

## **HUMAN CAPITAL: THE ENABLING INFRASTRUCTURE OF CREATING ORGANIZATIONAL KNOWLEDGE**

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### **Abstract**

*In the knowledge-based era, leading organizations are trying to provide required infrastructure for the successful implementation of knowledge management and encourage their personnel to actively participate in knowledge management processes and help in organizational knowledge creation and sharing. One of the enabling infrastructures is human capital that has become one of the most valuable and intangible assets. In this regard, the central question addressed in this study is that how human capital can help to develop organizational knowledge creation. To this end, the effect of four dimensions of human capital (expertise, skills, experience and education) on organizational knowledge creation capacity will be evaluated. The research method is descriptive and correlational. The statistical population consisted of 950 managers and experts*

*of a service organization in Tehran, that 270 subjects were selected as sample using random sampling. Results show that all examined dimensions of human capital have a positive and significant effect on organizational knowledge creation capacity. On this basis, recommendations will be presented to managers and researchers.*

*Keywords: Knowledge Management, Knowledge Creation, Intellectual Capital and Human Capital*

## **INTRODUCTION**

To survive in the competitive and dynamic world of today, organizations approach to develop their strategic assets to gain competitive advantage with the help of their intangible, inimitable and specific resources (Amit and Schoemaker, 1993). The ability of such organizations to create strategic assets can only be described as dynamic strategic capabilities and it would be valuable if I can help the creation and application of new knowledge that brings advantage (Teece et al., 1997). Therefore, managing knowledge workers who deal with strategic business processes like new, innovative products or process development was focused in knowledge management in organizations where they follow knowledge management as their main duty (Monavarian and Asgari, 2009).

Such tendency stems from this insight that the dynamic and evolving nature of capitalism has changes hierarchy and mechanical understanding of the organization and made attention to knowledge management across the organization be essential (Monavarian and Asgari, 2004). Knowledge management knowledge should be used targeted to create organizational knowledge by synergy of knowledge among employees. For this reason, many organizations have followed humanitarian approach to knowledge management consciously (Soliman and Spooner, 2000).

In the last century employees were reluctant to participate in knowledge management and knowledge sharing in particular because they thought that by doing this, they lose their strength and value in the organization (Pfeffer, 1981). But many organizations gradually came to this understanding that intellectual activity of employees is a key activity for the organization and knowledge management can help them to increase profitability and effectiveness. Therefore, organizations continuously encourage their employees to participate in knowledge management efforts and provide communication facilities and suitable culture for this purpose (Lai and Lee, 2007). Many of these organizations also try to connect most of organizational processes to main activities of knowledge management and have also developed strategies to facilitate knowledge

creation, knowledge organization, knowledge application and knowledge sharing (Soliman and Spooner, 2000).

Apart from organizational knowledge creation, researchers have noted the help of knowledge management in human capital development (Thomas et al, 2003). Although human capital belongs to each employee, organization can make it synergistic and transforms it to intellectual capital and therefore gain more market value and competitive advantage (Scandia, 1998).

Despite the vast literature on the relationship between knowledge management and human capital, knowledge available regarding the role that human capital can play in creating organizational knowledge, especially in service organizations is not yet rich enough. Moreover, most researches are carried out in the field of knowledge management in human capital development (such as Manning, 2009). Hence, this article tries to explain the quality and assistance of human capital in developing organizational knowledge. Increasing knowledge in this field can help to develop synergistic relationship between these two factors creating competitive advantage for leading organizations and provide good context for the development of the intangible assets of organization.

## **Capital**

### ***Various Forms of Capital and their Differences***

Capital is a productive wealth or source that one can use to generate income or other additional resources. For Bourdieu concept of capital is broader than the meaning of monetary capital in the economy, capital is an overall source that can have monetary and non-monetary as well as tangible and intangible forms (Anheier and Gerhard, 1995). Thus, capital is any resource that is used in a particular field and provides this possibility for person to obtain certain profits from the participation in the competition over it (Stones, 1998). Therefore, capital is sustainable phenomenon whose nature can be preserved after using it many times and even can be improved.

There were various forms of capital across the business history. In 1900, capital meant used funds (cost) to purchase land and means of production, equipment, raw materials, and so on. Capital as money was relatively small and open economy market will dictate this to a manager that organizes capital (Taslimi et al., 2008). When financial markets grew and using replacement of conventional capital became common, monetary capital was distinguished from physical capital such as land, factories, tools, etc.

With the growth of the service economy in which there was a need to have land, inventory and tools consisted small percentage of the required assets of the organization,

economists and accountants introduced the concept of "human capital". Some knew this term as a simple redefinition of the term of the labor, but the concept of human capital made an important change in the use of labor in the past. Human capital is considered as a competitive advantage, and as a result investment in human capital is taken into account (Taslimi et al., 2008).

### ***The New Investment Theory and Knowledge Management***

The term capitalism first was used in the nineteenth century. Capital theories are shared on common vision of "capitalisation" that has been originated from terminology of economy and refers to the investment of resources with the expectation of significant financial return out of the market. Capital is an investment resource that aims to make profit (Lin, 2005). The first expansion of capital theory by economists was the concept of physical capital. The idea was developed in the 1960s, and covered people and their capabilities. This new expansion of capital of economy theory was originated from the perspective of Adam Smith who knew all acquired and useful abilities of country's population as capital (Lin, 2001).

Theoretical principles of human capital theory were established by Schultz (1961) that provided the groundwork for this theory that human resources are the kind of capital. In the following, Becker (1975) developed the human capital theory, stating that people reasonably calculate the rate of return on their human capital. Analysis of human capital begins with this assumption that people decide about knowledge and health by trade-off benefits and costs of education, training, medical care and other expenses. Benefits include cultural and other non-monetary benefits with improved revenues and jobs and expenses are related to a lost value when spending on this investment (Becker, 1992).

Coleman (1990) also developed human capital theory from the sociological perspective. For him physical capital, human capital and social capital all facilitate productive activities. So groups with a lot of trust can have more responsible achievement.

As physical assets are created with changes in materials and turn them into tools that facilitate production, human capital is also created by changes in people's skills and capabilities that enable them to work in new methods. Social capital is also created through changes in relationships between individuals that facilitate working (Coleman, 1998).

The most important development of the capital theories in line with the objectives of knowledge management is intellectual capital that deals with intellectual , intangible and organizational assets and use of real and potential knowledge for wealth creation (Manning, 2009). Intellectual capital can value creation process and addition to assets [...] an action which is more than knowledge or understanding alone (Bontis, 1998). In another definition, with a

focus on non-financial processes, intellectual capital is defined as having knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a competitive edge in the market. The subsets of intellectual capital are: human capital, structural capital, logical capital, customer capital, social capital (Bontis, 1998).

This approach knows new funds are interconnected. Here this question arises whether the intellectual capital, social capital and human capital have a distinct meaning or not. In this study, to understand the relationship between intellectual capital, human capital and social capital Coleman view is used.

Coleman knows the relationship between the capitals is parallel and he says the concepts of social capital with physical capital and human capital investment concepts are the same, but covers relations between people (Coleman, 1990). Coleman later shows this relationship as three-dimensional structure so that the human capital is placed in nodes and social capital is on the lines connecting the nodes (Coleman, 1999). So from the perspective of Coleman, human and social capitals are the same, so they deal with social phenomena related, but different.

On the other hand, we can see intellectual capitals with social capital are parallel (Edvinsson & Malone, 1997). Intellectual capital refers to knowledge and its capacity as a social organization, intellectual organization or professional activity. Intellectual capital and human capital have parallel relationship and the knowledge covers skills and acquired abilities that enable people to act in new ways (Nahapiet and Ghoshal, 1998).

Although the relationship between intellectual capital, human capital and social capital is somewhat ambiguous, it can be said that human capital and social capital are parallel and complementary, so that they deal with different aspects of activities and resources for wealth creation ha are made socially. Also intellectual capital can be parallel with human capital so that intellectual capital focuses on group activity and human capital focuses on the activity of the individual level (Manning, 2009).

For example, Community of practices can be seen as a combination of human capital and intellectual capital, so that human capital is related to knowledge and learning interpersonal skills and intellectual capital is related to learning and knowledge of collective skills and social capital is related to social relations and structures needed for communication networks in order to create and promote human capital and intellectual capital (Manning, 2009). In other words, social capital provides context of conversion processes of human capital into intellectual capital (Swart, 2006).

### ***Principles of Human Capital***

Human capital refers to the competencies and capabilities of employees (Wiig, 1997). 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**

In today's competitive world, knowledge has become a strategic resource for many organizations (Barney, 1991). According to Nonaka, today's unstable condition, the only reliable source for gaining a sustainable competitive advantage is knowledge (Nonaka, 1994). Thus, knowledge management has become one of the most important tasks of organizations that are seeking to exploit this valuable asset (Monavarian and Asgari, 2007). Knowledge management refers to systematic and integrated synchronization of enterprise-wide activities including the acquisition, creation, and storage, sharing, and applying knowledge by individuals and groups in order to achieve organizational goals (Rastogi, 2000). The impact of knowledge management

projects on the overall success of the organization has been approved widely (Chennemaneni, 2007). One of the requirements for the success of knowledge management, is the existence of appropriate conditions and context (Wang and Ahmed, 2003) that leadership plays an important role in this regard.

### **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 (Bose, 2004). Knowledge creation is the result of social interaction and organizational cooperation (Alavi and Leidner, 2001). Nonaka describes four models of knowledge creation that are resulted from interaction between implicit and explicit knowledge at different levels of the organization: socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995).

Table1. Types of interaction between implicit and explicit knowledge

	To implicit knowledge	To explicit knowledge
From implicit knowledge	1. socialization	2. externalization
From explicit knowledge	4. internalization	3. combination

Source: Nonaka and Takeuchi, 1995

### **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 the 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).

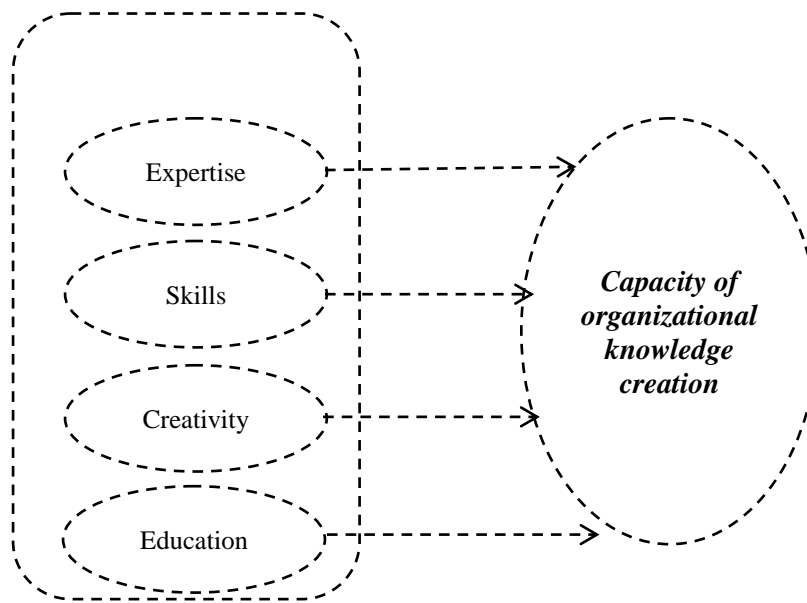
For example, sociability encourages direct interaction between employees and so they could get the benefit of implicit knowledge of other employees (Hussi, 2004). So the amount of knowledge sharing between employees will be the determining factor of the human capital of employees (Nonaka et al., 2001). 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 (Birasnav and Rangnekar, 2010).

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).



Figure 1: Conceptual Model



## Hypotheses

Considering mentioned issues and conceptual model of research about the impact of knowledge management on the development of human capital, and hypotheses developed in this study include:

1. Expertise of employees has a positive and significant impact on the organizational knowledge creation.
2. Skills of employees have a positive and significant impact on the organizational knowledge creation.
3. Creativity of employees has a positive and significant impact on the organizational knowledge creation.
4. Education of employees has a positive and significant impact on the organizational knowledge creation.

## METHODOLOGY

This study is an applied research in terms of objectives because its results are used to solve the problem specifically within organization. From the viewpoint of how to gather data, the research is descriptive - survey, because it tries to obtain required information about status quo of statistical sample using the questionnaire Also in terms of time, it is cross-sectional and in terms of data types, research is quantitative.

## **Population and Sample**

The study population consisted of all 950 managers and experts from a service company in Tehran. In this study, stratified sampling method was used. The number of samples based on a limited population sampling formula includes 270 subjects. To ensure that enough questionnaires were collected, 300 questionnaires distributed among managers and experts, and finally 276 questionnaires were collected. The number of 6 questionnaires were excluded due to being corrupted due to missing values.

## **Data Collection Tools**

The tools used for data collection is 18-item primary field data questionnaire which is used in the range of 5-level Likert scale. To measure organizational capital the questionnaire by Manning (2009) is used. And for the measurement of knowledge creation the questionnaire was used which was applied in research by Wang and Ahmed (2003) is used. To avoid excessive prolongation of the questionnaire, number of questions in the questionnaire was eliminated and most related ones have been used. To test the reliability of the questionnaire, the initial sample including 30 questionnaires was pre-tested and then using the data obtained and statistical software of SPSS, reliability coefficient using Cronbach's alpha was calculated as 83 %.

## **The Method of Analyzing Information**

In this study, to analyze the data obtained from the samples and studying the presence or absence of the relationship between variables, confirmatory factor analysis and structural equation modeling were used.

## ***Confirmatory Factor Analysis***

To examine the relationship between indexes and concepts, confirmatory factor analysis has been used in two stages. At the first stage quality and extent of the relationship between measurement indexes of each dimension (questionnaire) and these dimensions have been studied and at second stage, the quality and extent of the relationship between each dimension and the original concept (knowledge management and human capital) have been evaluated. In other words, in the first stage it is studied that each of the used indexes in the questionnaire to what extent can explain specific dimension and at second stage, it is studied that each dimension for each concept to what extent has related to it and can explain it. The results of the factor analysis of building blocks of human capital and knowledge management are shown in table 2.

Table 2: Factor Analysis of Building Blocks of Human Capital and Knowledge Creation

Factor	Dimensions	Standard coefficient	Significance numbers	Results
Human capital (HC)	Expertise	.86	11.67	Confirmed
	Skills	.98	12.03	Confirmed
	Creativity	.96	10.65	Confirmed
	Education	.58	8.83	Confirmed
Knowledge creation		.99	13.05	Confirmed

According to the results presented in Table 2, the significance of the impacts of all variables considered for the knowledge management and human capital has been approved because their amount is between 1.96 and -1.96.

## ANALYSIS AND FINDINGS

### Results of the Hypotheses Analysis

In structural equation modeling, relationships between latent traits extracted based on the theory are examined according to data collected (Kalantari, 2009). In this model, there are 18 obvious variables (including research questions) and 5 latent variables (dependent and independent expressed variables).

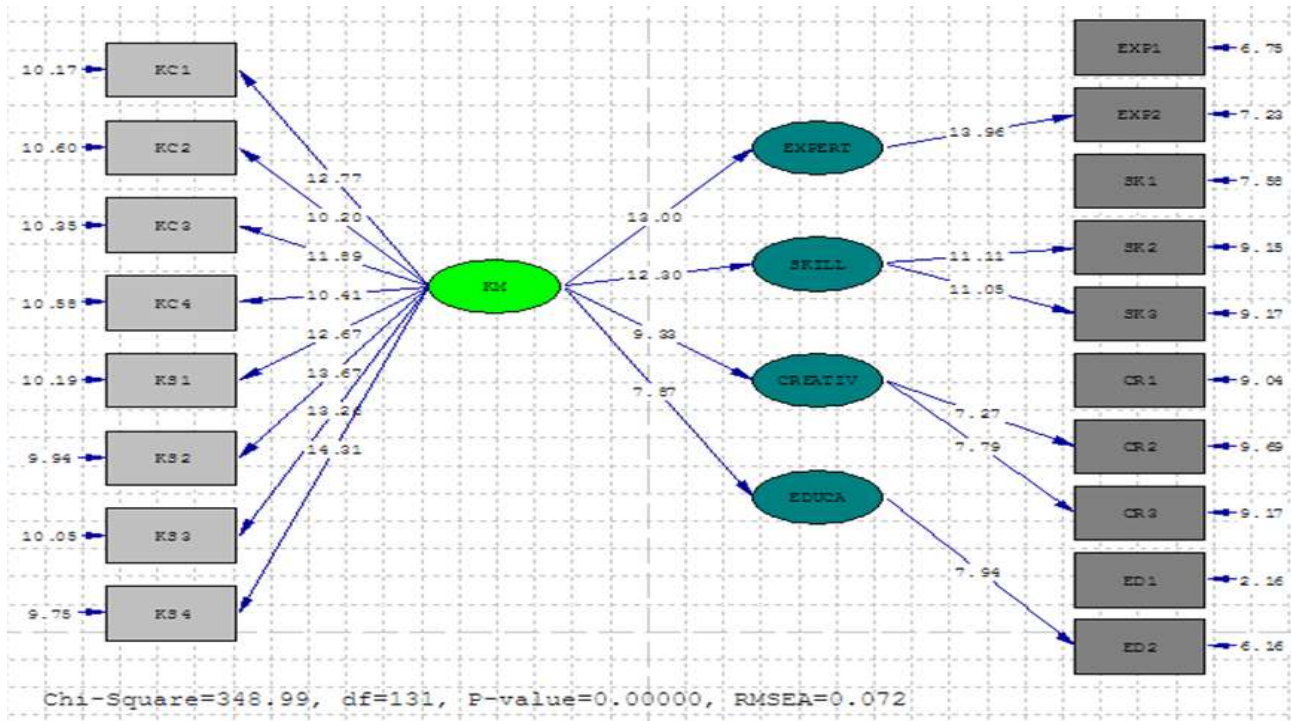
After modeling for assessing the validity of specific indexes including: ratio of chi square to degree of freedom which must be less than 3, the root mean square error of approximation that must be small than .08, and p-value which must be less than .05 and adjusted fitness index which must be greater than .9.

To determine the significance of the impact of knowledge management measures on human capital management and to assess the quality and extent of this impact, significance model and standard model were used, respectively. About the significance of the numbers in the model we can say that since tests of hypotheses are done at %95 of confidence level then those numbers will be significant which are not between 1.96 and -1.96. This means that if the number is between 1.96 and -1.96, it will be non-significant. Figure 2 shows the significance of impact of human capital on organizational knowledge creation.

### Sub-Hypotheses Test

In order to investigate the relationship expressed in the hypotheses, first significance of each predicted relationship will be studied using significance model and then using standard model, quality and extent of impact of each relationship will be evaluated. Figure 2 shows the significance of predicted relationships in the model.

Figure 2: Significance of Human Capital Impact on Knowledge Creation



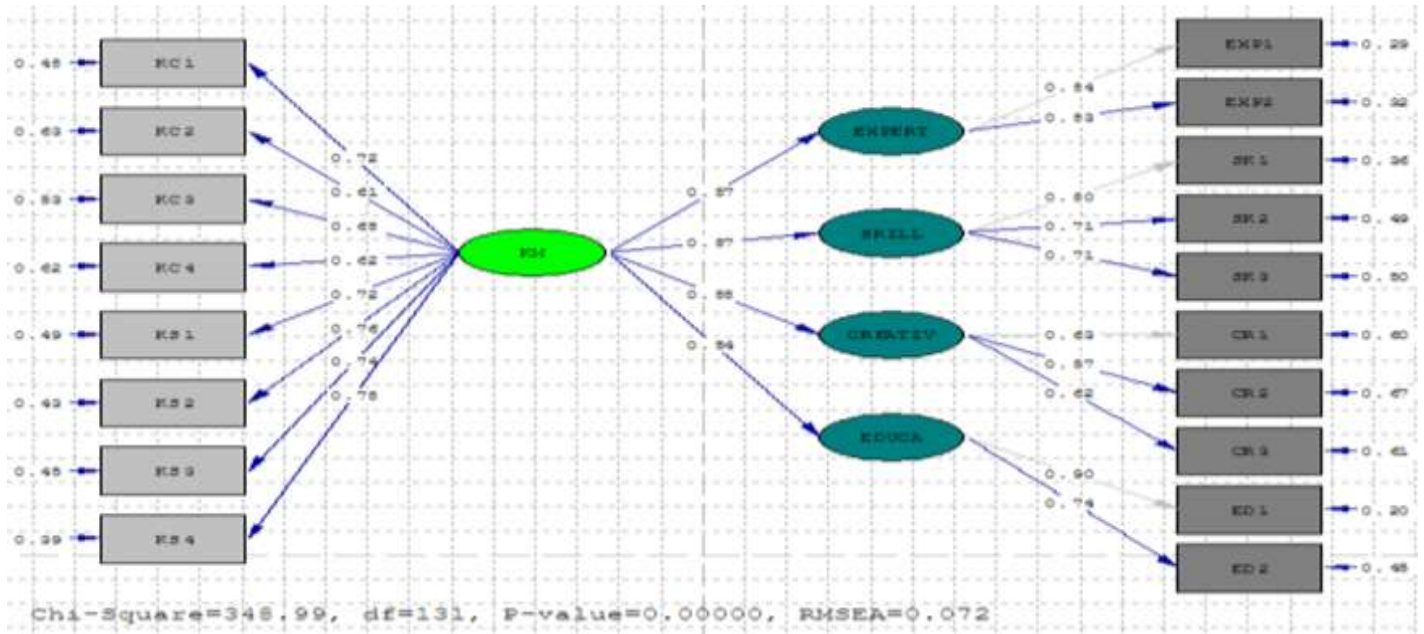
Based on the indexes of following table we can judge about fitness of impact model of knowledge management measures on human capital development.

Table 3: Fitness Indexes of Impact Model of Human Capital on Knowledge Creation

Indexes	Allowed value	Result	Assessment
Ration of chi square to degree of freedom	$\chi^2 / df < 3$	2.66	Good fitness
P-value	p-value < .05	0.000	Good fitness
RMSEA	.05 < RMSEA < .08	.72	Good fitness

Fitness indexes show the appropriateness model of measuring variables because the ratio of chi square to degree of freedom equals 2.66 and is less than 3, RMSEA ( .078) approximately equals .08 and p-value (0.0000) is less than .05. Based on this model, the impact of predicted relationships in all hypotheses are significant because their amount for 1-4 hypotheses are 13, 12.30, 9.33 and 7.88 respectively and all are greater than 1.96. Using the standard model also we can study the impact of relationships in this model whose significance have been approved.

Figure 3: Impact Model of Human Capital on Knowledge Creation in Standard Mode



Model in standard mode shows the positive and significant impact of all dimensions of human capitals on the capacity of organizational knowledge creation is confirmable. So, all the expressed hypotheses are approved. So according to the results obtained from the standard model and significance model, the results obtained from studying the hypotheses can be summarized in table 4.

Table 4: The Results of the Hypotheses Study

Hypothesis	Path; Positive and significant impact	Standard coefficient	Significance numbers	Results
1	Expertise of employees on capacity of organizational knowledge creation	.87	13.00	Confirmed
2	Skills of employees on capacity of organizational knowledge creation	.87	12.30	Confirmed
3	Creativity of employees on capacity of organizational knowledge creation	.88	9.33	Confirmed
4	Education of employees on capacity of organizational knowledge creation	.54	7.78	Confirmed

The general pattern of relationships between variables in the structural equation model was consistent with the stated hypotheses; every four studied relationships were important and significant. Based on the results obtained, the development of human capital dimensions has important and significant impact on improving capacity of organizational knowledge creation.

## CONCLUSIONS AND RECOMMENDATIONS

In general, organizations are constantly trying to improve the human capital of their employees through the system of human resources so they can improve their performance (Youndt et al., 1996). One of the goals of knowledge management is fostering personal knowledge which is considered a part of human capital.

Activities of the development of human capital are done formally and informally all day among employees particularly through knowledge management process. Employees take part in knowledge management process with knowledge sharing informally in business talks in the corridors and restrooms, and the knowledge acquisition as learning from books, journals and articles and knowledge application as using knowledge of colleagues to solve their problems. Such participation in the process of knowledge management improves innovative behaviors and knowledge of each employee and thus has a positive impact on the development of human capital.

Employee participation in problem-solving processes improves their ability to find problems, find various solutions and select the optimal solution. This process is a kind of knowledge creation process and encourages employees to use their implicit knowledge which was obtained through the experience and explicit knowledge gained through the knowledge base to solve specific problem.

The organizations encourage processes of knowledge creation and sharing and employees' innovative behaviors, give them more authority and provide them more opportunities to participate in decision-making and having experiences. In this way, knowledge, skills, capabilities and commitment of each employee will be more, and this means the development of human capital.

It can thus be concluded that the development of human capitals can facilitate measures and objectives of knowledge management in the organization. Employees with more knowledge, skills, experience and greater expertise, have greater ability to create and apply their knowledge and have valuable work experience that they can share it with others. Therefore, the development of human capitals of organization can be a catalyst for knowledge creation in the organization. Thus, for the development of capacity for knowledge creation, organization must try to develop its human capitals. For optimal use of this organizational capital, it is recommended to change policy of organization to attract people with required qualifications in knowledge organization and capabilities such as the ability to provide new ideas, problem-solving ability and providing appropriate strategies, intelligence and creativity to identify the key success factors of the organization, having academic degrees, a variety of skills and expertise, skill, experience and skills of employees, the ability to understand the relationship

between professional activities and other fields of expertise and providing necessary training to establish or enhance these capabilities should be taken into account seriously.

## 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: reluctance 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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