# Investigating the impact of information systems on knowledge sharing

Somayyeh Mirzaee and Ali Ghaffari

**Abstract**

**Purpose** – *Knowledge is the key factor and the strategic resource for acquiring assets and intangible organizational capabilities, which can lead to further growth and development, creation of value and the advantage of competitiveness. The purpose of this paper is to investigate the impact of information systems (ISs) on knowledge sharing.*

**Design/methodology/approach** – *The statistical society and the intended population of this study were the experts of the registry office in Tabriz, East Azerbaijan Province, Iran. A questionnaire was used as the instrument for collecting data. Also, SMART-partial least square was used for testing the hypotheses of the study.*

**Findings** – *The results gained in this study revealed that IS dimensions, i.e. service quality, system quality and technology, play a significant role in sharing knowledge among the personnel of an organization.*

**Practical implications** – *Nowadays, knowledge is regarded as a notable component of knowledge management process, which contributes to the growth and development of organizations. Sharing knowledge can be considered as a vital phenomenon in managing organizational knowledge. One of the remarkable tasks of ISs is to share information as a key factor. Sharing information can result in fast information distribution and efficient and effective organizational operations and enhanced internal and external performance of the organization.*

**Originality/value** – *This paper is aimed at introducing and presenting functional dimensions for optimizing the efficacy of ISs. Implementing an effective IS can accelerate the speed of information exchange among the personnel and the improvement of their capabilities.*

**Keywords** *Information systems, System quality, Knowledge sharing, Service quality, Technological factors*

**Paper type** *Research paper*

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## 1. Introduction

Knowledge management (KM) has recently become a significant issue in academic circles and functional domains. Academic and commercial societies contend that thanks to using power of knowledge, organizations can maintain and preserve their long-term advantages in the competitive domains. KM is a set of processes for understanding and using knowledge in organizations as a strategic resource. It is a structured approach that establishes certain methods and ways for identifying, evaluating, organizing, saving and applying knowledge so that needs are supplied and the organizational purposes are fulfilled (Dayan *et al.*, 2017).

Knowledge sharing is defined as the exchange between a contributor and a seeker, which calls for presenting and acquiring knowledge (Kimmerle *et al.*, 2007). KM can be divided into a number of sub-processes such as knowledge creation, knowledge storage, knowledge sharing and knowledge application. In fact, all the related processes play important roles in establishing a successful KM program. Specially, sharing knowledge is considered as the main element for the development of knowledge (Small and Sage, 2006).

Knowledge is a crucial resource that helps organizations to construct a sustainable competitive merit in a competitive and dynamic economy. Moreover, knowledge is a notable strategic resource at the disposal of organizations (Chen *et al.*, 2016).

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Knowledge sharing has recently become a hot research issue in different fields of management (Mueller, 2012; Connell *et al.*, 2014; Kim *et al.*, 2012). It is not only the biggest challenge in KM but also the most significant factor in measuring KM performance or organizational learning (Foss *et al.*, 2010; Quigley *et al.*, 2007; Giampaoli *et al.*, 2017). Besides the management of information, KM facilitates the production of new knowledge and manages different ways for sharing and applying knowledge (Davenport and Marchand, 1999; Lech, 2014). KM underscores the fact that organizations should employ employees who can contribute to sharing knowledge among other employees (Small and Sage, 2006).

Scientific and academic societies have recently focused on knowledge sharing processes across organizational boundaries (Gerlach *et al.*, 2015; Newell, 2015). Motivating employees to share useful knowledge across an organization can lead to the enhancement of competitive advantages within that organization (Wu and Lee, 2017; Liu and Phillips, 2011; Akgün *et al.*, 2017; Vuori and Okkonen, 2012).

A unified research model was developed by Razmerita *et al.* (2016); it was intended to integrate demographic, individual, organizational and technological factors for enhancing employees' motivation to share knowledge.

Employees' ignorance can have a negative impact on their intention for sharing knowledge; hence, it results in poor decision-making and communication in organizations. Also, this debilitating factor might reduce organizational ability for handling external threats, implementing innovation and doing away with future risks (Israilidis *et al.*, 2015).

The rationale behind this paper is to investigate the link between employee ambidexterity and two supportive organizational features, i.e. the perceived culture of empowerment and a knowledge-sharing culture. Moreover, this study focuses on the mechanisms through which these supportive organizational features can enable employees to engage in ambidextrous behavior. As a case in point, Caniëls *et al* (2017) examined the contribution of intrinsic motivation.

As mentioned above, in this study, we tried to highlight the impact of different parameters of ISs on knowledge sharing among organizational employees. For operationalizing this research question, we zoomed in on central registry office in East Azerbaijan Province, Iran. The following points were taken into consideration in this study:

- creation of a model and framework for determining the impact of different dimensions of ISs on knowledge sharing;
- evaluating the impact of the variables of ISs on sharing knowledge in organizations; and
- recommending some suggestions for enhancing and optimizing the quality of knowledge-sharing organizations.

The rest of the paper is organized as follows: Section 2 provides a brief review of the related works. Section 3 presents the model and hypotheses of the study. Section 4 reports the methodology of the study. Section 5 provides the results and discussion of the findings. Finally, Section 6 draws the conclusion of the study, directions for further research and limitations.

## 2. Review of the related works

### *2.1 The concept of sharing knowledge*

Different companies and organizations have recently started to join the knowledge process. As a result, the generation of concepts and ideas such as knowledge-work and knowledge organizations indicate the enhancement of this trend. By applying these terms, Drucker announced the creation of novel organizations in which the power of mind rather than the

power of arm is the dominant force. Based on this theory, in future, communities and societies with more power are expected to develop and progress. Although some people believe that knowledge is tantamount to power, it seems that knowledge does not have power by itself. That is, the component which empowers people is that part of their knowledge is shared with other people (Jeung *et al.*, 2017). Indeed, sharing knowledge is an operation through which knowledge, information, skills and expertise are exchanged and shared among people, friends, families, organizations and societies.

The significance of knowledge sharing is so high that some researchers have argued that KM exists so as to support knowledge sharing (Huysman and De Wit, 2002). Hence, an organization that supports information sharing and knowledge production among its staff members can lead to effective and efficient processes and improve organizational performance (Dayan *et al.*, 2017). Prior to the exploitation of knowledge, it should be distributed and shared. Indeed, knowledge sharing facilitates knowledge acquisition and re-application (Nonaka and Takeuchi, 1995).

Some research studies indicate that fruitful sharing and integration of knowledge lead to the reduction of production costs, faster completion of new product development projects, improvement of group performance, innovative capabilities of companies and the enhancement of the sales income of new products and services (Wang and Noe, 2010). Also, sharing knowledge among employees can result in the optimized performance of companies, such as employment and absorption capacity and innovation capability (Liu and Phillips, 2011; Akbari and Ghaffari, 2017). However, if knowledge cannot be shared effectively, undesirable consequences such as reduced work efficiency, increased failure probability for developing a new product and delay in executing the shared projects might occur. Nevertheless, very few studies on the realm of KM have been carried out (Wang and Ko, 2012).

Davenport *et al.* (2008) maintained that although knowledge sharing is fruitful in some dimensions, it may not necessarily optimize products and services, employees or superior work processes. Also, Gibbert and Krause (2002) maintained that knowledge sharing considers people's interest and willingness for sharing their obtained or produced knowledge with other employees in the working context. In other words, knowledge may not be shared necessarily until individuals want to do so. Organizational policies can motivate knowledge sharing through proper and appropriate frameworks.

Tseng and Huang (2011) investigated social and technical contents and values of Wikipedia and its impact on knowledge sharing and occupational performance. They found that Wikipedia has a significant impact on sharing knowledge and occupational performance. That is, companies can use Wikipedia for increasing their employees' interest and willingness for sharing knowledge and improving employees' occupational performance (Tseng and Huang, 2011).

Huang and Cheng (2004) investigated the relationship between implementing enterprise resource planning (ERP) system and sharing knowledge within organizations. The results of this study revealed that there is a positive relationship between implementing ERP and sharing knowledge. Also, they drew the conclusion that organizations have no adaptive problem with ERP systems and knowledge sharing processes.

Chen *et al.* (2012) studied the direct and indirect impact of the quality of KM systems (KMS), self-efficacy of KMS, organizational atmosphere and attitude toward sharing knowledge in the development process of new products. The results of this study indicated that attitude and intention are the key and effective factors in sharing knowledge.

According to social exchange theory and the perspective of positive organizational behavior, Wu and Lee (2017) investigated the positive leadership of group leaders, i.e. empowering leadership; they maintained that it can contribute to the development of positive psychological capital, which can enhance their knowledge sharing.

### 2.2 Understanding the concept of information systems

As organizations use IS for achieving strategic and operational purposes, ISs development is regarded as an essential organizational activity. ISs development calls for examining, designing and executing information technology (IT) systems for boosting business operations (Xia and Lee, 2005).

As organizations have to develop IS for handling their business requirements and challenges, the role and contribution of knowledge sharing in IS projects are unavoidable and essential (Tiwana and McLean, 2005).

ERP is characterized as an IS that can combine information and information-based processes across different areas of a given organization (Kumar and Van Hillegersberg, 2000). As it is considered a type of process-based IS, ERP can maintain different business operations such as accounting, finance, human resources, production and logistics. Other organizational applications of ERP require abandoning obstacles so that knowledge sharing can be effectively achieved. However, the issue of knowledge sharing among team members with regard to ERP systems is an under-researched topic, which should be addressed by further research (Esteves, 2009; Maas *et al.*, 2016).

Thanks to using centralized databases and integrated business processes across various parts and departments, ERP systems orient organizations toward a coherent and unified perspective of organizational information (Baskerville *et al.*, 2006).

Besides supporting decision-making and control, ISs can help managers and employees in analyzing problems, visualizing complicated issues and producing new products. An IS includes a set of interdependent variables that support decision-making and control in organizations via collecting, processing, storing and distributing information. This system contributes not only to coordination of organizational operations but also to the analysis and simulation of problems and challenges of a given organization (Baskerville and Wood-Harper, 2016).

ISs are considered as one of the notable elements of the current business contexts. That is to say, ISs can be used for reducing geographical lacuna and for motivating employees to be more efficient, leading to the improvement of the processes, administration and the management of information. Thus, it has a positive effect on the productivity and competitiveness of organizations and companies (Rai *et al.*, 2006).

Rao *et al.* (2015) investigated the enhancement of organizational performance by means of KM. By relying on KM and theories of organizational learning, they developed an experimental model in which knowledge sharing plays a mediating role between ISs and the performance and development of a company. The results of their study indicated that ISs have a positive effect on organizational performance and sharing knowledge has a mediating role on ISs.

Park and Lee (2014) investigated the role of trust and dependence on sharing knowledge in IS projects in large IT companies in 135 projects. They found that dependence and trust play key roles in knowledge sharing, which can lead to the improved performance of projects (Park and Lee, 2014).

In recent years, ERP systems have been used as comprehensive integrated systems in most companies and organizations. Some organizations highlight the promising significance of ERP systems, and others mention its failure as an issue which should be potentially addressed in research studies (Al-Ahbabi *et al.*, 2017). In fact, ERP systems contribute to the execution of organizational tasks by coordinating business processes and regulating business functions. Inasmuch as ERP systems focus on ideal practices, the majority of organizations have to modify their work operations so that they are compatible with ERP architecture (Chou *et al.*, 2014). Knowledge sharing plays a major role in the successful application of ERP systems (Park *et al.*, 2007; Acar *et al.*, 2017). A research

model was developed by Chou *et al.* (2014), which underscored the significance of knowledge sharing in ERP post-implementation stage. They also acknowledged the effect of using ERP systems. According to research findings, it can be argued that variables such as intrinsic motivation, self-efficacy and social capital knowledge sharing significantly impact knowledge sharing. In other words, these factors account for 45 per cent of knowledge sharing variance. An ERP is a software and innovative KM tool that is used for cost management. It helps construction contractors to effectively handle their cost data and make improved cost management decisions through being better knowledge managers. In case ERP is applied effectively, ERP can function as a KM strategy for optimizing knowledge transfer and reducing knowledge complexity (Chan *et al.*, 2009).

## 3. Research model and hypotheses

### *3.1 Implementing information systems and knowledge sharing*

KM is aimed achieving and enhancing organizational parameters such as innovation, improved performance, competitive advantage and success stories. It contributes to the optimization of organizational and individual performance. KMS is regarded as a remarkable technology infrastructure of an organization that generates and manages the collective knowledge for different operations and projects. However, very little information is available about the efficiency of KMS investments with regard to its impact on employees and organizational performance (Sharda *et al.*, 2014).

In fact, knowledge is shared when individuals share their own information, attitudes, experiments and effective activities with other individuals. Also, knowledge sharing includes sharing employees' related organizational information, beliefs, thoughts, suggestions and experiences with one another (Bartol and Srivastava, 2002). Nevertheless, according to Kinsey (2007), sharing knowledge is not a straightforward task. That is, as knowledge brings power, individuals are not readily willing to share their knowledge.

One significant logic and justification regarding knowledge sharing in the system development process is related to the operation of knowledge exchanges among the participants of a project. Participants are involved in mutual communications and interactions and may frequently change their roles from knowledge source to knowledge recipient (Pee *et al.*, 2010).

With regard to the above-mentioned discussion, we intend to investigate the following hypothesis:

*H1.* The success of information systems has a significant effect on knowledge sharing.

### *3.2 Service quality*

Service quality can help organizations to distinguish themselves from other organizations and achieve the competitive advantage (Ghobadian *et al.*, 1994). By providing high-quality services, companies can gain competitive advantages in terms of position. Organizations that underscore high-quality services and products focus on two aspects: internal culture and external reputation. They try to handle these two features in such a way that their competitors cannot follow them (Inhofe Rapert and Wren, 1998; Suppiah and Singh Sandhu, 2011).

Indeed, service quality is a function of leadership, good internal communications and team performance. For many organizations, quality is achieved by meeting all the needs of customers. Also, service quality denotes a managerial perception of services that are provided by a company for customers who have participated in the competition (Richey, 2014).

In fact, service quality denotes matching expectations with performance. Service quality includes sub-indexes of education and trust. Besides being a simple way for searching

information, service quality is a learning instrument that allows for different ways of knowledge production and knowledge sharing (Loureiro and Bettencourt, 2014).

Electronic education has become a robust approach for providing knowledge with respect to the increased number of users (Dharmawansa *et al.*, 2013). This approach has been increasingly used in recent years (Xu *et al.*, 2014). Along with the development of IT and communications, the domain of education will be inevitably involved in the internet. In fact, electronic education is a process through which people can acquire new knowledge and skills and improve their performance (Jia *et al.*, 2011).

Trust is defined as a set of mutual shared expectations, which leads to collaboration and information exchange (Zucker, 1986). Trust is a critical issue with regard to sharing knowledge. Hence, it should be taken into consideration while exchanging information and interacting with one another. On the other hand, achieving the resources of critical knowledge such as political purposes, critical information and organizational rumors depends on individuals' political intelligence and their respective trust. Indeed, trust is a prerequisite for exchanging information. Knowledge recipient should be confident about information accuracy and knowledge sender should be confident that his information has been used properly (Buckman, 1998). Trust and retaliation are necessary for social networks in which sharing knowledge is important (Burt, 1992). A trusted environment can easily contribute to knowledge sharing but an organization lacking trust has to create a set of rules for each interaction. Casimir *et al.* (2012) investigated the impact of perceived cost of sharing knowledge and affective trust in colleagues on the relationship between affective commitment and knowledge sharing. Also, Rutten *et al.* (2016) examined the differences at the level of knowledge sharing between co-workers with high and low trust conditions.

With regard to the above-mentioned issue, we considered and investigated the following hypothesis:

*H2*. Service quality has a notable effect on the success of information systems.

### 3.3 System quality

System quality refers to the ease, speed, multi-purposeness and the efficacy of information recovery and transfer of KMS. For sharing and codifying knowledge, KMS with a structure that can codify knowledge quickly and easily is of high significance (Davenport *et al.*, 1998).

A qualitative study indicated that the ease and facility of storing information can motivate individuals toward knowledge sharing (Goodman and Darr, 1998). Also, another qualitative study indicated that system quality in terms of ease of use, speed and coherence is crucial for sharing knowledge in organizations (Davenport *et al.*, 1998). System quality includes the indexes of ease of use and system security. Ease of use is defined as the degree of convenience/inconvenience involved in using an IS (Sanders and Manrodt, 2003). Indeed, the perceived ease of use can be considered as a method for improving an individual's performance. ISs not only facilitates doing tasks but also significantly affects economic growth and productivity (Graham and Nikolova, 2013).

The presence of security drawbacks in computer networks and lack of required instructions for preventing security shortcomings will bring about many issues. Consequently, it will cause damages for all computer users, and practically, the information infrastructure will be threatened and damaged. The third hypothesis of the study is as follows:

*H3*. System quality has a significant effect on the success of information systems.

### 3.4 Technological factors

This variable refers to the overall technical conditions, technical information infrastructure and ISs. It is concerned with the status of remote communications, electronic data exchange, IT

infrastructure and distributed systems. The most important criteria of this variable include the degree of permeation, spread and extension of bandwidth, the capability of supplying and extending internet and internet security. It should be noted that modern KM may not be distinguished from a consideration of technology (Holsapple, 2005). Also, technology variable includes sub-indexes of infrastructure capability, privacy and IT support.

The development of information and communication technology (ICT) can lead to innovations and evolutions in organizations. Hence, it can be rationally argued that IT and ICT play facilitating and accelerating roles in evolving public and private sectors and organizations (Ray, 2008; Brown and Thompson, 2011; Soto-Acosta and Cegarra-Navarro, 2016; Titi amayah, 2013). Also, further effort should be made for developing other sectors and lateral infrastructures. For example, without a legal infrastructure, it is not possible to benefit from the advantages of IT and ICT in areas such as e-commerce (Choshin and Ghaffari, 2017). The related literature in IS indicates that specific resources and capabilities of companies can improve the performance of the system (Chuang and Lin, 2013).

Security and privacy are considered as a significant factor, which were highlighted by Ross (2005). He argued that these factors influence a customer's decision on whether she/he shop should online. The privacy dimension in this stage is significant because it denotes the ability of preserving and protecting the personal information of the customer. It has a notable effect on the development of trust and long-term relations between the customer and the company (Ismail and Hussin, 2013).

Technical support refers to a set of services through which organizations help users in using technological products such as software or hardware products. Technical support of an online course might be an approach which facilitates interaction among users. It aids them to present their documents and contents and receive feedback (Rubin *et al.*, 2013).

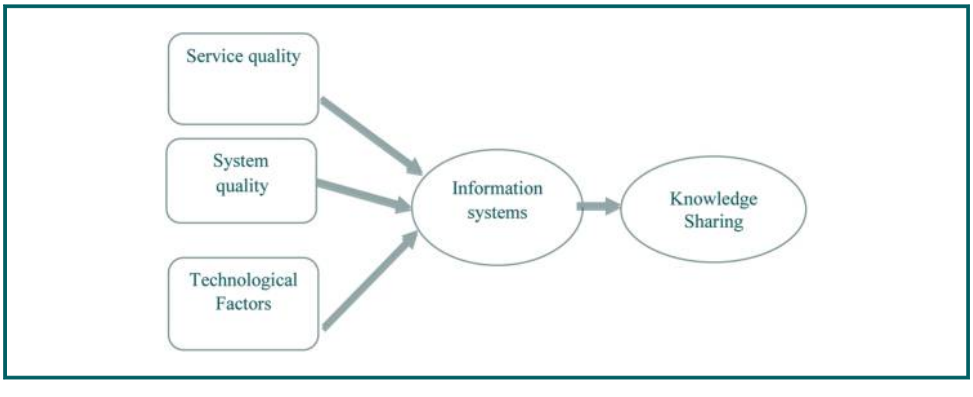
The degree of technical support depends on factors such as awareness of the organizational management from IT usefulness, educational courses held by top managers of the organizations, employees working on developing ISs, the resistance of employees against IT adoption and the trainings provided by the IT executive team (Lee and Kim, 2009). The fourth hypothesis of the study is as follows:

*H4*. Technology has a significant impact on the success of information systems.

### *3.5 Research model*

In the present study, we zoomed in on the success of ISs as a key factor in sharing knowledge. Based on this assumption, we formulated a conceptual model, which is illustrated in Figure 1.

**Figure 1** Presented conceptual model



## 4. Research methodology

The study reported in this paper is considered to be a survey study which is descriptive-analytic and has an applied purpose. The present survey study was aimed at investigating the features of the statistical population. This descriptive study was intended to specify and describe the features of the targeted variables. Also, it was an applied study as it was aimed at obtaining an understanding and knowledge for determining a tool through which certain needs and requirements can be met. In this study, we tried to discover and acquire new finding which can be applied specifically for a phenomenon or process.

### *4.1 Data collection*

The major data collection tool in this study was a questionnaire, which was directly used to gather primary data from the sample participants selected from the intended research population to test *H1-H4*.

### *4.2 Questionnaire*

In designing the questionnaire used in this study, we used five-choice Likert scale arranged from 1 to 5, where 1 denoted *completely disagree*, 2 meant *disagree*, 3 denoted *no idea*, 4 indicated *agree* and 5 meant *completely agree*. In this survey, the designed and developed questionnaire included 31 items. Al the included items were designed based on the intended variables (Appendix).

### *4.3 Sample participants of the study*

In this survey study, 85 participants were selected, who were the employees of the registry office in East Azerbaijan Province, Iran. By mean of Morgan table, it was found that 70 participants out of the selected 85 employees were appropriate for the present survey study. Hence, the designed questionnaires were distributed to the selected 70 employees, and they were gathered after the participants answered 31 questionnaire items. Demographic characteristics of the participants are presented in Table I.

**Table I** Demographic characteristics of the sample

| *View sample* | *Frequency* | *(%)* |
|---|---|---|
| *Gender* | | |
| Male | 54 | 77 |
| Female | 16 | 23 |
| Total | 70 | 100 |
| *Age* (years) | | |
| 21-30 | 30 | 43 |
| 31-40 | 25 | 36 |
| Above 41 | 15 | 21 |
| Total | 70 | 100 |
| *Education degree* | | |
| BA/BS | 19 | 27 |
| MA/MS | 41 | 59 |
| PhD | 10 | 14 |
| Total | 70 | 100 |
| *Work experience (years)* | | |
| 1-10 | 40 | 57 |
| 11-20 | 18 | 26 |
| Above 21 | 12 | 17 |
| Total | 70 | 100 |

## 5. Data analysis and results of the study

For investigating and checking the hypotheses of the study and the presented model, certain statistical tests and analyses were carried out and the collected data was fed into software so that the statistical analyses can be done. More precisely, in this survey study, three statistical tests, i.e. *t*-test, $R^2$ and goodness of fit (GOF) were used for evaluating the hypotheses and research model.

### *5.1 Reliability and validity*

As Cronbach's alpha is regarded as a traditional and conventional method of checking the reliability of the questionnaire, we also used partial least square (PLS) as a new criterion that considers the combined reliability of the entire data collection tool. The superiority of PLS to Cronbach's alpha is attributed to the fact that PLS evaluates reliability of variables as a correlation among variables rather than as separate absolute values for each variable. Hence, for a better evaluation of reliability, both criteria were used in this study.

In this study, the content validity of the questionnaire was checked and examined. That is, the designed and developed questionnaire was given to experts and experienced researchers in this field so as to check its content validity. After getting the experts' comments and feedback about the content validity of the questionnaire, it was revised and modified accordingly. Hence, in addition to the experts' comments, average variance extracted (AVE) was measured for ensuing the validity of the study. Then, the collected data from the questionnaire were fed into SPSS and SMART-PLS. The next criterion for evaluating the presented model was to measure AVE. Indeed, this criterion indicates average shared variance of each variable with its indexes. The critical value for this criterion is 0.5 (Hair *et al.*, 2006).

As Cronbach's alpha for each of the dimensions should be greater than 0.7, in this paper, for all the variables, the measured Cronbach's alpha was as follows: dependent variables: sharing knowledge (0.84) and ISs (0.85); independent variables: service quality (0.90), system quality (0.86) and technology (0.89). Also, the obtained composite reliability (CR) for all the variables was between 0.89 and 0.92. The measured AVE value was within the range of 0.58-0.67. According the measured tests and procedures, it was found that the proposed model was standard and acceptable. Table II indicates the validity and reliability for the proposed model.

Divergent validity is acceptable when AVE for each variable is greater than the shared variance between that variable and other variables in the proposed model (squared amount of shared variance among the variables). Table III shows the divergence validity for the proposed model.

As shown in Table III, the measured values for the proposed model are greater than the ones below them, which indicates that the data collection tool has acceptable divergent validity. Hence, based on the given values in Tables I and II, all the criteria have standard and acceptable values. Hence, the results are acceptable.

**Table II** Validity and reliability for the proposed model

| *Variables* | *AVE* | *CR* | $R^2$ | *Cronbach's alpha* |
|---|---|---|---|---|
| Knowledge sharing | 0.67 | 0.89 | 0.58 | 0.84 |
| ISs | 0.58 | 0.89 | 0.96 | 0.85 |
| Service quality | 0.60 | 0.92 | | 0.90 |
| System quality | 0.59 | 0.89 | | 0.86 |
| Technological factors | 0.66 | 0.92 | | 0.89 |

**Table III** Divergence validity for the proposed model

| *Variables* | *Service quality* | *System quality* | *Technological factors* | *ISs* | *Sharing knowledge* |
|---|---|---|---|---|---|
| Service quality | 0.78 | | | | |
| System quality | 0.50 | 0.77 | | | |
| Technological factors | 0.71 | 0.52 | 0.81 | | |
| ISs | 0.75 | 0.58 | 0.75 | 0.77 | |
| knowledge sharing | 0.62 | 0.65 | 0.52 | 0.76 | 0.82 |

### 5.2 Testing hypotheses

Structural equation modeling was used for investigating the proposed model and checking the relations between the independent and dependent variables. SMART-PLS () software was used for testing all the hypotheses of the study. In fact, SMART-PLS is a variable-based approach through which the reliability, validity and the relations between the variables of the study are measured (Cheng and Yang, 2014). PLS is mainly used as an alternative for structural equation modeling (Huang *et al.*, 2012). Selecting structural equation modeling rather than covariance-based tool (such as Lisrel) can be justified by a number of reasons. That is, PLS is capable of analyzing the proposed model by the productive indexes in the limited and abnormal data. The analysis was conducted in two stages. The first stage included the analysis of the reliability and convergent and divergent validity of the questionnaire. The second stage required acknowledging all the hypotheses of the study through statistic tests in the software (Chen and Tseng, 2012).

In this paper, SMART PLS 2.0 was used for analyzing the collected data. Hence, as mentioned above, for evaluating the overall fitness of the proposed model and the hypotheses, $\beta$, $R^2$, GOF index and *t*-test were used.

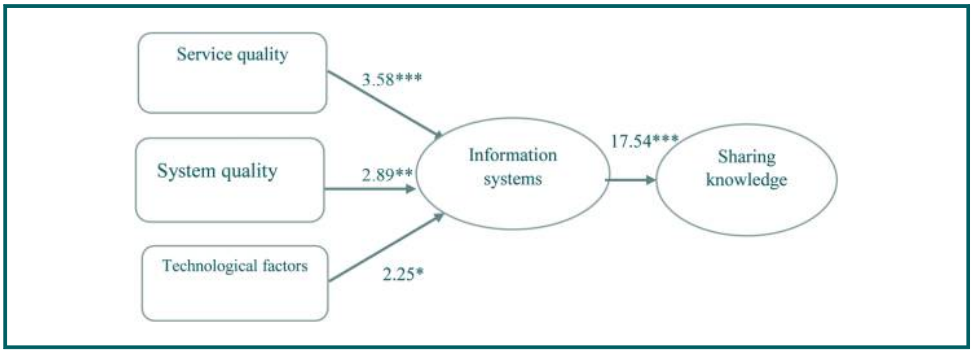
### 5.3 t-test

PLS software and Bootstrap were used for measuring the *t*-values (Chin *et al.*, 2003). The results indicated that all the hypotheses were statistically accepted. Figure 2 shows the measured *t*-value and the relations among the variables.

### 5.4 Coefficient of determination ($R^2$)

For evaluating the model, the value of $R^2$ criterion was measured for the constructs depending on the model. The value of this criterion for the independent variables was 0. Falk and Miller (1992) argued that $R^2$ value for the dependent variables should not exceed 0.1 (Falk and Miller, 1992). Chin (1998) introduced three values of 0.19, 0.33 and 0.67 as

**Figure 2** Results of the *t*-test



criteria for low, average and high values for $R^2$, respectively. The model explained that ISs have highly strong $R^2$ (0.69) and knowledge sharing has an average $R^2$ value (0.58). The obtained values for the $R^2$ criterion indicated that the hypotheses of the study are statistically accepted. Hence, each of the independent variables has significant impact on the respective dependent variables. Figure 3 shows the value of $R^2$.

### 5.5 Path coefficient ($\beta$)

The obtained values through the statistical analyses indicated that path coefficients ($\beta$) and $R^2$ criterion acknowledge the hypotheses of the study, and independent variables of the study have a significant effect on the dependent variables. Figure 4 depicts the related results.

### 5.6 Goodness of fitness criterion

GOF criterion is considered as the practical solution for sorting out the issue of the general fitness of the model. It can be generally used for investigating the validity or quality of PLS model (Ringle, 2006). This index ranges from 0 to 1, and the values approaching 1 indicate high quality of the model (Tenenhaus *et al.*, 2005).

Wetzels *et al.* (2009) introduced three values of 0.01, 0.25 and 0.36 as low, average and high values for GOF criterion, respectively. That is, in case the measured GOF value for a respective model is close to 0.01, it indicates poor general fitness for the intended model. Hence, the relations between the variables of the model should be modified. In a similar vein, a value of 0.25 reveals average general fitness and a value of 0.63 indicates high general fitness

**Figure 3** $R^2$ criterion

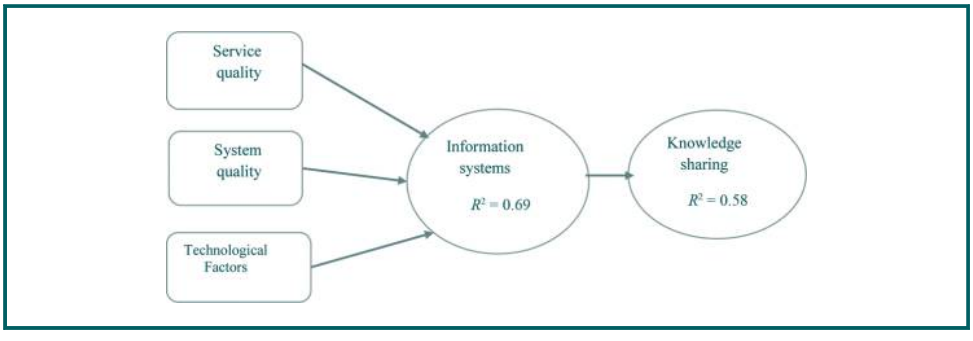
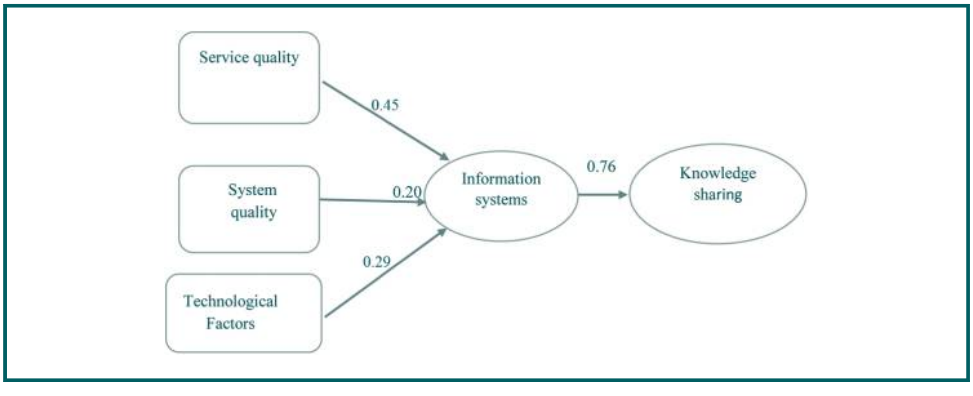



**Figure 4** The obtained results for path coefficient ($\beta$)



for the model. GOF denotes the average shared values of each variable. $R^2$ values are for the dependent variables of the study. GOF criterion is measured through the following equation:

$$GOF = \sqrt{\overline{AVE} \times \overline{R^2}} \tag{1}$$

Also, the following equation is obtained from the AVE values:

$$\mu_{AVE} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i \tag{2}$$

The average AVE values are measured with respect to equation (2):

$$\mu_{\text{AVE}} = \frac{0.58 + 0.67 + 0.60 + 0.59 + 0.66}{5}$$

$$\mu_{AVE} = 0.62$$

Furthermore, for measuring the general fitness of the model, the average $R^2$ should be measured:

$$\mu_{R^2} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i \tag{3}$$

$$\mu_{\text{R}^2} = 0.63$$

Hence, according to equations (2) and (3), which are within equation (1), GOF is obtained as follows:

$$\text{GOF} = \sqrt{0.62 \times 0.63} = 0.62$$

The obtained GOF value in this study was 0.62, which is beyond the high standard for this criterion. Hence, it can be argued that the structure of the proposed model has high fitness with the collected data.

### 5.7 Discussion

As shown in Table IV, the obtained results for the *t*-test and path coefficient ($\beta$ = 0.76, $t$ = 17.54, $p < 0.001$) indicate that ISs have a positive and significant effect on knowledge sharing. Thus, *H1* is accepted. Furthermore, the conducted statistical analyses support the existence of a positive relation between service quality and ISs ($\beta$ = 0.64, $t$ = 3.58, $p < 0.001$). Specifically, with respect to *H3*, the results acknowledged that there is a positive relation between system quality and ISs ($\beta$ = 0.20, $t$ = 2.89, $p < 0.01$). Moreover, the results confirmed *H4* ($\beta$ = 0.29, $t$ = 2.25, $p < 0.05$). In this way, it can be argued that technological factors have a significant influence on ISs. The results obtained from the analyses indicate that all the hypotheses of this study were accepted.

**Table IV** Synopsis of the results of the conducted testes

| *Relationships* | *Path coefficient ($\beta$)* | t-*value* | *Tentative results* |
|---|---|---|---|
| ISs vs knowledge sharing | 0.76 | 17.54*** | Accepted |
| Service quality vs ISs | 0.64 | 3.58*** | Accepted |
| Technological factors vs ISs | 0.29 | 2.25* | Accepted |

## 6. Conclusion

As mentioned above, the ability and willingness of people for sharing knowledge is a critical issue for organizations. Knowledge sharing is one of the fundamental steps in KM activities. For achieving effective knowledge sharing, employees should be motivated to share their knowledge with their colleagues. For maintaining competitiveness in business, work-knowledge and organizational expertise should be shared so that organizational efficiency and productivity are enhanced. One of the most important responsibilities of ISs is to share information as a crucial factor within each IS. In fact, sharing information leads to the fast flow and movement of information and optimization of organizational efficiency and efficacy and its performance. Thus, in the long term, organizations can achieve the competitive advantage. Consequently, organizations can use various methods for sharing knowledge. One notable instance of these methods is using ISs.

### *6.1 Theoretical implications of the study*

Nowadays, organizational knowledge is considered as an intangible spiritual asset within an organization and plays a notable role in the survival of that organization. In other words, the organizations that can develop and improve their intangible spiritual assets will be able to succeed against evolutions. Knowledge enables organizations to acquire awareness and expertise faster and more effectively than the past. Organizational KM is one of the most important factors for the success of companies and organizations under competitive conditions. In fact, organizational KM is so crucial that many organizations measure their knowledge and consider it as the intellectual asset and investment. Also, it is used as a variable for ranking organizations and is reflected in the organizational reports. It should be highlighted that KM is an essential component in the success of organizations and includes a wide range of organizational concepts and ideas such as strategic, economic, behavioral and managerial innovations.

### *6.2 Organizational applications of the results*

Organizations should get help from ISs for sharing knowledge and creating competitive advantage. The more the fitness between IS of the organization and users' needs, the more effective will be the IS in sharing and applying knowledge. Also, as the IS is placed and executed better, it will be more successful in sharing knowledge. *H2*, which indicates the presence of a positive relation between service quality and IS, was supported. Service quality indexes included education and trust. ISs should have appropriate hardware, software and trained and motivated human force so that they can provide services for users. Also, it is recommended that organizations should do the following actions:

- creating internet for sharing knowledge in the organization;
- freely using virtual forums in governmental organizations;
- creating a trust context between employees for sharing knowledge;
- establishing an appropriate reward structure for exchanging and transferring experiences among employees; and
- motivating team work in organizations.

### *6.3 Limitations of the study*

While conducting the present study, we encountered the following limitations.

*6.3.1 Time limitations.* In this study, the primary data were collected in a cross-sectional way. Hence, it should be noted that the causal relations among the variables might change over the time. Also, as the context of the present study was concerned with specific

conditions and limitations such as sanctions and economic fluctuations, it may be expected that replicating the study at another time span can lead to *different results*.

*6.3.2 Instrumental limitations.* During each scientific research, researchers may encounter certain problems. We used a questionnaire for collecting data in this survey study; some shortcomings were related to the questionnaire. Hence, the inherent limitation of the survey study can be compensated by triangulating the research method with other tools.

*6.3.3 Spatial limitations.* The present study was conducted in the registry office in East Azerbaijan, Tabriz. That is, as the context of the study and the intended research population was small, the results may not be readily generalized to other different organizations and companies.

*6.3.4 Implementation limitations.* Another limitation of this study was related to the procedure and implementation of the study. As the intended employees in the registry office deal with great bulk of working operations, they did not have abundant time for answering the questionnaire items, which is considered to be a limitation. Indeed, the lack of cooperation with researchers in the context of the study is challenge for researchers with respect to implementing their studies.

### *6.4 Directions for further research*

Future studies can focus on other challenges and problems that organizations encounter in implementing KM. Future studies can develop and propose new methods for measuring employees' implicit knowledge. Evaluation methods for promoting employees based on their knowledge in organizations should be investigated in future studies. The following methods can be considered as directions for further research.

- Other data collection methods such as interview should be considered for collecting data.
- This study may be replicated in other sectors such as industry, service and production, and the obtained results can be compared.
- The study may be conducted in other countries with different organizational and working culture to examine whether the same results are obtained.
- The status and conditions of the organizations should be constantly and periodically investigated to see how KM impacts organizations after it is established.

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## Further reading

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## Appendix. Questionnaire

| System quality | | | | | | |
|---|---|---|---|---|---|---|
| No. | Questionnaire items | Choices | | | | |
| 1. | Information systems are always accessible | 1 | 2 | 3 | 4 | 5 |
| | | Completely disagree | Disagree | No idea | agree | Completely agree |
| 1. | Information systems are always accessible | | | | | |
| 2. | Information systems do not need much opportunities for accessibility | | | | | |
| 3. | Information systems of the organization can be easily used | | | | | |
| 4. | The degree of accessibility of information systems is high and acceptable | | | | | |
| 5. | Accurate performance of information systems indicates high secuirity of these systems | | | | | |
| 6. | Data and information privacy in information systems is very high and the system has high quality in this aspect | | | | | |
| 7. | The organization has the required security and reliability for supporting information systems | | | | | |
| 8. | Hardware and software data security infrastructures such as firewalls, virtual networks and virus finder software are used in the organization | | | | | |
| 9. | It is essential to create infrastructure capabilities for achieving competitive advantage in the organization | | | | | |
| 10. | Information systems are technically supported in the organization | | | | | |
| 11. | Information systems are user-friendly in terms of designing | | | | | |
| 12. | I can benefit from technical system support through email or telephone | | | | | |
| 13. | In this organization, as a result of electronizing the communications with customers, customers' information is better preserved | | | | | |
| 14. | By using digital signature in this organization, customers' information is protected against misuse | | | | | |
| 15. | All safe structures are available for financial exchange in this organization | | | | | |
| | Service quality | | | | | |
| 16. | In terms of accuracy and reliability, the electronic service system of this organization is acceptable | | | | | |
| 17. | The organization does its services at the set and specified time | | | | | |
| 18. | In this organization, all the questions and problems are properly and quickly responded | | | | | |
| 19. | The training system of the organization is simple and understandable for all the employees | | | | | |
| 20. | The training system used in the organization is fully applied and functional | | | | | |
| 21. | The objective of the organization is to use an appropriate training system in line with new technologies | | | | | |
| | Information system | | | | | |
| 22. | My ability in using IT networks such as internet is high | | | | | |
| 23. | My understanding about how to use IT networks is high | | | | | |
| 24. | IT networks in our organization can be easily accessed | | | | | |
| 25. | Information systems should be essentially used for sharing knowledge | | | | | |
| 26. | As the information system of the organization is more reliable and well-designed with users' needs, it can be better used for sharing knowledge | | | | | |
| 27. | As the information system in the organization is properly established and executed, it can be more effective in sharing knowledge | | | | | |
| | knowledge sharing | | | | | |
| 28. | Sharing knowledge in IT networks leads to high efficacy in sharing knowledge | | | | | |
| 29. | High communication quality facilitates sharing knowledge | | | | | |
| 30. | Our organization motivates employees to share knowledge among each other | | | | | |
| 31. | Using information systems can help us in sharing knowledge | | | | | |

(*continued*)

**Symbols and abbreviations**

| Abbreviations | State |
|---|---|
| **AVE** | Average Variance Extracted |
| **CR** | Composite Reliability |
| **GOF** | Goodness of Fit |
| **PLS** | Partial Least Squares |
| **SPSS** | Statistical Package Social Sciences |
| **SEM** | Structural Equation Modeling |

**Morgan Table**

| N | S | N | S | N | S | N | S | N | S |
|---|---|---|---|---|---|---|---|---|---|
| **10** | 10 | **100** | 80 | **280** | 162 | **800** | 260 | **2,800** | 338 |
| **15** | 14 | **110** | 86 | **290** | 165 | **850** | 265 | **3,000** | 341 |
| **20** | 19 | **120** | 92 | **300** | 169 | **900** | 269 | **3,500** | 246 |
| **25** | 24 | **130** | 97 | **320** | 175 | **950** | 274 | **4,000** | 351 |
| **30** | 28 | **140** | 103 | **340** | 181 | **1,000** | 278 | **4,500** | 351 |
| **35** | 32 | **150** | 108 | **360** | 186 | **1,100** | 285 | **5,000** | 357 |
| **40** | 36 | **160** | 113 | **380** | 191 | **1,200** | 291 | **6,000** | 361 |
| **45** | 40 | **170** | 118 | **400** | 196 | **1,300** | 297 | **7,000** | 364 |
| **50** | 44 | **180** | 123 | **420** | 201 | **1,400** | 302 | **8,000** | 367 |
| **55** | 48 | **190** | 127 | **440** | 205 | **1,500** | 306 | **9,000** | 368 |
| **60** | 52 | **200** | 132 | **460** | 210 | **1,600** | 310 | **10,000** | 373 |
| **65** | 56 | **210** | 136 | **480** | 214 | **1,700** | 313 | **15,000** | 375 |
| **70** | 59 | **220** | 140 | **500** | 217 | **1,800** | 317 | **20,000** | 377 |
| **75** | 63 | **230** | 144 | **550** | 225 | **1,900** | 320 | **30,000** | 379 |
| **80** | 66 | **240** | 148 | **600** | 234 | **2,000** | 322 | **40,000** | 380 |
| **85** | **70** | **250** | 152 | **650** | 242 | **2,200** | 327 | **50,000** | 381 |
| **90** | 73 | **260** | 155 | **700** | 248 | **2,400** | 331 | **75,000** | 382 |
| **95** | 76 | **270** | 159 | **750** | 256 | **2,600** | 335 | **100,000** | 384 |


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