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STUDYING THE MEDIATING ROLE OF KNOWLEDGE MANAGEMENT PRACTICES IN THE EFFECT OF HUMAN CAPITAL ON ORGANIZATIONAL INNOVATION

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Abstract

In the knowledge-based era, successful organizations attempt to utilize their intangible capital for improving their innovative performance. This paper is to investigate the intervening role of knowledge management in the effect of human capital on organizational innovation. For this purpose, the simultaneous effects of two vital practices of KM (knowledge creating and knowledge sharing) have been investigated in the effect of human capital on the product, process and administrative innovation. The research method is descriptive and correlational. The population of the research consists of 820 managers and employees of a private bank in Tehran. A sample of 262 subjects was selected using statistical sampling. Data collection tool is a standard questionnaire that was used for the survey. Data analysis has been done through

path analysis. The results show knowledge management practices have meaningful intervening role in this relationship. Finally, according to research findings, some suggestions are presented to improve organizational innovation through human capital.

Keywords: Organization innovation, knowledge management, Knowledge creation, Knowledge sharing, human capital

INTRODUCTION

By increasing the global competition, the leading banks turn to improve the business performance continuously and gain sustainable competitive advantage, particularly through innovation. Today, individuals and the leading banks worldwide seek to benefit from the innovation and entrepreneurial activities as their priorities in order to gain competitive advantage (Gundy, Luzov, Kilic and Alpkan, 2011). In fact, the rapidly changing needs and demands of customers, short life cycle of products / services, in stability of competitive advantage and any new global competition are among main reasons that led to increasing importance of answer to the question among leading organizations that "how we innovate and how we achieve the resources of sustainable competitive advantage?" (Johannessen and Olsen, 2010). Many organizations have found answers to these questions in innovation. Innovation bodes efforts of organizations to find new opportunities and new solutions to gain competitive advantage through new products, new services or improve processes (Dess and Lumpink, 2005). Thus, understanding and enhancing the determinants of innovation and how to use it in order to improve organizational performance are among fundamental issues these organizations are facing.

On the other hand, with the development of knowledge-based economy, focusing on intangible assets and their effective utilization is the priority of the leading organization (Raaswami, Rivastava & Bhargava, 2009). Among these capitals, knowledge has a special place as a basis for achieving core and strategic competencies for superior performance and gaining competitive advantage, and knowledge management has also become a key task for these organizations (Nonaka, Toyama and Konno, 2002).

Reviews of the literature in this area suggest that many studies have been conducted to understand the relationship between knowledge management and innovation in an organization. In today's highly competitive environment organizations have gone into development of innovative performance in order to achieve more successes and survival in competitive markets For example, it was reported that 75% of revenues of successful companies derived from new

products or services that were not in market during last five years (Smith, 2006). So the competition is an important strategy based on knowledge and innovation for leading organizations. As a result, knowledge and innovation are of the most important requirements to maintain competitive advantage of organizations (Nonaka and Takeuchi, 1995). On the other hand, Organizations are trying to become an innovative organization to keep survival and have competitive advantage so they can get ready to adapt to fast changes and profound transformations of today's world.

Given the effect of human capital on the innovative performance, the organization has done a lot of research. However, more research is needed in terms of how the human capital influences promoting on organizational innovation. This study will be collaborative for identifying the mediating and intervening variables that play roles in this regard. Therefore, in this study what is addressed, is how and to what extent the two fundamental practices of knowledge management – knowledge creation and knowledge sharing- mediate the effect of human capital on improving the innovative capacity. Recognizing this issue can help to better understand the synergistic relationship among intangible assets, knowledge resources.

LITERATURE REVIEW

Innovation

Increasing attention to creativity and innovation and their close relationship with economic growth has led to create a set of various modes of process innovation. It can be said that creativity means to provide new and useful ideas and innovation means to accomplish and to implement these ideas (Alvani, 2008,230). Indeed, innovation is a process through which problems in organization are identified and defined and then new knowledge is used to resolve them actively.

Organizational innovation consists of developing products and service and new administrative systems and it is considered as a key source to have competitive advantage (Hurley and Holt, 1998). Innovation process includes acquisition, dissemination and implementation of existing and new knowledge. Organizational innovation is closely related to its capability in the use of knowledge resources (Subramaniam and Youndt, 2005). Innovation in organization can provide new product and service or new solution to do things (Rezaiian, 2006).

Product innovation: this kind of organizational innovation is pertinent to delivering new products and services, their obtained incomes, the success of new products and services and appropriate speed of providing products (Amalia & Nugroho, 2011).

Administrative innovation: it refers to changes in organizational structure or administrative processes, such as a change in the deployment of staff, allocation of resources,

task structures, powers and rewards (Damanpour, 1992). When organization decides to use new methods for distributing responsibilities and decision making among its employees, such procedure has been used. This process also provides new templates for structure of activities, such as implementation of an organizational model for improvement that provides necessary conditions for implementation of knowledge management in daily activities (Davenport and Prusak, 2000; Amalia & Nugroho, 2011).

Process innovation: This type of innovation includes the development of production methods and the use of new elements (such as raw materials, work specifications, facilities and information flows) in the manufacturing process (Damanpour, 1996). This innovation results in promotion of managerial system by developing technologies, products and processes and also reduction or elimination of additional problems (Rainey, 2006). Process innovation includes improving technologies and production processes in order to improve the product.

Knowledge management

Karl Wig promoted knowledge management concept for the first time in 1986. He knows knowledge management as a process of making and renewal, application and exploitation of knowledge to make background for knowledge effectiveness and returning its knowledge assets. Since then, many efforts have been done to define management. However, the definition of management is complex and the reason is its many interpretations resulting from multiple views and multiplicity of related fields (Martin, 2000: 17).

Knowledge management means the development and exploitation of knowledge assets of organization. In other words, knowledge management refers to systematic and integrated process of collaboration enterprise-wide activities including acquirement, creation, storage, sharing and application of knowledge by individuals and groups in order to accomplish organizational objectives (Rastogi,2002).

Knowledge creation

Knowledge comes originally from experience and skills of employees. Knowledge is created when people find a new way to get things done or to develop substantive knowledge. Organizational knowledge creation is the result of social interaction and organizational cooperation (Alavi and Leidner, 2001: 112). Nonaka describes four models of knowledge creation resulted from interaction between tacit and explicit knowledge at different levels of the organization: socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995).

Table 1. Types of the interaction between tacit and explicit knowledge (Nonaka and Takeuchi, 1995)

	To tacit knowledge	To explicit knowledge
From tacit knowledge	1. Socialization	2. Externalizing
From Explicit knowledge	4. Internalization	3. Combination

Knowledge sharing

Knowledge sharing by McDermott (1999) has been described in a way that talking about a person who shares his knowledge means he guides another person using his knowledge, insight and thoughts to help him see his status better. Additionally, the ideal is that a person shares his knowledge and has to be aware of objective of shared knowledge and its application and also needs and information gaps of a person who receives the knowledge.

Hislop (2009) knows the potential benefits of knowledge sharing in the rewards or incentives. Incentives can be used as tools to extract, enhance and maintain knowledge sharing behavior among employees. However, a study conducted by Wu and Zhu (2012) showed that incentives do not work on knowledge sharing behavior. It is like a trigger for knowledge sharing and can not be something to keep it in forming the attitude of a person. In many situations, organizational factors such as job involvement and job satisfaction, performance evaluation and recognition act as stimuli for increasing knowledge sharing behavior among employees. In addition, organizational culture, top management support and organizational communication influence knowledge sharing behavior (Sizlivati and Heng, 2015: 233).

Human capital

Human capital refers to the competencies and capabilities of employees. Some scholars also relate it to the knowledge, skills, abilities, commitment, implicit knowledge, ideas and health of employees (Snell and Bohlander, 2007). Chen Et al. (2004) know human capital as a basis of intellectual capital that refers to factors such as knowledge, skill, ability, and attitude of employees and results in improving performance and increasing profitability. This knowledge and skill is in the minds of employees, if intellectual employees are no employed by organization, available knowledge and skill in their mind cannot be activated and becomes market value.

From the viewpoint of Chen and colleagues (2004), human capital has two parts: hardware and software. Competency of employees forms the hardware of human capital and

knowledge, skills, and talents, among them knowledge and skills are the most important factors. Knowledge is related to academic and technical aspects and is more acquired through education and is theoretical. The skills and ability of employees are acquired through experiences in doing duties; however, they can be developed by education. The attitudes of employees are software and covers motivation and job satisfaction. The attitude is considered as precondition of competency emergence of employees.

The nature of human capital is intangible and can be moved along with employees. The organization is not the place where such capital is located. Employees also have the option to invest in human capital or not (Roos and et al., 1997). In such circumstances, an employee follows the human capital theory which indicates the level of investment in the development of knowledge and skills in the future by obtaining benefits such as salary increases or disposal of position (Becker, 1975). Hence the benefits of increasing capabilities of employees, encourages investment in human capital. So organizations need to consider the benefits and costs of human capital development (Snell & Bohlander, 2007).

Knowledge management and human capital

Added value of knowledge of employees enhances the value of products and thus knowledge management of human resources leads to achieve a competitive advantage (Soliman et al., 1999). Knowledge management of human resources is he development process that interfaces the relationship of employees with each other and covers employees with information storage. So, one of the key objectives of knowledge management is to improve organizational performance with the help of employees. In this regard, organizations are trying to inform their employees of the advantages of knowledge management applications for organizational performance and them. Obviously, the steps taken for the success in the field of knowledge management have some impacts on the human capital of employees (Birasnav and Rangnekar, 2010).

In the existing literature in the field of knowledge management, knowledge management architecture and infrastructure are well analyzed (Zaim et al. 2007), but little research is done on the relationship between human resources development and knowledge management (Smith, 1998). Encouraging employees to participate in external networks result in improving knowledge of employees and added value through new knowledge creation (Filius and colleagues, 2000). Acquired knowledge replaces old knowledge of employees about the process and production methods and as a result puts a great impact on the development of human capital. Participation in external networks of knowledge sharing among employees facilitates the increase of employee knowledge (Nonaka et al., 2001). For example, sociability encourages direct

interaction between employees and so they could get the benefit of implicit knowledge of other employees (Hussi, 2004). So the amount of knowledge sharing between employees will be the determining factor of the human capital of employees (Nonaka et al., 2001). The internal environment of organization facilitates the exchange between implicit and explicit knowledge through the processes of socialization, externalization, combination and internalization during which new knowledge is created (Nonaka, 1994).

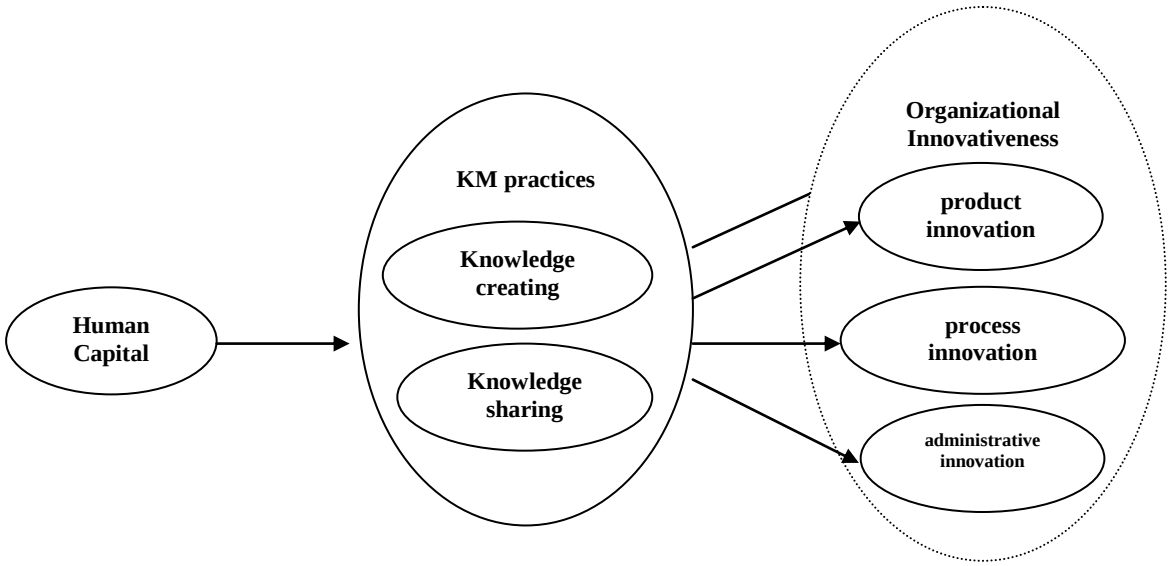
However, the knowledge is transferred to employees, develops human capital. Externalization crystallized implicit knowledge into explicit knowledge that acts as a medium to convey a special message to the others. Combination refines explicit knowledge available and makes it more complicated but systematic, and does this by adding or categorizing information. This form of documentation helps employees to encrypt their failures and successes and to learn from the past. Therefore, such knowledge documentation improves knowledge of employees and adds a specific value to building blocks of human capital. Finally, internalization changes explicit knowledge to implicit knowledge (i.e., charts, instructions and stories of inner knowledge). This is done through learning by doing and improves cognitive powers and implicit knowledge of employees (Nonaka et al., 2001; Hussi, 2004). Implicit inner knowledge is used creatively to improve products and services along with the customer experience with to be handled (Filius et al., 2000). Thus, the application of knowledge through encouraging creative and innovative skills, enhance human capital of employees .

Knowledge sharing can also help the development of human capital. For example, many organizations continually encourage upward communication or flow of information from employees to managers through the use of open-door policy in which senior management communicates directly with employees and asks for their feedback. Intervention of employees in this process will ensure their participation in the decision-making process (Kaye & Anderson, 1999). As a result, such connections promote organizational commitment, and strengthen this perception in them that the senior management encourages new and innovative ideas. Thus, such exchanges have a positive impact on human capital development because improve empowerment and employee commitments (Ulrich et al., 1999).

Theoretical framework

In this study, based on literature expressed, human capital (expertise, skills, creativity and education) is considered as independent variables and organizational innovation is considered as dependent variables. In addition, Knowledge management practices (Knowledge creation and knowledge sharing) is considered as intervening variables.

Figure 1: the conceptual model of the research



Based on the literature reviewed in this study, the following hypotheses were tested:

H1: KM practices have a significant intervening role in the effect of human capital on facilitating product innovation.

H2: KM practices have a significant intervening role in the effect of human capital on facilitating process innovation.

H3: KM practices have a significant intervening role in the effect of human capital on facilitating administrative innovation.

RESEARCH METHODOLOGY

This study is practical in terms of objectives; because its findings are used to solve specific problems within the organization. From the perspective of how to collect data, it is considered descriptive-correlational study; because the required information from the status quo of the statistical sample is obtained using a questionnaire. This study is also considered cross-sectional in terms of time period and quantitative in terms of data types.

The population of interest consists of 820 managers and employees of a private bank in Tehran. The random sampling method is used. The sample size on the basis of sampling formula from a limited population is 262 subjects.

In order to collect primary field data, a 21-item questionnaire with five-level Likert scale was used. To test the reliability of the questionnaire, a prototype contains 30 questionnaire was pre-tested and then using the data and SPSS, reliability coefficient was calculated .86 using Cronbach's alpha (Table 2).

Table 2. Reliability of the questionnaire of the variables

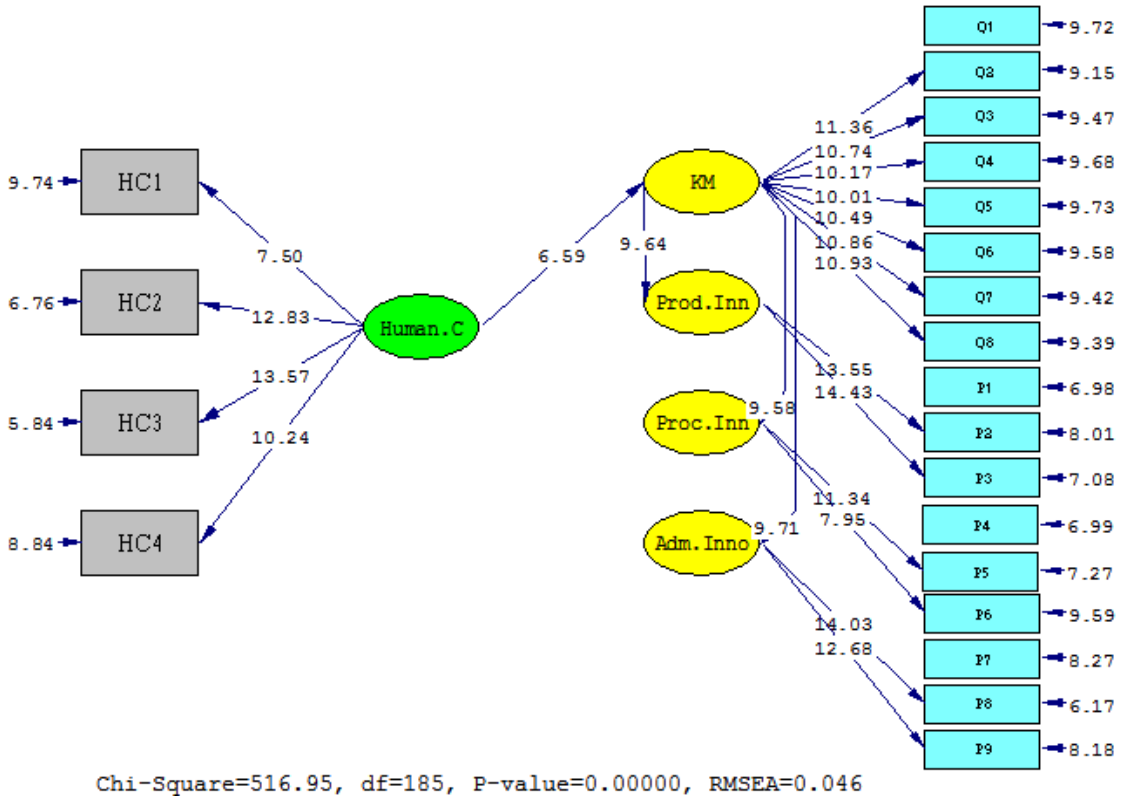
	Human Capital	KM practices	product innovation	Process innovation	administrative innovation
Reliability coefficient	76%	87%	83%	86%	84%

ANALYSIS AND FINDINGS

In the structural equation model, the relationships between latent traits that have been extracted based on the theory, are investigated according to collected data are (Kalantari,2010). In this model, there are 21 observed variables (including the questions of the questionnaire) and 5 latent variables (dependent, independent and intervening variables). After modeling, to assess the validity of model the special indicators are used such as: the ratio of chi-square to the degree of freedom which must be less than 3, the root mean square error of approximation which must be less than .08 and p-value that must be less than .05 and AGFI that must be greater than .9. To determine the significance of customer knowledge management influence on sales performance and to assess the quality and extent of this effect, the significant models and standard models were used. About the significance of the obtained numbers, it can be said that since the hypothesis test is at confidence level of .95, significant numbers will not be between 1.96 and -1.96; This means that if a number is between 1.96 and -1.96, it will not be significant.
In order to examine the relationships mentioned in hypotheses, significance model of each anticipated relationship were examined and then the quality and extent of their effects are evaluated using standard model. Based on the indexes of table 3, we can judge about goodness of fit for the effect model. The results of the assessment of the significance of relationships have been shown in figure 2.

The figure 2 shows the structural equation modeling of hypotheses in significance mode. According to this model, a significant number obtained for the relationship between human capital and knowledge management practices equals 6.59 and the obtained significant number for knowledge management practices and product innovation equals 9.64, both of which are greater than 1.96. Consequently, the first hypothesis is confirmed at 95 percent of confidence level and it can be said that knowledge management practices play the significant mediating roles in the effect of human capital on product innovation. Similarly, the significance of the mediating role of knowledge management practices in effect of human capital on other dimensions of organizational innovation (process innovation and management innovation) is also confirmable.

Figure 2. The effect model in significance mode



GFI shows appropriateness of measuring model of related variables; because the ratio of chi square to degrees of freedom equals to 2.79 and less than 3, RMSEA (i.e. .046) is less than .08 and virtually equal to .05. Based on this model, the effect of the anticipated relationships are significant in all hypotheses; because their values for all hypothesis is greater than 1.96.

Table 3. GFI of the effect model

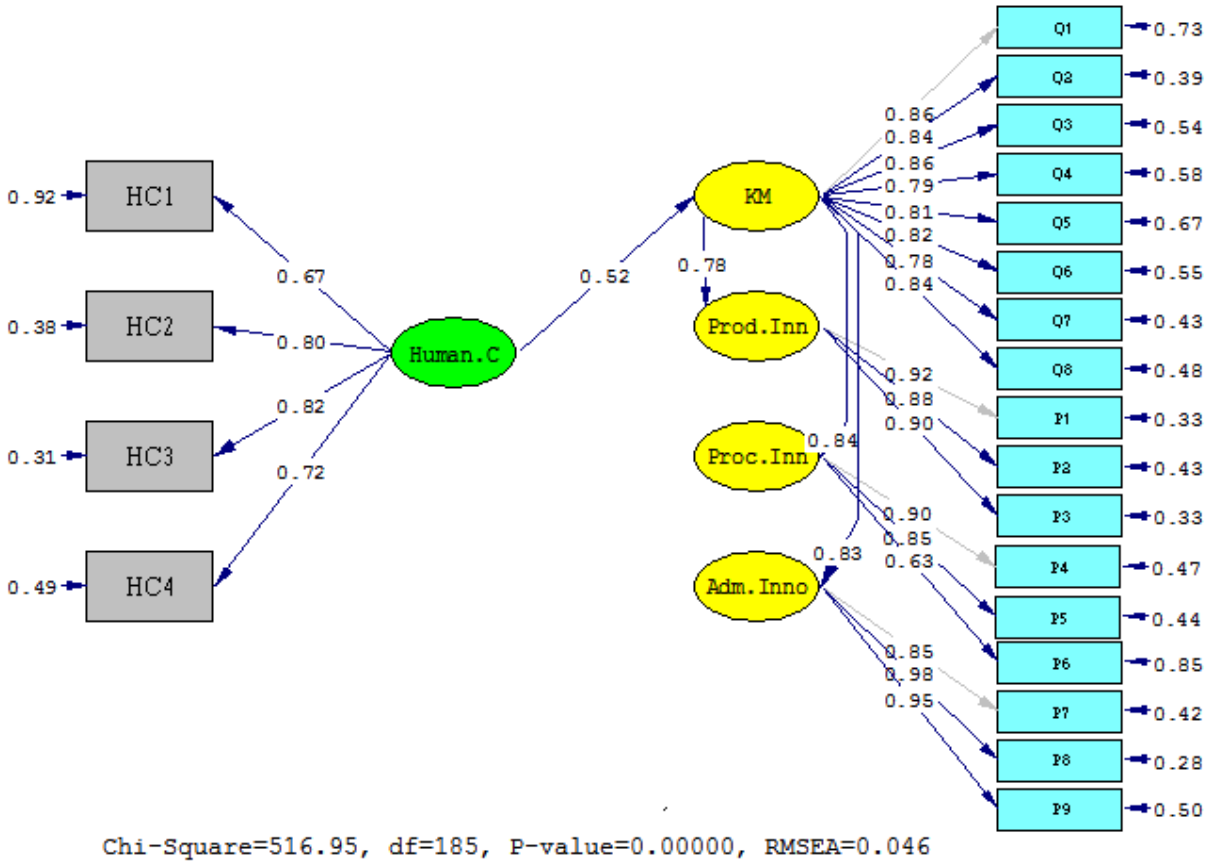
X2 / df	AGFI	GFI	RMSEA
2.77	.89	.92	.046

Using the standard model, we can examine the effect of the relationships that their significance has been confirmed in this model.

The figure 3 represents the structural equation modeling (path analysis) related to research hypotheses in the standard mode. As can be seen, the obtained standard coefficient for the relationship between human capital and knowledge management measures equals .52, which implies a significant positive correlation between these two variables. The obtained coefficient of determination ($R^{2)}$ equals .27 and indicates that human capital accounted for 27% of variations in knowledge management practices. Accordingly, the obtained coefficient for the

relationship between knowledge management measures and product innovation is positive and equals .78, which shows a significant positive correlation between these two variables. Variability or the obtained coefficient of determination (R^{2}) equals .60 and shows that knowledge management practices explain 60% of variations in product innovation. Confirming the positive effect of human capital on knowledge management measures on the one hand and the positive effect of knowledge management measures on product innovation on the other hand, it is concluded that the human capital has indirect effect (with mediating role of knowledge management practices) on product innovation and its coefficient equals .16. So indirect effect of human capital on other dimensions of and organizational innovation (process innovation and management innovation) can be also explained according to the role of knowledge management practices and results are presented in Table 4.

Figure 3. The effect model in standard mode



In this way, based on results obtained from the significant and standard models, we can summarize the hypotheses in table 4.

Table 4. The results of the study

hypothesis	The root	Coefficient (indirect)
1	the intervening role KM practices in the effect of human capital on product innovation.	.16
2	the intervening role KM practices in the effect of human capital on process innovation.	.26
3	the intervening role KM practices in the effect of human capital on administrative innovation.	.25

The general pattern of relationships between variables in the structural equation model were consistent with expressed assumptions; every 3 reviewed relationships were significant and important. Based on the obtained results, knowledge management practices (knowledge creation and knowledge sharing) have a meaningful intervening role in the effect on organizational innovation.

The results of data analysis showed that human capital has a positive and significant effect on the components of innovation capacity of the organization through knowledge management and knowledge creation. Explanatory role of human capital effect on organizational innovation through human capital can be explained in this way that the process and management innovations are more organizational, structural and long-term and less dynamic and their effectiveness is less associated with knowledge creation, while product innovation is more associated with human aspects and more dynamic and short-term and to develop such innovation, knowledge creation and sharing practices are required to provide innovative ideas. But about product innovation without practices for creating and sharing knowledge, the possibility to create this kind of innovation will be less.

CONCLUSIONS AND RECOMMENDATIONS

Today, human capitals and knowledge assets are amongst essential factors in the survival and development of organizations and help to improve organizational innovation. In this study, the mediating role of creating and sharing knowledge on improving organizational innovation through human capital management will be discussed.

The results of data analysis showed that human capital has a positive and significant effect on the components of innovation capacity of the organization through knowledge creation and knowledge management. Explanatory role of human capital effect on organizational innovation through human capital can be explained in this way that the process and

management innovations are more organizational, structural and long-term and less dynamic and their effectiveness is less associated with knowledge creation, while product innovation is more associated with human aspects and more dynamic and short-term and to develop such innovation, knowledge creation and sharing mechanisms are required to provide innovative ideas. But about product innovation without mechanisms for creating and sharing knowledge, the possibility to create this kind of innovation will be less.

According to findings, in order to enhance and further improve organizational innovation through human capital it is recommended to pay special attention to empower employees in terms of continuous training programs, providing new ideas in group sessions by employees and recruitment of creative and smart people to improve human capital. For these factors ultimately have significant effects on improving organizational innovation. Knowledge creation and knowledge sharing through research and development, visiting clients and market studies are amongst the most important variables of knowledge creation and it is also suggested to focus on these cases for knowledge creation and knowledge sharing within the company. In product innovation, the arena and quick delivery of products are prioritized. During process innovation, the likelihood of success of new processes and the speed of improving methods are to be addressed. Similarly, improving policies and strategies are considered in order to improve management innovation. The results of this research are consistent with results of studies by Albert and Fink (2003), Ross et al (1997) and Boxtin (2006) on positive and significant effect of human capital as one of the components of intellectual capital on knowledge creation and knowledge management.

According to the results of the present study, it is suggested to investigate the effect of other effective factors of intellectual capital such as customer capital and structural capital on improving organizational innovation. It is also possible to analyze the effectiveness of other dimensions of knowledge management such as knowledge application on organizational innovation.

RESEARCH LIMITATIONS

There might be unwanted factors in any research that make limitations to the research; hence, some of the unwanted variables are not under researcher`s control. These factors must be determined and the researcher must show his knowledge about the influence of these factors on the research results. In the present study, there were some limitations such as:

1. To study the variables the survey (questionnaire tools) has been used; while it was better to use observation and/or interview for some factors. The questionnaire is a tool

by which the understandings and attitude of any person is investigated; whereas, the reality might be different with respondent`s answers.

2. There are two issues must be considered regarding the nature and generalization of the research: firstly, there might be some practical behaviors like other survey researches that are mostly dependent on environmental conditions. Furthermore, intervening variables might affect the supposed relations among variables that are considered in this study.
3. Some other important limitations to this research include: reluctancy of some of the respondents to answer the questionnaires, not enough carefulness of some of the respondents in answering the questions, the possibility of bias in answering the questions by some of the respondents.

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