Original Article

Mediatory Role of Knowledge Management (KM) in the relationship between Organizational Structure & Information and Communication Technology (ICT)

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Abstract

The current research paper aims at the mediatory role of knowledge management in the relationship between organizational structure and information and communication technology. The current research makes use of a correlation method. The study population includes all of the Shiraz's Housing Foundation Staff Members.

Sampling Method: Due to study population limitations, census method was applied herein. Three questionnaires, namely knowledge management questionnaire, organizational structure questionnaire and information technology questionnaire were administered to collect the information. The questionnaires' reliability and validity has been confirmed.

The extracted data were analyzed in the section on descriptive and inferential statistics. Mean tables were used in descriptive statistics section and Pierson and regression correlation coefficients were applied in inferential statistics.

The results of the study has shown that the Housing Foundation staff members consider the following items as having optimum statuses to be implemented within the framework of organizational structure: knowledge management, appropriate structural patterns, information sharing, up-to-date information system, investments in information and communication technology, organizational structure's complicacy, vertical and horizontal complicacy, organizational structure's authenticity, the effect of technology on the structural dimensions' concentration, delimitation, team-orientation and professionalism, proper quality products and services.

Key words: Knowledge management, Organizational structure, Information, Communication technology

INTRODUCTION

Nowadays, a great many of the leading organizations have well-discerned the importance and the role of knowledge. Therefore, they have commenced extensive efforts in line with bringing about essential changes in their attitudes and their own organizations' strategies so as to prepare themselves for a transition from the industrial era to knowledge era followed by making use of and managing knowledge in their entire work and organizational dimensions in a systematic manner. Based on this, a new topic called "knowledge management" has been initiated in the management sciences world during the past several years (Stanovsky, 2005).

Toffler (1990) in his popular book, "the third wave", enumerates three waves of change for the purpose of explaining the nature of human evolution. He divides these three waves of the mankind history to four large epochs. The first is the clan life which dates back to two or three million years ago. In that era, the primitives acquired the preliminary abilities. The second is the agriculture era which dates back to between ten to twelve years ago at which time agriculture took the place of living on hunting and the families became a little bigger. In fact, these two eras are named as the first wave by Toffler.

The third is the industrial era that marks the commencement of the second wave. It happened between 18th and 20th centuries. In this era, factories became the economy

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propellers and took the place of agriculture. In this period, despite the fact that the families became smaller, a population burst took place worldwide and the cities grew larger (Toffler, 1990).

It was at this stage in the course of which the communities were turned into service societies. The employment attraction was based on offering of the services in this period. Capitals were enumerated as strategic resources in this era. Since the time that mankind comprehended industry and technology, it found out that the producible information a will reach to the extent that it cannot be held in the minds without it being assisted by any device. At this time, the individuals took part in specialized classes to be trained and the belief in big families, but not as extended as before, was still in place (Reza'eiyan, 20087).

The third wave, as noted by Toffler, is the very information century coinciding with the second half of the twentieth century and not the mankind is experiencing a transition period thereof. The industry and the economy of the world are based on the exchange of information, electronic communication and higher level of independence (Toffler, 1990).

In the information era, in lieu of the capital the focus is on information value and sovereignty belongs to specialists and very versatile individuals with computer and communication technology; and, instead of physical endeavors, the necessity to use the power of thoughts and contemplation is underlined (Fitz, Gerard, 1981).

In this period, the competency to analyze and design systems is more important than ever before because the communication networks and satellites have transformed the planet earth to a small village. In other words, the shortening of the distances as a result of the reduction in communication establishment time enables the managers to have access to the information in a glimpse of an eye and in a timely manner through instant contacts with the other organizations or countries. In the information era, added value is obtained via converting the information to knowledge as well as by the speedy pace with which the information is transferred (Reza'eiyan, 2008).

Generally, these four big epochs have each incorporated gains and accomplishments of their own for the social formations and organizations. The accomplishment of the first epoch has been the formation of "small social groups". In the second epoch the cornerstone of "hierarchy" formation was set in the organizations and the development of the departments and sections in the third epoch was accompanied by the emergence of "bureaucracy" in the organizations in the fourth and last epoch.

The fourth epoch, or as it is known the information century, the organizational borders (boundary extension) were expanded and extensive work networks were created and virtual organizations were established. Therefore, the creation of virtual organizations is a gain of the information century, in general, and computer era, in its specific sense (Asili, 2001).

PROBLEM STATEMENT

The present era is the period of hasty and unexpected changes and revolutions. Organizational managers, in this highly competitive and daily changing world, need to adapt the related institutions' structure to the environmental conditions so as to be able to accomplish the organizational objectives. One such factor that is constantly undergoing changes and variegation is the technology applied. Information technology is a utility that provides the necessary facilities for collecting, accumulating, processing and distribution of the information. The necessity of technology in fulfilling the objectives by every organization is undeniable in the communication era. Various organizations, based on their nature and the objectives they are in pursue of, should make use of this tool in such a manner that they can accomplish their objectives as quick as possible. On the other hand, the speed of the change and transformations has made utilizing this tool necessary by the organizations for purposes such as survival. To put it differently, today's organizations are forced to apply information technology otherwise they will be eliminated from the arena of activities in an environment featuring increasing change and evolutions.

One topic proposed in regard of the organizations is the organizational structure. Managers design special structures within their organizations to help them accomplish their objectives and intentions. In fact, it can be stated that such an organizational structure is a tool that assists the managers in reaching to their goals. Having a structure adjusted to the immediate environment and making proper use of information technology and organizational structure are among the most important instruments and preparatory works that the organizations should be always looking for them. According to Robins, organizational structure expresses the way the duties are assigned as well as the way the coordination mechanisms and interactive patterns are set for the overall organization to follow. Robins realizes organizational structure as a component of organization that is comprised of three elements, namely complicacy, authenticity and concentration. Adopting an information technology approach towards the organizations influences their various aspects. Organizational structure is a component that is highly influenced by various factors.

Investigating the various aspects of such effects can be of a considerable aid to the organizational managers in applying this tool. The subject of elaborating the relationship between information technology and organizational structure has originated from the studies by Vedutred Charles Prou and the other theorists advocating the theory of contingency attitudes. Information technology like the other technologies influences the various organizational factors including the organizational structure. Therefore, its related structures should also undergo changes and be adjusted.

To increase their abilities in improving the services and goods and thus keeping heir consumers and customers satisfied, companies are in need of knowledge. Improved commodities and services should be accompanied with the changes in the systems, structures and problem-solving methods (Davenport and Prosic, 1998). Knowledge is like food to the learning organizations. The nutrients in the knowledge enable the organization to grow. Individuals may come and go but if the valuable knowledge is lost the company will be placed at the verge of decline (Zali, 2006). Organizations' management should provide themselves with the ability to adopt reasonable decisions regarding important topics and improvement of the knowledge-based performances through relying on knowledge. This is why knowledge management is a topic far more important that the individual and organizational understandings that can be elaborated and made clear via the individual and group knowledge and skills (Propist, 2000). Therefore, in the third millennium, knowledge management implementation is envisaged as necessary and the organizations should proceed to its execution through making plans and programs (Chander, 2008). In an environment featured by primary signs such as daily development of knowledge and technology, the business areas have lost their traditional form and appear in novel forms, including the virtual organizations or networked organizations. Thus, the main issue in the current research paper is that whether the knowledge management can play a mediatory role in the relationship between the organizational structure and information and communication technology?

IMPORTANCE AND NECESSITY OF RESEARCH

At the turn of the third millennium, the mankind has experienced a new era of life evolution and organizational structure. Substantial changes in the economical environment as a result of globalization and advent of technology have urged the organizations to create significant changes so as to be able to adapt and keep balanced with

this modern world. To enhance and increase their abilities in improving the commodities and services and, subsequently, satisfying their customers and consumers, companies require knowledge. Improved goods and services should be followed the changes made in the systems as well as the adoption of problem-solving methods (Davenport and Prosic, 1998). Organizations' management should provide themselves with the ability to adopt more sensible decisions regarding more important organizational issues and the improvement of knowledge-based performances via relying on superior knowledge. So, the knowledge management is considered as being more important than the knowledge at the hands of the organization and individuals in separate and it is the overall knowledge that clarifies the individual and organizational understandings (Propist, 2000). Therefore, in the third millennium, the implementation of knowledge management has become a must and the institutions should take measures in line with executing it by means of programming and planning (Chandra, 2008). In an environment the major sign of which is daily development in knowledge and technology, the work fields have lost their traditional forms and are manifested in novel shapes. One such a field is the virtual or networked organization. Knowledge management is a fluid concoction of experiences, values, background information and specialized knowledge that provide a coherent and integrated framework for the evaluation and acquisition of experiences (Azizi, 2007). Knowledge management as a coherent, explicit and implicit paradigm sets the ground for reaching to some certain smartness and this per se enables an indirect or direct interaction. Knowledge management takes distinctive steps to associate with the organization's smartness cycle and it contributes to better and more precise guidance and programming through creating and acquiring knowledge. In line with this, the explicit knowledge is collected from all over the organization and it will be made available to the organizational planners and guiders. Such knowledge can be used as throughput to organizational tools in an electronic format (Foruzandeh et al, 2010). Organizational structure is a tool for a better fulfillment of the duties and thus it has to feature the required flexibility, dynamicity, speed, practicality, accuracy and quality; furthermore, it has to enjoy the feasibility to be individually developed, controlled and made internally coherent. The structure of an organization can be recognized as a system of ways by which organizational activities are divided into well-described duties and then coordinated. The components of organizational structure are expressive of the internal features residing in an organization the weakness and strength of each is effective on the overall organizational structure formation (Ramezanpur, 2005). Therefore, the survey and discovery of the relationship between knowledge management with organizational structure and

information and communication technology is deemed necessary and highly important.

The present study aims at the survey of the mediatory role played by knowledge management in the relationship between the organizational structure and information and communication technology among Shiraz's Housing and Accommodation Foundation. To do so, 102 employees were given questionnaires and the extracted data were analyzed. In this chapter, the information was evaluated in two levels of descriptive and inferential. In descriptive level, study variables standard deviation and mean and in inferential level the proposed model's test have been carried out by the use of path analysis by taking advantage of Barron and Kenny's method.

RESULTS

Inferential Findings

Hypothesis One: there is a significant relationship between organizational structure and knowledge management

To test this first hypothesis, Pierson correlation coefficient was used and the results are presented in [Table 1].

From table [Table 2], it can be concluded that organizational structure (r=0.807, p<1%) is in direct relationship with the knowledge management. With the improvement of the organizational structure in the Housing Foundation, the knowledge management is improved in the staff members.

Hypothesis Two: there is a significant relationship between the organizational structure and information and communication technology

To test the hypothesis, Pierson correlation coefficient was used and the results are summarized in table [Table 3].

From the [Table 3], it can be concluded that there is a direct and significant relationship between organizational structure and information and communication technology (r=0.706, P<1%). Information and communication technology can be developed in the Housing and Accommodation Foundation with the improvement in its organizational structure.

Hypothesis Three: there is a significant relationship between the knowledge management and information and communication technology

To test this latter hypothesis, Pierson correlation coefficient has been used and the results are observable in table [Table 4].

It can be concluded from the [Table 4] that there is a significant and direct relationship between knowledge

Table 1: Mean and standard deviation of organizational structure, knowledge management and information and communication technology

	Organizational structure	Knowledge management	Information and communication technology
Mean	67.23	73.87	65.80
Standard deviation	11.01	11.24	11.92

Table 2: Correlation matrix of the organizational structure and knowledge management

	Knowledge management
Organizational structure	0.807**

*:significance in 5% level; **:significance in 1% level

Table 3: Correlation matrix of the organizational structure and information and communication technology

	Information and communication technology
Organizational structure	0.706**

*:significance in 5% level; **: significance in 1% level

Table 4: Correlation matrix between knowledge management and information and communication technology

	Information technology and communication
Organizational structure	0.703**

*:significance in 5% level; **: significance in 1% level

management and information and communication technology (r=0.703, p<1%). Information and communication technology can be developed with an improvement in the knowledge management by Housing Foundation's staff members.

Primary Hypothesis: Knowledge management can play a significant mediatory role between the organizational structure and information and communication technology.

To test the mediation role played by knowledge management between the organizational structure and information and communication technology, there is made use of path analysis based on hierarchical regression method as well as Barron and Jenny method. [Table 5] summarizes the results of multiple regressions based on hierarchical method for examining the mediatory role played by knowledge management in the relationship between organizational structure and information and communication ICT.

Table 5: Multiple regressions' results based on hierarchy analysis method for testing the knowledge management's mediatory role

Step	Variables	Beta	t-value	p-value	R	R²	F-value	df	P
First	Organizational structure	0.706	9.974	0.000	0.706	0.499	99.49	1.100	0.000
Second	Organizational structure	0.399	3.493	0.001	0.741	0.549	60.36	2.99	0.000
		0.706	9.974	0.000	0.706	0.499	99.49	1.100	0.000
		0.399	3.493	0.001	0.741	0.549	60.36	2.99	0.000
	Knowledge management	0.381	3.338	0.001					

In the first step, organizational structure was inserted into the equations for predicting the information and communication technology. In the second step, knowledge management was inserted into the equation as a mediatory variable. The results of the analyses signified that in the first step [F (1.100) = 99.49, Pp<0.01] and in the second step [F (2.99) = 60.36, p<0.01]. The results indicated that in sum, 55% of the variance of information and communication technology can be accounted for by the organizational structure and knowledge management in the proposed model. The results of the hierarchical regression analyses as tabulated in [Table 6] are suggestive of the idea that knowledge management plays a mediatory role between the organizational structure and information and communication technology (P<0.01). Also, the reduction in the organizational structure beta from 0.706 in the first step to 0.399 in the second step emphasizes the partial mediatory role played by knowledge management in the relationship between the organizational structure and information and communication technology. Next, the reduction in the regression coefficient (from 0.706700 in the first step to 0.399 in the second step) was explored. The hypothesis assuming an indirect effect (partial mediation) was found statistically significant according to statistic proposed by Sobel, Arian and Goodman (P<0.01) in [Figure 1].

In the following chapter, first of all the summary of the study is presented and then the findings obtained thereof are examined according to the special objectives and the results of the studies undertaken by the others. Also, based on the results obtained in the current research paper, recommendations will be offered in the sections on applied and future research suggestions.

STUDY SUMMARY

The current research paper was conducted with the objective of investigating the mediatory role played by knowledge management in the relationship between the organizational structure and information and communication technology in Shiraz's Housing and Accommodation Foundation in 2016. The study was carried out based on a descriptive method of correlation type.

Table 6: The direct and indirect effect of the organizational structure and knowledge management on information and communication technology

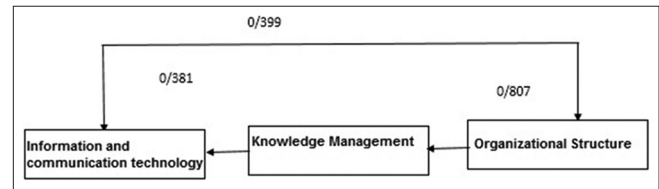| Study variable	Direct effect	Indirect effect	Total effect
Organizational structure	0.399	0.307	0.706
Knowledge management	0.381	-	0.381

Figure 1: The proposed model of the knowledge management partial mediation in the relationship between the organizational structure and information and communication technology

Study population included all of the employees working in Shiraz's Housing and Accommodation Foundation. The total number of study population was 130 individuals. Thus, sampling method was not applied here due to the study population's limitation and the entire study population was selected based on a census method as the study sample volume.

A questionnaire proposed by Robins (2008) was used to assess the organizational structure. It contained 24 questions and it evaluated three aspects of complicacy, authenticity and concentration. The questionnaire was translated to Persian by Alvani and Dana'eefar (2009).

Another questionnaire, which was codified by Azadmehr (2010), measured information and communication technology. It contained 20 items evaluating the extent to which the participants are familiar with computer, internet and software. The responses are scored as follows: (1=very low, 2=low, 3=medium, 4=much, 5=very much). The minimum and maximum acquirable scores are 50 and 100 respectively.

Knowledge management questionnaire was designed by Joseph Haddad (2006). Barzegar et al (2012) used the

questionnaire in their own studies. The questionnaire contains 21 items and 4 indicators. The replies are scored based on Likert's five-point scale as follows: (5=completely agree, 4=agree, 3=no idea, 2=disagree, 1=completely disagree).

To analyze the data in descriptive statistics level, means and standard deviation and Pierson correlation coefficient and stepwise regression tests, in inferential statistics level were applied. Of course, the abovementioned questionnaires had been investigated and verified by a group of assistant and supervising professors before being administered and also specialists' ideas had been inquired in order to determine their validity rates.

The data gathered in the current research paper were analyzed based on multivariate regression tests and Pierson correlation coefficient measurements. The next chapter deals with the discussions on and evaluation of the variables applied herein.

Primary Hypothesis
Knowledge management plays a mediatory role in the relationship between the information and communication technology and the organizational structure

The results obtained though taking advantage of hierarchical regression method and by the use of the method proposed by Barron and Kenny.

In the first step, organizational structure was inserted into the equations for the prediction of the information and communication technology and the mediatory variable of KM was entered to the equations in the second step. According to [Table 6] as it was indicated in chapter four, KM plays a mediatory role in the relationship between the organizational structure and information and communication technology.

Also, the reduction in the coefficient or beta-value of the organizational structure in the second step underlines the partial mediatory role of the KM in the relationship between organizational structure and information and communication technology. According to the Sobel, Arian and Goodman's statistics, it was found out that the relationship is statistically significant.

Hypothesis One: there is a significant relationship between KM and organizational structure
To test this first hypothesis, Pierson correlation coefficient was used. It can be concluded that there is a significant relationship between KM and organizational structure. And, that KM can be improved with the improvement in the organizanial structure of the place the Housing

and Accommodation employees work. This finding is consistent with the results obtained by Asgari (2005), Rahman Saresht (2011), Marzban (2011), and Ashena (2012) as well as with the results obtained in the studies undertaken by Robins (2010) and Park (2011).

In elaborating this hypothesis, it can be stated that based on the studies on organizations, implementation of every organizational process requires paying attention to the necessities and appropriate grounds. One of the most important aspects of every organization is organizational structure. Organizational structure can be considered as one of the most original components of the organizations after the objectives set in an organization. Organizational structure is the skeleton and the foundation upon which the other internal sections are laid and surrounded by the extra-organizational environment. On the other hand, dealing with KM in the absence of an appropriate and supportive structure is not feasible. The organizations should welcome the structures that allow them to create and transfer more knowledge to the maximum extent possible. To reach to such a structure, the relationship between the variables, namely authenticity, complicacy, concentration, and KM is examined by the use of questionnaires the validity and reliability of which have been justified. It has been shown that structural indicators of authenticity and concentration negatively influence the KM interventions. This is while some structural dimensions such as delimitation, informal networks, team-centeredness and professionalism have had a positive effect.

Hypothesis Two: There is a significant relationship between KM and information and communication technology
To test this hypothesis, Pierson correlation coefficient was used. And, it can be concluded that KM is in a direct relationship with information and communication technology. This finding is compliant with the results obtained in the studies performed by Ghobadi (2006), Goudarzi and Abutorabi (2007), Burgerf (1997) and Mirson (1997).

In elucidating this finding, it can be said that the role of information and communication technology in KM is a progressive one and the best way for taking advantage of information technology in KM process is blending the two factors: first of all, enhancing the culture consistent with the latest technologies of the world and second making the state-of-the-art world technologies, in accordance with KM, accessible.

Also, information technology can be used by KM as a means of facilitating communications and knowledge sharing in organizations such as Housing Foundation.

Web-based internet causes interactive and extensive networks to be created which will enable the work groups communicate with one another, share information, plan and program and run follow-ups on their jobs and manage complex plans.

Hypothesis Three: there is a significant relationship between the organizational structure and information and communication technology.

To test this hypothesis, Pierson correlation coefficient was used and it was concluded that the organizational structure is in a significant relationship with the information and communication technology.

M. Bern (1989), Hekmat Dastranj (1999), Fo'ad Adineh Gholamjani (1999), Gholamzadeh (2001), Abtin (2002) and Kasra'ee and Rahimi (2009) has also come to the same conclusion.

As for the third hypothesis, it can be stated that up-to-date information systems have a considerable effect on organizations' structural components. Also, it has been found directly associated with complicacy due to the fact that information technology causes a reduction in the organizational levels. The existence of tight regulations and highly formalized administrative procedures has brought about the conditions for information technology to play a very significant role in the reduction of authenticity in organizations and finally it is worth mentioning that technology has the greatest effect on KM.

Eventually, there was found a significant relationship between the extant organizational structure complicacy and non-effectiveness of the communication in employees' level. It was demonstrated that the structural complicacy indicators, to wit horizontal and vertical complicacy, influence the communication trend and render the communication ineffective.

DISCUSSION AND CONCLUSION

Primary Hypothesis
Primary Hypothesis: KM plays a mediatory role in the relationship between information and communication technology and organizational structure

The results were obtained based on hierarchical regression and by the use of the method proposed by Barron and Kenny.

In the first step, organizational structure was inserted into the equations for the prediction of the information and communication technology. In the second step, KM entered the equations as the mediatory variable. According to [Table 6], as it was presented in chapter four, it can be seen that KM plays a mediatory role between the organizational structure and ICT.

Also, the decrease in organizational structure's beta coefficient in both of the aforementioned steps highlights the partial mediatory role of KM in the relationship between organizational structure and ICT.

The relationship was shown to be statistically significant according to Sobel, Arian and Goodman's statistics.

Second Subordinate Hypothesis: there is a significant relationship between aspects of KM and ICT

To test this hypothesis, Pierson correlation coefficient was used and it was concluded that there is a direct and significant relationship between KM and ICT. ICT will be developed with the improvement in KM of the employees working in Housing and Accommodation Foundation. This finding conforms to the findings obtained in the studies conducted by Goudarzi and Abutorabi (2007), Ghobadi (2006), Burgerf (1997) and Mirs (1999).

Third Subordinate Hypothesis: There is a significant relationship between organizational structure and ICT

To test this hypothesis, Pierson correlation coefficient was used and it was concluded that there is a direct and significant relationship between organizational structure and ICT. It was also indicated that ICT will develop with the improvement in the organizational structure of the Housing and Accommodation Foundation. This finding was consistent with the results obtained by M. Bern (1989), Hekmatullah Dastranj (1999), Gholamzadeh (2001), Abtin (2002), Kasra'ee and Rahimi (2009) and Javad Adineh Gholamjani (1999).

STUDY CONSTRAINTS

The most substantial constraint of the current research paper was the method it used to carry out the study and it has to be pointed out that the causal relationships are not well-elaborated herein.
1. Some of the employees did not act as expected in the data gathering phase by means of questionnaires for reasons such as stating that they are very busy.
2. Some variables like economical, social and cultural status of the staff members were not controllable due to the study conditions.
3. The unavailability of a standard questionnaire for KM and ICT.
4. The existence of tight and strict rules and criteria for getting the research done.

APPLIED RECOMMENDATIONS

1. It is recommended that the organizations establish required information systems and make use of appropriate software in various areas and topics so as to enable their employees readily and quickly comprehensively and extensively access documents and scientific evidences. To create research theories and transfer knowledge to such systems, the organizations need proper software.

2. Documentation of the successful as well as unsuccessful experiences by the foreign and domestic organizations to be used in line with advancing the organizational research and panorama.

3. Holding in-service training and educational workshops and courses in areas such as ICT, KM and organizational structure.

4. Precise and continuous assessment of organizational structure.

FURTHER RESEARCH SUGGESTIONS

1. According to the idea that ICT can be taught, it is here suggested that further research can be performed on the effects of ICT on KM in an experimental manner.

2. It is suggested that the future research perform the same study in other organizations and during various periods so as to be able to comparatively study the results and then come up with more appropriate solutions.

3. There is a need for carrying out research on the solutions to increase ICT and KM.

4. Empirical or semi-empirical studies by means of questionnaires and for instance through observations and interviews can also be helpful in this regard.

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