

Nº 37

AD-MINISTER

UNIVERSIDAD EAFIT · MEDELLÍN · COLOMBIA · JULIO - DICIEMBRE 2020 · ISSN 1692-0279 · E-ISSN: 2256-4322

LEILA NAMDARIAN

ARMAN SAJEDINEJAD

SOMAYEH BAHANESTEH

JEL: G3, C5, M1

DOI: <https://doi.org/10.17230/Ad-minister.37.4>



UNIVERSIDAD
EAFIT[®]

THE IMPACT OF KNOWLEDGE MANAGEMENT ON ORGANIZATIONAL PERFORMANCE: A STRUCTURAL EQUATION MODELING STUDY

EL IMPACTO DE LA GESTIÓN DEL CONOCIMIENTO EN EL DESEMPEÑO ORGANIZACIONAL: UN ESTUDIO DE MODELADO DE ECUACIONES ESTRUCTURALES

LEILA NAMDARIAN¹

ARMAN SAJEDINEJAD²

SOMAYEH BAHANESTEH³

JEL: G3, C5, M1

RECEIVED: 26/11/2019

MODIFIED: 18/11/2019

ACCEPTED: 04/11/2020

DOI: <https://doi.org/10.17230/Ad-minister.37.4>

ABSTRACT

This study attempts to investigate the role of knowledge management (KM) in commercial companies. To this end, a literature review was made and relevant components were extracted to conceptualize KM and organizational performance (OP), and the relationship between KM and OP was presented in a theoretical framework. Secondly, to assess the proposed model, a questionnaire was given to 200 participants in five commercial companies, chosen through multi-stage stratified sampling. The data were analyzed using structural equation modeling (SEM) and Lisrel 8.8. The results revealed that the model enjoyed an acceptable degree of fit. The obtained coefficient (0.41) showed a direct impact of KM indices on OP, indicating the significant and positive relationship between KM and OP dimensions such as financial performance, quality of goods and services, staff members' performance, innovation, and customers' level of satisfaction.

KEYWORDS

Knowledge management, Organizational performance, Structural equation modeling, Commercial companies

RESUMEN

Este estudio trató de investigar el papel de la gestión del conocimiento (KM) en las empresas comerciales. Con este fin, se revisó la literatura y se extrajeron componentes relevantes para conceptualizar el KM y el desempeño organizacional (OP). A continuación, la relación entre KM y OP se presentó en un marco teórico. En segundo lugar, para evaluar el modelo propuesto, se entregó un cuestionario a 200 participantes en 5 empresas comerciales, elegidos mediante muestreo estratificado de etapas múltiples. Los datos se analizaron utilizando modelado mediante ecuaciones estructurales (SEM) y Lisrel 8.8. Los resultados revelaron que el modelo proporcionaba un grado aceptable de ajuste. El coeficiente obtenido (0,41) muestra un impacto directo de los índices de KM en OP, lo que indica la relación significativa y positiva entre las dimensiones de KM y OP, tales como el desempeño financiero, la calidad de los bienes y servicios, el desempeño de los miembros del personal, la innovación y el nivel de satisfacción de los clientes.

1 PhD in Science and Technology Policy, Tarbiat Modares University, Assistant Professor of Iranian Research Institute for Information Science and Technology (IranDoc), Tehran, Iran. namdarian@irandoc.ac.ir, <https://orcid.org/0000-0002-1411-6368>

2 PhD in Industrial Engineering, Tarbiat Modares University, Assistant Professor of Iranian Research Institute for Information Science and Technology (IranDoc), Tehran, Iran. sajedinejad@irandoc.ac.ir, <https://orcid.org/0000-0001-7705-6406>

3 MA in Commercial Management, PN University of Tehran, West Branch, Tehran, Iran. somayehbahaneh@aol.com, <https://orcid.org/0000-0002-4928-3123>

PALABRAS CLAVE

Gestión del conocimiento, desempeño organizacional, modelación de ecuaciones estructurales, empresas comerciales

INTRODUCTION

In the current knowledge-based era, knowledge, along with other physical properties of organizations (e.g. land, human resources, equipment, capital, etc.) is conceived of as the most important organizational property and the source of competitiveness advantage. It is believed that knowledge performance is very important to the survival of an organization (Easterby-Smith & Prieto, 2008). Numerous scholars consider it as an important factor in achieving dynamic potentials and value for an organization (Zollo and Winter, 2002; Karami et al., 2015). Knowledge, a floating combination of experiences, values, information and expert vision, provides a framework for evaluating and combining new experiences and information. Organizational knowledge not only results from the experts' minds but also is internalized within the organizational norms and actions, processes, procedures, warehouses or documents (Pandey & Dutta, 2013).

Achieving competitiveness advantage from organizational knowledge requires its accurate management, the so-called knowledge management which currently has an important status in the organizational leadership and management to which researchers have paid particular attention. This is due to the fact that several areas such as philosophy, cognitive sciences, social sciences, management sciences, information sciences, engineering sciences, and artificial intelligence play a key role in the evolution of knowledge management, and as such, several definitions have been proposed. Ju Choi et al. (2005) defined knowledge management as the process of creating, gathering, organizing storing, disseminating, using and exploiting knowledge for creating organizational value and competitiveness advantage. Pandey and Dutta (2003) held that knowledge management entails identifying and exploiting individual and collective knowledge in an organization, in order to contribute to the organizational performance. Knowledge management processes would be useful for problem-solving, dynamic learning, strategic planning, decision-making and avoiding burnouts, and lead to increasing flexibility and organizational intelligence. In the most comprehensive definition, Hislop (2010) believed that any attempts to manage organizational knowledge is called knowledge management which can be implemented in a wide range of direct ICT-based methods or indirect ones based on managing social processes, organizational structures, creating culture and individuals' management approaches.

Also, knowledge management, if it is well implemented, can contribute to faster and more efficient innovation, more coordination, commercializing goods, responding to the environmental changes, flexibility, efficiency, productivity, and profitability (Gold et al., 2001). However, no study has yet touched upon the possible

impact of knowledge management on the performance of commercial companies in terms of various proposed dimensions. Identifying its influence on various dimensions of performance would lead to improved performance of commercial companies. Bearing this in mind, the current study primarily attempts to identify various dimensions and factors constituting knowledge management and their relationships with different dimensions of performance. The study further aimed to present a model for constituent dimensions and factors of knowledge management and their influence on various dimensions of performance. To this end, a review of the existing literature is presented, followed by the method, findings, discussion and conclusion.

REVIEW OF THE LITERATURE

During the last decades, knowledge management has been discussed as a scientific concept. Since 1995, several studies have been conducted and developed. Nowadays, few journals publish articles without mentioning the concept of knowledge management. Knowledge management, as a vital instrument for organizations and society, is of utmost significance. Moreover, the concept has led to transforming knowledge management into an updated term (Desouza, 2011).

Knowledge management is a systematic process involving the creation, collection, organization, storage, dissemination, and utilization of knowledge to create business value and competitive advantage (Pandey and Dutta, 2013). Several local and international studies have been carried regarding the influence of knowledge management on the performance of organizations, and have illustrated that knowledge management practices positively affect the performance of the organizations.

Yang et al. (2014) discovered the positive influence of knowledge management on organizational performance. They understood that the customers' knowledge leadership, as the independent variable, and innovation, customers' level of satisfaction, and products and services quality, as various dimensions of organizational performance, were related.

Gholami et al. (2013) analyzed the influence of knowledge management on the performance of micro and moderately-sized firms. They concluded that acquiring knowledge, storing knowledge, sharing knowledge, creating knowledge, and applying knowledge were among the leading factors for knowledge management. They also discovered that production, financial performance, staff members' performance, innovation, professional relationships, and customers' level of satisfaction were the leading positive factors related to organizational performance. They concluded that knowledge management would have a direct impact on the performance of micro and moderately-sized businesses.

Many researchers like Miković et al. (2020) and Matveeva et al. (2021) believed that effective knowledge management would lead to the collaboration and cooperation among individuals, projects, and organizations. For example, those organizations which create new knowledge and widely distribute it across the organization can incorporate it into their technologies quickly and thereby, produce and present new

products. Moreover, McKenzie and VanWinkelen (2004) highlighted the importance of knowledge as a vital source for organizations which lead to their performance enhancement. This was also emphasized by Iqbal et al. (2012), Salleh and Ching (2012), and Tsai et al. (2012). The role and influence of knowledge management on improving organizational performance have been specifically identified in numerous studies, such as (Hosseini et al., 2019). The significance of knowledge management is not only confined to performance of knowledge-based companies in high-tech industries but is also important to all economic sectors (Teng and Soung, 2011). Commercial companies also significantly enjoy the benefits of knowledge management (Byukusenge et al., 2017). Today, commercial companies play an important role in the economies of countries; in a way, a large part of the world's wealth is produced by these companies, and the shares of commercial companies constitute the major part of people's wealth. The importance of commercial companies, especially in the economies of developing countries such as Iran, is twofold. Commercial companies pursue income by buying and selling goods and services. Paying attention to the value of knowledge and knowledge requirements in these companies can help develop a knowledge strategy tailored to their business strategy and strengthen their competitive advantage (García-Holgado & García-Peñalvo, 2016). If commercial companies develop a knowledge strategy based on their transaction data and customer information, and use appropriate data mining tools and other knowledge management techniques, they will be able to learn about their customers' purchasing behavior, customers' characteristics, information market trends, and effective knowledge-based means to execute marketing strategies (Kasemsap, 2017).

Byukusenge et al. (2017) determined that knowledge management could improve the commercial performance of companies through making a positive impact on organizational innovation. The effect of knowledge management and organizational innovation on companies and business' performance has been reviewed by Vaio et al. (2021).

It appears that knowledge management may likely influence gradual and radical innovations within organizations (Miković et al., 2020). Gradual innovations are those which change customers' behavior. The key role of knowledge management in gradual innovation is taking advantage of the knowledge properties. Radical innovations are those which deform and reform the competitive condition among firms. The main role of knowledge management in radical innovations is recombination of the knowledge properties while creating new ideas and exploring new knowledge.

This review of the research literature shows that no study has yet touched upon the possible impact of knowledge management on the performance of commercial companies in terms of various dimensions (such as financial performance, goods and services quality, staff members' performance, and customers' level of

satisfaction). As such, this study further aimed to present a model for constituent dimensions and factors of knowledge management, and their influence on various dimensions of performance.

Knowledge Management Processes

Several models have been proposed for describing knowledge management processes in the existing literature. The review of literature indicates that knowledge management entails creating, storing, sharing, and using knowledge. These processes are described below:

- (i) **Knowledge Creating:** Creating knowledge includes using internal and external resources of an organization to create new knowledge in order to achieve organizational objectives. According to previously conducted studies of successful organizations and the intellectual methods and research related to making better use of customers' and suppliers' knowledge properties, the best strategies employed to create such knowledge were identified by (Alavi & Leidner, 2001).
- (ii) **Knowledge Storing:** Storing knowledge encompasses recording and keeping knowledge which makes it possible to retrieve individual and organizational information. Technical systems (e.g. modern information software and hardware) and human processes are commonly used to identify, code, store, and retrieve knowledge (Alhawari et al., 2012). Storing knowledge can effectively contribute to protecting organizations from the negative impacts of duplication, repeating actions, and solving present and future problems (Stein, 1995). The best form of storing knowledge is creating an organizational memory. Organizational memory is a warehouse or system including details about previous decisions and their results, previous crises and organizational reactions and other decisions. This memory makes it possible to retrieve knowledge in inactive knowledge dissemination and distributes knowledge actively among staff members (El Sawy & Majchrzak, 2004).
- (iii) **Knowledge Sharing:** As soon as organizational knowledge is obtained, coded, and stored, it should be shared. To this end, it is necessary to change the organization and staff members' mindset. The staff members should be asked to share their knowledge, and they should be ensured that this would not negatively influence their organizational position and status, and thus would increase their respect among their colleagues and counterparts (Mohapatra et al., 2016).
- (iv) **Knowledge Utilization:** This entails using existing knowledge for making decisions, improving organizational performance and achieving organizational objectives. Indeed, organizational knowledge should be applied in services, processes and products of an organization (Tarlatt, 2013). This seems to be a challenging issue for organizations. Developing an effective framework for implementing knowledge management before applying it can be influential.

Such framework acts as guidelines which illustrate the key components to effective application of knowledge in organizations.

Infrastructural Factors

The infrastructural factors of knowledge management refer to a set of mechanisms through which an organization manages its knowledge. Individuals share their knowledge in various sectors through these Infrastructural factors so that everybody can effectively use it. The review of literature reveals such important Infrastructural factors as organizational culture, leadership, information technology, and organizational processes. These are all illustrated below:

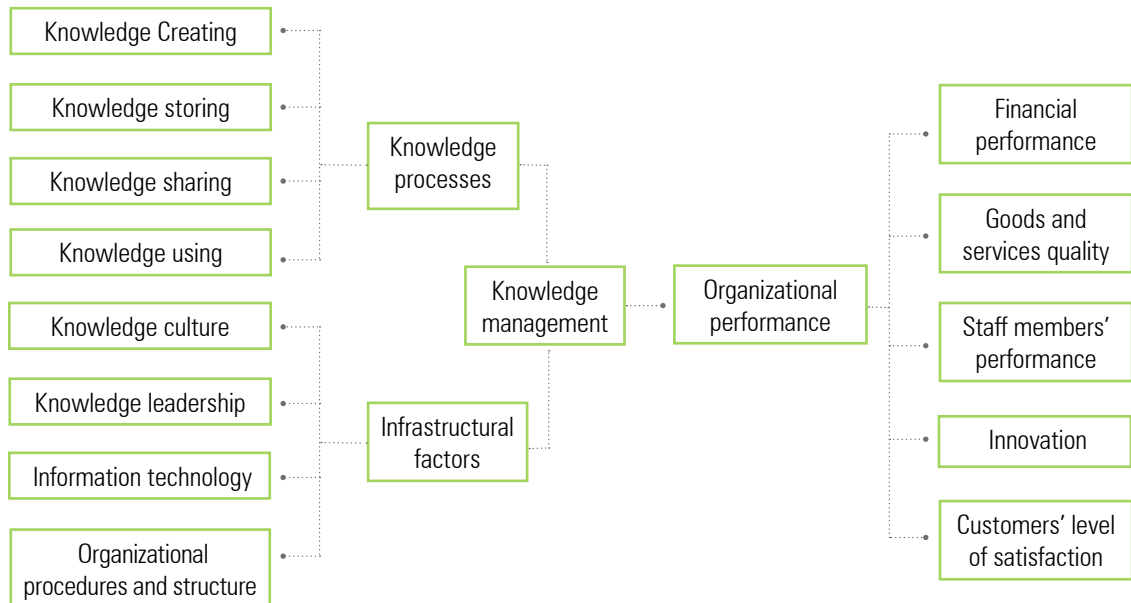
- (i) **Organizational Culture:** Sharing knowledge at all levels, from face to face individual interactions to collective knowledge sharing, and even sharing knowledge in virtual teams, which are all highly moderated by cultural factors. Knowledge sharing processes, particularly implicit knowledge sharing, requires social interactions which are in turn formed in a cultural context including values and beliefs. These determine behavioral and normal patterns. Organizational culture in general, and organizational subcultures in particular, can make a significant impact on processes related to knowledge in four ways: 1) culture forms the assumptions revealing which type of knowledge is useful, 2) culture moderates the relationship between individuals and organizational knowledge, 3) culture provides a context for social interaction, and 4) culture influences the creation and adaptation of new knowledge. Organizational culture may facilitate or debilitate sharing knowledge.
- (ii) **Leadership:** Leadership is an impetus leading knowledge management strategies in an organization. The organization's leaders' ability to react to knowledge-based organizational challenges is crucial. Knowledge management leadership is assessed in terms of knowledge management policies and strategies in an organization. Moreover, leadership is assessed in terms of actions taken to create a relevant context to knowledge management behaviors in an organization (Young, 2010).
- (iii) **Information Technology:** Information technology (IT) is a key factor which influences the implementation of knowledge management. A wide range of IT-based instruments exist, which make a tremendous impact on knowledge management, including the intranet, extranet, content management systems, document management systems, data warehousing, data mining, and portals, etc. (Kruger & Johnson, 2009). Information technology can play different roles in knowledge management settings, including acquiring knowledge, defining, storing, ranking and relating knowledge-based goods, searching and identifying knowledge content, creating context-based content flexibility, creating communicative channels among the staff members for sharing knowledge, and identifying knowledge carrying locations (Hedelin & Allwood, 2002).

(iv) Organizational structure and procedures: Organizational structure and procedures can make an impact on the knowledge management through forming the patterns and influencing the frequency and intensity of communication among members of an organization. Furthermore, knowledge management can impose a structural effect on the effectiveness of an organization since it influences the efficiency and effectiveness of daily routines (Zheng et al., 2010). The more flexible the organizational structure and procedures are, the better they can be adapted to the changes related to knowledge management. Furthermore, the lower the number of hierarchies an organizational structure has, the less it would be enabled to foster communication among individuals and units, and to facilitate knowledge sharing and flow (Du Plessis, 2006).

Theoretical Model of Research

According to the sections 2, -2-1 and 2-2, a theoretical model has been developed to show how knowledge management affects the performance of commercial companies (Figure 1).

Figure 1. Theoretical model of the study



The metrics of the theoretical mode of the study are presented in Table 1. Many of these metrics have been extracted from the knowledge management framework of the Asian Productivity Organization (APO) (Young, 2010).

Table 1. Metrics of the theoretical model of the study

Secondary factors of the theoretical framework of the study	Metrics
Knowledge creating	<ol style="list-style-type: none"> 1. Creating knowledge is part of the philosophy and culture of an organization; 2. The local research and development and joint projects with other organizations are supported; 3. Cooperative learning is facilitated and fostered through developing and enhancing group and team work.
Knowledge Storing	<ol style="list-style-type: none"> 1. Important, relevant and new knowledge is stored in the organization; 2. All information related to meetings and seminars, such as notes, invitation letters, enactments, etc. are stored in the organization; 3. The guidelines are stored and prepared to be retrieved later in the website to be easily accessible.
Knowledge sharing	<ol style="list-style-type: none"> 1. The staff members are informed of the organizational events through formal and informal channels; 2. Open communities and informal networks such as CoPs are formed in order to facilitate knowledge dissemination and sharing; 3. The communications beyond the organizational structure are supported in order to facilitate knowledge dissemination and sharing.
Knowledge using	<ol style="list-style-type: none"> 1. The acquired knowledge is used in completing the organizational usual tasks, identifying the problem, and solving it (by whom and how); 2. The acquired knowledge is used for evaluating the existing options for action and the possible approaches such as determining the risks and the advantages of all options; 3. The staff members are given freedom to use knowledge in doing their job and the managers and supervisors put emphasis on indirect supervision and low control.

Secondary factors of the theoretical framework of the study	Metrics
Knowledge culture	<ol style="list-style-type: none"> 1. There is trust among the staff members and secondary units in an organization in sharing knowledge; 2. There is commitment at all levels of the organization; 3. There is a belief that knowledge hoarding is not power and sharing knowledge would foster one's power and position; 4. The information technology strategies and the knowledge strategy and prospects are in line with each other; 5. The values and beliefs about the value of knowledge and sharing knowledge are internalized.
Knowledge leadership	<ol style="list-style-type: none"> 1. It focuses on the organizational management, performance improvement, individual and organizational learning, sharing knowledge, and creating knowledge and innovation; 2. The organization owns a policy for protecting its knowledge (e.g. copyright, patent, knowledge management, knowledge security); 3. The required financial resources are allocated to the innovations in knowledge management.
Information technology	<ol style="list-style-type: none"> 1. The organizational management provided the necessary IT substructures (e.g. the Internet, intranet, website) for developing the required capabilities for facilitating knowledge management; 2. All people have access to the computer in the organization; 3. All people have access to the Internet, intranet, and email address in the organization.
Organizational processes and structure	<ol style="list-style-type: none"> 1. The organization designs its mechanism and key processes for creating value for the customers, and achieving the performance excellence; 2. The organization implements and manages its key professional mechanisms to ensure that the customers' needs are met and the commercial outcomes are stable; 3. The organization continuously evaluates and improves its professional processes in order to reach a better performance and decrease deviations; 4. The organizational structure includes a low degree of hierarchy and facilitates communication.

Secondary factors of the theoretical framework of the study	Metrics
Goods and services quality	<ol style="list-style-type: none"> 1. Knowledge management increases the quality of goods and services; 2. Several indices are developed and applied in the organization to evaluate the influence of knowledge innovations on the quality of goods and services, and individuals' role in them; 3. The customers' comments are used to improve the quality of goods and services; 4. Numerous facilities are used to offer services faster and better; 5. The organization is constantly using new knowledge and incorporates innovation in goods and services; 6. The organization prioritizes the quality of its goods and services over profitability; 7. The organization attempts to receive its customers' feedback on the quality of its goods and services through various channels; 8. There are mechanisms for constant evaluation of the goods and services quality control.
Financial performance	<ol style="list-style-type: none"> 1. Knowledge management increases the speed of responding to the market crises; 2. Knowledge management increases the profitability; 3. Knowledge management improves the financial and commercial processes; 4. Knowledge management creates new financial and commercial processes; 5. Knowledge management improves the productivity of the organization after increasing learning; 6. Knowledge management causes the stable growth of the organization; 7. Knowledge management creates new commercial opportunities.

**Secondary factors
of the theoretical
framework of the study**

Metrics

Innovation	<ol style="list-style-type: none"> 1. The organization constantly illustrates the values related to learning and innovation; 2. The organization considers individuals' mistakes and risk-taking as opportunities for learning unless they are not repeated; 3. Inter-task teams are formed to confront the problems or difficulties in various units of the organization; 4. Individuals feel competent and feels that the organization appreciates their ideas and contribution to knowledge management; 5. Organizational management is inclined to test new techniques and instruments; 6. Confronting a problem, creative solutions are prioritized over the common ones; 7. The organization increases the speed of innovation through decreasing the amount of time for the operational cycle, being more efficient at saving money, improving effectiveness, using resources (e.g. knowledge) more efficiently, improving decision-making; 8. The organizational environment is ready to acknowledge and accept individuals' ideas.
Customers' level of satisfaction	<ol style="list-style-type: none"> 1. Knowledge management leads to an increase in the customers' level of satisfaction; 2. It is common to discuss and negotiate ideas about meeting the customers' wants; 3. Various social media are used to ease the customers' access; 4. The customers' feedbacks are evaluated and the knowledge resulting from this is recorded and used in the organization; 5. The goods and services are developed based on the customers' basic level of knowledge; 6. The data of the customers' telephone center are evaluated and examined and the resulting knowledge is used.

**Secondary factors
of the theoretical
framework of the study**

Metrics

The staff members' performance

1. The occupational skills enhance through educational and occupational development programs;
2. There is a systematic process for acquainting the new staff members including their familiarity with knowledge management and its advantages, knowledge management system, and knowledge management instruments;
3. The staff members take advantage of the stored and recorded knowledge within the organization;
4. Knowledge management and the staff members' awareness of it leads to presenting new methods or appropriate methods for doing their tasks;
5. The staff members share the best methods and this decreases the learning curve;
6. Using knowledge management leads to the staff members' better decision-making;
7. New staff members use the knowledge bank and portal for learning and thereby, their productivity increases;
8. The organization owns a databank of the staff members' capabilities;
9. The staff members are organized in small groups in order to respond to the concerns and problems in the occupational environment.

METHOD

The method of the current study included two stages: 1. Documentary and library method to access the existing theoretical viewpoints on knowledge management and review of related literature, 2. Survey to gather the required data, to describe and illustrate the questions and the research theoretical model. The statistical population consisted of the staff members in Tehran. The multi-stage stratified sampling method was used and the participants were selected through appropriate stratification for the proportion. In this way, five commercial organizations (strata) in Tehran were selected. Then, participants were selected from each organization based on the staff members' proportion, field of study, and major. The final participants were 200 staff members of these organizations. The demographic characteristics of the sample are presented in Table 2.

Table 2. Demographic characteristics of the research sample

Educational level	Frequency percentage	Working experience (years)	Frequency percentage	Field of study	Frequency percentage
Diploma	4.5	less than 1 year	9.5	Management	25
Associate and BA	16	1-2 years	38.5	Industrial engineering	33
MA	42	2-4 years	27.5	IT engineering	24
PhD	32.5	more than 4 years	24.5	Social sciences	14

The instrument was a researcher-made questionnaire including 65, 5-point Likert scale items. The responses ranged from completely agree (5) to completely disagree (1) (completely agree=5, agree=4, neutral=3, disagree=2, completely disagree=1). These items measured knowledge processes (12 items), infrastructural structures (15 items), quality of goods and services (8 items), financial performance (7 items), staff members' performance (9 items), organizational innovation (8 items), and customers' level of satisfaction (6 items).

The research variables had a sufficient degree of content validity. Content validity is commonly checked by the experts in the field, and relies on their judgment (Khaki, 2012, p.288). In the current study, six experts in the field of knowledge management were asked to comment on the first draft of the questionnaire and all had consensus over 65 items of the questionnaire. Moreover, factor analysis was run and the Kaiser Meyer Olkin (KMO) value was 0.87, which indicates that the items were appropriately correlated in order to create a factor analysis.

Reliability indicates the internal consistency of the instrument. In order to assess the reliability of the instrument used in the current study, the construct reliability was checked through calculating Cronbach alpha. The standard construct reliability coefficient should exceed 0.7. The Cronbach alpha coefficients for the components of the questionnaire were as follows: knowledge processes (0.76), infrastructural factors (0.78), quality of goods and services (0.86), organizational performance (0.88), staff members' performance (0.71), innovation (0.74), and customers' level of satisfaction (0.77). Cronbach alpha coefficients for all research variables were more than 0.7, indicating the acceptable degree of the reliability for the instrument used in the current study.

In order to analyze the gathered data, descriptive and inferential statistics were used. To gain descriptive statistics, the table of frequency and questionnaire components, SPSS was used. To test the research hypotheses, SEM and Lisrel 8.8 were utilized.

FINDINGS

In this section, descriptive statistics for variables of organizational performance have been provided. Table 3. presents descriptive statistics for variables of organizational performance.

Table 3. Measures of central tendency and dispersion for variables of organizational performance

Indices	Organizational performance	Financial performance	Quality of goods and services	Staff members' performance	Innovation	Customers' level of satisfaction
Mean	145.35	42.08	27.74	24.66	22.76	28.13
Median	14617.767	43	28	25	23	28
Mode	138	44	35	24	26	28
Standard deviation	17.767	9.019	6.023	3.636	3.607	4.346
Coefficient of Skewness	-0.17	-0.38	-0.843	0.03	-0.357	-0.292
Kurtosis coefficient	0.077	0.06	0.618	0.910	0.22	-0.57
Max	110	48	28	28	23	22
Min	81	12	7	7	7	13
Total score	191	60	35	35	30	35

The measures of central tendency, mode, median, and mean have approximate values for organizational performance which represents a normal distribution. As Table 3 displays, the minimum and maximum scores for organization performance were 81 and 110, respectively and the total score was 191. Accordingly, the range of normal distribution was 110. Most of the respondents had an organizational performance score of 138. Half of the respondents has an organizational score of less than or equal to 146 and half of them had more than this score. The average score of the organizational performance of the statistical sample was 145.35. Taking into account the standard deviation, the distribution score of the organizational performance variable was dispersed at 17.76 around the mean values. Hence, the scores of the organizational performance for %95 were estimated as more than or equal to 127.59 and less than or equal to 163.11. A general evaluation of organizational performance variable and its five dimensions indicates that the approximate values of this variable and its dimensions to the normal distribution accounts for the optimal status of this variable in the organizations under the study.

Structural Equation Modeling and the Model Fit

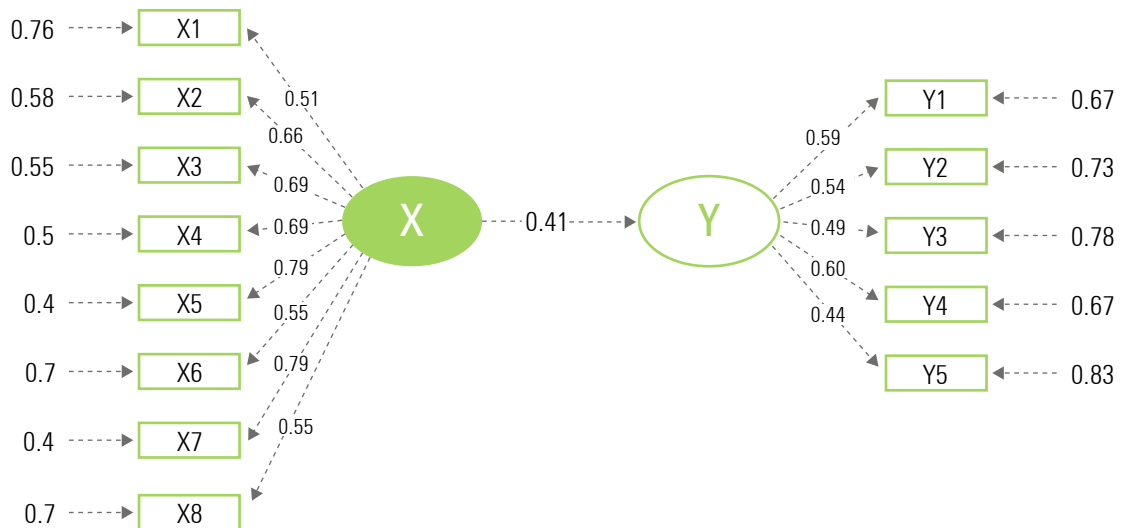
Structural Equation Modeling (SEM) is a technique for analyzing the data which was designed for evaluating the relationship between two types of variables: a. Explicit variables (variables which were directly measured and included observed variables); b. Implicit variables (variables which were the theoretical constructs). Compared to other data analysis techniques, SEM makes it possible for the researcher to test the complicated theoretical models in an analysis. The most distinguishing characteristic of SEM is simultaneous processing and analysis of the relationships among variables. SEM allows the researchers to conduct a simultaneous causal analysis of the implicit and observed variables. When SEM is used, an important component is evaluating the fit of a hypothetical model or observed data. Researchers commonly use goodness of fit indices for evaluating this fit. In general, goodness of fit indices is divided into two categories: a. goodness of fit indices, and b. badness of fit indices. Goodness of fit indices includes comparative fit index (CFI), incremental fit index (IFI), and normal fit index (NFI). The higher values are more desired. The suggested value for these indices is 0.9. In the same line, badness of fit indices entails χ^2/df and the root mean square error of approximation (RMSEA). The lower values indicate a more desirable fit. In order to answer the fit model, both goodness and badness indices should be examined. These indices are illustrated below (Toit, H., & Du Toit, 2008).

- RMSEA: It is the root mean square of approximation and its closer value to 0 indicates a better fit. If it is less than 0.1, the model fit is excellent.
- RMR: This index is the root mean square of residuals and its closer value to 0 indicates a better fit.
- χ^2/df : It is the absolute value of the residuals and it should be less than 3.
- NFI: It is an index for assessing the goodness of fit model considering the data. If it is more than 0.9, it would indicate the fitness of the extracted model.
- CFI: It is a comparative fit index and values more than 0.9 indicate the fit of the extracted model.
- NNFI: It is non-normal fit index and values more than 0.9 indicate the fit of the extracted model.
- RFI: It is a relative fit index and values more than to 0.9 indicate the fit of the extracted model.
- IFI: It is incremental fit index and values more than 0.9 indicate the fit of the extracted model.
- SRMR: It is the standard root mean square residual and its closer value to 0 indicates a better fit of the extracted model.

Taking advantage of SEM, it was attempted to examine the causal relationship among the implicit variables and their relationship with their relevant indicators (explicit variables). First, dependent and independent variables and their indicators as explicit variables were separately examined to ensure that appropriate indicators

were considered for the implicit variable. Then, independent variable indicators were separately tested against the dependent variable in the LISERAL model frame. In the current study, knowledge management was considered as the external implicit variable and organizational performance was considered as the internal implicit one. Taking into account that data analysis based on fit indices and according to the presented reasoning in SEM is the basis on which decisions on the accuracy of the proposed hypotheses are made. All indices were calculated. Figure 2 displays the model of the relationship between knowledge management indices (X) which encompasses such variables as creating knowledge (X1) (3 items), storing knowledge (X2) (3 items), sharing knowledge (X3) (3 items), using knowledge (X4) (3 items), knowledge culture (X5) (5 items), knowledge leadership (X6) (3 items), information technology (X7) (3 items), organizational structure and processes (X8) (4 items) as the independent variable and organizational performance indices (Y) encompassing financial performance (Y1) (7 items), quality of goods and services (Y2) (8 items), the staff members' performance (Y3) (9 items), innovation (Y4) (8 items), the customers' level of satisfaction (Y5) (6 items) as the dependent variable.

Figure 2. Analysis of knowledge management indices paths (X1-X6) and organizational performance indices (Y1-Y5)



This model is not different from that the real data. The Lambda rates for the external implicit variable of knowledge management indices (X) were as follows: creating knowledge (X1= 0.51), storing knowledge (X2= 0.66), sharing knowledge (X3= 0.69), using knowledge (X4= 0.69), knowledge culture (X5= 0.79), knowledge leadership (X6= 0.55), information technology (X7= 0.79), and organizational structure and processes (X8= 0.55). These all constituted the knowledge management variable.

The Lambda rates for the external implicit variable and organizational performance indices (Y) were as follows: financial performance (Y1= 0.59), quality of goods and services (Y2= 0.54), the staff members' performance (Y3= 0.49), innovation (Y4= 0.60), and the customers' level of satisfaction (Y5= 0.44). These all constituted the organizational performance variable. Table 4 illustrates the goodness of fit model indices.

Table 4. Model's fit indices

Index	Standard rate	Calculated rate	Interpretation
RMR	close to 0	0.1	excellent fit
RMSEA	less than 0.1	0.021	excellent fit
X2/df	at least 3	1.57	excellent fit
CFI	at least 0.9	0.94	excellent fit
IFI	at least 0.9	0.95	excellent fit
NFI	at least 0.9	0.98	excellent fit
NNFI	at least 0.9	0.96	excellent fit
SRMR	close to 0	0.096	excellent fit

The values for the goodness of fit indices in Table 4 show that the research model has an acceptable fit. Moreover, the obtained coefficient (0.41) indicates the direct impact of knowledge management indices on the organizational performance. The most important indicators of the knowledge management index include knowledge culture and information technology, followed by sharing knowledge and using knowledge, and finally storing knowledge, knowledge leadership and knowledge structure, and processes and creating knowledge. The %41 coefficient indicates that %41 of the changes in the organizational performance result from a set of knowledge management indices. Furthermore, knowledge culture and information technology had the highest degree of impact on the organizational performance variable.

Knowledge management indices (0.41) = Y (organizational performance)

DISCUSSION AND CONCLUSION

The research findings revealed a direct and positive relationship between knowledge management and different dimensions of the performance including financial performance, quality of goods and services, staff members' performance, innovation, and customers' level of satisfaction in commercial companies. More precisely, the path coefficient between knowledge and organizational performance indicated that %41 of the changes in the organizational performance could be explained by a set of knowledge management indices in the sample under the study. Taking into account the calculated effect sizes for the knowledge management indices, knowledge culture and information technology were identified as the most important indicators of knowledge management. It might be implied that the two factors, knowledge culture and information technology, had the highest degree of contribution to account for the changes in organizational performance.

The importance of information technology in knowledge management has also been emphasized in past studies such as Young (2010). Also, in their studies, researchers such as Kim et al. (2011) have emphasized the important role of knowledge culture for implementation of knowledge management.

The research findings were in line with most of the previously conducted studies at both local and international levels. One of the results of this study is the existence of a positive and significant relationship between knowledge management and innovation in the commercial companies. Research by Byukusenge et al. (2017) showed that knowledge management has a significant effect on business performance through its impact on innovation. Also, Prajogo et al. (2004) confirmed that knowledge management made a tremendous impact on innovation of the goods and services.

Another result of this study is that knowledge management has a positive and significant effect on the quality of goods and services of commercial companies. This result has been confirmed by other researchers such as Bouncken (2002). Some researches like Ellis (2020) demonstrated the influence of knowledge management on the quality of goods and services and thereby, profitability. She mentioned that knowledge management not only improved the quality of services but also played a key role in producing desirable goods and put the production on the right and optimal track. To this end, knowledge seems to be more important than the customer and management of goods. Organizations should learn from the market and turn this learning into knowledge, utilize it in the production process, and accordingly create knowledge.

Another result of this study is the positive and significant effect of knowledge management on the performance of staff. This result has been confirmed by other researchers such as Yang et al. (2014), and Sujatha and Krishnaveni (2018). Considering the impact of knowledge management on the staff members' organizational performance, Bhatt (2002) held that self-organized teams and social interactions are key to the development and enhancement of the organizational

knowledge base. Such teams create multiple interpretations which not only bring about new realities but also increase the organizational commitment for enriching the organizational knowledge bases. Multiple interpretational processes lead people to moderating and reorganizing their belief system in relation to each other. In order to develop the interactions among the staff members, an organization should use various viewpoints such as brainstorming and critical thinking. Through presenting multiple interpretations of knowledge, an organization becomes more sensitive to the environmental impetus in order to understand market realities. Moreover, various viewpoints lead an organization to take a risk in using a particular type of knowledge in different situations. Implementing and applying a wide range of solutions require the staff members' commitment; if the staff members' viewpoints are overlooked by the managers, an organization fails in solving the problems.

Another result of this study is the existence of a positive and significant relationship between knowledge management and customer satisfaction. This result has been confirmed by other researchers such as Kasemsap (2017), and Gholami et al. (2013). In addition, in this study, existence a positive and significant relationship between knowledge management and financial performance of commercial companies has been confirmed. This result has been emphasized and considered by Gold et al. (2001).

Although the relationship between knowledge management and each of the dimensions of organizational performance in previous studies has been considered separately, no study has yet touched upon the possible impact of knowledge management on the performance of commercial companies in terms of various dimensions (Financial performance, Goods and services quality, Staff members' performance, Innovation, and Customers' level of satisfaction). As such, this study has developed a model for constituent dimensions and factors of knowledge management and their influence on various dimensions of performance in commercial companies. This model can specify the need to implement knowledge management in commercial companies of countries like Iran. Based on this model, commercial companies can gain many benefits from knowledge management in favor of their performance. Achieving these benefits requires improving and strengthening IT infrastructure, knowledge culture, and knowledge management processes, leadership style, procedures, and organizational structure. In order to execute these, some managerial recommendations are given below:

- Knowledge management should be considered as an integrated managerial plan which focuses on strategic goals and works based on business processes. Also, it entails such components as substructure (including human resources, technology, culture, and processes), strategy, establishment and evaluative models. Developing a strategic knowledge management plan is a key action for organizations. Nevertheless, to develop a strategic knowledge management

plan, one should consider that knowledge management strategy of an organization highly relies on the organizational strategy, and is the source of various organizational plans, principles and organizational strategies.

- Human resources are knowledge creators in an organization and carry a considerable proportion of the organizational knowledge in their brains. Human resources and knowledge management are highly interwoven. Indeed, to succeed a knowledge management plan, the role and status of human resources should be given prominent attention. In this regard, creating a free environment and setting the required scene for expressing the staff members' ideas and comments, training and developing the human resources' skills and expertise, and fostering self-organized teams can be helpful.
- Technology supports the knowledge warehouses and increases accessibility, knowledge transfer, and knowledge environmental facilities, and can facilitate the individual, group and organizational interactions. Identifying and using IT-based knowledge management tools can make a tremendous impact on successful implementation of knowledge and organizational performance.
- Organizational culture can inhibit attempts to change the organizations in knowledge management plans. As such, most researchers have consensus over the fact the organizational culture is the most important factor contributing to successful knowledge management. Developing and fostering knowledge-based culture through senior managers' support is key to successful knowledge management in an organization.
- Organizational structure (such as learning organizations) and knowledge processes (managing, keeping and discarding knowledge, and documenting experiences) play an important role in knowledge management success, and should be led in a way that support knowledge flow among individuals and in an organization. Decreasing organizational hierarchies and moving towards creating flat structures are keys to this action.
- Leadership is a concept dependent on knowledge management strategy and applying knowledge management requires senior managers' support (in order to allocate resources and time to the knowledge management strategic plans and programs).

Finally, it should be noted that this study has some potential limitations. Due to the non-cooperation of commercial companies in completing the questionnaires, the authors obtained only the data of five commercial companies, provided that their names were not disclosed; however, if more companies had collaborated with the authors in this study, the possibility of generalizing the study results would have increased given that fact that sound generalizability requires data on large populations. In addition, data on large populations could increase the accuracy of study results.

REFERENCES

- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, *25*(1), 107-136.
<https://doi.org/10.2307/3250961>
- Alhawari, S., Karadsheh, L., Talet, A. N., & Mansour, E. (2012). Knowledge-based risk management framework for information technology project. *International Journal of Information Management*, *32*(1), 50-65.
<https://doi.org/10.1016/j.ijinfomgt.2011.07.002>
- Bhatt, G. D. (2002). Management strategies for individual knowledge and organizational knowledge. *Journal of knowledge management*, *6*(1), 31-39.
<https://doi.org/10.1108/13673270210417673>
- Byukusenge, E., & Munene, J. C. (2017). Knowledge management and business performance: Does innovation matter? *Cogent Business & Management*, *4*(1), 1-18.
<https://doi.org/10.1080/23311975.2017.1368434>
- De Long, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *Academy of Management Perspectives*, *14*(4), 113-127.
<https://doi.org/10.5465/AME.2000.3979820>
- Desouza, K. C., & Paquette, S. (2011). *Knowledge management: An introduction*. London: Facet. ISBN: 978-1-55570-720-0
- Du Plessis, M. (2006). *The impact of organisational culture on knowledge management*. Oxford, England: Elsevier. ISBN: 978-1-84334-296-0
- Easterby-Smith, M., & Prieto, I. M. (2008). Dynamic capabilities and knowledge management: an integrative role for learning?, *British journal of management*, *19*(3), 235-249.
<https://doi.org/10.1111/j.1467-8551.2007.00543.x>
- El Sawy, O. A., & Majchrzak, A. (2004). Critical issues in research on real-time knowledge management in enterprises. *Journal of Knowledge Management*, *8*(4), 21-37.
<https://doi.org/10.1108/13673270410548469>
- Ellis, G. (2020). Chapter 3 - Creating value from knowledge work in *Improve: The Next Generation of Continuous Improvement for Knowledge Work*, 41-49.
<https://doi.org/10.1016/B978-0-12-809519-5.00003-X>

- Gholami, M. H., Asli, M. N., Nazari-Shirkouhi, S., & Noruzi, A. (2013). Investigating the influence of knowledge management practices on organizational performance: an empirical study. *Acta Polytechnica Hungarica*, 10(2), 205-216.
<https://doi.org/10.12700/aph.10.02.2013.2.14>
- Gold, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, 18(1), 185-214.
<https://doi.org/10.1080/07421222.2001.11045669>
- García-Holgado, A., & García-Peñalvo, F. J. (2016). Architectural pattern to improve the definition and implementation of eLearning ecosystems. *Science of Computer Programming*, 129, 20-34.
<https://doi.org/10.1016/j.scico.2016.03.010>
- Hedelin, L., & Allwood, C. M. (2002). IT and strategic decision making. *Industrial Management & Data Systems*, 102 (3), 125-139.
<https://doi.org/10.1108/02635570210421318>
- Hislop, D. (2010). Knowledge management as an ephemeral management fashion? *Journal of Knowledge Management*, 14(6), 779-790.
<https://doi.org/10.1108/13673271011084853>
- Hosseini, S. S., Tekmedash, Y. N., Karami, A., & Jabarzadeh, Y. (2019). The Impact of Knowledge Management Strategy on Service Innovation Performance in Private and Public Hospitals. *Iranian Journal of Management Studies (IJMS)*, 12(1), 1-24.
<https://doi.org/10.22059/IJMS.2018.249784.672966>
- Iqbal, S., & Qureshi, I. A. (2012). M-learning adoption: A perspective from a developing country. *The International Review of Research in Open and Distributed Learning*, 13(3), 147-164.
<https://doi.org/10.19173/irrodl.v13i3.1152>
- Ju Choi, C., Cheng, P., Hilton, B., & Russell, E. (2005). Knowledge governance. *Journal of knowledge Management*, 9(6), 67-75.
<https://doi.org/10.1108/13673270510630303>
- Karami, M., Alvani, S. M., Zare, H., & Kheirandish, M. (2015). Iranian Journal of Manage. *Determination of Critical Success Factors for Knowledge Management Implementation, Using Qualitative and Quantitative Tools (Case study: Bahman Automobile Industry)*, 181-201.
<https://doi.org/10.22059/IJMS.2015.52588>
- Kruger, C. J., & Johnson, R. D. (2009). Assessment of knowledge management growth: a South Africa perspective. *Aslib Proceedings*, 61(6) (pp. 542-564). Emerald Group Publishing Limited.
<https://doi.org/10.1108/00012530911005517>

- Kasemsap, K. (2017). Career Management in the Knowledge-Based Organizations. *International Journal of Knowledge-Based Organizations (IJKBO)*, 7(2), 60-73.
<https://doi.org/10.4018/IJKBO.2017040105>
- Kim, J., Erdem, M., Byun, J. & Jeong, H. (2011). Training soft skills via e-learning: international chain hotels. *International Journal of Contemporary Hospitality Management*, 23(6), pp.739-763.
<https://doi.org/10.1108/09596111111153457>
- Miković, R., Petrović, D., Mihić, M., Obradović, V., & Todorović, M. (2020). The integration of social capital and knowledge management – The key challenge for international development and cooperation projects of nonprofit organizations. *International Journal of Project Management*, 38(8), 515-533.
<https://doi.org/10.1016/j.ijproman.2020.07.006>
- McKenzie, J., & Van Winkelen, C. (2004). *Understanding the knowledgeable organization: Nurturing knowledge competence*. Cengage Learning EMEA. ISBN 10: 1861528957
- Mohapatra, S., Agrawal, A., & Satpathy, A. (2016). Knowledge Management Cycles. In *Designing Knowledge Management-Enabled Business Strategies* (pp. 13-29). Springer, Cham. ISBN 978-3-319-33894-1
- Matveeva, N., Sterligov, I., & Yudkevich, M. (2021). The effect of Russian University Excellence Initiative on publications and collaboration patterns. *Journal of Informetrics*, 15(1), Available online 3 December 2020.
<https://doi.org/10.1016/j.joi.2020.101110>
- Pandey, S. C., & Dutta, A. (2013). Role of knowledge infrastructure capabilities in knowledge management. *Journal of knowledge management*, 17(3), 435-453.
<https://doi.org/10.1108/JKM-11-2012-0365>
- Prajogo, D. I., Power, D. J., & Sohal, A. S. (2004). The role of trading partner relationships in determining innovation performance: an empirical examination. *European Journal of Innovation Management*, 7(3), 178-186.
<https://doi.org/10.1108/14601060410549874>
- Salleh, K., Chong, S. C., Syed Ahmad, S. N., & Syed Ikhsan, S. O. (2012). Learning and knowledge transfer performance among public sector accountants: an empirical survey. *Knowledge Management Research & Practice*, 10(2), 164-174.
<https://doi.org/10.1057/kmrp.2011.46>
- Stein, E. W. (1995). Organization memory: Review of concepts and recommendations for management. *International journal of information management*, 15(1), 17-32.
[https://doi.org/10.1016/0268-4012\(94\)00003-C](https://doi.org/10.1016/0268-4012(94)00003-C)

- Sujatha, R., & Krishnaveni, R. (2018). Knowledge creating as a determinant of work performance of employees: An empirical analysis among pump manufacturing firms in South India. *Asia Pacific Management Review, 23*(1), 45-52.
<https://doi.org/10.1016/j.apmr.2017.01.006>
- Tarlatt, A. (2013). *Implementierung von Strategien im Unternehmen*. Springer-Verlag. ISBN 978-3-322-90319-8
- Teng, J. T., & Song, S. (2011). An exploratory examination of knowledge-sharing behaviors: solicited and voluntary. *Journal of knowledge management, 15*(1), 104-117.
<https://doi.org/10.1108/136732711111108729>
- Toit, D., H., S., & Du Toit, M. (2008). Multilevel structural equation modeling. In *Handbook of multilevel analysis* (pp. 435-478). New York, NY: Springer.
https://doi.org/10.1007/978-0-387-73186-5_12
- Tsai, M. T., & Cheng, N. C. (2012). Understanding knowledge sharing between IT professionals—an integration of social cognitive and social exchange theory. *Behaviour & information technology, 31*(11), 1069-1080.
<https://doi.org/10.1080/0144929X.2010.550320>
- Vaio, A. D., Palladino, R., Pezzi, A., & Kalisz, D. E. (2021). The role of digital innovation in knowledge management systems: A systematic literature review. *Journal of Business Research, 123*, 220-231.
<https://doi.org/10.1016/j.jbusres.2020.09.042>
- Yang, L. R., Huang, C. F., & Hsu, T. J. (2014). Knowledge leadership to improve project and organizational performance. *International Journal of Project Management, 32*(1), 40-53.
<https://doi.org/10.1016/j.ijproman.2013.01.011>
- Young, R. (2010). Knowledge management tools and techniques manual. *Asian Productivity Organization, 98*, 1-98. ISBN: 92-833-7093-7
- Zheng, W., Yang, B., & McLean, G. N. (2010). Linking organizational culture, structure, strategy, and organizational effectiveness: Mediating role of knowledge management. *Journal of Business research, 63*(7), 763-771.
<https://doi.org/10.1016/j.jbusres.2009.06.005>
- Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization science, 13*(3), 339-351.
<https://doi.org/10.1287/orsc.13.3.339.2780>