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The Model of Knowledge Management Components Relationships using Structural Equation Modeling

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Abstract: The aim of the current research was to test the structural model of the relationships of knowledge management components in universities (Qom province universities) using structural equation modeling. The present study is an applied and correlation research. Participants were 247 faculty members of universities in Qom province selected via random sampling. The results of the model test showed that the effect of knowledge-oriented organizational culture, strategic planning of knowledge management, infrastructure of information and communication technology and knowledge manpower on knowledge management processes is positive and significant. The effect of knowledge management processes on knowledge-based human resource management, knowledge identification and goal setting, and knowledge team building is positive and significant. The effect of weakness in knowledge management rules and lack of motivation of employees and professors on knowledge-based human resource management, knowledge identification and goal setting, and knowledge team building is negative and significant. The effect of organizational structure and individual characteristics of employees and professors on knowledge-based human resource management, knowledge identification and goal setting, and knowledge team building is positive and significant. Finally, the impact of knowledge-based human resource management, knowledge-based identification and goal-setting and knowledge-based team building on knowledge-based universities, improving university performance, and improving individual performance is positive and significant. Findings can be used to improve knowledge management in universities.

Keywords: Knowledge management model, knowledge-oriented organizational culture, strategic planning of knowledge management, Structural Equation Modeling

Introduction

Most organizations emphasize the importance of knowledge as a creator of competitive advantage in today's world. As Grant (1996) stated in his study on knowledge management, providing an accurate definition of knowledge is very difficult and risky. Knowledge is what people know, so it is hard to define. Plato, Aristotle, Locke, Kant and Descartes are famous philosophers who tried to define the concept of knowledge (Liebowitz, 2000). From the point of view of many researchers and scholars, knowledge includes various classifications and types, for example, open and hidden knowledge. The most comprehensive and clear definition of the concept of knowledge is taken from the researches of (Nonaka, 1994), which is stated that Knowledge consists of beliefs. and confirmed beliefs that can enhance the capacity and capabilities of a person (or an entity) to provide effective activities.

In this regard, in the broadest sense, knowledge management is a conceptual framework that includes all the activities and perspectives that are necessary to gain a perspective of creativity, transaction, and benefit from the company's knowledge assets and their specific role in the company's performance and

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business (Hislop et al., 2018). One of the reasons for the increasing attention to this issue is that business organizations are gradually looking at knowledge as their most valuable and strategic resource (Geisler & Wickramasinghe, 2015; Manesh et al., 2020).

Knowledge management is a special organizational and systemic process for acquiring, organizing, maintaining, applying, sharing and re-creating explicit and implicit knowledge of employees to increase organizational performance and value creation (Alavi & Leidner, 2001). Some researchers introduce knowledge management as one of the management tools. In other words, it is defined as an operational tool or a centralized management tool in terms of strategy (Zaim et al., 2019). According to Amin and Shahid (2013), the focus of knowledge management is on improving organizational ability. Success in the field of knowledge management requires the creation of a new work environment where knowledge and experience can be easily shared (Oztemel & Arslankaya, 2012).

Defining knowledge management is difficult and there is no clear definition that is generally agreed upon. A common problem in the definition of knowledge management is that the definition of knowledge as described is very broad and has caused various definitions of knowledge management. Davenport and Prusak (1998) have defined knowledge management as the collection, distribution and efficient use of knowledge resources. ODell and Grayson Jackson (1998) defined knowledge management as a strategy that should be created in an organization to ensure that knowledge reaches the right people at the right time and that those people share knowledge and use information to improve organizational performance. They define Knowledge management is an activity that develops, transfers, transmits, stores and applies knowledge and also provides real information to make correct decisions regarding the realization of organizational goals (Hung et al., 2005). Finally, Rotella et al. (2015) definition can be stated as focusing on human, technology and structure: "Knowledge management; the process of discovering, acquiring, developing and creating, sharing, maintaining, evaluating and applying appropriate knowledge that is done at the right time by the right person in the organization, which is done through creating a link between human resources, information and communication technology and creating a suitable structure to achieve organizational goals.

The concept of organizational knowledge management system can provide a better and more complete understanding of knowledge management and its elements. The knowledge management system is defined as a system that provides knowledge to the organization's users to support the decision-making process and perform tasks (Adeinat & Abdulfatah, 2019; Donate & de Pablo, 2015). Knowledge management systems refer to a group of information systems that are important for managing knowledge in different situations. In other words, they are developed to support the processes of creating, storing, retrieving, transferring and applying knowledge (Alavi & Leidner, 2001). These systems are a complex combination of technological infrastructures, organizational structures, organizational culture, knowledge and people. Technological infrastructure is the information technology tools including hardware, software and protocols. These tools provide the possibility of providing electronic versions

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of organizational knowledge and facilitating the exchange and transfer of knowledge. Organizational structures are the way employees are organized and interact within organizational teams and groups. The culture of the organization is the common values and norms, ethics, behavior and action within the organization.

Knowledge includes all kinds of organizational knowledge that is inside the organization. Finally, people are the internal and external stakeholders of the organization (Mahdi et al., 2019). Many researchers have presented different models and frameworks for understanding the concept and implementation of knowledge management. Although many frameworks have been presented for the implementation of knowledge management in the private sector. There are very few that are designed specifically for the government. The public sector has accepted that it is different from the private sector and therefore has some special characteristics. The knowledge management framework for the public sector has two major differences with the frameworks provided for the private sector. First, the public sector belongs to the beneficiaries. While the private sector is owned and dependent on partners and shareholders. The approach of stakeholders in the government sector requires the presence of various and numerous departments in the process, and therefore, the work on it is faced with more problems. In the government sector, these stakeholders can be citizens, local and state governments, private companies, users, etc., and the government makes policies and decisions, plans and provides services and is necessary to take into account the interests, opinions and interests of all stakeholders (Agrifoglio et al., 2021). In the private sector, companies are accountable to their shareholders, but the only thing that matters in this sector is that the investment made is profitable. The second distinguishing feature of knowledge management frameworks in the private and public sectors is their competitiveness. The private sector is based on competition and is basically competitive, while the government sector is based on factors such as providing services, providing information, identifying knowledge, sharing and using it.

People, processes and technology are the three main elements of any organizational environment. Knowledge management emphasizes on people and organizational culture in order to create a spirit of sharing and using knowledge. Also, in order to find, create, acquire and share knowledge, it focuses on processes or methods, and in order to store knowledge and make it usable during group work it is concentrated on technology. People are the most important part; Because knowledge management is directly related to people's desire to share and use knowledge. People, processes and technology can always be considered as a driving factor or an obstacle for the movement of knowledge. Therefore, it is always necessary to identify and remove obstacles and expand and increase motivational factors.

Feiz et al. (2019) investigated the effect of knowledge sharing on psychological empowerment of faculty members with regard to the mediating role of organizational memory in Semnan University. To study the research variables, three standard questionnaires were distributed among 334 faculty members of the studied sample. Structural equation modeling has been used to test the hypotheses. The results showed

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that there was a significant effect between knowledge sharing and empowerment. They also showed that organizational memory plays a mediating role in influencing knowledge in the field of empowering faculty members.

(Zand et al., 2018) investigated the relationship between knowledge management strategies, entrepreneurial skills and employee empowerment with organizational effectiveness and providing a suitable model. The results of this research showed that the effectiveness of the organization had four components including organizational commitment, organizational health, organizational innovation and job satisfaction. Also, between knowledge management strategies (and its dimensions including externalization, internalization, socialization and combination), entrepreneurial restraints (and its dimensions including technical skills, managerial skills, entrepreneurial skills and personal maturity skills) and employee empowerment (and its dimensions include meaningful feeling of job, feeling of competence in job, feeling of having the right to choose, feeling of being effective and feeling of participation with others) had a positive and significant correlation with organizational effectiveness.

(Al-Kurdi et al., 2020) examined the role of organizational climate in the management of academics' knowledge sharing in higher education. In this study, which uses the structural equation model, 257 universities were investigated. The results show that the organizational climate has a great effect on academics' performance. In addition, there was a positive relationship between leadership and organizational trust with academics' academic behavior.

(Widodo & Gunawan, 2021) investigated the effect of organizational empowerment on innovative behaviors with the mediating role of knowledge management and teaching creativity. The research method was correlation and structural equations were used for data analysis. The results showed that organizational empowerment has a positive and significant effect on knowledge management, teaching creativity and innovative behaviors. Knowledge management has a positive and significant effect on teaching creativity and innovative behaviors. Teaching creativity has a positive and significant effect on innovative behaviors.

Zuber-Skerritt (2005) has conducted research titled "Values and Actions Model for Personal Knowledge Management". This model includes the following seven values and principles: 1- Advancement of knowledge and learning, 2- Cooperation, 3- Trust, respect and honesty, 4- Concepts and views for excellence, 5- Openness, 6- Negativity and 7- Success. The mentioned model showed how these seven values affect people's actions and as a result, seven types of personal knowledge are produced.

According to the findings of the conducted researches, the existing theoretical foundations and the identification of the knowledge management components, the identification of the relationship between these components and the test of the related structural relations model can be a valuable research goal. Based on this, the aim of the current research was to test the structural model of the relationships of knowledge management components in universities (Qom province universities) using structural equation modeling.

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Material and Methods

The current research is a descriptive correlation study which has been used the structural equation modeling to test the proposed model. The statistical population was the faculty members of the universities of Qom (Iran), whose total number is 1500. To determine the sample size, Cochran's formula was used, based on which the sample size was estimated to be 306 people. The sampling method in the present study was simple random, and 320 questionnaires were distributed to ensure the return of the questionnaires. Out of this number of questionnaires, 261 questionnaires were returned, and finally, after removing incomplete questionnaires, 247 questionnaires were analyzed. Ethical considerations were observed in the data collection process and the respondents were assured that their answers would remain confidential.

A researcher-made questionnaire with 75 questions was used to collect data about knowledge management components. In order to check the content validity of the questionnaire, 10 experts in this field were provided and they expressed their opinion about the questionnaire. The CVR index was used to check the content validity, and the content validity of all questions was evaluated at an appropriate level above 0.70. Cronbach's alpha was also used to check the reliability, and the alpha values for the subscales are presented in Table 1.

Table 1. Cronbach's alpha values

Scale	Cronbach's alpha
Knowledge-oriented organizational culture	0.84
Strategic planning of knowledge management	0.77
Information technology infrastructure	0.80
Knowledgeable manpower	0.85
Knowledge management	0.94
Weakness in knowledge management rules	0.73
Lack of motivation of staff and professors	0.73
Organizational Structure	0.88
Personal characteristics of staff and professors	0.86
Knowledge-oriented human resource management	0.83
Scientific identification and targeting	0.90
Academic team building in the university	0.84
Knowledge-oriented university	0.87
Improving university performance	0.89
Improve individual performance	0.72

To analyze the quantitative data in this research, the structural equation modeling with confirmatory factor analysis test was used to test the model in SMART PLS software.

Results

In Table 2, the indicators related to descriptive statistics for the studied sample, including the mean and standard deviation for the variables studied in this research, are given.

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Table 2. Descriptive indices of research variables

Components	Mean	SD
Knowledge-oriented organizational culture	3.19	0.92
Strategic planning of knowledge management	3.28	0.93
Information technology infrastructure	2.97	0.95
Knowledgeable manpower	3.16	0.85
Knowledge management	2.97	0.83
Weakness in knowledge management rules	2.52	0.93
Lack of motivation of staff and professors	2.83	0.86
Organizational Structure	2.94	0.89

In order to check the normality of the research data, the Kolmogorov Smirnov test was used. According to the findings, the Kolmogorov Smirnov test is significant for most of the variables. So, the research variables are not normal. Therefore, the structural equation modeling was used by the method of partial least squares in SMART PLS software, which can be used for non-normal data. In order to show the validity of the findings of the research model, the fit indices of the structural equation models were used using the partial least squares method. The general fit index of the model in the partial least squares method is the GOF index and it can be used to check the validity or quality of the partial least squares model in general. In the current study, the GOF absolute fit index of the tested model was 0.67, and the value obtained for this fit index indicates the appropriate fit of the tested model. Table 3 shows the results of the tested model for direct coefficients and mediation effects using the Sobel test.

Table 3. Tested model results

Path	Coefficient	T value	Result
The effect of knowledge-oriented organizational culture on knowledge management processes	0.21	2.83	Confirmed
The effect of knowledge management strategic planning on knowledge management processes	2.29	3.55	Confirmed
The effect of information technology infrastructure on knowledge management processes	0.17	2.12	Confirmed
The effect of knowledge manpower on knowledge management processes	0.21	2.97	Confirmed
The effect of knowledge management processes on knowledge-oriented human resource management	0.25	3.93	Confirmed
The effect of knowledge management processes on knowledge identification and targeting	0.25	4.17	Confirmed
The effect of knowledge management processes on knowledge team building in the university	0.14	2.28	Confirmed
The effect of weakness in knowledge management laws on knowledge-oriented HR management	-0.16	2.63	Confirmed
The effect of weakness in knowledge management rules on knowledge identification and targeting	-0.18	3.52	Confirmed
The effect of weakness in knowledge management rules on knowledge team building in the university	-0.29	4.68	Confirmed
The effect of demotivation of employees and professors on knowledge-oriented HR management	-0.33	5.95	Confirmed
The effect of lack of motivation of employees and professors on knowledge identification and goal setting	-0.29	6.57	Confirmed
The effect of demotivation of staff and professors on academic team building in the university	-0.14	2.15	Confirmed
The effect of organizational structure on knowledge-based HR management	0.14	2.15	Confirmed
The effect of organizational structure on knowledge identification and targeting	0.23	3.86	Confirmed
The effect of organizational structure on academic team building in the university	0.14	2.42	Confirmed
The effect of individual characteristics of employees and professors on knowledge-oriented HR management	0.10	1.74	NC
The effect of individual characteristics of staff and professors on knowledge identification and targeting	0.17	2.47	Confirmed
The effect of individual characteristics of staff and professors on academic team building in the university	0.34	4.69	Confirmed
The effect of knowledge-oriented human resource management on knowledge-oriented universities	0.22	2.86	Confirmed
The effect of knowledge-based human resource management on improving university performance	0.22	2.85	Confirmed
The effect of knowledge-based human resource management on improving individual performance	0.37	5.18	Confirmed
The effect of knowledge identification and targeting on knowledge-oriented university	0.29	2.77	Confirmed
The effect of knowledge identification and targeting on improving university performance	0.24	2.77	Confirmed
The effect of knowledge identification and targeting on improving individual performance	0.34	4.68	Confirmed
The effect of knowledge team building in the university on the knowledge-oriented university	0.33	3.18	Confirmed
The effect of academic team building in the university on improving the performance of the university	0.40	4.16	Confirmed
The effect of academic team building in university on improving individual performance	0.18	2.70	Confirmed

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According to the path coefficients and t values reported in Table 3, hypotheses 1 to 28 are ($p < 0.05$), so all hypotheses are confirmed.

Discussion

According to the findings, the effect of knowledge-oriented organizational culture, knowledge management strategic planning, information and communication technology infrastructure, and knowledge manpower on knowledge management processes is positive and significant. The effect of knowledge management processes on knowledge-oriented human resource management, knowledge identification and targeting, and knowledge team building is positive and significant. The effect of weakness in knowledge management laws and lack of motivation of employees and professors on knowledge-oriented human resource management, knowledge identification and targeting, and knowledge team building is negative and significant. The effect of organizational structure and individual characteristics of employees and professors on knowledge-oriented human resource management, knowledge identification and targeting, and knowledge team building is positive and significant. The effect of knowledge-based human resources management on knowledge-based universities, improving university performance and improving individual performance is positive and significant. The impact of knowledge identification and targeting on the knowledge-oriented university, improving university performance and improving individual performance, is positive and significant. The effect of knowledge team building on a knowledge-based university, improving university performance and improving individual performance is positive and significant. According to the tested model, 51% of the variance of knowledge management processes, 60% of the variance of knowledge-oriented human resource management, 62% of knowledge identification and targeting, 57% of the variance of knowledge-based team building, 60% of the variance of knowledge-oriented university, 62% of the variance University performance improvement and 68% variance of individual performance improvement is explained by the research model. The findings were in line with the researches of Feiz et al. (2019), Zand et al. (2018) and Al-Kurdi et al. (2020).

In general, the findings support the appropriate fit of the proposed model and the relationships between knowledge management components are confirmed. The present research has some limitations that should be taken into account in the generalization of the findings. Limitations in the implementation of questionnaires in terms of the reluctance of some sample members to respond due to the corona situation, lack of sufficient accuracy in answering questions and biases that some sample members may have in answering some questions are important limitations of the research.

The findings have useful implications for knowledge management in universities and higher education centers. Interested researchers are suggested to study the relationship of knowledge management with other educational and educational structures in universities in future studies. Also, along with the questionnaires, use interviews to validate the data of the questionnaires.

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