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Identifying the success factors of knowledge management tools in research projects (Case study: A corporate university)

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A B S T R A C T

The factors affecting the success of knowledge management (KM) tools play an important role in knowledge processes. This research investigates the factors affecting the success of KM tools in the research projects of a corporate university. The research method is descriptive and the statistical population of the study consisted of all professors and knowledge workers of a university. 147 of them were selected through a targeted sampling method. Data collection was conducted through a questionnaire. To determine the validity of the questionnaire, content and formal validity were used and its reliability was calculated by using Cronbach's alpha with the value calculated of 0.83. Data were analyzed by using descriptive statistics, t-test and Friedman test. In this study, the factors of culture, information technology, strategy and goal, organizational infrastructure, employee motivation, leadership and management support, human resources management, education, financial resources, measurement, processes and activities, structure and communications in the knowledge management cycle of research projects of the university studied were identified as the effective factors in the KM cycle.

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1. Introduction

Knowledge as a strategic asset must be managed so that organization can maintain its competitive operation (Bolisani & Bratianu, 2017) and it plays a significant role in the growth, survival and performance of a knowledge-based economy (Huang & Wu, 2010). Knowledge management emphasizes the creation of value, which means managing existing knowledge and turning it into useful knowledge in the organization. Impact of Knowledge Management (KM) on the organization's overall success has been widely acknowledged (Terzieva, 2014; Frey et al., 2009; Alekseev, 2010). However, what factors and how to cause its success, are key questions, which require extensive study. Corporate Universities, in addition to being a specific educational organization, also play a facilitating role in the organization's knowledge management. For this reason, some researchers consider them to be a part of the organization's knowledge management process (Crocetti, 2001; Rademakers, 2005; Wiig, 1997). The corporate university studied in this study, as a scientific research center, is no exception and needs to capture, manage

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and take advantage of knowledge and information in order to improve the efficiency of its field of application. As with other science centers, the university, by defining its research and implementation, seeks to analyze the progressive problems, to add to its organizational knowledge, and to apply its findings in order to solve its scientific and organizational problems, or other scientific centers, through sharing and extracting the findings. Knowledge management tools, which are techniques and methods for the operating of knowledge management (Young, 2010), are important in this regard, and examining the factors influencing their success can contribute to the success of their use. In this regard, the questions are: What are the factors affecting the success of KM tools in the research projects of the corporate university?, What is the current status of these factors?, What is the priority of these factors? By answering these questions, the present study investigates the factors affecting the success of KM tools in the research projects of a corporate university.

2. Literature and subject background

Since the beginning of 1990, all companies in the world have been talking about knowledge management. Recent planners and modernists in information technology played an important role in the sudden emergence of knowledge management. KM development provided new tools for better knowledge sharing (Civi, 2000). KM tools and techniques have been designed to support business processes and enterprise projects in a more excellent manner (Young, 2010). The list of tools and techniques that the world's most successful organizations have used in KM initiatives are summarized in Table 1. These tools and techniques are not listed in any order, such as importance or hierarchy, but are categorized and listed into three groups of individual, organizational and information technology-based.

Table 1

KM tools and techniques (Ghomi, 2014)

Tools and techniques based on information technology	Tools and techniques based on organizational approaches	Tools and techniques based on individual approaches
Social network analysis	Leader or senior management support	Direct concurrence
Document libraries	Culture	Assistance to coworker
Knowledge bases	Knowledge center	Reviews of learning
Data bases	Identifying and sharing the best activities	Reviews after measurement
Social networking services	Creating a knowledge strategy	Innovation
Internet audiovisual protocol	Knowledge Audit	Knowledge house
Advanced searching tools	Sustainable competitive advantage	Work communities
Creating knowledge branches	Exit interview	Classification (science classification program)
Identifying specialist	Changing organizational structure (horizontal structure)	Teacher-student method
Collaborative virtual workspaces	Knowledge exhibition	Small articles
Databases	Motivational Activities	Writings
Learning in virtual spaces	Harvesting knowledge	Telling story
Websites	Reworking	Apprenticeship
Networks	Structured interview with experts	Dialogue
Groupware	Contribute qualified staff in education	Work groups
Knowledge sharing networks	Talking places and chat rooms	Apprenticeship
Expert system	After-project evaluation method	Trust
Recording learning and thoughts	Knowledge Map	Special session of leaned lesson
Blank pages	Collaborative physical work space	----------
----------	workflow	----------

To be able to use any KM tool, we need to know the success factors in implementing knowledge management in the organization and, with these factors, we may use the right tool. The success factors can be defined as “critical areas of planning and managerial measurement that must be provided to achieve effectiveness” (Saraph et al., 1989). In the language of knowledge management, the success factors are the activities and actions necessary to implement knowledge management. These factors must be created to provide its absence in the organization and, if any, be raised and developed. External factors such as environmental impacts are not taken into account because organizations do not control them in the implementation of knowledge management. Davenport et al. (1998), made an exploratory study of 31 projects in 24 companies. One of the objectives of this study was to determine the factors influencing the effectiveness of the plans. To this end, the performance of the plans was evaluated by using indicators similar to the evaluation indicators of other organizational change plans. According to studies, 18 projects

succeeded, and five projects failed. In eight companies, judgment about the success or failure of the plans was early. Eight common success factors were identified as follows: 1. Top management support 2. Clear expression and promotion of knowledge management objectives 3. Connecting the knowledge management plan to unit economic performance 4. Multiple channels for knowledge transfer 5. Motivational rewards for users of knowledge management 6. Standard and flexible knowledge structure 7. Strong technical and organizational infrastructure 8. Strong technical and organizational infrastructure 9. Knowledge-friendly culture. Sohrabi et al. (2009), in a research on the readiness for knowledge management, identified supporting change, change perspective, knowledge culture, structure and infrastructure as critical success factors for knowledge management. Supporting change includes education, management support, participation and incentive system; change perspective including benefits and advantages; harmony of change goals; need sense; knowledge culture including collaborative culture; open leadership environment; learning from mistakes and trust; structure including decentralization, formalization and group work; and infrastructure including information quality, access to infrastructure of information systems, verbal skills. According to Mathi (2004), leadership, training, patterning, performance evaluation, organizational policies, knowledge sharing and the structure of information systems are considered as the success factors for implementing knowledge management activities. Dixon (2000) identified two factors for the success of KM projects: 1. the alignment of knowledge management with organizational goals. 2. Identifying specific groups requires specific knowledge. Forcadell and Guadamillas (2002) showed the success of KM implementation in the form of seven factors focusing on organizational culture as shown in Fig. 1:

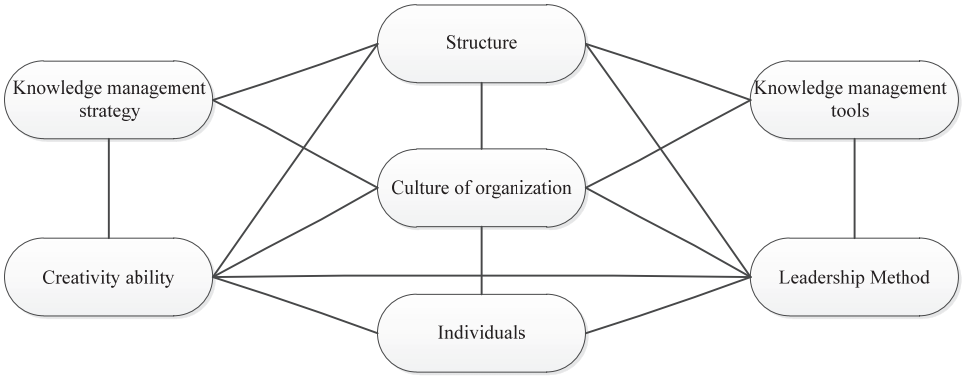

Fig. 1. Success Factors for Knowledge Management (Forcadell & Guadamillas, 2002)

According to Demarest (1997), for successful knowledge management, where the knowledge process takes place, we must focus on three infrastructures: 1. Cultural Infrastructure 2. Organizational Infrastructure 3. Technical Infrastructure (Soliman & Spooner, 2000). The Gartner Institute identified the alignment of knowledge management with strategies, the existence of organizational culture and organizational discipline for knowledge sharing, attention to human processes, and the necessity of a technology-based basis as the factors influencing knowledge management (Snyman & Krugere, 2004). Chait (2000) found that insight and alignment, the management of four areas of content, culture, process and infrastructure, and the creation of effective culture were the success factors for KM initiatives. Alavi and Liedner (2001) studied executive managers in a managerial development program in terms of the success of the KM system and found that organizational and cultural problems related to motivating users to share and use knowledge are the most important problems. They also found that measuring the benefits of the KM system and using an integrated technology architecture that supports databases, communications, and search and retrieval functions are important. Holsapple and Joshi (2000) conducted a broad study to examine the factors affecting the success of knowledge management in organizations. They first extracted the set of factors from different sources. Then, by using the Delphi method, with university professors and industry experts in the field of knowledge management, they evaluated the factors ob-

tained from the previous step. Finally, they proposed three main categories of factors, including management, resources, and environment, which are categorized as follows:

- The effects of management, including four main groups of coordination, control, measurement and leadership
- The effects of resources, including knowledge, human, materials, and finances resources
- The effects of environment, including competition, markets, time pressure, economic situation, conditions of government, etc.

In this study, it was reported that some items, such as technology and culture, must be investigated as factors, not components of other factors. For example, culture was not stated explicitly, but as an element called the source of knowledge. Even though on the basis of knowledge management, culture is a very important issue and must be considered as a factor. There were also some factors that could have been mentioned, such as infrastructure, communication, education, organizational planning, strategy, and bonus issues. Based on these studies, leadership and senior management support were identified as factors. Resources such as suitable financial support, staff skill levels and identifying knowledge resources were mentioned significant. Koskinen et al. (2003) studied tacit knowledge as a driving force in technology companies by using ten small technology companies; the key to the success of the KM system was the ability to identify, acquire, and transfer the company's essential tacit knowledge. According to Cross and Baird (2000), knowledge management does not improve organizational performance by merely using technology in the acquisition and sharing of lessons learned from past experiences. However, for this purpose, knowledge management must increase organizational learning through the creation of organizational memory. In order to examine this view, 22 projects were studied. The result was that improving organizational learning increases the chances of success in knowledge management. Sage and Rouse (1999), by reviewing the history of innovation and technology, considered focusing on modeling processes in order to identify requirements and resources of knowledge, the existence of a knowledge management strategy for identifying the knowledge used and its users, rewarding and motivating for using the knowledge management system, the existence of attraction Infrastructure, searching, retrieving and displaying knowledge, creating a specific knowledge structure at the organization level, identifying clear goals for the KM system, and measuring and assessing the effectiveness of knowledge management as factors in managing knowledge. According to Kemp et al. (2001), explicit goals, strong financial support, true expectations, systemic approach, flexible framework, evolutionary process and technical maturity are the key success factors of knowledge management. Hung et al. (2005) emphasized the commitment and leadership of senior management, employee engagement, trusted teamwork, employee empowerment, information systems infrastructure and performance evaluation as success factors in implementing knowledge management in an organization. They also made a comprehensive classification of the success factors of knowledge management, which is presented in Table 2.

Table 2
Classification of Knowledge Management Success Factors (Hung et al., 2005)

Success factors dimensions	Relevant research
Honesty and open organizational culture	(Davenport et al., 1998. Beckman, 1999. Gricault, 1999. Ryan and Prebotok, 2001. Wilde et al., 2002). Moffat et al., 2003)
Leadership and senior management commitment	(Davenport et al., 1998. Beckman, 1999. Grico, 1999. Ryan and Prebotok, 2001. Moffett et al., 2003; Wanbran, 1999; Des and Piscons, 2000).
Employees participation	(Ryan and Prebotok, 2001. Mouft et al., 2003, B. Brin and Chez, 1995. Copper Kahn, 1999. Wilson and Ashey, 1999)
Staff training	(Moffett et al., 2003, Greengard, 1998. Kuhn & Baker, 1999)
Group work	(Girant, 1998. Grangeard, 1998. Ryan and Prebotok, 2001. Moffat et al., 2003)
Encouraging staff	(Entry, 1997. Martinez, 1998. Erich, 1998. Diwall, 1999. Vorspage, 1999. Moffett et al., 2003)
Information systems infrastructure	(King, 1996. Davenport and colleagues, 1998. Grico, 1999. Bauderai and Coyleard, 1999. Sawari, 1999. Ryan and Prebotok, 2001. Lee and Hung, 2002. Pijaw et al., 2002. Wang, 2002. Moffet et al.
performance evaluation	(Martinez, 1998. Bassie and Wonbardin, 1999. Pearson, 1999. Barski, 2000. Moffat et al., 2003)
Patterning	(Davis, 1996. Drew, 1997. Dai and Wendler, 1998. A. Del and Grains, 1998. Moffett et al., 2003)
Knowledge structure	(Davenport & Claire, 1998. Beckman, 1999. Gricault, 1999. Hiskins, 1999. Tienan, 1999. Hassie et al., 2002). Moffat et al., 2003)

The most important factors affecting the success of KM tools in research projects from the perspective of literature are as follows:

Culture: Organizational culture is an essential factor for the success of knowledge management (Davenport et al., 1998; Mårtensson, 2000). Culture determines fundamental ideas, social values and norms governing the behavior and function of individuals in the organization. In relation to organizational culture, trust, participation, encouragement and participatory leadership are development factors of organizational goals (Forcadell & Guadamillas, 2002). In general, the culture supporting the management of knowledge considers a high value for knowledge and encourages the creation, sharing and its use. Based on studies, the culture is the biggest barrier for companies in building a knowledge-based organization (Chaudhry, 2005).

Information technology: knowledge management in practice requires information technology (Bharadwaj, 2000; Wade & Hulland, 2004; Tanriverdi, 2005). Every step of the KM process, such as the pursuit of knowledge assets, can be enhanced by information technology (Tseng, 2008).

Strategy and goal: In order to achieve future goals, organizations must shift their knowledge management activities towards real efforts based on a strategy or a clear program. Therefore, one of the factors of success in KM is to have explicit strategy with proper implementation planning, form a formal knowledge management strategy throughout the organization and provide training programs and enhancing the capabilities of the new knowledge management (Leibowitz, 1999). The strategy is the basis for applying the organization's capabilities and resources to realize the goals of KM. Even though different strategies have been proposed for implementing knowledge management, the strategy must be chosen according to the context and situation of the organization concerned (Sunassee & Sewry, 2003).

Organizational Infrastructure: The purpose of an organizational infrastructure is to create a set of roles and groups for carrying out the tasks related to knowledge (Davenport et al., 1998). Although some of the functions existing in the organization, such as human resource management and information technology deal with knowledge-related issues, the creation of a formal independent team with special responsibility of knowledge management is essential. The roles of this group can be assigned to the existing posts in the organization or created new posts for it.

Employee motivation: The success of KM requires encouraging employees to apply their company's intellectual resources. If people are unwilling to implement knowledge management, any investment, infrastructure, and technology will be useless in this way (Hwang et al, 2018). The organization must change its motivational activity in the direction of knowledge management (Davenport et al., 1998), and to do this, it must have a wide variety of types of reward structure and balance between the obvious and internal rewards. The most effective way is to use rewards for sharing knowledge at the start of KM activities.

Leadership and Management Support: Leadership plays a key role in the success of KM (Holsapple & Jushi, 2000). Leaders use the business strategy to survive and maintain their superior position in today's dynamic environments. They also determine the organization's prospect and must align it with business strategies to improve the value of knowledge management in the organization (Mathi, 2004). The behavior of leaders has the greatest impact on the organization (Hassanali, 2002). Leaders are the pattern of others, and they present a favorable behavioral sample in relation to knowledge management. The leadership style and the strategic role of the leader can promote the elementary process and provide ideas for improvement and support (Forcadell & Guadamillas, 2002). Other leadership abilities in relation to knowledge management are: guiding the process of change, transferring and realizing the importance of knowledge management to employees, strengthening morale and creating a culture of encouraging the creation and sharing knowledge.

Human Resource Management: Although human resource management is important for several purposes, the main goal here is to hire, train and retain human resources. Individuals are important because any change or introduction of new technology affects the workforce inside the organization. Therefore, measuring the organizational culture and readiness of individuals to accept new technologies is necessary (Ruikar et al., 2006). Individuals are the creators of knowledge in the organization and a major part of organizational knowledge is in their minds. In general, the discussion of individuals in the organization as human participants involves the skills and the roles of knowledge, motivation and self-reaction, reinforcement, learning/social networks, dialogues, coordination and creativity (Moffett et al., 2002). According to Ruggles (1998), 50 percent of the time and budget of knowledge management must be allocated to individuals. Organizational individuals must be consistent with organizational culture. Another crucial issue in knowledge management is the prevention of the exodus of knowledge by the withdrawal of experienced staff from the company.

Training: Training is considered as an important factor for the success of KM (Holsapple & Jushi, 2000; Mathie, 2004). So as to manage knowledge successfully, it is essential to invest in management and staff training. Members of the organization must be aware of the need for knowledge management and precept it as a vital source of exhilaration and organizational growth. In addition, using of knowledge management systems and other KM tools must be taught to employees (Hwang, 2003). Also, individuals need to be trained to understand their new roles in carrying out their tasks related to knowledge.

Financial and credit resources: Financial resources are an important factor for the success of knowledge activities. Increasing financial resources for knowledge activities (for example, acquiring the knowledge required) may affect the effectiveness of this activity or the quality of its outcomes (positive or negative) (Holsapple & Joshi, 2000). However, since resource provision is one of the main concerns of the organizations, especially in small and medium enterprises, this must be considered in implementing the KM program. For example, the domain of the project must not exceed the available resources. Investment decisions must be based on a thorough review of the resources. Therefore, understanding the optimal way of acquisition, allocating and managing resources for the successful implementation of knowledge management in organizations is important. Financial support is essential for investing in a technical system.

Measurement: In fact, the measurement involves evaluating the knowledge resources and how it is processed (Holsapple & Joshi, 2000). A plan, such as knowledge management, is always at risk to stay within the scope of the slogan. The way out of this position is *measurement*. Proverbs such as “something that cannot be measured cannot be managed” and “what is measured is done” is about knowledge management. Measurement enables the organization to track the progress of knowledge management and determine its benefits and effectiveness. Indeed, measurement is the basis for evaluating, comparing, controlling and improving the performance of organizations' knowledge management (Hassanali, 2002). Processes and activities: processes are activities that are carried out for a particular purpose, and include business rules and procedures of the organization (Ruikar et al., 2005). Here, we refer to the processes that scientists use to achieve the goals and mission of the organization. According to Ruggles (1998), in implementing KM, 25 percent of time and budget is allocated to the processes. Knowledge management processes are the processes that are conducted with knowledge within the organization. The number of processes in the field of knowledge management is numerous. For example, Alavi and Leidner (2001) presented four main processes: creation, storage and retrieval, transmission, and deployment.

Structure: Individuals work within an organizational structure that support organizational processes to achieve a company's overall strategy (Santoro & Gopalakrishnan, 2000). A structure is a set of solutions for assigning different tasks between individuals and describes how to coordinate these tasks. The importance of organizational structure has been highlighted in the successful implementation of knowledge management. The successful implementation of the KM strategy is dependent on the flexible structure and the elimination of control and traditional monitoring systems (Forcadell & Guadamillas, 2002). According to Ostroff (1999), flat organizations are more appropriate for the information age.

Table 3
Success factors of knowledge management from the viewpoint of experts

Source	Success factors of knowledge management
Sohrabi et al., 2009	Infrastructure, Structure, Culture, Change perspective, Change support
Hung et al., 2005	Performance evaluation, Information systems infrastructure, Strengthening employees, Employees involvement, Trustworthy teamwork, Leadership and senior management commitment
Mathi, 2004	Information systems structure, Sharing and obtaining knowledge, Organizational policy, Performance evaluation, Patterning, Training, Leadership
Snyman & Kruger, 2004	Technology environment, Systemic business, Human processes, Culture and discipline, Organization strategy
Koskinen et al., 2003	Transferring vital tacit knowledge, Obtaining vital tacit knowledge, Identifying vital tacit knowledge
Forcadell & Guadamillas, 2002	Individuals, Creativity capability, Organization culture, Leadership method, Knowledge management tools, Knowledge , management strategy Structure
Kemp et al., 2001	Technical maturity, Evolutionary, process, Flexible, frame work, Systemic approach, Real expectations, Financial support, Clear goals
Alavi & Liedner, 2001	Technology, Measurement, Culture, Organizational issues
Chait, 2000	Creating Effective Culture, Infrastructure management, Process management, Culture management, content management, Ensure insight and alignment
Cross & Baird, 2000	Improving, organizational learning
Dixon, 2000	Identifying specific groups requiring specific knowledge, Alignment of knowledge management with organizational goals
Holsapple & Jushi, 2000	Training, Competition, Communications, Markets, Government status, Strategy, Human, Coordination, Infrastructure, Knowledge resources, Infrastructure, Leadership, Technology, Measurement, Time pressure, Control, Financial resources

Flat companies are more flexible in environments with fast and competitive changes of business (Ruikar et al., 2005). Communications: Communications must be inclusive and repetitive. In many organizations, talking to colleagues is considered to be a non-value-added activity, while organizations must pay attention to the use of unofficial communication channels to share knowledge (Soliman & Spooner, 2000). Without the constant flow of communications and ideas, the creation of knowledge does not take place. Sharing knowledge through face-to-face communication, collaborative work groups, and a culture that supports the sharing of knowledge, learning and development of individual skills is developed (Chong, 2006). Effective conversations in the group are essential for knowledge acquisition and sharing. Conversation is a way of sharing the knowledge of experts with others (Moffett et al., 2002), which is usually done at informal meetings. Table 3 shows a summary of the success factors of knowledge management from the point of view of the experts.

3. Research Methodology

This is an apply research and descriptive in nature. In order to collect the required data of this research, a researcher-made questionnaire was used. To ensure the formal and content validity of the questionnaire, the questionnaire was provided to 5 faculty members in the field of knowledge management and their views were obtained; Then the items they agreed on were used in the questionnaire and the cases in disagreement were resolved; Their corrective comments were also presented in the questionnaire and the questionnaire was returned to them. The questionnaire was assessed appropriate to evaluate the factors by consensus. Cronbach's alpha method was used to ensure the reliability of the questionnaire; a sample of 40 active employees in the field of knowledge management of the university was asked to fill in the questionnaire and the obtained data were analyzed and the results are presented in Table 4.

Table 4
Reliability of the first questionnaire by using Cronbach's alpha method

Scale	Alpha coefficient	Number of items	Number of subjects
Cronbach's Alpha	0.83	76	40

As can be seen, Cronbach's alpha coefficient for the factors affecting the use of KM tools is 0.83. Christmann and Van Aelst (2006) stated that for subjects used for research purposes, a correlation of 0.70 or more is sufficient. Therefore, according to the obtained coefficient, the questionnaire can be used in this study. The statistical population of this study is 210 people who are all faculty members and staff of the corporate university under study. Considering the constraints of the statistical society, 147 professors and university staff were selected through a targeted sampling method as a statistical sample.

Due to the specialty topic, a workshop was conducted in the form of a knowledge-based course with the presence of the statistical sample of the research and at the end of the course, the questionnaire was distributed. Data were analyzed by SPSS software by using descriptive statistics such as mean, standard deviation, variance and inferential statistics (t test and Friedman test).

3. Findings

In order to identify the factors affecting the success of KM tools in the research projects of the university, in the first stage, by using the research literature, the factors affecting the success of KM tools were gathered. In the second stage, these factors were provided to the statistical sample specified in the university studied and they were asked to confirm or reject the validity of these factors and, in the next step, in an interview with the experts, they were asked to present, in addition to the identified factors in the research literature, the other key factors that contribute to the success of KM tools in the research projects of the university. Table 5 shows descriptive statistics indexes of the success factors of using knowledge management tools. The number of accepted questionnaires is 147.

Table 5
Frequency distribution of descriptive statistics indexes of success factors of using tools

Variable name	Domain	Lowest	Most	Mean	Standard deviation	Variance
Culture	1.33	3.11	4.44	3.8768	0.27283	0.074
Information technology	1.33	3.33	4.67	4.0907	0.24692	0.061
Strategy and goal	2	2.6	4.6	3.6884	0.3833	0.147
Organizational infrastructure	1.75	2.75	4.5	3.7296	0.38874	0.151
Employees motivation	1.5	3.5	5	4.4252	0.35163	0.124
Leadership and management support	1.6	3	4.6	4.0095	0.31781	0.101
Human resources management	1.75	3.25	5	4.2024	0.35275	0.124
Training	1.4	3.4	4.8	4.0435	0.31188	0.097
Financial and credit resources	1.71	3.14	4.86	4.1866	0.2694	0.073
Measurement	1.18	3.18	4.36	3.7854	0.24098	0.058
Processes and activities	1.4	3.4	4.8	4.0095	0.31695	0.1
Structure	2	3	5	3.9524	0.37841	0.143
Communications	1.83	2.67	4.5	3.6145	0.35693	0.127

In order to know the significance level of the 13 factors affecting the success of KM tools, single-sample t-test was used, the results of which are shown in Table 6.

Table 6

Table of comparison of the studied variables (with an average of 3 based on 5 point Likert scale)

Name of variable	Average	Standard deviation	Average difference	t value
	3.8768	0.27283	0.8768	38.965
Information technology	4.0907	0.24692	1.0907	53.556
Strategy and goal	3.6884	0.3833	0.68844	21.776
Organizational infrastructure	3.7296	0.38874	0.72959	22.755
Employees motivation	4.4252	0.35163	1.42517	49.141
Leadership and management support	4.0095	0.31781	1.00952	38.513
Human resources management	4.2024	0.35275	1.20238	41.328
Training	4.0435	0.31188	1.04354	40.567
Financial and credit resources	4.1866	0.2694	1.18659	53.402
Measurement	3.7854	0.24098	0.78541	39.516
Processes and activities	4.0095	0.31695	1.00952	38.618
Structure	3.9524	0.37841	0.95238	30.514
Communications	3.6145	0.35693	0.61451	20.874

N=147; DF=147; sig=0.00; P<0.01

The status of these factors in the knowledge management cycle of research projects in the studied university is higher than the average and is considered as effective factors in the KMS. In this research, “employees' motivation” with number 49.141, maintains the highest value of t and the “relationship” with 20.874 had the lowest value of *t*.

Friedman statistical test was used to compare the approved factors above and their prioritization in the knowledge management system of the studied university. The results are summarized in Table 7. It needs to be explained that this test has examined the difference between the total rank of the three correlated groups or more and does not have necessary sensitivity in the case of the pairwise comparisons. Therefore, the differences observed in this Table indicate the order of total rankings and the difference between the rankings cannot be deduced from this test

Table 7

Comparison and prioritization of the success factors of using tools in the knowledge management cycle of the university under study

factor	Average	Mean rank
Culture	3.8768	5.97
Information Technology	4.0907	8.32
Strategy and goal	3.6884	4.41
Organizational infrastructure	3.7296	4.83
Employees motivation	4.4252	11.06
Leadership and management support	4.0095	7.38
Human resources management	4.2024	9.17
Training	4.0435	7.61
Financial and credit resources	4.1866	9.36
Measurement	3.7854	4.93
Processes and activities	4.0095	7.19
Structure	3.9524	6.92
Communications	3.6145	3.84

N=147; DF=12; Chi-Square=548.068; sig=0.00; P<0.01

As can be seen, the value of Chi-Square calculated for factors influencing the knowledge management cycle with 12 degrees of freedom is 548.068 which is statistically significant at the level (0.01> P); Therefore, there are differences between the factors mentioned in the above table and according to the

means ranking, the factors listed in Table 8 are in higher priorities respectively.

Table 8
Success Factors of Knowledge Management Tools in priority order

Factor	Mean rank
Employee motivation	11.06
Financial and credit resources	9.36
Human resources management	9.17
Information Technology	8.32
Training	7.61
Leadership and management support	7.38
Processes and activities	7.19
Structure	6.92
Culture	5.97
Measurement	4.93
Organizational infrastructure	4.83
Strategy and goal	4.41
Communications	3.84

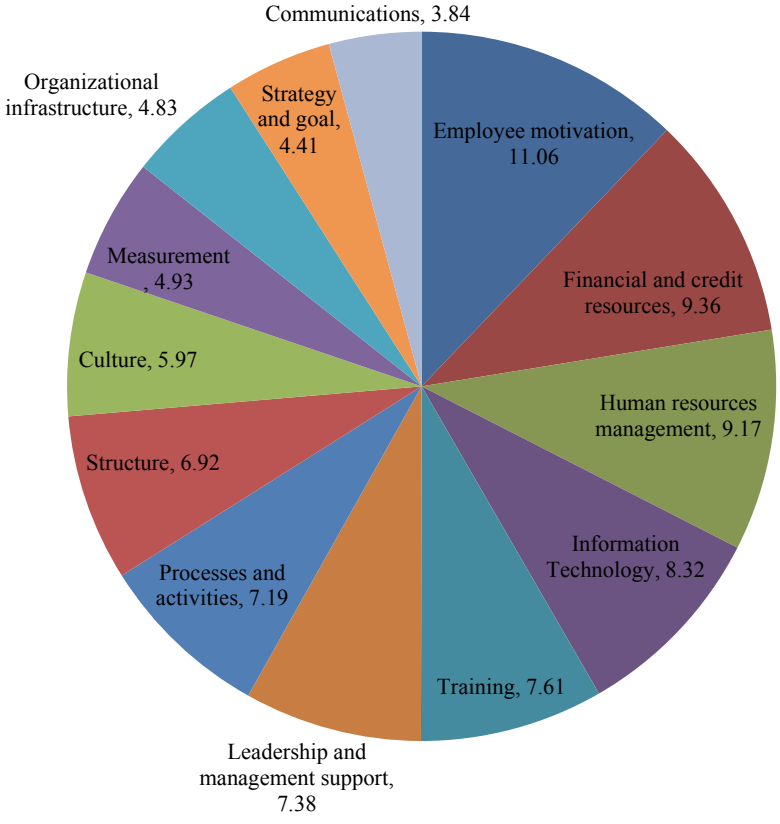

Fig. 2. Success Factors of Knowledge Management Tools

4. Conclusion

In the present study, the most important factors for the success of using knowledge management tools in the studied university are employee motivation, resources, human resources management, information technology, education, leadership and management support, processes and activities, structure, culture, measurement, organizational infrastructure, strategy and goal, and communication. As we can see, the first three factors (motivation of staff, resources, human resources management) are human-motivational in nature, and they are in some way related to the empowerment of employees, and it seems that in the studied university, it needs to pay more attention to the motivational factors, and the quantity and speed of payment of doing researches; Considering the university hierarchy and the high degree of administrative formalities, the results are in line with the current state of the university and confirms the necessity of promoting the incentive system and eliminating administrative bureaucracy for payment. In this regard, the results of studies by other researchers also confirm the findings of the research, For example, Davenport et al. (1998), argued that the organization must change its motivational activity in the direction of knowledge management; Researchers who care about human values argue that job satisfaction must be one of the main goals of the organization, and organizations must provide conditions that keep employees satisfied (Sarker et al., 2003). The information technology factor is ranked next to human-motivational factors and, in addition to its importance, confirms the necessity of strengthening this dimension. Knowledge management can play a very important role with the proper use of information technology (Alavi & Leidner, 2001).

Developing an intranet and creating computer centers can also play a key role in knowledge sharing. By reviewing the appropriate tools in the knowledge sharing process of the research projects of the university, IT-based tools were ranked higher. In the meantime, the research findings are consistent with the current status of the university and confirms the development of information technology. Among the confirmed factors for the success of the use of KM tools, training has the next rank. To manage knowledge successfully, it is necessary to invest sufficiently in management and staff training. Members of the organization must be aware of the need for knowledge management and its perception as vital source of vitality and organizational growth. This can be achieved by providing basic training to the staff. In addition, the use of knowledge management systems and other KM tools must be taught to the employees. By doing this training, one can be sure of their ability to use the capabilities of these tools. Also, people need to be trained to understand their new roles in carrying out their tasks related to knowledge. Equipping the staff with knowledge sharing skills and creativity and innovation is also important (Hasani & Sheikhesmaeili, 2016).

In the analysis carried out, the mean rank of the factors of culture, measurement, organizational infrastructure, strategy, and goal, and communications are in the next lines, and this question is put forward in mind, which, despite the high value that the factors mentioned in the literature of the research and also seen in the findings of other researchers, why do these factors rank as the next? In response to this question, it should be said that, regarding the confirmation of the factors mentioned in the present research, respondents also recognized the importance of these factors. Therefore, by comparing and adapting the current status of the studied university, with each of the mentioned factors, the status of the factors is evaluated at an appropriate level and is ranked in the lower priority by the respondents.

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