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Investigating in Relationship Between Knowledge Management Dimensions and the Effectiveness of Project Knowledge Management (Case Study: Tebyan Institute)

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Abstract: Knowledge management in projects are becoming an essential prerequisite for the creation of competitive advantage. It must be considered that the lack of knowledge management in projects, knowledge assets will disappear by the end of the project. The subject will lead to dispersion and loss of organizational knowledge and organizational learning. Therefore, two related categories of these areas are knowledge management infrastructure and processes. This study sought to examine the impact of knowledge management infrastructure and processes on effectiveness of project management knowledge on the Institute's Tebyan. Therefore, using a questionnaire to evaluate knowledge management infrastructure and processes based on Gold and effectiveness of knowledge management project based on Hanisch was made. Results of correlation and regression analysis revealed a significant positive impact of infrastructures (culture, technology, architecture) and processes on effectiveness of knowledge management project. The technique of path analysis showed infrastructures via processes impact on the effectiveness of knowledge management project.

Key words: Project knowledge management, knowledge management infrastructures, knowledge management processes, Tebyan Institute, path analysis

INTRODUCTION

In the new economy, knowledge is the main source of economic and industrial development and other traditional factors of production such as land, labor and capital are important in the next stage. Traditional factors of production in terms of scale and scope has been limited and their ultimate increase investment leads to diminishing returns. In contrast, other economic laws prevail on the efficiency of knowledge: investing more in knowledge or information would lead to higher efficiency.

Organizations that succeed in the knowledge-based economy that invest in the opportunities of the knowledge assets, these organizations will be industry winners. The knowledge management is an important issue because it is related to the most important valuable asset to the organization that is intellectual capital. KM convert human capital into organized intellectual property to create value for the organization (Hung *et al*., 2005).

In addition, many factors influenced the emergence of project management for business-related activities which include global competition, compression product life cycles, new product development, downsizing, outsourcing, customer focus and innovative technologies. In response to these influences and competitiveness of organizations, they must learn how manage the knowledge they have gained from the projects effectively. This requires changes within the organization for example the need to encourage learning through feedback. Knowledge management, whether explicit or implicit is a necessary precondition for success in a dynamic and changing global environment that is creating project knowledge management. Project knowledge management is knowledge management in special situations of a project and establishing a relationship between principles of knowledge management and project management.

Value of knowledge management depends on the effectiveness of this issue that managed knowledge, empower project-based organizations (in their project teams) in the face of the current activities and image their future and create it effectively. But, the main challenge for organizations is understanding of knowledge management and how to implement it that ultimately leads to effectiveness. The greatest wish for organizations defining an appropriate knowledge management system and run it as a successful method.

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Implementation of programs and activities require a set of factors and infrastructure that guarantee its success that the dimensions of knowledge management processes and infrastructures more pointed. In this study, researchers are seeking to investigate relationship between knowledge management's dimensions and the effectiveness of project knowledge management. The objectives of this study include:

- To examine the relationship between knowledge infrastructures and the effectiveness of project knowledge management
- To examine the relationship between knowledge management processes and effectiveness of project knowledge management
- To investigate the relationship between knowledge management infrastructures and knowledge management processes

Research literature: In a general classification, researchers such as Gold *et al.* (2001) and Mohsen *et al.* (2011) in their research in order to evaluate knowledge management classified it into two dimensions:

- Knowledge management infrastructures
- Knowledge management processes

Knowledge management infrastructures: Implementation of programs and activities requires a series of factors and infrastructure that guarantee its success. By reviewing of the literature found that several factors have been identified by experts in this field Which are described as follows.

Infrastructure factors that the researchers experts in the field of knowledge management have proposed is given in Table 1.

In section of infrastructure's dimensions, according to the Gold Model, dimensions of technology, culture and structure were considered. The importance of each is expressed below:

Technological dimension: Today, many organizations have turned to technology to facilitate learning and knowledge transfer. Technology, particularly IT one of the main factors underlying the relationship between different parts of the organization and knowledge transfer. Information and communication technologies as a suitable vehicle for communication within the organization, one of the knowledge management infrastructure which should be a priority in organizations. In other words, the important role of information technology is its ability to support communication, cooperation, mutual learning and seeking knowledge.

Table 1: Summary of knowledge management infrastructures from the perspective of different researchers

Researchers	Knowledge management infrastructures
Davenport and Prusak	Technology Leadership, culture, training Knowledge infrastructure and Knowledge's electronic resources
Trussler (1998)	Commitment of leadership and strategic management Creation of share culture Technology Education and learning
Donoghue *et al.* (1999)	Technology Human resources Organizational culture Organizational structure
Liebowitz (1999)	Senior management support Interface of knowledge and knowledge resources Knowledge management systems and tools Creation of knowledge sharing culture and culture support
Choi (2000)	Employee training and delegation of authority to the staff Team working Commitment and leadership of senior management Infrastructures of information systems
CIO Council	People Processes Technology
Stankosky and Baldanza (2001)	Organizational culture Organizational structure Leadership, training, learning Technology
Gold *et al.* (2001)	Technological infrastructure Structural infrastructure Cultural infrastructure
Soo *et al.* (2002)	IT sub-system Language organization sub-system organization Transmission sub-system Network sub-system
Lee and Lee (2007)	People Organizational culture Organizational structure Technology
Zaim *et al.* (2007)	Organizational culture Organizational structure Intellectual capital Technology

Cultural dimension: Culture, set of values, beliefs, norms and practices shared by members of the organization. Organizational culture such as organizational structure, shape and control the behavior of individuals in organizations and affects the reaction of people in different situations (Farrell and Mavondo, 2004). An effective organizational culture by providing a suitable environment for the exchange of knowledge and support for knowledge-based activities can play an important role (Janz and Prasarnphanich, 2003). In other words, organizations need a culture of knowledge sharing or provide appropriate cultural model. In order to changing attitudes of behavior and reducing barriers should be created a culture of knowledge sharing.

The structural dimension: The structure of knowledge management refers to the norms and mechanisms of trust in the organization (Gold *et al*., 2001). Bonus and incentive systems that encourage knowledge sharing within the organization and recognizes, an important element is the structural dimension of knowledge management. In addition, research has shown that the intrinsic and extrinsic rewards can increase employee motivation in providing new ideas and developing new products and services. In addition, a flexible structure that will facilitate interaction between employees is one of the important elements of the structure. In this regard, participation in the organization provides conditions to encourage employees to offer new ideas and exchange knowledge. Participation is one of the strategic human resource practices that causes cooperation and involvement of employees in the learning and knowledge management activities. Therefore, participation in problem solving and decision-making commitment could enhance their commitment, participation and involvement in the organization (Chen and Huang, 2009).

Knowledge management processes: The number of processes that are related to the field of knowledge management is very high, many researchers have pointed to a set of activities or processes related to knowledge management such as: Heisig, McElroy, Beckman, beckowitz o williams and Nonaka & Takeuchi.

Acquisition process: Obtaining, search, produce, create, attract and cooperation: these are many words to describe this process. All these terms refer to a common topic of knowledge accumulation. Innovation is another aspect of the acquisitio. The creation of new knowledge and use of knowledge requires a concerted effort and a high degree of experience in identifying and capturing new knowledge. Key aspects of the acquisition process is improving the utilization of existing knowledge and more effectively acquiring new knowledge, two examples of these processes are benchmarking and collaboration. Organization through benchmarking identifies prominent ways organizations (including themselves) and then assess the current status of a specific process to identify gaps and problems involved. When these methods and differences are identified, organizations can capture knowledge for domestic use. Creating knowledge need to sharing and dissemination personal experiences (e.g., collaboration). Collaboration occurs at two levels within the organization: between individuals and between the organization and its network of business partners.

Conversion process: Conversion processes to build useful knowledge from existing knowledge. Some of these processes are able to convert knowledge to the ability of a company to organize, integrate, composition, structure, coordination or distribution of knowledge. The organization should develop a framework for organizing and structuring knowledge. Knowledge about a specific subject may exist in different parts of the organization or different systems within the organization. Combineing or merging of this knowledge to reduce redundancy, increase consistent view and improve efficiency through the elimination of is a redundancy. This process also enables organizations to replace outdated knowledge.

Application processes: Application based processes are those oriented toward the actual use of the knowledge. Interstingly, littlr disscution has been devoted to the outcomes of the effective application of knowledge. Effective application seems to be largely assumed or implied as opposed to treated explicitly. Effective storage and retrieval mechanisms enable the organization to quickly access knowledge. To remain competitive, organizations must create, capture and locate organizational knowledge. In addition, organizational knowledge and expertise must be shared.

Protection process: Protection-based of knowledge management processes for protection of knowledge of illegal or improper use or theft are designed. A company to create and maintain a competitive advantage, it is important to protect their knowledge. Similar application process, this process also has received little attention in the literature. May often assume that a Enterprises can protect their knowledge through patents, trademarks, copyright and so on. However, all knowledge can not be defined according to the rules and property rights. Since, the protection of knowledge is inherently difficult, it should not be abandoned or marginalized. Steps such as alignment of incentives, employee behavior rules or design work can be mention for protecting these assets. In addition, organizations can develop technology that restricts access to critical knowledge. Despite the difficulties in the protection of knowledge, it is an important process for an organization (Gold *et al*., 2001). Hanisch have developed a model for project knowledge management which refers to the five component effective knowledge management project: avoiding duplication of work, learning by repetition, promoting innovation, harmonizing of methods/standardizing, allocating resources (Table 2).

Research background: Table 3 is a summary of studies is in the field, it should be noted that the factors affecting the effectiveness of knowledge management project has not been investigated.

Table 2: Targets knowledge management in project environments (Hanisch *et al*., 2009)

Avoiding duplication of work	Learning by repetition	Promoting innovation	Harmonizing of methods/standardizing	Allocating resources
Reuse of previously acquired knowledge	Continuous improvement of processes and products	Identification and application of innovative ideas using the potential of interdisciplinary collaboration	Identification of best practices and transfer in company standards	Optimal staffing of projects with regard to capacity and competence of employees
Facilitating access to information (methods, processes, contact persons)	Avoiding repetition of mistakes		Establishment of and support through routines Creation of safety in procedures Consistent terminology	

Table 3: Research background

Researchers	Subject of research
Khosh	Study the relationship between knowledge management processes and effectiveness of knowledge management
Taghi and Ravesh	Study the relationship between organizational infrastructure and effectiveness knowledge management
Nahavani	Identify and prioritize the effective criteria on effectiveness of knowledge management in Iranian research organizations with a comparative approach (definitiveand fuzzy)
Ebrahimian	Evaluate the effectiveness of knowledge management (with an overview of the capabilities and process management knowledge)
Mohsin *et al*. (2001)	The effect of the enablers of knowledge management on knowledge management processes
Ajmal and Koskinen (2008)	Knowledge transfer in project-based organizations: an organizational culture perspective
Gold *et al*. (2001)	Knowledge management: an organizational capabilities perspective
Lee and Lee (2007)	Capabilities, processes and performance of knowledge management: a structural approach
Pandey and Dutta (2013)	Role of knowledge infrastructure capabilities in knowledge management
Savaneviciene and Girdauskiene (2007)	Influence of knowledge culture on effective knowledge transfer
Zheng *et al*. (2010)	Linking organizational culture, structure, strategy and organizational effectiveness: mediating role of knowledge management

Status of knowledge management at the Tebyan institute: Tebyan cultural and informative institute was established in 2002 that provides cultural and educational services in the form of various projects. On the actions taken about KM at Tebyan Institute, according to interviews with experts, activities have been carried out in three parts: explicit and tacit knowledge management and knowledge of users tebyan. To documentation the explicit and tacit knowledge, working procedures have been developed in sectors such as health, religion and technology. Given that one of the activities of the institute is in the field of data centers and the sensitivity related to IT service management framework ITIL (3rd edition) it used 300 form for content documentation. This institute for tacit knowledge management, people can use the personal portal to share tacit skills. In addition, incentives for knowledge sharing is placed. Also, mapping process is used for the of explicit knowledge management. According to the Tebyan Institute site most viewed, on the users' knowledge all this views is stored that provide good information that according to the case for example, analysis of social and political behavior of people used it.

Develop hypotheses and conceptual model:

- H_1: there is a significant positive relationship between the infrastructure knowledge management and effectiveness of project knowledge management
- H_2: there is a significant positive relationship between the knowledge management processes and effectiveness project knowledge management

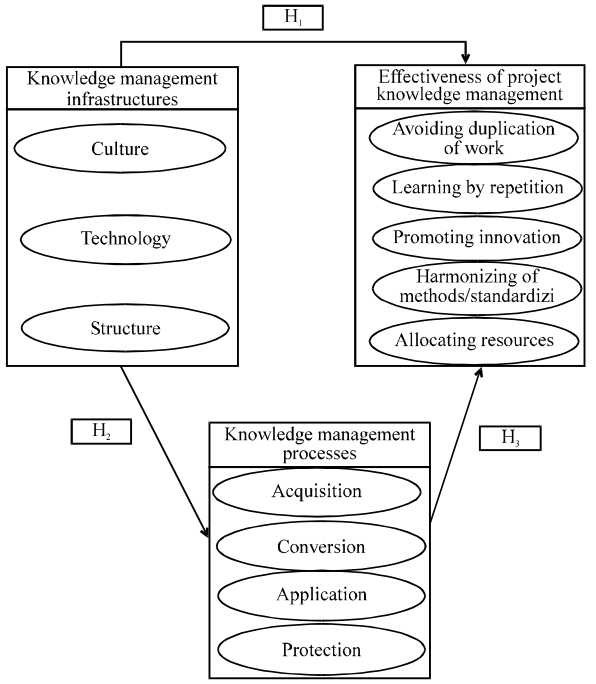

Fig. 1: The conceptual model (Based on the Gold *et al*., 2001; Hanisch *et al*., 2009)

- H_3: there is a significant positive relationship between infrastructure knowledge management and knowledge management processes

Based on the assumptions and literature research, conceptual model are presented in Fig. 1.

MTERIALS AND METHODS

The research was conducted by Correlational Survey Method and is an applied research. In this study, using conducted different studies a questionnaire with 90 main questions and some general questions (demographic) is designed and to achieve the desired goal is set in two parts:

- The first part: consists of questions on gender, work experience, age, education
- The second part: this part consists of 20 items in the range (very low, low, some, high and very high). Which is divided into three parts:
  - Knowledge management infrastructures (technology infrastructure 22 items, structural infrastructure 21 items, cultural infrastructure 23 items)
  - Knowledge management processes (acquisition 21 items, conversion 20 items, application 21 items, protection 20 items)
  - Effectiveness of project knowledge management 20 items

Statistical population of this study to evaluate the effect of infrastructure and processes of knowledge management on the effectiveness of project knowledge management include managers and knowledge workers working in Tebyan Institute. The statistical sample was 110 that the number of 85 cases is selected using the cochran formula.

RESULTS

To analyze the data collected, first, descriptive statistics is used to examine the demographic variables included gender, education, age and work experience. Kolmogorov-Smirnov test was used to determine the distribution of the sample population. Then in accordance with the considered assumptions to examine the impact of infrastructure and processes of knowledge management on the effectiveness of project knowledge management, Pearson correlation coefficient test and regression analysis were used. Independent two samples t-test based on demographic variables and variance analysis were used for evaluate the effectiveness of project knowledge management. Path analysis technique was used to examine the conceptual model.

The SPSS and SPLS Software are used for data analysis. At reviews of Tebyan Institute determined that 40% of respondents were male (34 members) and 60% were female (51 member). The 35% of respondents were between 30-20 years old, 50% between 31-40 years old, 12/5% between 41-50 years old and 2.5% >50 years old. The 10% of respondents have an associate's degree, 50% have a bachelor's degree and 40% have a master's degree or higher.

The 30% of respondents have 1-5 years of work experience, 27.5% 6-10 years, 25% 11-15 years, 12.5% 16-20 years, 2.5% 21-25 years and 2.5% have >25 years experience. Kolmogorov-Smirnov test results confirmed the normality of variables at 95% confidence.

Descriptive statistical review of research in the field of knowledge management infrastructure shows the lowest average is related to the culture and the highest average belonged to the technology. Well as review of descriptive statistics show in dimensions of knowledge management processes lowest average is related to the acquisition process and the highest average is in the process of application.

Because the average of all aspects of both knowledge management infrastructures and knowledge management processes is higher of the average level (3), said desirability of level of dimensions knowledge management is from moderate to high.

Hypothesis research test: To test the hypothesis Pearson correlation and linear regression analysis was used. Table 4 shows datas about correlation test using SPSS Software. As this Table 4 shows there is a significant positive relationship between infrastructure (culture, technology, structure) and knowledge management processes with effectiveness of project knowledge management. This means that the organization more strive to strengthen the infrastructure and processes, project knowledge management will be more effective.

Multiple linear regression variables:

- Dependent variable includes: effectiveness of project knowledge management
- Independent variables includes: processes and infrastructures

We use enter method for this regression (Table 5). The results of the regression analysis shows a significant positive impact of infrastructure and knowledge management processes on effectiveness of project knowledge management. According to regression analysis, we can say: effectiveness of project knowledge management = 0.326 (knowledge management infrastructures) + 0.440 (knowledge management processes). Results of hypotheses can be seen in Table 6.

Table 4: Pearson correlation test results

Hypothesis	The significance levels	Errors	Results	Correlation coefficient
Relationship between infrastructure and effectiveness of project knowledge management	0.000	0.05	Positive	0.612
Relationship between processes and effectiveness of project knowledge management	0.000	0.05	Positive	0.652
Relationship between infrastructures and knowledge management processes	0.000	0.05	Positive	0.650
Relationship between culture and effectiveness of project knowledge management	0.000	0.05	Positive	0.693
Relationship between technology and effectiveness of project knowledge management	0.000	0.05	Positive	0.566
Relationship between structure and effectiveness of project knowledge management	0.000	0.05	Positive	0.508

Table 5: Regression analysis results

The significance levels	t-values	β-values
0.043	2.100	0.326
0.007	2.839	0.440

Table 6: Research hypotheses reviews

Main hypotheses of research	Effects	Significance	Approval or rejection
Impact of infrastructures on knowledge management processes	0.677	9.06	Approved
Impact of processes on effectiveness of project knowledge management	0.470	2.59	Approved
Impact of infrastructures on effectiveness of project knowledge management	0.331	1.77	Rejected

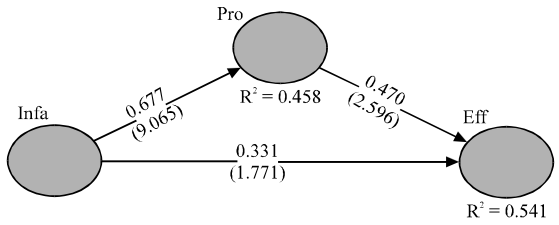

Fig. 2: Research structural model (standard evaluation and significant coefficients)

Path analysis: Path analysis (structural model) is a technique that shows the relationships between variables (independent, intermediate and dependent) simultaneously.

Figure 2 shows the effect of independent variables (knowledge management infrastructure) on intermediate and final dependent variables (knowledge management processes and effectiveness of project knowledge management.

Given that significance amount of both relationship (impact of infrastructure on knowledge management processes and impact of knowledge management processes on the effectiveness of project knowledge management) is >1.96 both relationship is confirmed. Also, amount of direct impact of knowledge management infrastructure on effectivness project knowledge management is 0/331 and its significance is 1.77. Because the significance coefficient is <1.77, the direct impact of knowledge management infrastructure on the effectiveness of project knowledge management is rejected. Value of R^2 for knowledge management process is 0/458 and for effectivness of project knowledge management is 0/541 which is relatively good value.

DISCUSSION

Investigation the factors affecting the effectiveness of knowledge management, especially in project-based organizations in theory of knowledge management less attention has been paid. Therefore, in this research impact of knowledge management infrastructure and processes on effectiveness of project knowledge management has been studied. Results of this research were investigated by using correlation, regression analysis and path analysis techniques.

All hypotheses were confirmed. Scholars such as Savaneviciene and Girdauskiene (2007), Zheng *et al.* (2010), Mohsen *et al.* (2011) and Pandey and Dutta (2013) conducted studies on knowledge management infrastructure and effectiveness of project knowledge management and concluded there is a significant relationship between the infrastructure and the effectiveness of project knowledge management.

Infrastructure are considered as the backbone of knowledge management and almost all of the organizations that have successfully implemented knowledge management aware of the need and importance of a supportive infrastructure to support knowledge management system, it confirms the fact that the efficiency and effectiveness of knowledge management requires a strong infrastructure.

Lee and Lee (2007) in studies that have been done have shown there is a close relationship between the processes of knowledge management and effectiveness of knowledge management.

The results show in the case study culture status compared to other infrastructure elements is lower than the average level. Organizational culture affects all aspects of knowledge management and on the basis of shared beliefs and values, empowers organizations. Most important barriers to effective knowledge management in project based organizations, the lack of knowledge sharing culture and lack of understanding of numerous benefits knowledge management among the staff of the project.

Also, research shows knowledge-based culture including values and beliefs of members of the

organization in relation to the concepts of information and knowledge is one of the most important factors in the success of knowledge management. Especially, the role of culture in project knowledge management is due to the increasing collaborative projects in different places.

Because of issues like communication problems, conflict, increase the variety of stakeholders and consequently project risk, the role of corporate culture can appear more important. For example, the business scope expansion and globalization projects, the use of standards for people involved in project and ensuring the implementation work is essential. Standards, in addition to explaining the work and determine how correct implementation of the operation as a reference for the project team in conflict.

CONCLUSION

The research shows that the most important infrastructure that affect the effectiveness of project knowledge management is culture, so the following recommendations is recommended: since, the support of senior management is the main component of knowledge management culture, managers must be willing to foster a culture of knowledge management and knowledge sharing. Considering the seniority of managers must be proactive in the implementation of knowledge management.

Therefore, considering that creativity plays an important role in the acquisition and development of knowledge. Therefore, people should be encouraged innovation and creativity. For employees become knowledge workers, training, problem solving and creativity offer.

LIMITATIONS

The main limitation of this study is inherent limitations of scale, since the questionnaire measures staff perceptions of reality, this possibility should not be ignored that this perception is not entirely match the reality.

Scholar according to this research experience and studies done provide proposals for research by others interested in the field of knowledge management:

- Review the current status of project knowledge management in various industries
- Identify the key success factors in project knowledge management
- Treatment of human resources in support of project knowledge management

SUGGESTIONS

It is suggested brainstorming sessions and expression of business successes and failures of projects to be held.

Due to IHE institute is project-based, creating knowledge management cores will be effective in different units. Publishing journals knowledge management and familiarizing people with knowledge management systems and encouraged to use it improve knowledge sharing culture. Also, creating a common conceptual framework, results in the formation of relationships based on trust therefore increase confidence in the relationship between members and consequently increase their willingness to share knowledge.

Path analysis showed that infrastructure indirectly through knowledge management processes affect the effectiveness of project knowledge management. Considering the average achieved by knowledge management processes, the process of acquisition in lower case, so the following suggestions are offered:

The establishment of a knowledge management system according to the needs of the organization and with regard to users' needs that their design and implementation, the majority of users with respect to user friendliness and ease of use have agreed. The establishment of data mining and customer relationship management systems in the organization will be effective. Also, the technologies should be used that employees always have access to the learning tools.

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