

## **LINKING ORGANIZATIONAL STRUCTURE, TECHNOLOGICAL SUPPORT AND PROCESS INNOVATION: THE MEDIATING ROLE OF KNOWLEDGE SHARING IN THE IRAQI TEXTILE INDUSTRY**

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### **ABSTRACT**

This paper investigates the relationships among organizational structure, technological support, knowledge sharing and process innovation and whether knowledge sharing has a mediating effect on these relationships. Based on the survey among employees in the Iraqi textile industry, the results revealed that organizational structure and technological support positively and significantly influence knowledge sharing. Knowledge sharing was also found to be an important mediator between organizational structure, support technology and process innovation. The findings bear implications to the Iraqi government's call for innovation in the Iraqi textile industry.

**Key Words:** Organizational Structure, Technological Support, Knowledge Sharing, Process Innovation

### **INTRODUCTION**

Process innovation is unique, complex and difficult to control (Gerybadze, Hommel, Reiners, and Thomaschewski, 2010). It describes the activities that are performed at each stage of the development of innovation (Ortt and Duin, 2008). Process innovation is defined as developing a new or substantially improved production process through new equipment or reengineering of operational process (Wong and He, 2003). Capon, Farley, Lehmann and Hulbert (1992) suggest process innovation as tools, devices, and knowledge in throughput technology that mediate between inputs and outputs and are new to an industry, organization, or subunit. Knowledge management can play a pivotal role in supporting and nurturing innovation (Chen and Huang, 2009; Gold, Malhotra and Segars, 2001). Knowledge sharing plays a potentially mediating role in connecting organizational structure and technological support with organizational innovation process. Successful knowledge sharing is believed to have the potential of enhancing an organization's competitive advantage, customer focus, employee relations and development, innovation, and lower costs. Finally, the organizational promotion of knowledge sharing is changing traditional ideas concerning managing intellectual resources and employee work styles by providing new processes, disciplines and cultures, thus constituting an organizational innovation (Darroch and McNaughton, 2002).

Knowledge sharing and process innovation in the Iraqi textile industry are relatively new concepts whereby the industry is dominated by 6 government-owned manufacturers who run the textile factories. The researchers conducted preliminary interviews with the manufacturers and were informed that whereas the factories share common organizational structure, the operations were lacking in technological support and knowledge sharing as they were still using traditional technology and focused on production, not process innovation. Therefore, the purpose of this paper is to examine the possible

mediating effect of knowledge sharing on the relationship between organizational structure and technological support with process innovation in the Iraqi Textile industry.

## LITERATURE REVIEW

### Process Innovation

Today's competitive business environment, innovation is absolutely essential. Superior innovation provides companies with opportunities to grow faster, better, and smarter than their competitors. Ultimately this can enable a company or organization to influence the direction of its industrial sector (Davila, Epstein and Shelton, 2006). Cetindamar and Ulusoy (2008) defined "innovation" as the process leading to the adoption and diffusion of new technologies with the express aim of creating new processes, products and services. Damanpour (1991) defines innovation in a broader way by viewing it as a new product or service, a new production process technology, a new structure or administrative system, or a novel plan or program pertaining to organizational members. Process innovation is viewed as a pervasive and embracing process which includes research, development, and implementation of new ideas and behaviors (Damanpour, 1996).

Extensive literature reviews suggest that process innovation depends on several dimensions: level, driver, direction, source and locus (Crossan and Apaydin, 2010). Level explains the split between individual, group and firm's processes. Driver deals with both, internal and external driver. Internal drivers of the innovation process can be available knowledge and resources. Prajogo, Power and Sohal (2004) identified two types of innovation performance, product and process. These classifications enable the grouping of organizational innovation into product innovation and process innovation. Prajogo *et al.* (2004) stressed that knowledge management has substantial positive relationship to both product innovation and process innovation. Gerybadze, Hommel, Reiners and Thomaschewski (2010) mentioned that it is important to monitor innovation from different perspectives such as structure related, market related, product/project related, process/performance related and culture related. In considering innovation as a process, unitary sequence model is used to explain process innovation (Gopalakrishnan and Damanpour, 1997).

### Organizational Structure

Organizational structure refers to the formal allocation of work roles and administrative mechanisms to control and integrate work activities (Ghani, Jayabalan, and Sugumar 2002; Robbins 1990). According to Claver-Cortés, Zaragoza-Saez and Pertusa-Ortega (2007), organizational structure can be defined as the result of the combination of all the ways in which work can be divided into different tasks, the coordination of which must afterwards be ensured. Structures that promote individualistic behavior in which individuals, divisions, or functions are implicitly or explicitly required to keep knowledge private have been shown to inhibit effective management of knowledge in organizations (Gold et al. 2001, O'Dell and Grayson 1998).

The knowledge-based view emphasizes the importance in understanding the processes through which organizations access and utilizes knowledge possessed by its individual members (Grant, 1996). Structure can influence knowledge management processes through shaping patterns and frequencies of communication among organizational members, stipulating locations of decision-making and affecting efficiency and effectiveness in implementing new ideas (Zheng, Yang and McLean, 2010). Despite inconclusive findings regarding the relationship between organizational structure and knowledge management (Tsai, 2002), a decentralized structure has often been seen as facilitative to knowledge management success (Damanpour, 1991; Deal and Kennedy, 1982; Gold et

al., 2001). High centralization inhibits interactions among organizational members (Gold et al., 2001), reduces the opportunity for individual growth and advancement (Kennedy, 1983), and prevents imaginative solutions to problems (Deal and Kennedy, 1982). Therefore, it is posited that:

H1. Organizational structure relates positively to knowledge sharing.

Two important aspects of organizational structure are centralization and formalization (Eppler and Sukowski 2000; Jarvenpaa and Staples 2001). Accordingly, organizational structure is construed as a second-order construct encompassing these dimensions. Centralization refers to the locus of decision authority and control within an organizational entity Caruana, Morris and Vella 1998; Ein-Dor and Segev 1982). Centralization of decision making can result in complex and time-consuming communication channels (Bennett and Gabriel 1999), which may introduce distortion and discontinuity of ideas and knowledge as they are passed along multiple levels of authority (Stonehouse and Pemberton 1999). Formalization refers to the degree to which decisions and working relationships are governed by formal rules, standard policies, and prescribed procedures. Smith (2006) argues that organizational structure facilitates the discovery, creation, sharing, exchange, and transference of new knowledge within the organization. It is the main mechanism through which organizations supervise the behavior of employees and coordinate individuals and functions (Holsapple and Joshi 2001; Rapert and Wren 1998). Therefore, it is posited that:

H2. Organizational structure relates positively to process innovation.

### **Technological Support**

Sher and Lee (2004) indicated technology is certainly conceptually complicated and multi-dimensional. It exists in several types which include artifact, knowledge, and process. Artifact technology can relate like tools, techniques, and actions used to change organizational inputs into outputs. Similarity study by Tippins and Sohi (2003) show the technological support enhance individual's connectivity and facilitate knowledge structuring and interpretation. According to (Kim and Lee, 2005) show support technology is multi-dimensional and organization must invest in an extensive infrastructure that supports the different kinds of knowledge.

Technology tools for knowledge sharing include electronic bulletin boards, discussion forums, knowledge directories, groupware, databases, intranets, intelligent search engines, personal web pages, electronic mail, virtual conference rooms, libraries, corporate yellow pages, among many others (Alavi and Leidner, 2001; Bender and Fish, 2000). It is evident that technology enables and aids core knowledge activities such as knowledge creation, knowledge sharing, knowledge distribution, and knowledge application (Gold, Malhotra and Segars, 2001). Similarly, it is clear that technology is an integral part of the KM application. Specific technologies play a fundamental role in promoting the KM movement (Barney, 1991). Kharabsheh (2007) draws a very clear relationship between technology and knowledge sharing. Therefore, it is posited that:

H3. Technological support relates positively to knowledge sharing.

H4. Technological support relates positively to process innovation.

### **Knowledge Sharing and Process Innovation**

Mohd and Zawiyah (2009) defined knowledge sharing as a process where individuals exchange knowledge (tacit or explicit) and together create new knowledge. Knowledge sharing can play a pivotal role in supporting and nurturing innovation (Chen and Huang, 2009). As noted earlier, various scholars have proposed the importance of managing knowledge in the organizations, hence implying that the implementation of KM would be conducive to process innovation. Knowledge creation involves a continuous process through which one overcomes the individual boundaries and constraints imposed by information and past learning, by acquiring a new context, a new view of the world, and new knowledge. By interacting and sharing tacit and explicit knowledge with others, the individual enhances the capacity to define a situation or problem, and apply his or her knowledge to solve the problem effectively (Nonaka, Von Krogh and Voelpel, 2006). Nonaka (1991), and Nonaka and Takeuchi (1995) contend that the concept of innovation and “knowledge creation” are closely related. Along this line, it is generally assumed that the process of innovation consists of an ongoing pursuit of harnessing new and unique knowledge (Subramaniam and Youndt, 2005). Hence, it is posited that:

H5. Knowledge sharing relates positively to process innovation.

### **Mediating role of Knowledge Sharing**

Effective knowledge management contributes to competitive advantage (Connor and Prahalad, 1996), improved performance (Teece, 1998), and innovation (Nonaka and Takeuchi, 1995). Knowledge resources are an outcome of organizational culture, structure, because knowledge is created, made sense of, and utilized in accordance with a set of cultural values and norms, embedded in structural relationships. For example, knowledge sharing practices are affected by cultural expectations such as what knowledge should be shared with the organization and what should be hoarded by individuals, by structural relationships such as how quickly the knowledge flows through formal reporting relationships. In turn, organizational knowledge reflective of cultural, structural, characteristics of the organization is utilized to help produce new products and services, improve efficiency, and enhance effectiveness (Nonaka, Toyama and Konno, 2000). Finally, the organizational promotion of knowledge sharing is changing traditional ideas concerning managing intellectual resources and employee work styles by providing new processes, disciplines and cultures, thus constituting an organizational innovation (Darroch and McNaughton, 2002). In this light, knowledge sharing can be seen as mediating the relationship between organizational factors and process innovation, hence it is posited that:

H6. Knowledge sharing mediates the relationship between organizational structure and process innovation.

H7. Knowledge sharing mediates the relationship between technological support and process innovation

### **Research Model**

The intersection of the resource-based view lays the theoretical grounding for this study. The resource-based view posits that firm competitiveness comes from unique bundles of tangible and intangible assets that are valuable, rare, imperfectly imitable, and sustainable (Barney, 1991). Researchers such as Barney (1991), Peteraf (1993), and Wernerfelt (1984) argue RBV views a firm as a bundle of resources and capabilities. Resources consist of tangible components like financial and physical assets like property; plant and equipment; and intangible components like human capital, patent, technology know-how (Grant, 1996). Capabilities are “invisible assets”, tangible or intangible organizational processes developed by a firm over a period of time that “cannot be easily bought; they must be built” (Teece, Pisano and Shuen, 1997, p.514). It has been widely accepted among scholars and practitioners that organizational context and processes have considerable influences on the

organizational effectiveness of practices (Zheng, Yang and McLean; Gold, Malhotra and Segars, 2001). A vast number of studies and surveys indicate that there is a positive relationship between an efficient organizational context and effective knowledge sharing and the organizational competitiveness of implement KM. In this conceptual model, the organizational contexts (organizational structure and technological support) as independent variables; knowledge sharing as a mediating variable and process innovation as the dependent variable.

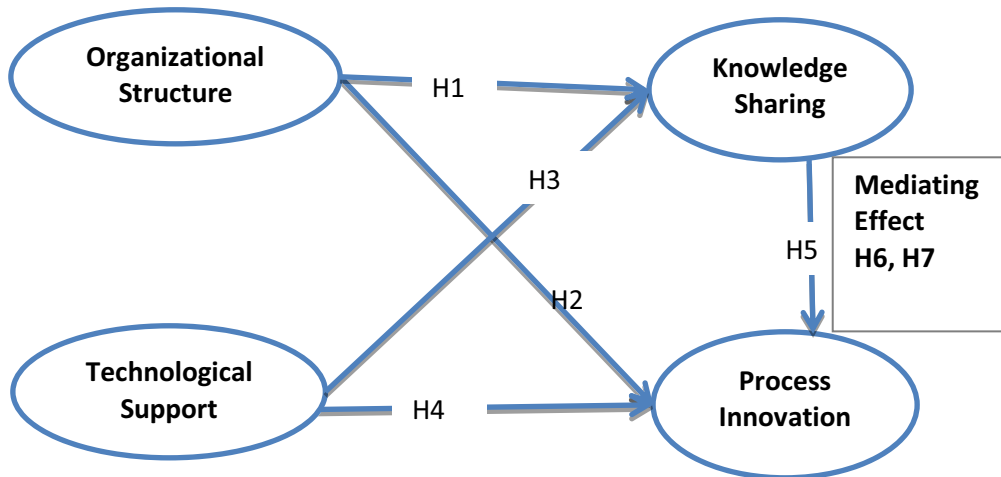


Figure 1. Research Model.

## METHODOLOGY

Based on proportionate stratified random sampling technique, questionnaires were randomly distributed among 361 employees of the Iraqi textile from March to June 2013. Only 350 of the 360 questionnaires were complete and used for Structural Equation Model (SEM) analysis. Survey items were adapted from existing instruments used in past research. Measures of process innovation were based on five items from Hung, Lien, Yang, Wu and Kuo (2011). Ten items to evaluate organizational structure, technological support and knowledge sharing were adapted from Gold et al. (2001). The results of the principal component factor analysis yielded eigen values greater than 1.0, which accounted for 58% and 65% of the variance for the independent and dependent variables respectively.

## RESULTS

### Measurement models

Results from the confirmatory factor analysis demonstrated that all of the scales used in the study formed adequate measurement models and thus provided evidences for the construct validity of the measures. Table 1 shows the fit indices of the measurement models whereas Table 2 shows the descriptive statistics of the constructs.

Table1

#### Evaluation of Measurement Models

Variables	$\chi^2$	df	P	CFI	GFI	CMIN/df	RMSEA
Organizational Structure (OS)	7.84	4	.098	.994	.99	1.96	.052
Technological Support (TS)	8.64	6	.195	.997	.99	1.44	.035
Knowledge (KS) Sharing	5.20	4	.297	.997	.99	1.30	.029
Process (PSI) Innovation	12.59	5	.082	.991	.99	2.52	.066
All measurement model	335.60	146	.000	.93	.90	2.44	.064

Table 2

#### Descriptive Statistics (N=351)

Constructs	Mean	SD	OS	TS	KS	PSI	CR	AVE
Organizational Structure (OS)	39.16	6.43	1				.89	.67
Technological Support (TS)	36.02	6.73	.80**	1			.92	.63
Knowledge (KS) Sharing	42.41	5.64	.61**	.57**	1		.85	.54
Process (PSI) Innovation	15.76	4.12	.56**	.55**	.46**	1	.93	.59

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### Assessing Structural Model

The goodness of fit indices show that the hypothesized model fit the data well .The path coefficients in Figure 2 and Table 2 was used in testing hypotheses 1 to 5, the indirect effects between the variables were tested in hypotheses 6 and 7.Holbert and Stephenson (2003) indicated specific indirect effects are not calculated by the major SEM software packages, so Sobel test for significant indirect effects are shown in Table 4.



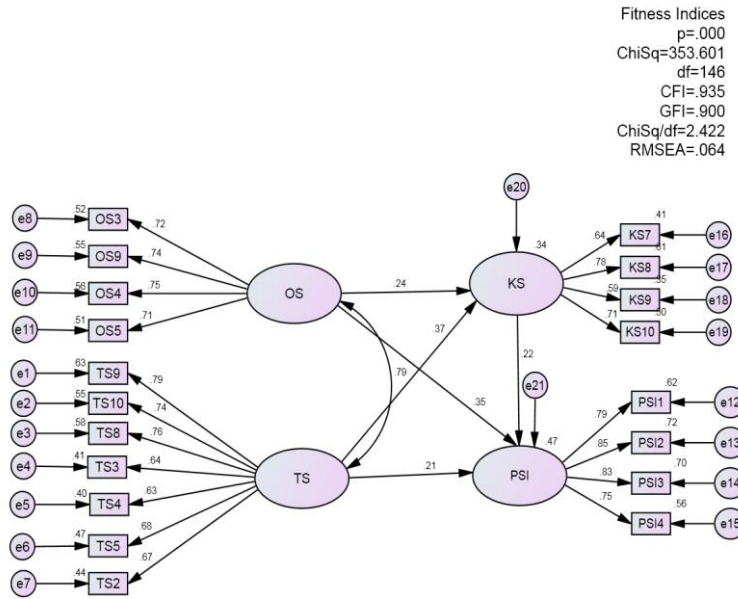


Figure 2.Path Diagram of the Model.

**Hypotheses testing**

All of the hypotheses were examined through the investigation of the path coefficients and the statistical significance. Based on the results in Tables 3 and 4, Hypothesis 1 is supported. There is a significant path coefficient of .24 ( $p < .05$ ) from organizational structure to knowledge sharing. Hypothesis 2 is also supported. There is a significant path coefficient of .35 ( $p < .01$ ) from organization structure to process innovation. Hypothesis 3 is supported. There is a significant path coefficient of .37 ( $p < .05$ ) from technological support to knowledge sharing. Further, Hypothesis 4 is supported. There is a significant path coefficient of .21 ( $p < .05$ ) from technological support to process innovation. Hypothesis 5 is supported. There is a significant path coefficient of .22 ( $p < .05$ ) from knowledge sharing to process innovation. From the results in Table 4, knowledge sharing was found to have partial mediating effect between organizational structure and process innovation, and between technological support and process innovation. So, hypotheses 6 and 7 are partially supported.

Table 3

Path Coefficients and Goodness-of-Fit

Path	Standard Path Coefficients	CR	P	Goodness-of-fit
OS→KS	.24	2.09	.037	CMIN/DF=2.44 DF=146 CFI=.93 P=0.000 GFI=.90 RMSEA=.056 $\chi^2 = 353.601$
OS→PSI	.35	3.45	.000	
TS→KS	.37	3.26	.001	
TS→PSI	.21	2.14	.032	
KS→PSI	.22	3.24	.001	

Table 4

## Summary of Significant Indirect Effect of Variables

Predictor Variables	Process Innovation				Result
	Direct Effect	H	Indirect Effect	H	
Organizational Structure	.35	Sig	.05	Sig	Partial mediation
Technological Support	.35	Sig	.08	Sig	Partial mediation

## DISCUSSION AND CONCLUSION

The results of the study are in line with the knowledge-based view of the firm which emphasizes the importance of understanding the processes through which organizations access and utilize knowledge possessed by its individual members (Grant, 1996). Organizational structure can influence knowledge management processes through shaping patterns and frequencies of communication among organizational members, stipulating locations of decision-making and affecting efficiency and effectiveness in implementing new ideas (Zheng, Yang and McLean, 2010). It also corresponds with Penrose's (1959) opinion that the usefulness of organizational resources varies with changes in organizational knowledge and knowledge management serves as a key leverage point in organizations. One practical implication of this study is that the Iraqi textile factories should take cognizant and try to improve their knowledge sharing practices.

This study bear theoretical implications as it provide some insights in integrating the resource-based view when applied in the Iraqi textile industry. It reveals that whereas the resources (knowledge) in the textile factories may be hierarchical (organizational structure), knowledge sharing may bring the factories one step closer towards organizational effectiveness (process innovation) by mediating the resources to process innovation. Further exploration is needed to examine this proposition. The social implication of this study for the Iraqi government which owns the factories is to enhance knowledge sharing activities in the factories in order to promote process innovation in the Iraqi textile industry.

One of the limitations of this study is that the study was done in one industry and in one middle-eastern country, specifically in the Iraqi textile industries which limits generalizability of the findings. To further test the organizational contexts of the model, future research are encouraged in the context of an Asian or developing countries or emerging economies from which the measurement model was tested (Gold, Malhotra and Segars, 2001; Wong, 2005). The study can also be replicated in other industries as well as in public or private factories.

In conclusion, based on the survey among employees in the Iraqi textile industry, the results revealed that organizational structure and technological support positively and significantly influence knowledge sharing. Knowledge sharing was also found to be an important mediator between organizational structure, technological support and process innovation. The findings bear implications to the Iraqi government's call for innovation and knowledge management practices in the Iraqi textile industry.



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