

The association between knowledge creation and organizational innovation in Tehran University of Medical Sciences

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ABSTRACT

Purpose: This study was designed to investigate the association between knowledge creation and organizational innovation among the staff of Tehran University of Medical Sciences (TUMS).

Materials and Methods: In this descriptive correlational study, 132 individuals from TUMS employees were randomly selected based on Cochran's formula. The questionnaires of knowledge creation management and organizational innovation were created by the researchers and their reliability was measured by Cronbach's alpha coefficient for the 0.87 and 0.85. After data collection, the statistical analysis methods, such as descriptive and inferential statistics, mean and standard deviation were performed. Pearson and Friedman test were carried out to obtain their correlation status.

Results: The relationship between knowledge creation components and the components of organizational innovation (product innovation, process innovation and administrative innovation) using Pearson analysis was significant ($P < .001$).

Conclusion: Knowledge creation and organizational innovation is at an encouraging level in TUMS.

Keywords: employee; knowledge management; organizational innovation; system analysis; academic medical centers.

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INTRODUCTION

Today's organizations must have the ability of compliance with continuous transformation for achieving success. The increasing proliferation of science and technology and complexity of social, cultural and economical conditions of the society, presentation of new ideas, uncertainties and global challenges, marketing competition, plus globalization and its effects on social, cultural and economical structure, causes the organizations to equip themselves with the required skills and strategies to enable them in keeping up with a rapid development and timely response to environmental stimulus. Thus,

acquisition of dynamic knowledge could result in the improvement of organization.¹

The increasing importance of knowledge in the this era makes the organizations inevitable to think more deeply on the meaning of technique creativity, product or process creativity and organizational and strategic creativity.² Innovation represents something new and therefore is added to the existing knowledge. In fact, many authors are used the concept of knowledge creation and knowledge production for a referral of innovation to technological knowledge and technical innovation as the output process. In line with policies coordination,

strategies and human resource management programs, especially knowledge-based and innovative performance are necessary to identify the relation and coordination between these two phenomena in era which is known as era of wisdom and knowledge, helping the organization to achieve its goals efficiently and effectively.

An important feature of knowledge production which leads to innovation is the knowledge, based on skills and competencies that are regarded as the most important data. It means the most developed skills and competencies are the most used. It is tempting to consider innovation as a linear process. New practical results are the as first step, technological innovations the second step, and introducing innovations in the form of new products and processes to the market the third step of the process. But the bulk of empirical and historical literature indicates that feedback loops have the essential role. The new one-way road of practical consequences to new product is an exception rather than a rule. New models of innovation emphasize that knowledge production is an interactive process in which interaction between customers, suppliers and institutions has a great importance. Empirical analysis on this topic approves that companies rarely innovate alone. Any analysis of innovation and production of knowledge in the level of institution requires paying attention to the institution's position in a network. The degree to which institutions can use external competence is considered as innovation. Learning organizations combine the inside and outside organizational processes.³

Tehran University of Medical Sciences (TUMS) is one of the institutions which seeks new and unique services and acquisition of competitive advantage in the field of education, research and treatment at its faculties, hospitals, and healthcare and research centers. So considering the role of knowledge creation and organizational innovation in advancing an organization to its goals, this study aimed to investigate the association between knowledge creation and organizational innovation and their sub-elements among the employees of TUMS.

MATERIALS AND METHODS

This was an applied descriptive investigating the association between the two variables, knowledge

creation and organizational innovation. The population of this study consisted of 200 employees including managers and employees from TUMS in the year 2012. The sample size also, by using Cochran formula, with error coefficient of 5% was equal to 132 persons. The Friedman test was used to compare the mean of ranks among Chi square variables (groups).

The data were collected by conducting surveys from experts and managers of TUMS. A questionnaire of knowledge creation and organizational innovation was used. The knowledge creation questionnaire was based on 25 Likert scale items. The validity of questionnaire was approved in accordance to content validity and its reliability was measured based on Cronbach's alpha (0.87). The organizational innovation questionnaire was based on 17 Likert scale items. The validity of questionnaire was approved according to content validity and its reliability was calculated based on Cronbach's alpha (0.85).

Statistical Analysis

The Friedman and Pearson test were used to assess correlation in components scores. An α -value of .05 or less was considered statistically significant (i.e. $\alpha < .05$). Data analysis was conducted by the statistical package for the social science (SPSS Inc, Chicago, Illinois, USA) version 21.

RESULTS

Pearson Test

The correlation between knowledge creation and organizational innovation components based on Pearson test is indicated Table 1. There was a direct, significant positive association between knowledge creation and organizational innovation (Pearson $r = 0.502$; $P = .01$). Also, there was a direct, significant positive association between knowledge creation and productive innovation (Pearson $r = 0.443$; $P = .01$). In addition, the results revealed that there is a direct, significant positive association between knowledge creation and administrative innovation (Pearson $r = 0.405$; $P = .01$). Moreover, there was a direct significant positive association between knowledge creation and processing

Table 1. Correlation between knowledge creation and organizational innovation.

Variables	Correlation	Correlation Values	P value
Knowledge creation and Organizational innovation	Pearson	0.502	.01
Knowledge creation and Producing innovation	Pearson	0.443	.01
Knowledge creation and Processing innovation	Pearson	0.423	.01
Knowledge creation and Administrative innovation	Pearson	0.405	.01

innovation (Pearson $r = 0.423$; $P = .01$). In all cases the alpha level was 0.01

Friedman Test

The findings of Friedman test showed the statistic amount of Chi square, ($6.25 < 132$) and with freedom degree 1 and also meaningful level of zero, which indicated that there was an association between knowledge creation and organizational innovation (Table 2).

Also, the results revealed the statistic amount of Chi square $6.25 < 51.54$ for knowledge creation and productive innovation, $6.25 < 64.19$ for knowledge creation and processing innovation, and $6.25 < 116.48$ for knowledge creation and administrative innovation with freedom degree 1 and also meaningful level with amount of zero, which shows that there is a correlation between knowledge creation and components of organizational innovation in different rankings (Table 2).

The results in Table 3 demonstrated the ranking of knowledge creation influence on components of organizational innovation based on Friedman test. The calculated Chi square for administrative innovation was 116.48, for processing innovation it was 64.19 and for productive innovation it was 51.54.

DISCUSSION

Knowledge is the form of subjective ideas, facts, concepts, recorded data and techniques in the memory of human, which is originated from human brain and is based on information that is metamorphosed and fertile with experiences, beliefs and personal values along with his decision and action.² Knowledge creation refers to

the organization's ability to establish and create solutions and new and efficient ideas. Organizational innovation refers to the development or acceptance of an idea or behavior in business operations which is new for the entire organization. It creates value in terms of new products or processes from new technology or new business activities.⁴ Productive innovation is a tool provider for production,⁵ which refers to developing and providing of new and improved products and services. Processing innovation provides a tool in order to preserve and improve the quality and cost savings and include adoption of new or improved methods of production, distribution or delivery service.⁶ Searching, using, pioneering and being conservative in providing modern management systems are the evaluative indicators of administrative innovation.⁷

In a study, James and Sanz-Valle indicated that organizational learning has a positive significant impact on organizational innovation.⁸ Also, Argon-Correa and colleagues have shown that organizational learning has a stronger impact than transformational leadership on organizational innovation.⁹ Jung and colleagues argued that there is direct positive association between transformational leadership and organizational innovation.¹⁰ In addition, Weijing suggested that knowledge creation can have a meaningful impact on organizational innovation capability of enterprises.¹¹

The ability of knowledge development can have a significant positive impact on administrative innovation.⁷ Some research findings demonstrate that the intentions of the project, personal independence, project independence, redundancy, multiplicity and conversion of knowledge are effective factors of knowledge creation in projects.¹²

Table 2. Friedman test and the components of knowledge creation and organizational innovation.

Variables	Average Rating	χ^2 (1)	P value
Knowledge creation and Organizational innovation	1 2	132	< .001
Knowledge creation and Producing innovation	1.6 1.4	51.54	.019
Knowledge creation and Processing innovation	1.84 1.16	64.19	< .001
Knowledge creation and Administrative innovation	1.97 1.03	116.48	< .001

Table 3. Components of organizational innovation comparison.

Rank	Variables	Average Rating	χ^2 (1)	Pearson Correlation Coefficient
1	Knowledge creation and Administrative innovation	1.97 1.03	116.48	0.405
2	Knowledge creation and Processing innovation	1.84 1.16	64.19	0.423
3	Knowledge creation and Producing innovation	1.6 1.4	51.54	0.443

Saadi Pahlavan argued that the existence of formal organizational positions for further knowledge creation process is known as the most important structural factor that affects on the knowledge creation rate.¹³ Blackman and Kennedy found significant associations between the elements of knowledge management (i.e. creation, acquisition, organization, storage, distribution and utilization), and the elements of human resource practices.¹⁴ It was determined that the strategic association has correlation with organizational innovation and can be the reason this variable is important.¹⁵

In one study there was a significant association between thinking style of school principals and innovation and pragmatic thinking style is the most anticipant of organizational innovation¹⁶. Development of information technology tools is an important factor in innovative creation in parent companies of automotive industry. Additionally, there is a negative association between decentralization and flexibility in duties and innovation.¹⁷ Lopez Nicolas, and colleagues found a weak significant relation between thinking styles and organizational innovation. In their study pragmatism thinking styles had the most association with organizational innovation.¹⁸ Lastly Vaccaro et al. have concluded that there is a significant positive association between knowledge management with processing innovation. Their results indicated that there was a positive significant association between all the elements of knowledge management and processing innovation.¹⁹

The results of knowledge creation and organizational innovation and their sub-elements have shown that increasing the knowledge creation can lead to increasing organizational innovation. This is in compliance with the previous findings.^{20,21} According to the findings, knowledge as a main source of organizational innovation has particular importance; hence the knowledge creation is recognized as a source and primary reference of innovation and a basic requirement of the innovation process in the organization. Knowledge creation in TUMS has had the greatest impact on administrative innovation, according to calculated amount of Chi square (116.48) (Table 3).

By creating knowledge through shaping and re-combining new knowledge with the past knowledge, the organizations are able to create new concepts and realities. This newly achieved knowledge can have a direct impact on administrative innovation, new procedures, new policies and new forms of organization. So there is an effective association between knowledge creation and administrative innovation.

After administrative innovation, knowledge creation in TUMS has had an impact on innovation process, according to calculated amount of Chi square (64.19) (Table 3). The findings have shown that knowledge creation refers to organization's ability for creating new and useful ideas and solutions. Through several sets of interactions and by restructuring and re-combining background and foreground knowledge, the organization can create new concepts and realities. In innovation process that includes adoption of new or improved methods of production, distribution or delivery of services and providing, maintaining and improving the quality and cost savings. So there is an effective association between knowledge creation and innovation process.

Knowledge creation in TUMS has had the lowest effect on productive innovation because of the amount of calculated Chi square (51.54). Knowledge creation creates opportunities from inside the organization and outside of the organization for knowledge re-combining and new knowledge creation. Interaction with the existing knowledge can adjust stock or stored knowledge and encompass the extent and depth of knowledge, increasing the potential capacities for innovation consequences. Interaction with knowledge can modify stock or stored organizational knowledge. Consequently, the potential of innovative outcomes of new products at TUMS is increased and reaches to a higher level of providing services and new technological products. One of the limitations of this study was the extendibility of the results to other populations. This research was carried out only in the case of TUMS employees and generalization of the results to other organizations should be considered with caution. Therefore, interpretation of the results must be made by considering the current situations of an organization and the effects of unwanted variables.

CONCLUSION

Innovation in TUMS is associated with the ability in using knowledge resources. Knowledge creation is an aspect of effective application of knowledge and expertise for increasing the organizational effectiveness. Greater levels of knowledge creation in TUMS show the impact of organizational learning which can improve its capabilities in reducing reaction time and rapid response to changes, and creation of new ideas and innovation. Effective management of knowledge facilitates the exchange of required knowledge in innovation process and increases innovation performance through creating insight and new capabilities. So, the having the capacity for knowledge creation has an important role in accelerating innovation.

CONFLICT OF INTEREST

None Declared.

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