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Modeling Senior Managers' Supportive Behavior in Knowledge Management Implementation: A Theory of Planned Behavior Perspective

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ABSTRACT

A crucial factor for successful knowledge management is strong support from senior managers across all organizational levels. However, few studies have explored how senior managers' supportive behavior directly influences knowledge management implementation and improvement. This research proposes and tests a model using the Theory of Planned Behavior (TPB) to predict the formation and enhancement of senior managers' supportive behavior in implementing knowledge management. Data was collected through a questionnaire distributed among 101 senior managers and employees in project-oriented organizations within Iran's Power Plant Industry. The model was analyzed using Structural Equation Modelling (SEM). Results show that the components of mental attitude, social norms, and perceived behavioral control significantly influence the behavioral intentions of senior managers to support knowledge management. Strengthening these components can increase senior managers' support, thereby positively impacting the overall success of knowledge management within the organization. This insight underscores the importance of leadership in driving knowledge management success.

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1. Introduction

Knowledge management is one of the new subjects in scientific and professional discussions and many fields of knowledge, including cognitive science, sociology, management science, information science, knowledge engineering, AI and economy (Farzin et al., 2014). Knowledge management provides an integrated approach to identifying, evaluating, retrieving and sharing all information assets of a company. These assets consist of databases, documents, policies, methods and receiving previous expertise and experience of any employee (Meihami & Meihami, 2014; Pereira et al., 2021). Nowadays, organizations have found that in order to stay competitive in the market, it is necessary to acquire knowledge and apply it effectively as a strategic resource (Tseng et al., 2012). Therefore, companies require a methodological exploitation of their knowledge to succeed (Mahdi et al., 2019).

Applying the obtained knowledge from success or failure in the conducted projects in project-oriented organizations is one of their main concerns due to the number and the temporary nature of the project and the need for various specialties (Ajmal & Koskinen, 2008; Areed et al., 2021; Lindner & Wald, 2011; Söderlund et al., 2014; Sydow et al., 2004) Investigating the position of management shows that applying knowledge management in project-oriented organizations is far from that of the international firms. Those organizations are considered successful if they can learn and use modern knowledge (Ujwary-Gil & Godlewska-Dzioboń, 2022). Teixeira et.al addressed the subject of knowledge management success in organizations (Teixeira et al., 2022). This research, while stating that knowledge management is now an important competitive incentive for developing dynamic features in businesses, some of the critical factors, such as lack of knowledge management strategy, cultural aspects, leadership and technology prevent successful implementation of knowledge management in organizations. Its results show that collaborative design may help the implementation of knowledge management in small and medium-sized companies through using available but underutilized technology tools. Another research was also conducted to identify and understand the factors affecting knowledge management success using an integrated approach of Analytical Hierarchy Process (AHP) and Decision-Making Test and Evaluation Laboratory (DEMATEL) to rank these critical factors of success and understand their reciprocal relations. The findings have determined organizational factors (cultural aspects, organizational structure, senior managers' support), technology factors (adopting technology, support of infrastructure, collaborative systems) and human resource factors (teaching and learning, agile workers, sharing knowledge) as the critical factors for success (Singh & Pradhan, 2024).

The conducted studies to address the success of knowledge management in the organization, have considered the main principles of knowledge management, such as technology, knowledge processes and organizational culture. Although, the "organizational culture" was considered as an important stimulus (Oltra, 2005), the studies investigated this factor showed that its role in the success of knowledge management is less than the two other factors. Among the factors related to organizational culture, senior managers' support was one of the key factors affecting the success of knowledge management (Du Plessis, 2007).

Despite the growing popularity of knowledge management in education and business, ambiguities remain about its optimal application. This research explores the supportive behavior of senior managers in project-oriented organizations, focusing on how they anticipate future projects and record lessons learned, given the temporary nature of projects. The study highlights gap in effectively implementing knowledge management systems, the scarcity of literature on its success, and managers' supportive roles. Using the Theory of Planned Behavior (TPB), the research examines how managers' supportive intentions influence their actions and identifies factors affecting management support. It raises key questions

about evaluating managers' support for knowledge management and understanding its influencing factors, emphasizing the need for deeper study in this field. These inquiries aim to clarify the role of senior managers in fostering knowledge management success in dynamic organizational contexts. Accordingly, two research questions have been considered as follows:

1. What factors affect the senior managers' supportive behavior in the implementation of knowledge management?
2. Which components play a key role in the formation of this behavior?

In the following, in order to answer the above-mentioned questions, after reviewing available literature and using the theory of planned behavior, we developed and tested a model to effectively predict the supportive behavior of senior managers regarding the implementation of knowledge management. In the research methodology section, we explain the way of analyzing the model and hypotheses using modeling and structural equations (SEM).

According to the obtained results, this research can enhance the understanding of managers in project-oriented organizations about supportive behavior, through identifying the necessary components to stimulate the supportive intention of senior managers. Moreover, it can state the concept of these components to form the strategy of the organization towards the success of knowledge management.

2. Literature

2.1 Factors affecting the success of knowledge management

The factors affecting the success of knowledge management are the results of necessary activities and measures to successful implementation of knowledge management. Ghomi et. al. (2018) conducted a study to determine the critical factors affecting success in using knowledge management tools, including human motivational factors such as employees' motivation, resources and human resources management; IT; Education; management and leadership support; processes and activities; structure; culture; measurement; infrastructure; organizational goal and strategy; relationship based on available frameworks and models (Ghomi & Barzinpour, 2018).

The results of another study conducted by Sensuse et. Al., confirmed five important factors of the mentioned ones, including "senior management or leadership's support", "organizational and personal culture" (for example: motivation and commitment of individuals), "technology" (including the development of knowledge management infrastructure to achieve information), "strategy" (such as organizational objectives) and "regulations and policies" (to improve knowledge sharing process) (Sensuse et al., 2018).

Yang et. al, also presented a summary of CSFs including 4 main categories of organizational factors, individual factors, knowledge and capability of knowledge management and organizational performance (OuYang et al., 2010).

Another study has referred to technology, knowledge processes and organizational culture as the factors affecting the success of knowledge management in organization (Sivan, 2000). All of these three factors are significant considering the context and structure of the organization. However, according to the majority of conducted studies, the factor of organizational culture has been considered as an important incentive (Oltra, 2005). Moreover, another in-depth and comparative study identified seven critical success factors (CSF) along with their relevant elements. These factors include organizational culture, leadership in management, organizational structure, manager or human resources, information technology, measurement system and organizational strategy. These CSFs analysis indicated that leadership and senior manager's support and organizational culture factors are the most important factors

(Bello, 2015; Du Plessis, 2007). Wong et. al, (2005) identified 8 common factors as the factors affecting knowledge management success in organizations (Yew Wong & Aspinwall, 2005). These factors include economic performance or industrial value, clear goal and language, standard and flexible

knowledge structure, multiple channels to transfer knowledge, knowledge-friendly culture, technical and organizational infrastructure, changes in motivational practices and senior management's support. In addition, qualitative research in 2006 has investigated the mid-level managers' understanding of knowledge management implementation in New Zealand organizations regarding two important subjects of obstacles and drivers of knowledge management. This research has paid more attention to internal factors such as leadership, organizational culture and training, as well as external factors such as competition, more productivity and collaboration. The obtained results show that managers who manage themselves consider their organizations as the greatest obstacle to the implementation of knowledge management (Mason et al., 2008).

Generally, senior managers' support includes resource allocation, leading and training. Management support is to guide and meet the needs of the organization to ensure the appropriate allocation of resources and creation and maintenance of knowledge, knowledge sharing and creating a developed organizational culture (Abbas et al., 2020; Jennex et al., 2007). Senior managers and leaders should do their best to promote the collaboration mindset that emphasizes sharing knowledge in the organization. They should understand the company's culture, value and beliefs and support promoting knowledge during the knowledge process. Moreover, managers should help create an environment for knowledge development and mutual learning. The important issue is that their support and commitment should be continuous from the beginning to the end, and support the efforts towards knowledge management (García-Sánchez et al., 2017; Lindner & Wald, 2011; Yew Wong & Aspinwall, 2005). Managers should encourage their employees to voluntarily demonstrate the ability to use and create knowledge to support knowledge management. In the meantime, the leadership should develop its facilitating and guiding role (Donate & Guadamillas, 2011). Senior management's support is measured based on criteria such as allocation of sufficient resources, encouraging employees to use IT, support and training (Jacqueline et al., 2024; King et al., 2002).

In general, reviewing the literature showed that up to now, various factors and indicators related to knowledge management have been identified by different researchers. Table (1) shows a summary of critical factors affecting successful implementation of knowledge management in organizations.

Table 1. *The factors affecting successful implementation of knowledge management*

Critical and necessary factors for successful implementation of knowledge management	**Source**
Creating a reward strategy, desire to share knowledge, mechanism for approving activities, a friendly system for sharing and reusing knowledge, senior management's support	(Lin, 2006)
Knowledge architecture, identifying knowledge, sharing knowledge, saving knowledge and knowledge strategy, re-engineering, organizational structure, training plans, pilot, CEO's support, culture, clarity, trust	(Akhavan & Jafari, 2006)
Management: CEO's support and commitment, strategic planning and spending money- organizational structure, clarity, decentralization, knowledge centers- human resources that include knowledge committees, network of experts, conferences and sharing knowledge- culture: trust, clarity, alignment of knowledge strategies and organizational strategies, sharing knowledge- KM architecture; - others: pilot, IT, training plans, business process reengineering (BPR).	(Jafari et al., 2008)
Organizational factors: management support, technology support, organization' structure, training, reward, leadership Individual factors: learning attitude, trust, openness, motivation, compatibility, factors related to individuals Knowledge: knowledge structure, knowledge resource Capability: sharing, creating, and using KM Organization performance: financial index, management index	(OuYang et al., 2010)
Leadership: senior managers' support, Culture: collaboration, trust, technology KM strategy should be integrated with the business strategy of the organization Individuals: motivation	(Theriou et al., 2011)
Senior manager's support of knowledge management initiatives, -managing and motivating employees, -organizational culture, -knowledge structure, -training and learning, -knowledge strategy, -relationships between employees in the organization, -IT infrastructure, -executive management	(Arif & Shalhoub, 2014)
- Human resources; -information technology (IT), -leadership, -organizational learning, -organizational strategy, -organizational structure, -organizational culture	(Al-Hakim & Hassan, 2016)
-Employees' motivation, -financial resources, -human resources management, -IT, -training, -leaders and managers' support, -processes and activities, -structure, -culture, -measurement, -organizational infrastructure, -strategy and goal, -communication.	(Ghomi & Barzinpour, 2018)
- Readiness to adopt the new system, -reward and acknowledging human resources, -personal engagement and commitment to knowledge management practices, - senior manager's support and encouragement.	(Ganapathy & Uma, 2019)

-leadership, -culture: time, appreciation, general view, communication, -structure, roles and responsibilities, -technology: user-friendly system, sufficient infrastructure, knowledge base.	(Heryanto et al., 2020)
-enhance capabilities and abilities: employees training, employees' enablement, employees' engagement, sharing knowledge, focus. -long term commitment and innovation: reward policies, trust, senior management support, knowledge strategy, formalization -synergistic work culture: collaboration, open communication context, learning from mistakes, access to infrastructures of web and hardware	(Yap & Toh, 2020)
Culture, motivation, conflict, IT and communication, trust and leadership	(Davidavičienė et al., 2020)
-structure -culture -leadership -trust	(Rezaei et al., 2021)
-knowledge management strategy; -organizational structure; -productivity indicators; -resources; -reengineering; -organizational culture; -senior manager's support; -training; -human resources management; -technology infrastructure; knowledge management processes; -social-economic environment; -political impacts; -industry impacts; -environment impacts	(Teixeira et al., 2022)
-sharing knowledge based on HRM, information technology integration in teaching methods, alignment of organizational culture, perceived effectiveness of training, and perceived senior management support	(Jacqueline et al., 2024)

2.2. Components of supportive behavior of senior managers in the success of knowledge management – the factors affecting the success of knowledge management

Senior management's support refers to the degree of senior management's acknowledgement of the importance of knowledge management, as well as the degree of participation of senior management in knowledge management performance. Continuous support of senior management of the organization is useful for long term competition. And finally, senior management's support and participation can significantly affect the success of knowledge management in the organization. Factors of senior management's support and leadership, individuals and IT are the most important factors of successful implementation of knowledge management in organizations (Azmi et al., 2018). The impact of the role and behavior of managers on the success of knowledge management are determined based on components involving indicators for evaluation that a manager should do to support knowledge management. Table (2) shows the indicators obtained from reviewing the articles in the field of knowledge management by focusing on the way of formation of senior management's support, strengthen it and evaluating the supportive indicators of knowledge management in organizations by senior managers.

Table 2. *The components of supportive behavior of senior managers (Author)*

Row	Indicator	component	References
1	-Considering a specific budget in the organization for knowledge management activities -Hiring employees or skill and expert	Allocating sufficient resources appropriately (human and financial)	(García-Sánchez et al., 2017; Kavalić et al., 2021; Lindner & Wald, 2011)
2	-Focus on individuals and informing the expert -Clarifying the needs for learners and identifying training opportunities -Using incentives -Connecting individuals with an enthusiastic person who has competency in the field of knowledge management -Fostering the culture of sharing and creating knowledge through encouragement and training	Managers participation	(Dubey et al., 2017; García-Sánchez et al., 2017; OuYang et al., 2010; Yew Wong & Aspinwall, 2005)
3	-Creating groups with the aim of focusing on development and performance of the group to provide chances for group discussions and fertilizing ideas and responding to all questions and listening to problems and increasing skill and support as well as connecting people with those individuals with higher competency in the field of knowledge management -Monitoring the activities of knowledge management and continuous support -Manager's presence in the activities of knowledge management -Developing the necessary instructions to make all processes knowledge-based	Leader and facilitator and guide	(Bueno & Gallego, 2017; Dubey et al., 2017; García-Sánchez et al., 2017)
4	-Encouraging and rewarding by managers for active experts collaboration in creating and sharing knowledge in the field of knowledge management	Encouraging and rewarding employees to use technology and knowledge management	(Dubey et al., 2017; King et al., 2002)
5	-Holding introductory courses with knowledge management -Holding introductory courses with information systems	Training plans	(Dubey et al., 2017; King et al., 2002)

According to Tables (1) and (2), low quality of leadership was identified as a threat for successful implementation of knowledge management. Nowadays, senior managers have found that the inherent knowledge of the organization is a valuable asset, which should not be left without management and influence. In fact, in order to realize the potential of implementing knowledge management, companies' managers should provide an appropriate context for motivating employees to create, organize and share knowledge (Cristina, 2009). In order to achieve this goal, senior managers should change their attitude towards the extent and way of supporting knowledge management in organizations. The role and behavior of managers is determined by components including the indicators for evaluation that a manager should meet them to support knowledge management. However, yet no empirical study has been conducted to address senior managers' support of knowledge management in the organization considering all effective components and indicators. So, this study is focused on the support of senior managers as an important prerequisite to create an environment to share organizational knowledge.

2.3 The theory of planned behavior

The theory of planned behavior (TPB) is a social-cognitive theory that provides a useful framework to predict and understand managers' social behavior and supportive behavior for the implementation of knowledge management. This theory assumes that every human behavior has a reason and people consider the results and consequences of doing or not doing this behavior before doing it. Moreover, people consider availability of resources and information before doing that behavior and then make decision about doing or not doing it. Therefore, the person behaves the way she/he has consciously decide on. Table (3) shows the concepts related to the attitude, subjective norms and perceived behavior control based on the person's beliefs (Jahanfar & Hajaliakbari, 2015)

Table 3. *The main infrastructure of the theory of planned behavior (Ajzen, 1991)*

Main factors	Definition
The person's attitude towards behavior	A positive or negative feeling about doing a certain behavior
Subjective norm	Person's perception about most of the people who are important to him/her, how do they think and to what extent she/he should consider their dos and don'ts in his/her behavior.
Perceived behavior control	The simplicity and difficulty of a behavior from the person's point of view "perception of internal and external constraints on behavior" (Taylor, 1995; quoted by Khoshkam, 2012, p. 78)

According to TPB, the higher the intention for a behavior, the more likely it is to do it.

Conducted studies show that senior managers play a key role in promoting and developing organizational culture. In this regard, this research examines the following hypothesis: it is assumed that intentions are motivating factors affecting the behavior.

They are signs of how much the people are eager to effort, and how much of that effort is applied in their behavior. As a general rule, in order to do a behavior, the stronger the intention, the more likely it will be done (Ajzen, 1991). This theory suggests that a person's decision on a certain behavior can be predicted by their intention to do that behavior.

In the field of sharing knowledge, Ryu et.al., (2003) used TPB to predict belief factors affecting the behavior of sharing knowledge by professional groups. The Theory of Planned Behavior (TPB) effectively explains senior managers' encouragement of knowledge sharing within organizations. Experts' sharing behavior is influenced by attitudes, norms, and perceived behavioral control. This study's TPB-based model suggests that senior managers' encouragement impacts employees' actual knowledge-sharing behavior. Managers' intent to promote knowledge sharing is shaped by attitudes, norms, and behavioral control perceptions. Following the identification of research factors and parameters, the study will detail the methodology used to examine these dynamics.

3. Method

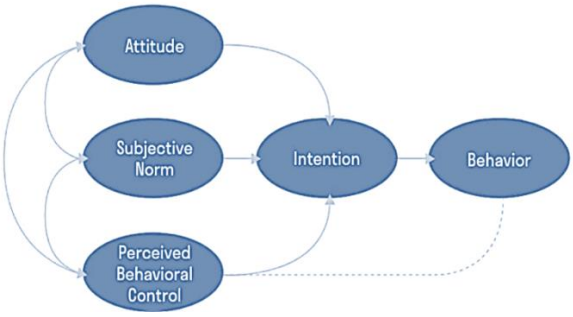
As the purpose of this research is investigating how the supportive behavior of senior managers regarding the implementation of knowledge management is formed and how to promote this behavior in project-oriented organizations, it is conducted using Structural equation modeling method (SEM), a new statistical method and one of the most powerful multivariate analysis methods (Byrne, 2013; Jöreskog, 2005). This research methodology is a combination of factor analysis and regression or path analysis. The structural model has examined the relationship between latent variables with each other. These relations are defined based on the researcher's assumptions and the research structural model is formed based on them (Fadaie et al., 2023).

LISREL 8.8 was used for SEM. Normality was assessed using Mardia's test (skewness = 12.4, kurtosis = 28.7, $p<0.05$) and Kolmogorov-Smirnov tests, revealing non-normality due to ordinal Likert-scale data. Thus, Weighted Least Squares Mean and Variance adjusted (WLSMV) estimation was employed, as it is robust to non-normal distributions and suitable for ordinal data (Byrne, 2013). A robustness check with Robust Maximum Likelihood (MLR) confirmed consistent path coefficients. (Lomax, 1982).

3.1 Conceptual model of the research

This research focuses on the factors affecting the supportive behavior of senior managers for the implementation of knowledge management in the power plant industry. We have tried to develop a conceptual framework of the research by identifying the independent and dependent variables. Then, we investigated the relations between the variables using structural equation modeling. Studies show that TPB can effectively model and explain organizational behaviors (Chang, 1998; Kurland, 1995; Millar & Shevlin, 2003; Santhanam, 2002). Figure (1) shows how each of the components are related to others in the theory of planned behavior. This question is raised: what factors affect the supportive behavior of senior managers for the implementation of knowledge management?

Figure 1. The Theory of Planned Behavior model adapted (Ajzen, 1991)



Studies show that managers support knowledge management by modeling behavior, promoting information sharing, fostering a continuous learning environment, seeking new knowledge, allocating resources, leading, and training. However, limited research explores how such support develops in project-oriented organizations or what is expected from management's supportive behavior. This study examines the influence of behavioral intention on supportive actions through the Theory of Planned Behavior (TPB). Understanding these factors aids organizations in identifying what drives managers' supportive intentions. Consequently, the hypothesis proposed is:

H1) There is a positive significant relationship between the supportive behavior intention and the extent of support of senior managers for the implementation of knowledge management.

Our personal attitude towards a certain behavior is the result of all positive and negative knowledge, attitude and prejudices that we think about them while doing a behavior (Brookes, 2021). Therefore, one of the considered components in TPB, is attitude test which is one of the predictors of senior managers' behavior intention. Attitude towards behaviors significantly affects behavior intention. It means that the desire of senior managers for the success of knowledge management is very important. Consequently, the second hypothesis of the research is:

H2) There is a positive significant relationship between manager's attitude and the intention for the supportive behavior.

Subjective norms (meaning that how we consider the beliefs of others about a certain behavior) for these can be the attitude of

family, friends and colleagues towards that behavior. This is not what others think, it is our perception of others' attitude. Therefore, according to TPB, one of the components affecting the people's behavior is social or subjective norms. Subjective norms directly show the attention of others to that behavior, which includes approval and disapproval of the behavior by others (Ajzen, 1991).

Conducted studies show that the impact of this component is more than the others. This research investigates subjective norms (social pressure) of senior managers from the organization or upper managers on their behavior. Consequently, the third hypothesis of this research is:

H3) There is a positive significant relationship between norms of a manager with the intention of a supportive behavior.

Perceived behavior control is the degree of control we believe have over our behavior. This degree depends on the person's perception of internal factors such as ability and intention, as well as external factors such as available resources and support. This theory argues that our perceived behavior control has 2 effects: first, it influences the person's intention of a certain behavior, meaning that the more the person thinks she/he has control over her/his behavior, the stronger her/his intention to do that behavior. Moreover, it directly affects the person's behavior; meaning that if he/she perceives that he/she has a high level of control, he/she will try more for success (Brookes, 2021).

According to TPB, the component of perceived behavior control refers to individual conditions, which include the degree of information, skill and the ability to feel and willingness of the person about a certain behavior. Behavior control (the power of influence, self-efficacy, easy access to resources and technology) has a significant impact on behavior intention. Accordingly, the fourth hypothesis of this research is:

H4) There is a positive significant relationship between the degree of perceived behavior control of manager and the intention of supportive behavior.

In addition, this theory states that perceived behavior control is an estimation of the skills required for showing behavior and the possibility to overcome obstacles. Therefore, it is considered that the perceived behavior control has a direct impact on behavior. The perceived behavior control refers to the person's awareness and understanding of easiness and difficulty of expressing the desired behavior. Moreover, it is different in all situations and actions. It states that depending on the situation, the person has a different perceived behavior control.

H5) There is a positive significant relationship between the degree of perceived behavior control of managers and supportive behavior.

H6) There is a positive significant relationship between manager's attitude towards supportive behavior and mental values of managers about knowledge management. Figure 2 shows the conceptual model of the research.

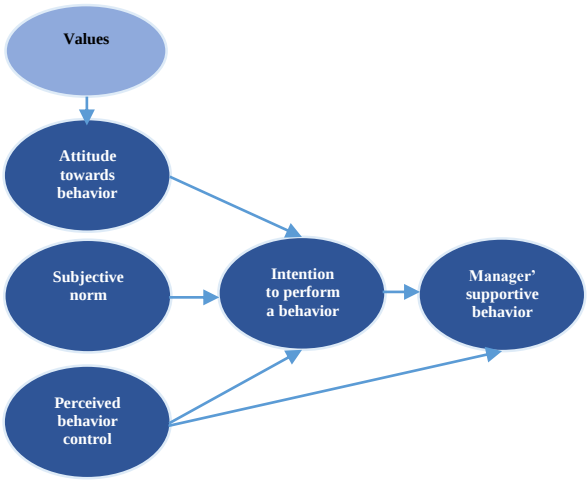


Figure 2. *Research conceptual model (Authors)*

This model predicts the occurrence of a certain behavior, provided that the person intends to do it. Based on that, the intention to do a behavior is predicted by three factors of attitude towards that behavior, subjective norm and perceived behavior control. This research investigates the relationship between three variables of attitude, subjective norms and perceived behavior control towards senior managers' supportive behavior on the managers' support intention, as well as the relationship between senior managers' support intention on their supportive behavior and the relationship between perceived behavior control and senior managers' supportive behavior. In this research, senior managers' supportive behavior indicators are selected as independent variables to investigate their impact on forming senior management's supportive behavior as the

dependent variable and with the presence of mediating variable of managers' support intention.

3.2 Sampling and data collection

The statistical population of this research consists of all managers at different levels of the organization, such as strategic managers, top managers, middle managers, executive managers and board members, as well as staff experts, project experts and knowledge management team of the organization in the power plant industry in Mapna company (one of the largest holdings leading in the implementation of knowledge management). A stratified random sampling method was used to select subjects. At first, the employee groups (managers and experts) of Mapna Company in the power plant industry were selected through stratified sampling method as representatives of the society with the same proportion as they exist in the society. Then, the subjects were selected from each stratified group through simple random sampling method, and the questionnaire was distributed among them. Stratified random sampling ensured proportional representation of managers and experts, followed by simple random sampling within strata. Inclusion criteria required managers to have ≥5 years of experience in managerial roles and experts to have ≥3 years in knowledge management teams, with involvement in KM-related decision-making. Exclusion criteria included questionnaires with >20% missing data or respondents without KM exposure. Control variables (age, tenure, organizational role) were included in SEM but had no significant effects ($p > 0.10$).

Supportive behavior items were adapted from Du Plessis (2007) and Yew Wong & Aspinwall (2005).

Content validity was confirmed by a panel of five experts (CVR > 0.80). Persian items underwent translation/back-translation for linguistic consistency.

EFA (KMO = 0.82, Bartlett's $p < 0.001$) confirmed a unidimensional structure (eigenvalue = 4.2, 68% variance), and CFA validated the structure (loadings > 0.70).

As in this research, the statistical population was limited, thus Cochran's formula was used to estimate the sample size. Initially, Cochran's formula estimated a sample size of 71 subjects (50 managers and 21 experts) for Mapna Company's power plant industry, with a 5% error rate and 95% confidence level.

Following reviewer feedback, we expanded the sample by adding 30 participants (20 managers and 10 experts) from the same strata, resulting in a total of 101 subjects.

A post-hoc power analysis using G*Power (version 3.1) confirmed adequate statistical power (0.85) for detecting medium effects ($f^2 = 0.15$, $\alpha = 0.05$, 5 predictors) (Byrne, 2013).

Table (4) shows the information of the statistical population.

Table 4. *Separation of the statistical population based on organizational classification*

Organizational category	Number of community	Number of sample members
Managers	81 people	70 people
Experts	36 people	31 people
Total	117 people	101 people

Data was collected through two questionnaires composed of two main sections (Appendix 1).

Questions of the questionnaire were developed based on items whose validity was confirmed in previous research and experts' opinions. The first questionnaire was filled out by managers of the organization. The second questionnaire was about measuring senior managers' supportive criteria that examined indicators related to the way managers support the implementation of knowledge management in the organization with 15 questions. This questionnaire was filled out by staff experts and project experts and knowledge management team members in the organization.

A five-point Likert scale was used to measure the variables of the questionnaire. Table (5) shows Cronbach's alpha value for each item (reliability coefficient for all existing variables based on the final report).

Table 5. *Cronbach's alpha value*

Test type	Stage		Number of samples	Number of items	Statistical value	AVE	CR	Fornell-Larcker
Cronbach's alpha	Questionnaire 1 (Related to managers)	Attitude	70	4	0.709	0.52	0.81	√AVE=0.72 > r (0.42–0.75)
		Subjective norm	70	4	0.877	0.58	0.89	√AVE=0.76 > r (0.45–0.78)
		Perceived behavioral control	70	4	0.801	0.62	0.87	√AVE=0.79 > r (0.50–0.78)

		Intention to perform behavior	70	4	0.871	0.68	0.92	√AVE=0.82 > r (0.48–0.75)
	Questionnaire 2 (Related to experts)	Management supportive behavior	31	5	0.889	0.65	0.90	√AVE=0.81 > r (0.42–0.75)

In the next step, we explained the demographic characteristics and descriptive indicators of variables and normality of data using SPSS software.

Finally, the hypotheses were tested through analysis, confirmatory factor analysis and structural equation modeling using Lisrel software (version 8.8). The following table describes the measurement of dispersion of variables' values. It shows descriptive information related to research variables, including the number of questions of each variable, average, mode, median, standard deviation, variance, range of changes, maximum and minimum data. According to the investigation, the component of attitude is more congruent than the supportive behavior (because attitude has the least standard deviation, 0.324) and is more incongruent than the subjective norm (because subjective norm has the largest standard deviation, 0.579).

Table (6) shows the result of descriptive analysis of variables in the research, the number of questions for each variable in the research, descriptive statistics including average, mode, standard deviation and variance of each variable.

Table 6. *Descriptive statistics of research variables*

Variable		**Question number**	**Average**	**Mode**	**Median**	**Standard deviation**	**Variance**	**Range of Changes**	**Lowest Data**	**Highest Data**
Questionnaire 1	Attitude	9 to 18	4.402	4.30	4.40	0.324	0.106	1.40	3.60	5
	Subjective norm	19 to 28	3.388	3.40	3.50	0.579	0.335	2.60	1.70	4.30
	Perceived behavioral control	29 to 38	3.152	2.80	3.20	0.467	0.218	2.20	2.30	4.50
	Intention to perform behavior	39 to 48	3.374	3.40	3.40	0.493	0.243	2.60	2	4.60
Questionnaire 2	Management supportive behavior	1 to 15	2.742	2.40	2.80	0.551	0.304	2.07	1.53	3.60

In Table (6), as standard deviation is a criterion for dispersion, the smaller it is, it indicates that the studied group is more homogeneous in terms of the measured factor, and vice versa, the higher value of standard deviation indicates incongruency. In terms of attitude, it is more congruent than supportive behavior (because attitude has the least standard deviation, 0.324), and in terms of subjective norm, it is more incongruent (because subjective norm has the largest standard deviation, 0.579).

Kolmogorov-Smirnov (KS) test was used to examine the data distribution of quantitative variables of the research. It shows the significancy level of each variable. In other words, data can be assumed normal with a high confidence. After examining normality of data and their significance level, we investigated the relationship between latent and explicit variables of the model with the

aim of determining the validity and reliability of the measurements. The confirmatory analysis was used to analyze the internal structure of the questionnaire and discover the constituent factors of each structure or variable. The results of confirmatory analysis show that all of the indicators related to research variables with a confidence level of 99 percent, have an acceptable factor loading values (more than 0.4). So, they are suitable indicators for research variables.

Measurement validity was assessed through CFA using LISREL 8.8. Factor loadings ranged from 0.71 to 0.89. AVE values were 0.52 (Attitude), 0.58 (Subjective Norms), 0.62 (Perceived Behavioral Control), 0.68 (Intention), and 0.65 (Supportive Behavior). CR values ranged from 0.81 to 0.92. HTMT ratios (0.42–0.78) and Fornell-Larcker criterion confirmed discriminant validity. VIFs (1.2–2.8) indicated no multicollinearity.

Table 7. *Measurement Model Validation (CFA Results)*

Construct	Items	Loadings	AVE	CR	HTMT	Fornell-Larcker	Construct
Attitude	4	0.72–0.85	0.52	0.81	0.42–0.75	√AVE=0.72 > r (0.42–0.75)	Attitude
Subjective Norm	4	0.74–0.88	0.58	0.89	0.45–0.78	√AVE=0.76 > r (0.45–0.78)	Subjective Norm
Perceived Behavioral Control	4	0.73–0.87	0.62	0.87	0.50–0.78	√AVE=0.79 > r (0.50–0.78)	Perceived Behavioral Control
Intention to Perform Behavior	4	0.75–0.89	0.68	0.92	0.48–0.75	√AVE=0.82 > r (0.48–0.75)	Intention to Perform Behavior
Management Supportive Behavior	5	0.71–0.86	0.65	0.90	0.42–0.75	√AVE=0.81 > r (0.42–0.75)	Management Supportive Behavior

4. Data analysis

In this research, in order to investigate causal relationships between variables, the structural equations method or multivariate analysis with latent variables have been used. Figure (3) shows the structural equations model for testing the research hypotheses. This model is in Standard Solution and T-Values mode.

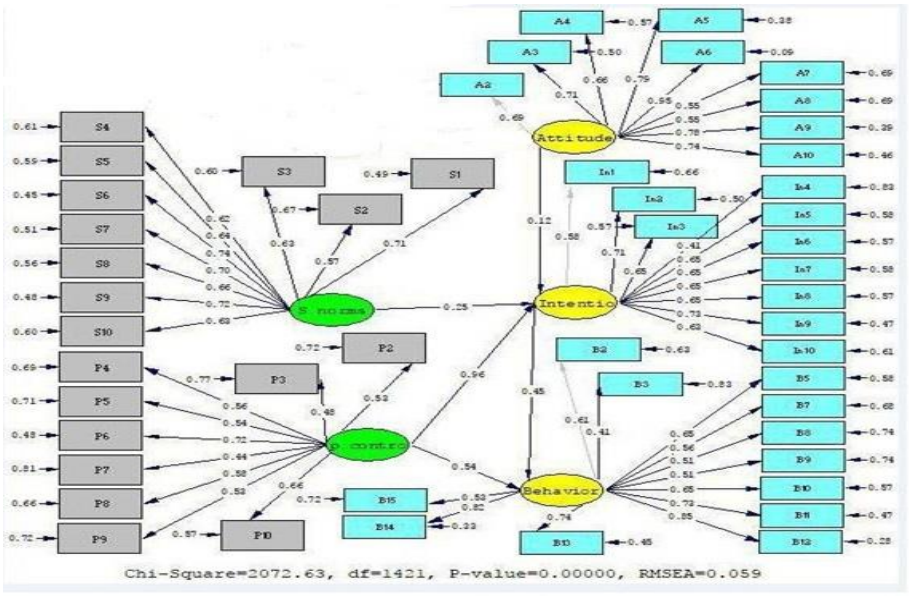


Figure 3. *Structural equation modeling- the research conceptual model (standard estimation)*

By examining fit of the model, it was possible to investigate compatibility of the model with data. Therefore, in the analysis of structural equations and before interpreting them, it was ensured that the model is suitable. Table (8) shows the most important and common index of fit.

Table 8. *Fit index of the conceptual model of the research*

Index name	Allowed limit	Obtained value	Result interpretation
$\frac{\chi^2}{df}$ (the square of the degree of freedom)	Less than 3	1.45	Excellent fit
GFI(goodness of fit)	Higher than 0.9	0.91	Excellent fit

AGFI (Adjusted fit index)	Higher than 0.9	0.89	Very good fit
RMSEA (The root mean square of the estimation error)	Less than 0.06	0.059	Excellent fit
CFI (Comparative fit index – adjusted)	Higher than 0.9	0.95	Excellent fit
RFI (Relative fit index)	Between 0 and 1	0.93	Excellent fit
NFI (normed fit index or Bentler-Bonnet index)	Higher than 0.9	0.94	Excellent fit
NNFI (Not Normed fit index)	Higher than 0.9	0.91	Excellent fit

As you see in Table (8), almost all indices are statistically acceptable. Therefore, with a high degree of confidence we can say that the researcher has achieved a perfect fit for this index.

In the following, Table (9) shows the research results of testing hypotheses and their significant relations.

Table 9. *Final results of testing hypotheses*

Hypothesis	**Relations**	**Type of relationship**	**Standardized coefficient β**	**T statistics**	**The result of testing hypothesis**
First hypothesis	The intention to do a supportive behavior- management supportive behavior	Significant	0.45	3.05	Confirmed
Second hypothesis	Attitude towards supportive behavior	Significant	0.12	3.68	Confirmed
Third hypothesis	Subjective norm- The intention to do a supportive behavior	Significant	0.25	3.77	Confirmed
Fourth hypothesis	Perceived behavior control- The intention to do a supportive behavior	Significant	0.96	10.89	Confirmed
Fifth hypothesis	Perceived behavior control- management supportive behavior	Significant	0.54	3.63	Confirmed
Sixth hypothesis	Knowledge management values- attitude towards supportive behavior	Significant	0.33	5.89	Confirmed
The high β for PBC → Intention is consistent with theoretical expectations in high-control settings. Collinearity checks (VIF < 3) and Harman's test (<50% variance) confirmed no methodological issues.					

The high standardized coefficient (β = 0.96, t = 8.12) between perceived behavioral control and intention reflects a strong relationship consistent with TPB studies in high-control contexts (Ajzen, 1991; Ryu et al., 2003). In Mapna Company's project-oriented environment, managers' significant control over KM implementation, amplified by cultural and organizational factors in Iran, likely strengthens this effect. Diagnostic checks confirmed no multicollinearity (VIF = 1.2–2.8) or common method bias (Harman's test: 42% variance explained), supporting the coefficient's validity.

According to Table (9), all hypotheses were confirmed using structural equations. There is a positive significant relationship between two variables of managers' supportive intention and their supportive behavior, and Hypothesis1 confirms it. High correlation coefficient indicates that managers are dependent on resources and facilities and control belief.

There is a positive significant relationship between two variables of managers' attitude and supportive intention, and Hypothesis2 confirms it. Attitude towards supportive behavior means that if managers think that it is desirable to support the implementation of knowledge management, their willingness to express supportive behavior will increase. As a result, the possibility of supportive behavior on their part will increase, too. There is a positive significant relationship between two variables of individuals' subjective norm and supportive intention, and Hypothesis3 confirms it.

The significant effect of subjective norm on managers' supportive behavior intention indicates that the opinion of other managers is also important. It means if a manager believes that other managers or the organization value his/her support, he/she will be more willing to support knowledge management. There is a positive significant relationship between two variables of perceived behavior control of individuals and their intention, and Hypothesis4 confirms it. This

issue indicates that managers are able to support, if they have sufficient resources at the right time.

There is a positive significant relationship between two variables of perceived behavior control and managers' supportive behavior, and Hypothesis5 confirms it. The intensity of this effect is 0.96, if we consider the support intention as a mediator. This issue indicates that the influence of behavior control factors is greater in expressing conscious behavior. The research model shows that the identified components properly influence supportive behavior intention and supportive intention has a positive significant impact on senior managers' supportive behavior. In addition, Figure (4) shows the structural model including path coefficients.

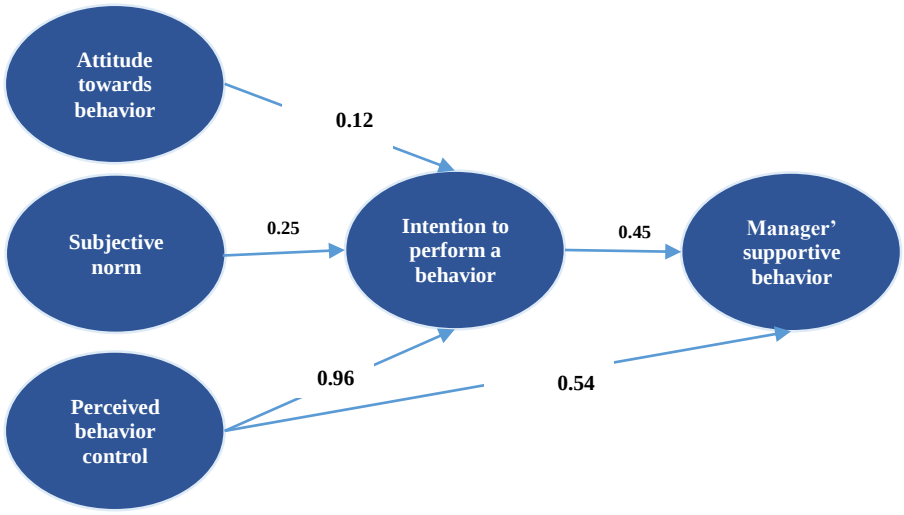


Figure 4. Final research model

5. Discussion

The main purpose of this research is showing the way of forming supportive behavior of senior managers for the implementation of knowledge management and the way of improving this behavior in project-oriented organizations. In this study, a research model was provided to effectively predict the creation and improvement of senior managers' supportive behavior for the implementation of knowledge management. The research results showed that the components of mental attitude, social norms and perceived behavior control have a positive significant relationship with senior managers' behavior intention to support knowledge management. By improving these components, we can increase the support of organization's senior managers, which plays a key role in the success of knowledge management in the organization. These results provide an important behavioral perspective about knowledge management, and highlights TPB's potential for organizational research.

Findings of this research are similar to those of the previous studies, as it has investigated the impact of attitude, subjective norms and perceived behavior control on managers' intention to support the implementation of knowledge management in project-oriented organizations (García-Sánchez et al., 2017; Kanwal et al., 2017; Lee et al., 2006; Yew Wong & Aspinwall, 2005). Specifically, this study shows that the role of senior management behavior to support knowledge management, significantly influences the organizational culture and experts' behavior in the field of knowledge management. These findings are consistent with the theory of planned behavior (TPB). They show that improving these components can increase senior managers' support for knowledge management. Moreover, in line with the findings of this research, Allen et.al., have also considered important the effective retention of knowledge under the influence of organizational and behavioral factors such as leadership support, strategic implementation and managing the risks of knowledge loss. They have also stated that retention of implicit knowledge is affected by providing a supportive environment (Martins & Meyer, 2012). Various studies show that senior managers' positive attitude and organizational culture significantly affect success of knowledge management (Bello, 2015; Jennex et al., 2007). For example, Kanwal et. al, (2017) also concluded that according to the accepted behavior pattern learning theory, senior managers' support influences employees' behavior. Meaning that in information system projects, if employees feel supported by senior managers, they will enthusiastically do their tasks. Moreover, the study conducted by Tavallaei et. al, (2021) confirmed that providing the necessary resources and tools for managers can increase their support for knowledge management.

6. Conclusion

Since no study has been conducted on senior managers' support behavior and intention to implement knowledge management in project-oriented organizations using TPB, one of the main differences of this research with other research is its focus on project-oriented organizations in the power-plant industry in Iran. Also, many other research addressed in the literature, have investigated knowledge management in other industries and countries, so cultural and organizational differences may have influenced the obtained results.

The first question of the research, "What factors affect the supportive behavior of senior managers in the implementation of knowledge management?" was examined in the section of the research conceptual model and theoretical background under the title of components of senior managers' supportive behavior. It included components of "allocating sufficient (financial and human) resources", "managers' participation", "leadership and facilitating and guide", "encouraging experts to use technology and knowledge management" and "teaching plans". Regarding the second question, which was looking for the factors affecting supportive behavior, according to the analysis, it was concluded that factors of attitude, subjective norms and perceived behavior control influence the supportive behavior of senior managers in project-oriented organizations. Moreover, it was found that the values formed in managers' minds affect their behavior. Therefore, to improve managers' supportive behavior of implementing knowledge management, they should have a desirable attitude towards that behavior. So, we should drive their mental values in the desired direction.

One of the most important findings of this research is the positive impact of senior managers' attitude towards knowledge management. With a positive attitude towards knowledge management, managers will be more willing to allocate enough resources, employ skilled staff, and participate in plans and activities related to knowledge management. This issue shows that changing senior managers' attitude can be used as an effective strategy to strengthen support for knowledge management. In addition, usually individuals' attitude towards an issue is the most effective factor on their behavior.

However, in this research, it is not considered that way. Although this research doesn't deny the relationship between attitude and intention, it is a very weak relationship. It is concluded that managers pay little attention to their attitude in expressing a supportive behavior.

Moreover, social norms play a key role in forming the behavior intention of senior managers. The managers who feel knowledge management support is encouraged by their peers and organization, are more willing to support this process. Therefore, creating an organizational culture where knowledge management is considered as a common value, can help improve senior managers' support. Perceived behavior control is also identified as a key factor in senior managers' support for knowledge management.

The managers who feel they have sufficient power and control to support knowledge management are more willing to do this job. This finding indicates that providing necessary resources and tools for managers can increase their support for knowledge management. According to research findings, subjective norms have a moderate effect on managers' behavior.

Meaning that on average they seek to please top managers, and also the organizations' strategies are a medium priority for their behavior. It can be concluded that managers have a relatively independent behavior regarding support for the implementation of knowledge management.

By carefully examining the findings, it was found that managers have sufficient motivation and opportunity to participate in knowledge management implementation activities at a moderate level. Moreover, it seems that organizations don't provide sufficient fund to managers to implement knowledge management.

The results of this research show that when a person does not intend to support, but he/she is in a situation that is possible to do that, he/she will support the implementation of knowledge management in the organization. Thus, this component is independently more effective in the support for knowledge management implementation compared to managers' attitude and their subjective norms.

According to the identified factors affecting the implementation of knowledge management, this research suggests that organizations should pay special attention to creating a reward strategy, willingness to share knowledge, a mechanism to approve activities, a friendly system for knowledge exchange and reuse, and senior managers' support. Also, providing a suitable context for employees' communication with knowledge experts and building groups for discussions and idea exchange can improve the culture of knowledge management in the organization. This study advances organizational knowledge processing by applying TPB to model

senior managers' supportive behavior in knowledge management (KM) implementation, a critical yet underexplored factor in project-oriented organizations. By providing empirical evidence from Iran's power plant industry, it bridges behavioral theory with KM practices, offering actionable insights for fostering knowledge sharing and retention. Practically, the findings guide organizations in designing leadership development programs to enhance managers' attitudes, norms, and perceived control, thereby improving KM success in dynamic contexts.

Finally, this research shows that leadership quality plays a key role in the success of implementing knowledge management. Leaders of the organization should provide an appropriate context to motivate employees to create, organize and share knowledge. This issue can realize the full potential of knowledge management in the organization and improve organizational performance.

The cross-sectional design limits causal inference, as it captures associations at one time point without establishing temporality. This constraint cautions against definitive causal claims. Future research should employ longitudinal or experimental designs to track changes in managers' intentions and behaviors over time, enhancing causal interpretations.:

- Considering the poor research culture and reluctance of some subjects, in some cases, they may not have stated their real opinion and feeling, and their answers may be influenced by personal bias.
- Lack of enough experts in the research subject in project-oriented organizations due to the novelty of the subject caused lack of enough field information compatibility with the culture and context of research.

It is suggested that future research:

- To study each of the managers' supportive behaviors using the planned behavior theory
- To develop the support maturity model of senior managers in project-oriented organizations for the implementation of knowledge management
- To provide solutions to improve the supportive behavior of managers for the implementation of knowledge management in project-oriented organizations
- To study the hierarchical model of value, attitude and supportive behavior of managers for the implementation of knowledge management considering the importance of managers' understanding and attitude towards their supportive behavior.

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Appendix (1)

Research questionnaire

Dear participant;

As you know, knowledge management is one of the factors of creating competitive advantage for organizations. Proper implementation of knowledge management in organizations requires various prerequisites, including senior managers' support. However, according to the conducted studies, the components required for supportive behavior of senior managers and the factors that strengthen this behavior have been ignored. Therefore, a research in the form of Master's thesis has been done to explain the supportive behavior of senior managers in project-oriented organizations regarding the implementation of knowledge management. The

following questionnaire is a part of the studies of this thesis. It has two parts. The first part is related to the factors affecting managers' support and is organized in 5 separate tables. The second part is about the indicators that measure the view of managers towards the values of knowledge management. Please read the attached questionnaire and state your comments based on your valuable experience in project-oriented organizations. It should be noted that it takes 10 to 15 minutes to fill put this questionnaire.

- Your organization? Yes No
- Age: under 30 years old 31-40 years 41-50 years 51-60 years More than 60 years old
- Current organizational position: executive manager middle manager Senior manager strategic manager board member other
- Email: …… (if you wish to know the results of the research, please write down your email)

▪ **First part:** The questionnaire to measure the factors affecting supportive behavior of senior managers for knowledge management.

Allocating sufficient resources (financial, human, facilities…)

Row	Item					
1	In my opinion, it is effective to allocate sufficient resources to the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
2	In my opinion, allocating enough resources accelerates and guarantees success and achieving the organization's goals regarding knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
3	Allocating sufficient and appropriate resources to knowledge management is institutionalized among the managers of our organization, so I also commit myself to allocate enough resources.	Completely disagree	Disagree	Middle	Agree	Completely agree
4	As allocating sufficient resources is important for achieving the goals and strategy of our organization, I also commit myself to follow the organization's plans and goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
5	In my opinion, I have the necessary expertise and experience in the field of allocating appropriate resources to knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
6	The organization has provided me with sufficient resources and authorities to advance knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
7	I have decided to allocate resources to knowledge management in the best possible way.	Completely disagree	Disagree	Middle	Agree	Completely agree
8	I have a clear plan to properly allocate resources to the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree

Manager's participation

1	In my opinion, manager's participation in the implementation of knowledge management is very effective in its success.	Completely disagree	Disagree	Middle	Agree	Completely agree
2	In my opinion, manager's participation in the activities related to the implementation of knowledge management accelerates and guarantees its success and achieving the organization's goals in this regard.	Completely disagree	Disagree	Middle	Agree	Completely agree
3	Manager's participation in the implementation of knowledge management is institutionalized among the managers of our organization, so I also commit myself to participate.	Completely disagree	Disagree	Middle	Agree	Completely agree
4	As manager's participation in the implementation of knowledge management is important for achieving the goals and strategy of our organization, I also commit myself to follow the organization's plans and goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
5	In my opinion, I have the necessary motivation to participate in the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
6	I have sufficient and necessary facilities and time to actively participate in knowledge management plans.	Completely disagree	Disagree	Middle	Agree	Completely agree
7	I have decided to actively participate in the activities related to the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
8	I care about participating in the implementation of knowledge management and participate in the activities related to it.	Completely disagree	Disagree	Middle	Agree	Completely agree

Guidance and leadership

Row	Item					
1	In my opinion, guiding and leading employees in the field of knowledge management is very valuable.	Completely disagree	Disagree	Middle	Agree	Completely agree
2	In my opinion, guiding and leading employees in the field of knowledge management accelerate and guarantees its success and achieving the organization's goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
3	Guiding employees in the field of knowledge management is institutionalized among the managers of our organization, so I also commit myself to this job.	Completely disagree	Disagree	Middle	Agree	Completely agree
4	As employees' guidance and leadership in the field of knowledge management is important for achieving the goals and strategy of our organization, I also commit myself to follow the organization's plans and goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
5	In my opinion, I have the necessary expertise and experience to guide and lead employees in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
6	I have the necessary resources and authorities to guide and lead employees in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
7	I have decided to guide and lead employees in the field of implementing knowledge management in the best possible way.	Completely disagree	Disagree	Middle	Agree	Completely agree
8	I have a clear plan to facilitate the success of knowledge management and lead employees in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree

Employee reward

Row	Item					
1	In my opinion, rewarding employees for the implementation of knowledge management affects its results.	Completely disagree	Disagree	Middle	Agree	Completely agree

2	In my opinion, rewarding employees active in knowledge management accelerates and guarantees its success and achieving organizations' goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
3	Rewarding employees for activities related to knowledge management is institutionalized among our managers, so I also commit myself to do this job.	Completely disagree	Disagree	Middle	Agree	Completely agree
4	As the issue of rewarding employees is considered in our organization strategy and goals, I also commit myself to follow the organization's plans and goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
5	In my opinion, I have the necessary expertise and experience to reward employees properly and timely to act in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
6	I have the necessary resources and authorities to reward employees in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
7	I have decided to reward employees regarding the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
8	I have a clear plan for rewarding employees for the implementation of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree

Training

Row	Item					
1	In my opinion, holding training courses in the field of knowledge management in the organization is valuable and effective.	Completely disagree	Disagree	Middle	Agree	Completely agree
2	In my opinion, holding training courses accelerates and guarantees the success and achievement of the organization's goals in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
3	Paying attention to training courses related to knowledge management is institutionalized among the managers of our organization, so I also commit myself to this issue.	Completely disagree	Disagree	Middle	Agree	Completely agree
4	As holding training courses is important in our organization's strategy and goals, I also commit myself to follow its plans and goals.	Completely disagree	Disagree	Middle	Agree	Completely agree
5	In my opinion, I have the necessary expertise and experience to hold training courses in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree
6	I have enough resources and authorities to hold training courses in the field of knowledge management in the organization.	Completely disagree	Disagree	Middle	Agree	Completely agree
7	I have decided to hold training courses in the field of knowledge management in the best possible way.	Completely disagree	Disagree	Middle	Agree	Completely agree
8	I have clear plans to hold training courses in the field of knowledge management.	Completely disagree	Disagree	Middle	Agree	Completely agree