

# The Impact of Organizational Factors on the Effectiveness of Knowledge Management among Nurses

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## Abstract

**Background and Objectives:** Knowledge Management (KM) has emerged as a pathway towards competitive advantage in current complex industrial environment. The aim of the present study was to explore the relationship between KM effectiveness and various organizational factors including social interactions (trust, communication and coordination), infrastructure factors (structure, information technology, and organizational culture), and process factors (knowledge acquisition, conversion, application and protection) in nursing staff.

**Methods:** A sample of 220 nurses was surveyed out of the total of 392 nursing staff at Golestan Hospital of Ahvaz City (South Western Iran). KM effectiveness questionnaire (Lin, 2008), social interactions questionnaire (Huang and Li, 2009), and infra-structure and process questionnaire (Ghosh and Scott, 2006) were used as the study tools. The data were analyzed by structural equation modeling (SEM) and partial least squares (PLS) methods.

**Findings:** The results showed that social interactions, infrastructural factors, and process factors are significant predictors of the effectiveness of KM among nurses at both individual and organizational levels.

**Conclusions:** Among other organizational factors, infrastructure factors have the strongest positive influence on KM. This implies that KM practices need to focus on promoting structure, information technology and culture to foster a knowledge-friendly environment for nurses.

**Keywords:** Knowledge management effectiveness, Infrastructure capabilities, Process capabilities, Social interactions, Nurse, Health care organization

## Background and Objectives

Knowledge Management (KM) is increasingly considered as a strategic resource for creating sustainable competitive advantage in business organizations [1]. KM refers to the strategies and processes for acquisition, conversion, application, and protection of knowledge with the aim of enhancing competitiveness [2]. Several studies have indicated the impact of KM on the success of organizations in terms of organizational performance [3, 4], team building [5], and organizational effectiveness [6]. In the healthcare domain, evidence shows a strong relationship between the

quality of work life in nurse managers and their participation in KM [7].

Benefiting from the advantages of KM is contingent on its effective implementation. Therefore, all organizational dimensions of KM should be directed towards successful realization of KM. Effectiveness of KM at organizational level requires that KM processes empower employees to develop, share and use information [3].

The aim of the present study is, therefore, to develop a model representing the factors influencing KM effectiveness at both individual and organizational levels.

## KM in hospital

Knowledge sharing is important in knowledge-based organizations such as modern hospitals. The impact of nurses' knowledge on healthcare outcomes has

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increased the importance of promoting KM in health organizations [8]. Given the diverse and specialized activities of health organizations, storing different information including pharmaceutical stock, periodic patient reports, and treatment outcome are highly essential. Hence, use of expert systems and modern information tools is crucial to identifying, collecting, and sharing information [9]. Most hospitals use information recording systems to store their patients' clinical data. However, in recent years, hospitals have increasingly considered the use of information technology (IT)-based KM systems which are consisted of knowledge databases, decision support systems, workflow, and portals that facilitate storage, conversion and use of medical information [10]. The need to work as a team with a focus on the patient increases the importance and significance of information sharing and management in hospitals [11]. Thus, the healthcare industry increasingly becomes dependent on KM in order to provide high-quality services. Hospital processes can adapt to the KM criteria. The knowledge creation process in hospitals is guided by the interaction between the medical staff and patients [12]. The acquired knowledge is stored in the KM system by the nurses. Thus, all the hospital personnel can use the stored knowledge in their future interactions with the patients or other relevant activities [13].

Shortened hospitalization periods, reduced healthcare costs through applying medical breakthroughs, enhanced treatment processes, increased sharing of knowledge among healthcare providers, and improved quality of patient care are among the other advantages of applying a KM system in hospitals [9, 10].

### Infrastructure

Several studies indicate that KM effectiveness is influenced by the organization infrastructure [16-18]. The role of culture in KM effectiveness is particularly emphasized in the literature [18]. Indeed, for success-

ful implementation of KM, the organizational culture should have already been developed to accept and foster it [19]. This requires managers to try to remove those beliefs that hinder knowledge sharing and to reinforce a culture that facilitates KM processes [14].

In this regard, KM and IT are intertwined and have a synergistic relationship [1]. IT promotes dissemination of knowledge within an organization and facilitates information search and application [20]. In addition, by removing the possible obstacles, creating information gathering channels, establishing a proper knowledge flow within the organization, and identifying the position of knowledge holders and seekers, IT directly and indirectly influences personnel's motivation to share knowledge [21]. However, IT is only a communication path and a platform to store information that is going to be exchanged. This technology cannot create or construct knowledge. In fact, in an organization with an "anti-knowledge culture", use of IT does not guarantee the creation or promotion of knowledge, and does not transform "knowledge hoarding culture" into "knowledge sharing culture" [22]. Putting these all together, the first research hypothesis is formulated as follows: "Infrastructure dimension of KM (structure, technology, and culture) has a significant impact on KM effectiveness (at both individual and organizational levels)".

### Social interactions

The majority of KM experts agree that knowledge creation and management in organizations is strongly influenced by social processes [23]. Social interactions are characterized by three factors, including trust, coordination, and effective communications. Several studies have reported that social networks and interactions increase mutual learning opportunities and knowledge exchange [24]. Members of an organization can acquire their necessary knowledge through close communication and interaction [25]. Social in-

**Table 1 Benefits of adopting knowledge management in hospital**

Benefits to hospital	Benefits to patients
Identifying new clinical opportunities	Shortened treatment period
Quick adaptation to unexpected changes	Enhanced nursing services offered to the patients
Quick reaction to the information provided by patients	Lower unnecessary visits by patients
Facilitated fulfillment of patients' needs	Increased effectiveness of patient care
Increased number of new customers	Improved patient's satisfaction with the hospital services

**Table 2** The reliability analysis of the study tool

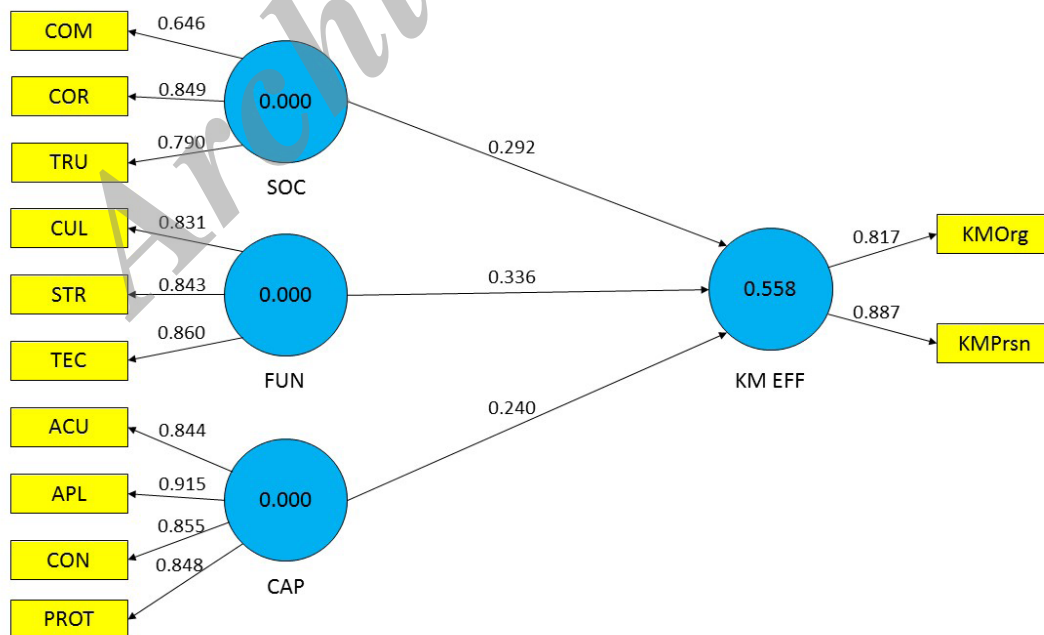
Variable	Number of Questions	Cronbach's Coefficient	Composite Reliability
Social Interactions	9	0.641	0.808
Infrastructure	14	0.80	0.882
Process	18	0.888	0.923
Effectiveness	9	0.629	0.842

teraction creates a common language that enhances knowledge integration, and provides a tool to evaluate the advantages of the created knowledge [26, 27]. Therefore, social interactions may be considered a prerequisite to successful implementation of KM in an organization. Built on this, the second hypothesis of this study is formulated as follows: "Social interactions (trust, communications and coordination) have a significant impact on KM effectiveness (at both individual and organizational levels)".

### Process

The process dimension of KM comprises four compo-

nents, including knowledge acquisition (e.g. interaction with patients, considering project's feedback, and knowledge sharing sessions), knowledge application (use of knowledge acquired through previous experiences via checklists, use of created knowledge to solve new problems, and facilitation of communication with other individuals), knowledge conversion (use of knowledge to design new medical services, integrating various types of knowledge, and organizing input knowledge), and knowledge protection (protection of knowledge against any misuse by defining different access levels, and informing the personnel of the importance of knowledge protection) [14]. Evidence shows that all of these factors influence KM effectiveness in hospitals [9]. Therefore,



**Figure 1** Structural equation modeling (SEM) and partial least squares (PLS) modeling of the relationship between KN effectiveness and organizational infrastructure, social interactions, and processes.

the third hypothesis of the present study is formulated as follows: "Process dimension of KM (knowledge acquisition, conversion, application, and protection) has a significant impact on KM effectiveness (at both individual and organizational levels)".

## Methods

### Setting and sample

The research population consisted of 392 nurses of Golestan Hospital of Ahvaz City (Iran). Using Cochran's formula, a sample size of 196 was determined. To account for non-responses and invalid responses, a sample size of 220 was considered.

### Study instruments and data collection

Data were collected using a questionnaire measuring effectiveness [3], social interactions [27], infrastructure, and process aspects of KM [9]. A seven-point Likert-type scale was used to quantify the answers. The questionnaires were administered through face-to-face meeting with the nurses. The time and place for completing the questionnaire were determined by the nurses.

**Table 3** Convergence validity of Knowledge Management construct

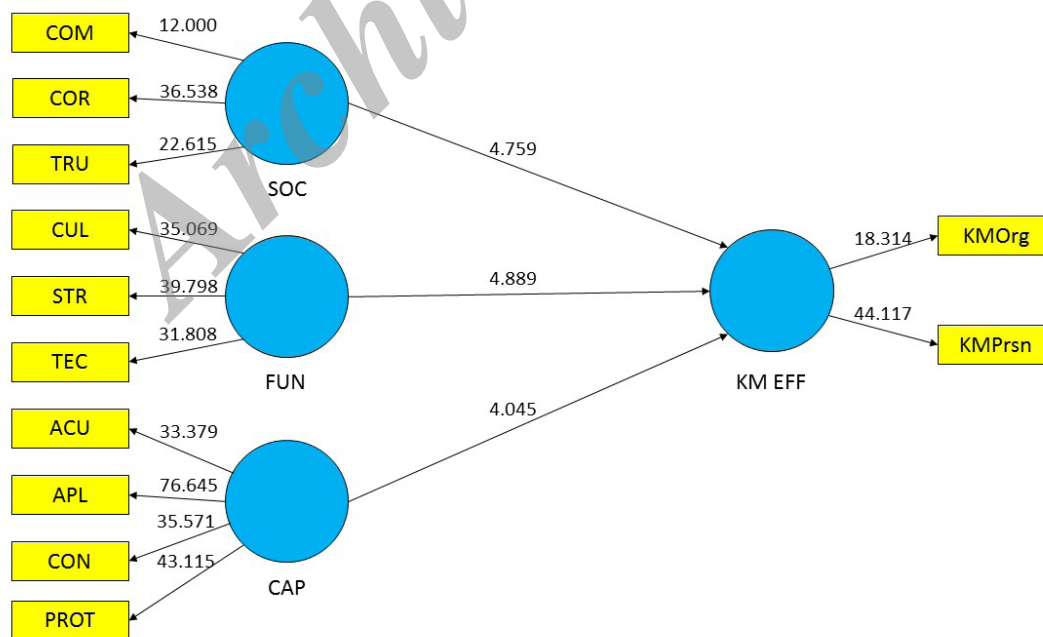
Variable	Convergence Validity
	Average Variance Extracted
Social Interactions	0.587
Infrastructure	0.713
Process	0.750
Effectiveness	0.727

### Ethical issues

The verbal consent of all participants was obtained before administering the questionnaires. They were briefed about the objectives of the study, and assured of the confidentiality of their responses.

### Data analysis

The collected data were summarized using descriptive statistical methods. The normality distributions were examined using Kolmogorov-Smirnov test. The internal consistency reliability of the items was tested using Cronbach's alpha coefficient.



**Figure 2** Structural equation modeling (SEM) together with significance values

**Table 4** Factor loadings for organizational variables

Dimensions	Social Interactions	Infrastructure	Process	KM Effectiveness
Communications	0.646			
Coordination	0.849			
Trust	0.790			
Culture		0.831		
Organizational Structure		0.843		
Technology		0.860		
Knowledge Acquisition			0.844	
Knowledge Application			0.915	
Knowledge Conversion			0.855	
Knowledge Protection			0.848	
Organizational Effectiveness				0.817
Individual Effectiveness				0.887

Table 2 shows the number of items used to evaluate each variable, Cronbach's alpha coefficient, and composite reliability of the variables.

In order to examine convergence validity, the average variance extracted was analyzed. As shown in Table 3, all the average variances extracted are greater than 0.5, showing that the model has acceptable convergence validity [28].

In order to model data and test the study hypotheses, structural equation modeling (SEM) and partial least squares (PLS) were used. Table 4 shows the factor loadings for the latent variables. As seen, all the values of the measures related to the latent variables (that are inserted in shaded cells) are greater than 0.5, indicating the adequate reliability of the model.

Table 4 also presents the probability values. These values are often referred to as reliability parameters in confirmatory factor analysis. As can be seen, all of the probability values are smaller than 0.05, suggesting that the research tool is adequately reliable.

## Results

Test of the first research hypothesis: as shown in Figure 1, the path coefficient for the relationship between social interactions and KM effectiveness is estimated to be 0.292. Considering that the probability value is also smaller than the significance level of 0.05, the significance value is not within the range of  $\pm 1.96$  (Fig. 2), showing that social interactions significantly affect KM effectiveness.

Test of the second research hypothesis: the path coefficient for the relationship between infrastructure

and KM effectiveness was obtained as 0.336. Considering that the probability value is smaller than the significance level of 0.05, the significance value is not within the range of  $\pm 1.96$  (Fig. 2), showing that infrastructure significantly affects KM effectiveness.

Test of the third research hypothesis: the path coefficient for the relationship between process and KM effectiveness was calculated to be 0.240. Considering that the probability value smaller than the significance level of 0.05, the significance value is not within the range of  $\pm 1.96$  (Fig. 2), showing that process significantly affects KM effectiveness. Thus, all the three hypotheses of the study were confirmed.

The quality and validity of the model were evaluated by cross validation. Table 5 shows CV-communality and CV-redundancy values. As can be seen, these values are positive, indicating the validity of the developed model.

## Discussion

This study examined the impact organizational social interactions (trust, communication and coordination),

**Table 5** CV-communality and CV-redundancy of the model variables

Variable	C.V. Com	C.V. Red
Social Interactions	0.056	0.056
Infrastructure	0.412	0.412
Process	0.501	0.501
Effectiveness	0.205	0.379

infrastructure (structure, information technology, and organizational culture), and processes (knowledge acquisition, conversion, application and protection) KM effectiveness in hospitals. It was confirmed that KM effectiveness is significantly influenced by all these organizational factors. Although the impact of the above-mentioned factors was found to be significant at both individual and organizational levels, the former impact was found to be greater. The largest impact of organizational factors on KM effectiveness was identified for infrastructural elements, including structure and culture, followed by social interactions.

Our results are, generally, concordant with those from previous studies. Jafari *et al.* explored the relationship between the organization's structure and culture in nine hospitals affiliated with Tehran University of Medical Sciences (TUMS). There was an average level of KM effectiveness in these hospitals due to high centrality of the organizational structure. Improving organizational freedom and removal of unnecessary limitations were suggested as potential strategies to promote knowledge sharing [17]. Zheng *et al.* reported that organizational structure, culture, and strategy impact organizational effectiveness through the mediating role of KM [16]. The study of Tanriverdi confirmed the effect of proper use of IT on KM effectiveness and thereby organizational performance [29].

Consistent with our findings, some previous studies indicate that social interactions between individuals facilitate sharing, acquisition and application of knowledge [24, 30]. The findings of Huang and Li [27] revealed a positive significant effect for all three aspects of social interactions (including trust, collaboration and coordination) on KM effectiveness. Uzzi and Lancaster concluded that reinforcing social communication networks in an organization facilitates sharing of the relevant and required knowledge [25]. We found the largest impact of social interactions on KM effectiveness for coordination. It could be explained by the evidence that in a well-coordinated organization, the personnel can interact more often and thus find more opportunities to acquire, share, and use knowledge [31]. On the other hand, the positive impact of trust on KM effectiveness confirmed in the present study is supported by the study of Abrams *et al.*, showing that a high level of trust in any organization is crucial to facilitating knowledge sharing and exchange [19].

## Conclusions

Our study confirmed that KM effectiveness among hospital nurses is significantly influenced by. The largest

impact of these organizational factors on KM effectiveness was identified for infrastructural elements (structure and culture), followed by social interactions. Our results may provide KM professionals in hospitals with an insight into organizational factors that influence KM outcomes among nurses. Based on our findings, KM practices need to promote information technology, fostering culture, and appropriate coordination to develop a knowledge-friendly environment for nurses, which facilitates creation, share, and use of knowledge.

## Abbreviations

(KM): Knowledge Management; (IT): Information Technology; (SEM): Structural Equation Modeling; (PLS): partial Least Squares

## Competing Interests

The authors declare no competing interests.

## Authors' Contributions

The authors contributed equally to this study.

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