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Research Article

Relationship Between Knowledge Management Processes and ERP Effectiveness: Testing the Mediating Role of User Satisfaction Using PLS

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Abstract

Background and Objective: Currently, knowledge is becoming an important asset and thus, exploring the impact of knowledge management processes on the effectiveness of organizational information systems and employees is being sought. Enterprise resource planning (ERP) systems are at the core of every firm as they contribute many benefits to organization performance. The current study aims at exploring the mediating role of user satisfaction on the relationship between knowledge sharing and effectiveness of enterprise resource planning (ERP). **Materials and Methods:** Knowledge management practices including knowledge sharing was applied to assess the effectiveness of organization ERP. Data were collected through simple random sampling from 135 organization employees. The study used the SmartPLS package in the statistical analysis of the collected data. **Results:** The results point out that the user satisfaction has a partial mediation on the relationship between knowledge sharing process and ERP effectiveness. **Conclusion:** The conclusion is based on the results, encouraged researchers and organizations to use the proposed theoretical model in testing the relationship between other knowledge management processes such as knowledge creation and ERP effectiveness.

Key words: Knowledge management, knowledge sharing, enterprise resource planning (ERP), user creativity, SmartPLS

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

In today's digital society, knowledge is considered as a valuable asset with huge strategic value and therefore, organizations find themselves in need for new strategies which will enable their employees to create, save, capture and share experiences¹. One of the knowledge management challenges is knowledge sharing because much knowledge is inserted into organizational processes². The method by which people actually do their jobs is often different from the formal method identified for doing even the routine jobs³. It is also challenging because there are gaps between what people do and what they think they do⁴.

Many organizations are deploying enterprise resource planning (ERP) systems to cut costs, standardize operations and leverage common processes across the organization. ERP permits businesses to have a more convergent vision by using a centralized database and integrated software modules^{5,6}. Consequently, enterprise resource planning system is considered as one of the most important factors for improving the effectiveness of employees and organization as a whole⁷. Also, based on recent literature review by Al-Emran *et al.*⁸, Acar *et al.*⁹ and Migdadi and Abu Zaid¹⁰, few researches discuss the relationship between knowledge management process and ERP effectiveness. For this reason, this study takes the initiative to explore the mediating role of user satisfaction between knowledge sharing and ERP effectiveness where the ERP effectiveness is conceptualized in terms of user creativity.

Enterprise resource planning (ERP) is a strategic mean that assists companies gain a competitive advantage by restructuring business processes, integrating business units and providing organizational employees better access to information on time⁵. Based on literature review by Catherine and Abdurachman¹¹ and Addo-Tenkorang and Helo¹², the effectiveness of ERP system can be defined as contribution of ERP to system users. In this study, the ERP effectiveness is conceptualized as the extent to which the ERP contribute to user creativity¹³.

Knowledge management (KM) is a process where organizations have expressed means in the attempt to identify and archive knowledge resources within the organization that are resulting from the employees of different departments within organization¹⁴. The knowledge creation and management have positive influence on the individual and organizational performance¹⁵. This is indicated in several studies and publications when they confirm the hypothesis that the creation of communities of practice increasing the creation of knowledge, learning processes and professional development^{16,17}.

In Knowledge management processes Becerra-Fernandez and Sabherwal⁷ indicated that the knowledge processes can be classified into 4 categories, where each process includes 2 sub-processes:

- Knowledge discovery is defined as the enhancement of new explicit or implicit knowledge extracted either from data or from the synthesis of previous knowledge. The discovery of novel explicit knowledge depends on most directly on combination, whereas the discovery of new tacit knowledge depends on socialization
- Knowledge capture is defined as the transferring of knowledge from tacit to explicit form and vice versa using the sub-processes of internalization and externalization. The sources of gained knowledge being might be located in outside the organizational boundaries containing customers, competitors, consultants, suppliers, etc. Externalization is the sub-process through which an organization takes the tacit knowledge owned by workers for sharing and documentation purposes. Internalization is the sub-process that enables workers to get tacit knowledge. It embodies the traditional concept of learning whereas the Knowledge capture can also be conducted outside the boundaries of the organization⁷
- Knowledge application is identified as the knowledge which is used in decision making and accomplishment of tasks through direction and routines. Direction indicates the process through which the individual possessing the knowledge directs the action of another individual without transferring to that individual the knowledge underlying the direction. It is more that an individual who possesses knowledge advises another. For instance, direction is the process employed when the worker ask about the solution of particular problem with a machine using an expert and then go step forward to answer the problem based on the instructions produced by the expert. Routines include the usage of knowledge embedded in rules, procedures, norms and processes that guide the future behaviour⁷
- Knowledge sharing is described as the process by which explicit or tacit knowledge is shared and linked to other individuals

In this study, the concept of knowledge sharing is defined as "The exchange of knowledge between and among individuals and within and among teams, organizational units and organizations¹⁸."

User satisfaction with regard to electronic commerce and web users' satisfaction, several researchers indicated that web

satisfaction is considered as one of the most significant measures for evaluating the effectiveness of electronic commerce system¹⁹. Also, Sugianto and Tojib²⁰ mentioned that the user satisfaction with web portals is considered as an important attitude of the users who interact with web portals. Wang *et al.*²¹ remarked that the web satisfaction with e-learning can be identified as one of the constructs that could be used for measuring the effectiveness of e-learning system. Few researches focus on the evaluation and concepts of user satisfaction with web based systems and therefore, the studies just concerned with the concept of the user satisfaction as a two dimensional construct or measure including web information satisfaction as well as system satisfaction^{22,23}.

Cheung and Lee²² mentioned that the web information satisfaction can be defined as the user satisfaction which focuses on the information quality of the Web-based information system.

They also remarked that web system satisfaction can be defined as the user satisfaction which is concerned with the system quality of the web-based information system. In the current study, Lin²⁴ defined the user satisfaction as the assessment result of the evaluation of affective responses and of users' cognitive towards ERP System, where the actual perceived performance is evaluated based on some comparison standard

This study focused on the mediation effect of satisfaction on the relationship between knowledge sharing and ERP effectiveness in order to explore the reasons behind the relationship.

MATERIAL AND METHODS

Conceptual model of research variables: Figure 1 demonstrates the theoretical model of independent, mediating and dependent variables. The independent variables include knowledge store, knowledge application, knowledge creation and knowledge sharing. The dependent variable is the user creativity while user satisfaction is considered as a mediating variable.

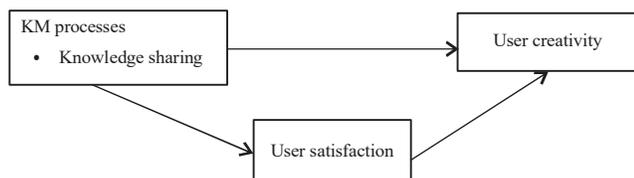


Fig. 1: Theoretical model of study variables

Research hypothesis: Based on the research objective, the research examines the following hypothesis: "User satisfaction mediates the relationship between knowledge sharing and ERP effectiveness".

To check the significance of the mediation role of user satisfaction, it is important to check: (1) Significance of the relationship between knowledge sharing and ERP effectiveness before mediation, (2) Significance of the relationship between knowledge sharing and ERP effectiveness after mediation and (3) Applying the Sobel test for ensuring the mediation effect of user satisfaction based on the results of the previous two points.

RESULTS

Based on the research objective and hypothesis, the research used the SmartPLS statistical package to model the research variables and test the research hypotheses. Figure 2 shows the SmartPLS model after mediating the user satisfaction between knowledge sharing and user performance or creativity.

Based on factor analysis shown in Fig. 2, it is found that there is no cross loadings between the 3 factors: knowledge sharing, satisfaction and user creativity. Table 1 shows the cross loadings between study factors and also, it demonstrates that the loadings of all items is >0.7.

Mediation analysis: To test the mediation effect, it is important to test the significance of the relationship between knowledge sharing and user creativity, first, before mediation (i.e., direct relationship). Then it is essential to tests the significance of relationship after mediation and finally,

Table 1: Factor loadings of study variables

Factors	Item	Factor loadings
K. sharing	KMS1	0.8828
	KMS2	0.7474
	KMS3	0.7657
	KMS4	0.7959
	KMS5	0.7209
	KMS6	0.8144
	KMS7	0.9177
	KMS8	0.8569
Satisfaction	Sat1	0.9127
	Sat2	0.9616
	Sat3	0.9639
	Sat4	0.9614
User creativity	Uc1	0.8886
	Uc2	0.910
	Uc3	0.9515

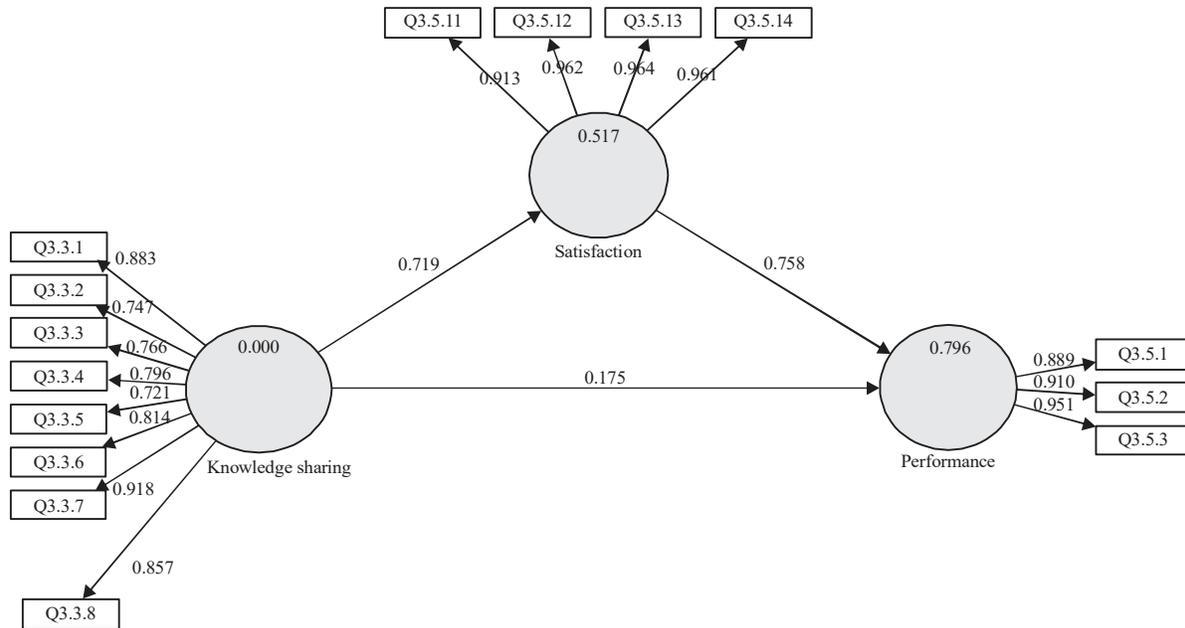


Fig. 2: Factor loadings of research variables

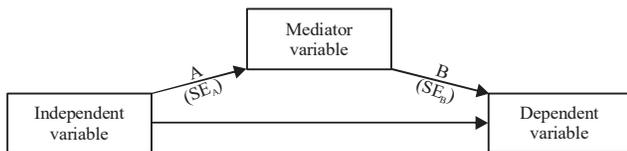


Fig. 3: Hierarchy of the mediation role

Table 2: Correlation before mediation

Parameters	Knowledge sharing	User creativity
Knowledge sharing	0	0.7298
User creativity	0	0

Table 3: Correlation between IVs and DV after mediating satisfaction

Parameters	Knowledge sharing	Satisfaction	User creativity
Knowledge sharing	0	0.7187	0.1748
Satisfaction	0	0	0.7583
User creativity	0	0	0

Sobel test should be used to ensure the mediation effect of satisfaction. Figure 3 demonstrates the hierarchy analysis of the mediation role.

Thus, the study follows the following three steps in the analysis of mediation:

First step: Before mediation: Before mediating the user satisfaction, the study assesses the direct relationship between independent variable (knowledge sharing) and dependent variable (ERP effectiveness) through finding the correlation between them.

Table 2 shows the correlation between knowledge sharing and user creativity which is equal to 0.7298 before mediation. This indicates that there is a high correlation between independent and dependent variables.

Second step: After mediation: In second step it is significant to assess the correlation between knowledge sharing and user creativity after mediating user satisfaction on the relationship.

Table 3, shows that the correlation between knowledge sharing and user creativity is decreased from 0.7187-0.17.

Thus, the high correlation between knowledge sharing and ERP effectiveness might be referred to user satisfaction. To check and ensure the mediating role of satisfaction on the relationship, the researcher used online Sobel test whereas Step number three explains the significance of the user satisfaction mediation.

Third step: Sobel test: The SOBEL test is employed to check and ensure the significance of the mediation effects of satisfaction on the relationship between knowledge sharing and user creativity. Based on SmartPLS analysis, the following path coefficients values are obtained:

Table 4 shows the relationship model of the research variables including the effects of IV on mediator, effect of mediator on DV and the standard errors after bootstrapping. Figure 4 shows the results of Sobel test of mediation and thus it explains the significance of mediation role of user satisfaction.

A:	<input type="text" value="0.7187"/>	<input style="border: none; border-radius: 50%;" type="button" value="?"/>
B:	<input type="text" value="0.7583"/>	<input style="border: none; border-radius: 50%;" type="button" value="?"/>
SE _A :	<input type="text" value="0.0517"/>	<input style="border: none; border-radius: 50%;" type="button" value="?"/>
SE _B :	<input type="text" value="0.0497"/>	<input style="border: none; border-radius: 50%;" type="button" value="?"/>
<input style="background-color: #cccccc;" type="button" value="Calculate!"/>		
Sobel test statistic:	10.27581822	
One-tailed probability:	0.0	
Two-tailed probability:	0.0	

Fig. 4: Results of online Sobel test

Table 4: SmartPLS path coefficients values

A (effects of IV on mediation)	0.7187
B (effect of mediation on DV)	0.7583
SE _A	0.0517
SE _B	0.0497

DISCUSSION

Based on the analysis, it is clearly seen that there is a high correlation between independent and dependent variables before mediation. The correlation is decreased after mediation the user satisfaction between the knowledge sharing and ERP effectiveness. Finally, the results explained in Fig. 4 indicate that the Sobel test statistics is positive and the tailed probability <0.05. Therefore, there is a partial mediation of satisfaction on the relationship between knowledge sharing and user creativity.

Chou *et al.*²⁵ pointed out that the knowledge sharing influence the usage of ERP which is considered on the indicators for ERP effectiveness. Also, Jeng and Dunk²⁶ indicated that knowledge management processes affect the ERP success including user performance. Thus, the results of this study are in line with several researches such as Chou *et al.*²⁵ and Jeng and Dunk²⁶.

Consequently, the current study can contribute to the gap in the current knowledge and research regarding the relationship between knowledge management processes and effectiveness of enterprise resource planning system (ERP system) in comprehensive manner. Also, this study helps the decision makers to assess the level of knowledge sharing and effectiveness of ERP systems to take actions for development of current management practices at organization.

CONCLUSION

The results show that there is a direct relationship between knowledge sharing and ERP effectiveness. There is

also a significant relationship between the knowledge sharing and user satisfaction. Additionally, it is found that there is a significant relationship between user satisfaction and effectiveness. More importantly, the user satisfaction has a partial mediation on the relationship between knowledge sharing and ERP effectiveness. The mediation role is tested using the SmartPLS statistical package. It is suggested to tests the mediation role of user satisfaction on the relationship between knowledge application and ERP effectiveness.

SIGNIFICANCE STATEMENT

This study discovers that there is gap in the knowledge regarding the relationship between knowledge management processes and effectiveness of enterprise resource planning system (ERP system) in comprehensive manner. Recently, the large organizations have employed ERP system in their daily work and reporting as it such type of planning systems significantly affect the effectiveness of employee work and organization as a whole. Thus, this study work will add to the research in the field of management and management information systems and also, it is expected to assist decision makers in developing management practices.

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