process through the attention to knowledge creation within the formal structure of the organization, development of work teams along with the organization's hierarchical structure, expansion of social networks in the organization, revision of the hierarchical structure and development of vertical communications along with more attention to informal groups, organizations can develop innovation and knowledge creation process (Nasehifar et al., 2011).

## Limitations

The effect of the interventional variables due to the impossibility of controlling all the effective variables lies among the limitations of the present research. Also, the results of the current research can be generalized in the studied population only. Since the research data is taken from a service sector, its results may be influenced by its specific environment and, as a result, research findings cannot be easily extended to other sectors.

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