



AN INVESTIGATION ON INTELLECTUAL CAPITAL PUTTING EMPHASIS ON THE LEVEL OF KNOWLEDGE MANAGEMENT MATURITY: CASE STUDY OF GOVERNMENTAL ORGANIZATIONS IN KERMAN PROVINCE, IRAN

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ARTICLE INFO

Article history:

Received 19 February 2019
Received in revised form 22
May 2019
Accepted 03 June 2019
Available online
11 June 2019

Keywords:

G-KMMM; Factor
analysis; Knowledge
management maturity
Level; Intellectual capital
management.

ABSTRACT

Intellectual capital has an influential role in helping an organization to reach its purposes. Hence, in the current study, the related factors with the concept of intellectual capital are investigated with an Emphasis on the Level of Knowledge Management Maturity regard organizations of Kerman province (Iran). The participants of this study consisted of two groups: the experts and the instructors of governmental management and the staff of executive organizations. To select the governmental management instructors all around Iran, 30 instructors who had the prerequisite criteria had been selected. Moreover, 381 staff were selected to participate in this study. The data analysis by SPSS®22 and LISERL®10 showed that the factors such as capabilities and qualifications, technical knowledge, attitudes, culture, structure, organizational learning, technical capital, social services, social excellence, social connection, partner relationship, connection with the media, and the organization image of intellectual capital have positive effect on intellectual capital considering the levels of maturity of knowledge management.

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1. INTRODUCTION

Organizations are realizing that knowledge management (KM) is essential for them to remain agile in a dynamic business environment and are increasingly investing in various KM initiatives (Pee and Kankanhalli, 2009). In the current knowledge-based societies, the importance of intellectual capital is more emphasized than financial capital due to their feature of bringing sustainable profits (Rostami & Seraji, 2005). In the knowledge-based economy, intellectual capital is considered as an important part of company value. Researchers have stated that the hidden values can be analyzed as the organization intangible assets and to be called intellectual capital (Soler et al., 2007).

With the multi-disciplinary concept, understanding intellectual capital may vary for commerce and business. There are some factors leading to intellectual capital such as the revelation in the technology of knowledge, the increasing rate of attention to a knowledge-based economy, the changing pattern of the social network, and innovation which lead to competitive advantages (Anvari et al., 2003). Given the importance of intellectual capital in the success of organizations and companies, in the current study, the related factors with the concept of intellectual capital are investigated with regard to the organizations of Kerman province (Iran).

Knowledge and intellectual capital management turn to be among the skills of the managers which in the current economy have competitive advantages for the organization. The organizations seek intellectual capital through knowledge and knowledge management. When the companies are paving the way from an industrial economy to knowledge-based economic they may encounter different complexities. Sequentially, they need them aware of the ways to control intellectual capital. This issue leads the companies to determine their intangible assets and manage them.

Intellectual capital plays an important role in innovation, productivity, growth, commercial competitiveness and economic performance of companies. Measuring intellectual capital is very important to measure the organization productivity.

Ignoring the intellectual capital by the managers will lead to some consequences such as inability in using the entire value added. The research question of this study is what are the related factors of the intellectual capital of the staff of Kerman province organizations, and what is the fit model for it?

2. THE HYPOTHESES DEVELOPMENT

The research proposes the hypotheses as follow:

- * Factors associated with intellectual capital has a significant relationship on intellectual capital.
- * Maturity level of knowledge management has a significant impact on the relationship between Factors associated with intellectual capital and intellectual capital.

The software SPSS®22 and LISERL®10 are used as the analytical tool.

3. THEORETICAL UNDERPINNINGS

3.1 INTELLECTUAL CAPITAL MANAGEMENT

The term intellectual capital has been around for many years, although not treated in the formal economic theory in the same way as the concept of human capital (Latas & Walasek, 2016). The intellectual capital consists of possessed knowledge, experience, organizational technology, customer relationships, and professional skills. These values give the company a competitive advantage in the market. The definition of intellectual capital can hardly stand apart from the other factors that characterize the organization, which the individual is, part of systems, culture, and research. Variously labeled 'know-how' or 'the former procedural knowledge' is often distinguished from know-that, know-what, or declarative knowledge (Galeitzke et al., 2016). Intellectual capital is the

difference between the market value and the book value of the organization, which is the sum of the hidden assets not included in the balance sheet of the company (Toorchi et al., 2015). This can reinforce management system such as circular structure (Hamidizadeh and Asl, 2019).

3.2 KNOWLEDGE AND KNOWLEDGE MANAGEMENT

In the context of organizations, knowledge is defined as a justified belief that increases an entity's capacity for effective action (Huber, 1991). This definition is deemed to be more appropriate than a philosophical definition of knowledge because it provides a clear and pragmatic description of knowledge underlying organizational knowledge management 5 (Alavi and Leidner, 2001), which is the entity of interest in this study. Knowledge is often conceptualized as the most valuable form of content in a continuum beginning with data, encompassing information, and ending at knowledge (Grover and Davenport, 2001). With respect to input, KM requires ongoing user contribution, feedback, and human input whereas IM typically involves one-way information transfer and assumes that information capture can be standardized and automated. In terms of scope, IM is usually concerned with storing and disseminating electronic and paper-based information, while KM deals with a far broader range of approaches to communicating, applying, and creating knowledge and wisdom (Bukowitz and Williams, 2000).

Figure 1: General Knowledge Management Maturity Model.

Maturity Level		General Description	Key Process Areas		
			People	Process	Technology
1	Initial	Little or no intention to formally manage organizational knowledge	Organization and its people are not aware of the need to formally manage its knowledge resources	No formal processes to capture, share and reuse organizational knowledge	No specific KM technology or infrastructure in place
2	Aware	The organization is aware of and has the intention to manage its organizational knowledge, but it might not know how to do so	Management is aware of the need for formal KM	Knowledge indispensable for performing a routine task is documented	Pilot KM projects are initiated (not necessarily by management)
3	Defined	The organization has put in place a basic infrastructure to support KM	<ul style="list-style-type: none"> - Management is aware of its role in encouraging KM - Basic training on KM is provided (e.g., awareness courses) - Basic KM strategy is put in place - Individual KM roles are defined - Incentive systems are in place 	<ul style="list-style-type: none"> - Processes for content and information management is formalized - Metrics are used to measure the increase in productivity due to KM 	<ul style="list-style-type: none"> - Basic KM Infrastructure in place (e.g., a single point of access) - Some enterpriselevel KM projects are put in place
4	Managed	KM initiatives are well established in the organization	<ul style="list-style-type: none"> - Common strategy and standardized approaches towards KM - KM is incorporated into the overall organizational strategy - More advanced KM training - Organizational standards 	Quantitative measurement of KM processes (i.e., use of metrics)	<ul style="list-style-type: none"> - Enterprise-wide KM systems are fully in place - Usage of KM systems is at a reasonable level - Seamless integration of technology with content architecture
5	Optimizing	<ul style="list-style-type: none"> - KM is deeply integrated into the organization and is continually improved upon - It is an automatic component in any organizational processes 	Culture of sharing is institutionalized	<ul style="list-style-type: none"> - KM processes are constantly reviewed and improved upon - Existing KM processes can be easily adapted to meet new business requirements - KM procedures are an integral part of the organization 	Existing KM infrastructure is continually improved upon

3.3 MATURITY MODEL AND KM MATURITY

Akin to the life cycle theory, a *maturity model* describes the development of an entity over time

and has the following properties (Klimko, 2001; Weerdmeester et al., 2003): an entity's development is simplified and described with a limited number of maturity levels (usually four to six), levels are ordered sequentially and characterized by certain requirements that the entity must achieve, and the entity progresses from one level to the next without skipping any level. Maturity models have been developed for many different entities, including IS. The model identifies various organizational issues in IS implementation and development and highlights the priorities requiring managerial attention at different stages of growth. Table 1 presents the General Knowledge Management Maturity Model (G-KMMM).

4. RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT AND INTELLECTUAL CAPITAL

The most basic components of intellectual capital are knowledge and information knowledge is a key resource of intelligent decision makings, prediction, designing, planning, troubleshooting, detection, analysis, evaluation, and intuitive judgment. Knowledge can be created and shared between individuals and groups. Therefore, knowledge is functionally a strategic resource. From this perspective, managerial adaption turns into a necessity for achieving competitive advantages and added value through basic knowledge of the organizations. Generally, knowledge management is a managerial paradigm and managers identify knowledge and organization's ability for creating more value through clear and regulated methods, necessary tools for evaluation and managing intellectual capitals (Karlochi et al. 2004). Intellectual capital and knowledge have been known as sustainable strategies for achieving and maintaining competitive advantages (Barni, 1991). Organizations must implement knowledge management in order to achieve knowledge economy. Knowledge management is the process of creating value through hidden assets of the organization (Vilkaks, 1997). According to the researchers, knowledge management and intellectual capital are two branches of one tree. Intellectual capital focuses on creating value, while knowledge management is quite operational. In addition, knowledge management and intellectual capital are strategies that are simultaneously executed in the entire organization and are considered to be among the tools of the improvement of the overall plan of an organization. From the perspective of Bontis (1999), intellectual capital and knowledge provide a new database for resources that can be helpful for the organization to compete in the market. Knowledge and intellect have properties such as additional return, efficiency, and incredible power; they are both dependent on time, must be up to date, have undetermined value and dispersion and because of these specifications, they are completely different from other organizational assets (Halt et al. 2000). Knowledge management is a part of an organization's intellectual capital since knowledge leads to the creation of human capital and knowledge management leads to the successfulness of structural capital. Ramezan (2011) has stated, the maturity level of knowledge management of an organization might be related to the productivity of its intellectual capital.

Nowadays, implementation of an effective knowledge management system is one of the key factors in improving the business processes as well as developing organizations' intellectual capital; because one of the most important responsibilities of intellectual capital managers is to form the processes of creating and obtaining value from knowledge. In fact, this establishes a relationship

between human resources, intellectual assets and intellectual ownership (Stin, 2004). Intellectual capital management through managing knowledge can be divided into two main stages that are:

Value creation stage: at this stage, value creation is related to producing new knowledge and converting it into commercialized innovations. Thus, management focuses on individuals or human capitals, activities involved in value creation such as education, training, innovation, creating organizational structures, developing customers, organizational and personal relations and organizational culture management.

Value education: at this stage, the focus is on the encoded value created by the human capital of the organization. The value education process has a close relationship between valuation, decision-making processes, databases, systems, and exchange mechanisms and asset management capabilities. Therefore, creating a framework for intellectual ownership and preserving valuable products through granting permission for monopolization, mutual investment or similar methods are essential at this point.

Both of these stages, i.e. value creation and value education, simultaneously play a crucial role when it comes to the success of an organization. Thus, it can be said that the main path for managing intellectual capital through knowledge management is moving away from human resources towards intellectual assets and then turning intellectual ownership to a more specialized and detectable frame. Although, it must be pointed out that while the portion of valuable knowledge has not been encoded and on the other hand, a small part of it has legally found its way into the intellectual ownership of an organization; the rest of the knowledge might remain in people's minds and some processes must be designed for using them in the respect of improving an organization's products (Khavandkar et al. 2009).

5. METHODOLOGY AND ANALYSIS

This research is a mixed method study in the form of a correlational one. Two groups participated in this study. the first group included the experts and the instructors of governmental management which contributed to the study first by introducing the related factors of intellectual capital and , second, in the proposing the fit model of intellectual capital; having in mind the level of maturity of their knowledge management in the governmental organizations of Kerman (Iran). The second group was all the staff of the governmental organizations of Kerman. The executive organizations are all those organizations which are included in article 11 (1) of the Law on Program and Budget and article 160 of the Fourth Development Plan Act, in one way or other benefits from the general budget. There is 111 organization which are included in this category based on Kerman human resource and development management of Governorate. To select the governmental management instructors all around Iran, 30 instructors who had the prerequisite criteria had been selected by using the opinions of their thesis supervisors. Moreover, using Morgan's Table (1970), 381 staff were selected to participate in this study.

The main tool for data collection in the present study is a researcher-made questionnaire. The

questionnaire that measures intellectual capital has 42 questions. Out of these 42 questions, 15 questions measured human capital (question 1 to 15), 13 questions measured structural capital (question 16 to 28) and 14 questions measured relational capital (questions 29 to 42). The spectrum of the options ranged between completely agree to completely disagree and scores 1 to 5 were given to each question. The second questionnaire used in this research had 61 questions and measured the level of maturity of knowledge management. Out of these 61 questions, 10 questions measured the initial level, 13 questions measured the repeatable level, 14 questions measured the defined level, 15 questions measured the managed level and 9 questions measured the optimizing level. The spectrum of the options ranged between completely agree to completely disagree and scores 1 to 5 were given to each question. The validity of both of these two questionnaires was content validity and 30 questionnaires were given to specialized experts in this field and their opinions were used.

To measure the reliability of the questionnaires, the Cronbach's alpha coefficient was used (Hooshangi et al., 2017; Amin Afshar & Fazil, 2018). Table 1 shows the results related to reviewing the reliability of the questionnaire that measured the level of maturity of knowledge management. According to the results and according to the calculations, the Cronbach's alpha for the questionnaire was 0.97 which indicates that the questionnaire is highly reliable. In addition, among the components of the questionnaire, the lowest reliability was the reliability of the component initial level (0.84) and the highest reliability was the reliability of the managed level (0.93). Therefore, the results indicate that the questionnaire is reliable and each of the 5 scales showed a desirable level of reliability of the questions associated with each of the research variables.

Table 1: Reviewing the internal consistency of the questionnaire for measuring the maturity level of knowledge management

	Variable	n	Number of questions	Cronbach's alpha
1	The overall level of maturity of knowledge management	387	61	0.97
2	Initial level	387	9	0.84
3	Repeatable level	387	13	0.89
4	Defined level	387	15	0.89
5	Managed level	387	15	0.93
6	Optimizing level	387	9	0.89

The Cronbach's alpha for the intellectual capital questionnaire was also 0.95 which shows that the questionnaire was highly reliable. In addition, among the components of the questionnaire, the lowest reliability was the reliability of the structural capital component (0.84) and the highest reliability was the reliability of the relational capital component (0.91). Therefore, the results indicate that this questionnaire was reliable and each of the three scales showed a desirable level of reliability of the questions associated with each of the research variables.

Table 2: Reviewing the internal consistency of the intellectual capital questionnaire

	Variable	n	Number of questions	Cronbach's alpha
1	Overall intellectual capital	387	33	0.95
2	Human capital	387	12	0.88
3	Structural capital	387	9	0.84
4	Relational capital	387	12	0.91

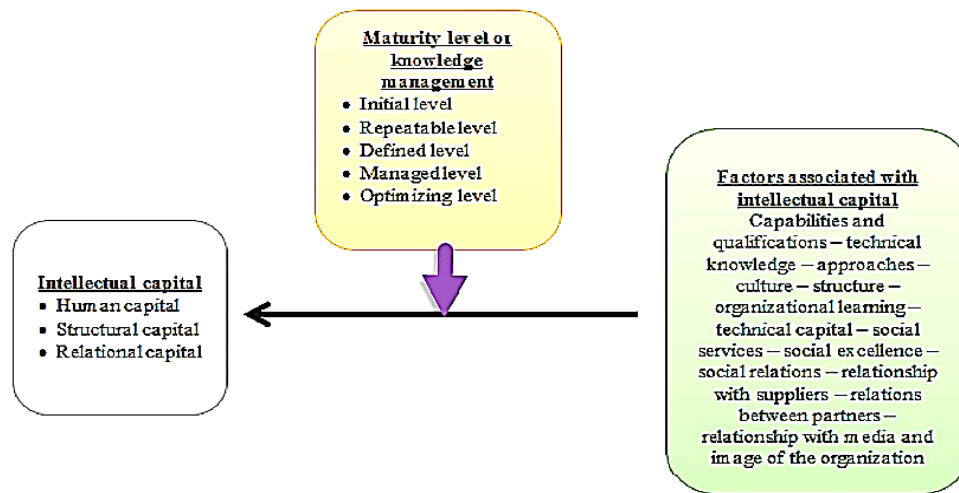


Figure 1: The conceptual model of this research.

6. FINDING

To determine the level of the intellectual capital of the employees, the one-sample t-test was used and the mean of the samples was compared with the Bazargan (1997) Table. Since the five-option Likert scale has been used in this research, the theoretical mean for the calculation was 3.00. According to the results shown in Table 3, since the significance level obtained for this test for the intellectual capital variable ($p < 0.001$) was below the error level of 0.01, thus, it can be concluded that there is a significant difference between the constant mean and the mean obtained for the intellectual capital variable ($df=391$, $p < 0.001$, $t=8.36$). In addition, given the criterion in the Bazargan (1997) Table, the level of intellectual capital was more than satisfying.

Table 3: status of the intellectual capital variable

Variable	Theoretical mean			
	Mean	t-value	Df	p-value
Intellectual capital	3.26	8.36	391	<0.001

In addition, to determine the level of the intellectual capital of the employees, the one-sample t-test was used and the mean of the samples was compared with the Bazargan (1997) Table. Since the five-option Likert scale has been used in this research, the theoretical mean for the calculation was 3.00. According to the results shown in table4, since the significance level obtained for this test for the three components of the intellectual capital variable ($p < 0.001$) was below the error level of 0.01, thus, it can be concluded that there is a significant difference between the constant mean and the mean obtained for the intellectual capital variable.

Table 4: Status of the intellectual capital variable

Variable	Df	Mean	t-value	p-value
Human capital	391	3.21	6.31	<0.001
Structural capital	391	3.20	5.57	<0.001
Relational capital	391	3.36	10.44	<0.001

In the human capital dimension, given the mean ($M=3.21$) and the criterion in Bazargan (1997) Table, human capital was satisfying. In the structural capital dimension and the relational capital dimension, given the mean ($M=3.2$ and $M=3.36$, respectively) and the criterion in Bazargan (1997)

Table, human capital was satisfying.

To determine the level of maturity of knowledge management of the employees, the one-sample t-test was used and the mean of the samples was compared with the Bazargan (1997) Table. Since the five-option Likert scale has been used in this research, the theoretical mean for the calculation was 3.00. According to the results shown in Table 5, since the significance level obtained for this test for the knowledge management maturity level variable ($p < 0.001$) was below the error level of 0.01, thus, it can be concluded that with 99% confidence, there is a significant difference between the constant mean and the mean obtained for the intellectual capital variable ($df=391$, $p < 0.001$ and $t=5.37$). Given the criterion in Bazargan's Table (1997) for the knowledge management maturity level variable was more than satisfying.

Table 5: status of the knowledge management maturity level

Variable	Mean	t-value	Df	p-value
Knowledge management maturity level	3.18	5.37	391	<0.001

In addition, to determine the level of maturity of knowledge management of the employees, the one-sample t-test was used and the mean of the samples was compared with the Bazargan's Table (1997). Since the five-option Likert scale has been used in this research, the theoretical mean for the calculation was 3.00.

Table 6: Status of the knowledge management maturity level

Variable	Df	Mean	t-value	p-value
Initial level	391	2.99	-0.01	0.001
Repeatable level	391	3.26	7.54	0.001
Defined level	391	3.18	5.55	0.001
Managed level	391	3.21	5.6	0.001
Optimizing level	391	3.16	4.31	0.001

According to the results shown in Table 6, the significance level for this test for the initial level variable ($p=0.99$) was higher than the error level (0.05) and with a 95% confidence, it can be concluded that there is no significant difference between constant mean and the mean obtained for the initial level variable. Thus, the mean of the initial level variable is lower than the theoretical mean ($M=2.99$) and given the criterion in Bazargan's Table, this variable was satisfying (below the theoretical mean) ($df=391$, $p=0.001$, $t=-0.01$).

According to the results, the significance level for this test for the variables the repeatable level, defined level, managed level and optimizing level ($p=0.001$) was higher than the error level (0.01) and with a confidence level of higher than 99%, it can be concluded that there is no significant difference between constant mean and the mean obtained for the four components of the knowledge management maturity level.

In the repeatable level dimension, given the mean ($M=3.26$) and the criterion in Abas Bazargan Table, the obtained value at this level was satisfying ($df=391$, $t=7.54$, $p=0.001$). In the defined level dimension, given the mean ($M=3.18$) and the criterion in Bazargan's Table (1997), the obtained value at this level was more than satisfying ($df=391$, $t=5.6$, $p=0.001$). In the managed level dimension, given the mean ($M=3.21$) and the criterion in Abas Bazargan's Table (1997), the obtained value at this level

was satisfying. In the human capital dimension, given the mean ($M=3.16$) and the criterion in Abas Bazargan Table (1997), the obtained value at this level was satisfying ($df=391$, $t=5.6$, $p=0.001$).

To test this hypothesis, the simultaneous regression was used. One of the presumptions of the multivariate linear regression is that the mean of errors must be zero and the variances of errors must be constant. To review the independence of errors, the Durbin-Watson test was used and if its value is between 1.5 and 2.5, it means that there is no correlation between the errors and according to Table 7, the value for this test is 1.82. In addition, since the significant level (0.0001) is lower than error level (0.01), therefore the required regression is sufficiently valid at the error level of 0.01.

Table 7: Regression model of the components of knowledge management maturity for predicting intellectual capital

Model	R	Determination coefficient	Adjusted determination coefficient	F	Significance level	Durbin-Watson test
Intellectual capital	0.84	0.71	0.71	192.05	0.001	1.82

The results of the regression analysis in Table 8 shows that the initial level component was able to positively and significantly predict the intellectual capital variable ($p=0.01$, $\beta=0.12$). In addition, the repeatable level component was able to positively and significantly predict the intellectual capital variable ($p=0.01$, $\beta=0.14$). The results for the defined level component was not able to significantly predict the intellectual capital variable ($p=0.89$, $\beta=-0.008$). the managed level component was able to positively and significantly predict the intellectual capital variable ($p=0.001$, $\beta=0.41$). In addition, the optimizing level component was able to positively and significantly predict the intellectual capital variable ($p=0.001$, $\beta=0.24$). The results of the regression analysis and determination coefficient showed that approximately 71% ($R^2=0.71$) of the variance of the intellectual capital variable can be expressed by the components of knowledge management maturity ($p=0.001$, $F=192.05$).

Table 8: simultaneous regression analysis for predicting intellectual capital based on the components of knowledge management maturity

Predictor	Standardized coefficient (β)	Standard error	t-value	Significance level
Initial level	0.12	0.04	2.50	0.01
Repeatable level	0.14	0.05	2.52	0.01
Defined level	-0.008	0.05	-0.15	0.89
Managed level	0.41	0.05	6.94	0.001
Optimizing level	0.24	0.05	4.35	0.001

To review the relationship between the components of the level of maturity of knowledge management and intellectual capital, Pearson's correlation coefficient was used. According to the results shown in Table 9, given the significance level ($p=0.001<0.01$), there is a significant and direct relationship between the initial level component and intellectual capital with a confidence of more than 99% ($r=0.72$). In addition, there is a significant and direct relationship between the repeatable level component and intellectual capital with a confidence of more than 99% ($r=0.76$). Moreover, given the significance level ($p=0.001<0.01$), there is a significant and direct relationship between the defined level component and intellectual capital with a confidence of more than 99% ($r=0.71$). At the same significance level, there is a significant and direct relationship between the managed level component and intellectual capital with a confidence of more than 99% ($r=0.81$), and there is a

significant and direct relationship between the optimizing level component and intellectual capital with a confidence of more than 99% ($r=0.78$).

Table 9: Reviewing the relationship between components of knowledge management maturity level and intellectual capital

Variable	1	2	3	4	5	6
Intellectual capital	1					
Initial level	0.72**	1				
Repeatable level	0.76**	0.73**	1			
Defined level	0.71**	0.71**	0.80**	1		
Managed level	0.81**	0.77**	0.84**	0.79**	1	
Optimizing level	0.78**	0.77**	0.80**	0.78**	0.82**	1

The G-KMMM identifies salient aspects of KM development that allow organizations to grasp the essential elements of the phenomenon. Its applicability in assessing KM development and indicating possible future improvements were demonstrated in an exploratory case study. In particular, a unit found to be at one maturity level seldom implements practices characterizing higher maturity levels.

7. CONCLUSION

The results at the 5% significance level, there is a direct and significant relationship between the components initial level, repeatable level, defined level, managed level and optimizing level and intellectual capital and all of the components of knowledge management have a positive and significant effect on the level of intellectual capital. Results of multiple regression analysis have also shown that the variables elementary level, repeatable level, manageable level, and optimum level have been able to positively and significantly predict the intellectual capital variable. However, the results associated with the variable defined level have shown that this variable has not been able to positively or significantly predict the intellectual capital variable. According to these results, the determination coefficient equal to 0.71 ($R^2=0.71$ or 71%) of the variance of the intellectual capital variable can be determined by the components of knowledge management maturity.

Thus, given the research results, the researcher has the following recommendations:

Since there is a significant relationship between the factors associated with employees' intellectual capital and the maturity level of their knowledge management, it is recommended to reinforce and promote factors such as capabilities and qualifications, technical knowledge, approaches, culture, structure, organizational learning, technical capital, social services, social excellence, social relations, relationship with suppliers, relationship with partners and media so that knowledge management would be enriched in the organizations.

With a significant relationship between the maturity level of employees' knowledge management and their intellectual capital, it is recommended to the organizations to use their intellectual capital to create balance in the activities associated with knowledge. Establishing this kind of balance requires making some changes in the organizational processes, management of the organization, employees' skills, information technology systems, individuals' motivation, knowledge-related activities in the frame of team activities.

Having a significant relationship between factors associated with employees' intellectual capital and the maturity level of their knowledge management, if intellectual capital is used well, it can improve the ability of an organization in taking actions regarding managing knowledge. In addition, components of intellectual capital, including human capital, structural capital and relational capital, are regarded as important inputs for creating knowledge in the organization. Thus, it is recommended to organizations to pay more attention to these factors. For this purpose, organizations must make developing their intellectual capitals and knowledge management their priority.

As the maturity level of knowledge management plays a direct and significant role in the relationship between the factors associated with employees' intellectual capital and their intellectual capital, thus, paying attention to the interaction between the effective factors on this relationship will reinforce the organization in managing knowledge. To put it differently, paying attention to the three main components of intellectual capital, i.e. human capital, structural capital, and relational capital, through adjusting knowledge-related interactions in the organization can be effective in the successfulness of the organizations. In this case, the factors associated with intellectual capital can be used for creating and applying knowledge in order to increase value.

8. DATA AVAILABILITY STATEMENT

The used or generated data and the result of this study are available upon request to the corresponding author.

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