

## Studying the Relationship Between Knowledge Management Effectiveness and Administrative Innovation Among Shiraz Manufacturing Firms

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**Abstract.** The purpose of this study was to examine the direct effect of knowledge management effectiveness on administrative innovation. Knowledge management effectiveness is conceptualised as comprising of knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness. Three hypothesised relationships were tested using a sample of 85 manufacturing firms in Shiraz industrial zone. The results derived from the regression analyses showed that of the three dimensions of knowledge management effectiveness (knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness), only knowledge acquisition effectiveness was found to have a significant positive effect on administrative innovation.

**Keywords:** Administrative innovation, knowledge management effectiveness, manufacturing firms, knowledge acquisition

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## 1. Introduction

The forces of technology and global competition have created a revolution that encourages organisation to seek new ways to reinvent themselves. Greater emphasis is now being placed on organisational innovation. In fact, Stokey (1995) claimed that innovation is one of the key factors underlying a country's international competitiveness. In efforts to become a knowledge-based economy, we should place a great emphasis on the need for innovation in all sectors of economy.

In the field of manufacturing, firms have been refining their capabilities to keep up with accelerated changes in technology and global market particularly over the last two decades. The rise in environmental uncertainty has increased the need for firms to be cost-efficient and competent in delivering superior customer value. In this regard, many studies have highlighted the pivotal role played by product and process innovation. However, as suggested by Naveh, Meilich, and Marcus (2006), a firm's ability to develop new social structures, rules and procedures, rewards and information systems, as well as communication networks, are equally important since efficient administrative processes will lead to cost efficiency and greater business performance. This form of innovation is commonly referred to as administrative innovation.

Given the importance of innovation to a firm's competitive position, an array of studies were conducted to identify the possible antecedents of innovation. The extant literature has grouped these factors into: individual, organisational, and environmental factors (Damanpour, 1991; Damanpour, Szabat, & Evan, 1989). Many of these investigations were Western-based such as from the United States of America and Europe (Damanpour, 1991; Damanpour et al., 1989; Kimberly & Evanisko, 1981; Lundvall & Nielsen, 2007; Miller & Friesen, 1982). Among all the possible predictors of innovation, organisational variables have been argued as a conspicuous role (Damanpour, 1991). Knowledge management effectiveness has also emerged as an important predictor of organisational innovation and performance (Chang & Lee, 2008; Darroch & McNaughton, 2002; Gloet & Terziovski, 2004; Lundvall & Nielson, 2007). This is not surprising since knowledge is an intangible asset of

the organisation and creates the core competence of an organisation (Hamel & Prahalad, 1994). Besides, when knowledge is used, learning takes place (Darroch & McNaughton, 2002), which in turn, serves as the key ingredient for the innovation process.

Organisations that have been effective in knowledge management are likely to regard knowledge as an asset, to develop organisational norms and values which would support the acquisition, sharing and application of knowledge among their employees, which are all necessary for innovation activities (Davenport & Prusak, 1998). In essence, knowledge management effectiveness consists of three dimensions: knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness. According to Zheng (2005), these three dimensions would have a profound effect on innovation. While many scholars had provided evidence on the role of various aspects of knowledge management as antecedents to innovation, these studies focused on product innovation (Madhavan & Grover, 1998; Un & Cuervo-Cazurra, 2004) and process innovation (Gloet & Terziowski, 2004) but ignored other types of innovation such as administrative innovation. Administrative innovation, unlike product innovation and process innovation, cannot be protected by patent (Teece, 1980). In addition, this type of innovation often involves significant "set-up" costs and requires major reassignment of tasks and responsibilities (Teece, 1980). Thus, administrative innovation is considered peculiar and may involve different antecedents. Furthermore, according to Chuang (2005), many studies on innovation (Wang, 2005) had focused on product innovation and process innovation instead of administrative innovation. In the manufacturing context, since innovation in administrative processes could lead to cost efficiency as noted by Naveh et al. (2006), investigating the predictors of administrative innovation would be worthwhile. Against this backdrop, the goal of this study is to examine the effect of knowledge management effectiveness (which consists of knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness) on administrative innovation within the Shiraz manufacturing industry.

## 2. Literature Review

### 2.1 Organisational Innovation and Administrative Innovation

Organisational innovation has been conceived as an adoption of idea or new behaviour to the adopting organisation (Damanpour & Evan, 1984). Thus, innovation could take the form of a new product or service, a new production process technology, a new structure or administrative system, or a new plan or program pertaining to the organisational members (Damanpour, 1991). There are many types of innovation. For example, Knight (1967) classified innovation according to product or service, production-process, organisational structure, and people. Damanpour (1992) studied six types of innovation namely product, process, administrative, technical, radical and incremental in his study on the relationships between organisational size and innovation. Similarly, Johanessen, Olsen, and Lumpkin (2001) had identified six types of innovation, which included new products, new services, new methods of production, new markets, new sources of supply, and new ways of organising. Mavondo, Chimhanzi, and Stewart (2005) categorised organisational innovation into three types: product innovation, process innovation, and administrative innovation. Meanwhile, others (Chuang, 2005; Damanpour & Evan, 1984; Damanpour et al., 1989) had identified two distinct types of organisational innovation: technical or technological innovation, and administrative innovation. According to Lin (2006), distinguishing the different types of innovation is necessary since each type of innovation has specific determinants. Of the array of innovation types that have been examined, administrative innovation has been posited to result in better organisational performance (Ravichandran, 2000). Administrative innovation reflects performance derived from the changes to organisational structure and administrative process, reward and information system, and it encompass basic work activities within the organisation that is directly related to the management (Chew, 2000; Damanpour & Evan, 1984; Mavondo et al., 2005). Since manufacturing firms operate on the basis of internal process efficiency, administrative innovation can

be regarded as a key source of competitive advantage.

## **2.2 Knowledge Management and Knowledge Management Effectiveness**

Various conceptualisations of knowledge management have been forwarded based on the different views of knowledge. For instance, knowledge management refers to identifying and leveraging the collective knowledge in the organisation to help the organisation compete in the market (Von Krogh, 1998). Hanley and Dawson (2000) viewed knowledge management as a collecting procedure for effectively conducting the creation, expansion, and effect of knowledge, to accomplish goals in an organisation. Likewise, there are many different definitions for knowledge management effectiveness. According to Salisbury (2003), knowledge management effectiveness relates to the deployment of a comprehensive system that enhances the growth of an organisation's knowledge. On the other hand, Ralph (2003) regarded knowledge management effectiveness as a management discipline which focused on the development and usage of knowledge to support the achievement of strategic business objectives. In sum, knowledge management effectiveness can be viewed as the effectiveness of an organisation in managing the knowledge acquired, shared, and applied by its employees. High level of knowledge management effectiveness has been presented in the literature as one method for improving organisational innovation and performance.

Knowledge management is usually analysed from the process perspective (Gold, Malhotra & Segras, 2001; Zheng, 2005). Three processes that have received the most accord comprised of knowledge acquisition, knowledge sharing, and knowledge application (Gold et al., 2001; McAdam & McCreedy, 1999; Newman & Conrad, 2000; Shapira, Youtie, Yogeessvaran, & Jaafar, 2005). When knowledge is acquired, shared, and applied, the learning process takes place to improve the collection of knowledge available to the organisation (Jimnez-Jimnez & Sanz-Valle, 2005). According to Alavi and Leidner (2001), maximisation of knowledge-related effectiveness of an organisation will result in actions for innovation. Operating within a highly competitive and uncertain

environment, manufacturing firms are more likely to place greater emphasis on knowledge management effectiveness.

### **2.3 Knowledge Management Effectiveness and Administrative Innovation**

Based on the knowledge-based view of the firm, different capabilities in developing and deploying knowledge will lead to differences in organisational performances. Thus, knowledge has become the most strategically significant resource of the firm (Grant, 1997; Nonaka, 1994). According to Grant (1997), knowledge-based view consists of assumptions which includes the characteristics of knowledge and the circumstances of its acquisition, sharing, and application, which can be considered as a crucial capability of the firm, which serves as the primary driver of administrative innovation. This means that firms effectiveness in knowledge management will enable them to continuously transform their administrative process, information system, and organisation structure into new innovation. This aligns well with the argument by Jennex and Olfman (2004) that the knowledge management effectiveness is expected to strengthen organisational capability to innovate. Since knowledge management effectiveness has been identified as having three dimensions: knowledge acquisition or knowledge generation, knowledge sharing or knowledge transfer, and knowledge utilisation or application based on the most scholars studies (i.e. Gold et al., 2001; McAdam & McCreedy, 1999; Newman & Conrad, 2000; Shapira et al., 2005; Zheng, 2005).

### **2.4 Knowledge Acquisition Effectiveness and Administrative Innovation**

Knowledge acquisition, also known as knowledge generation refers to the activity of identifying knowledge in the environment and transforming it into a representation that could be internalised, and/or used (Holsapple & Joshi, 2003). Based on Gold et al. (2001), the effectiveness of knowledge acquisition can be viewed from two perspectives: (i) creation of new knowledge from the application of existing knowledge, and (ii) improved usage of existing knowledge and more effective acquisition of

new knowledge. Generally, knowledge and opportunities acquired from a firm's business partners (such as customers and suppliers) can be used as information to increase the likelihood of meeting customer's requirements by improving the quality of service and administrative system (Pinho, 2007). In other word, knowledge acquisition helps to ensure the smooth development and establishment of new organisational structure and effective administrative system, which will lead to better administrative innovation. When firms are effective in their acquisition of knowledge from external sources especially specialised knowledge, they are likely to increase their innovative capabilities, enhancing their knowledge to establish new administrative systems. In line with recent studies (Chen & Huang, 2009; Liao, Wu, Hu, & Tsuei, 2009).

## **2.5 Knowledge Sharing Effectiveness and Administrative Innovation**

Knowledge sharing, are also called knowledge transfer or knowledge diffusion refers to the process in which knowledge is transferred from one person to another, from individuals to groups, or from one group to another (Davenport & Prusak, 1998). According to Chen and Huang (2009), knowledge sharing relates to the understanding of information and communication among team members from the different functions within the firm concerning customer requirements, suppliers' capacities, and internal capabilities which are necessary for new development and establishment of administrative system which will foster administrative innovation. Ralph (2003) articulated that knowledge sharing is a process capturing valuable knowledge and stringing it, making it available for the organisation to be used by the employees-the process of transforming knowledge into an easily accessible form and the process of accessing context specific knowledge for a specific purpose, whether by a user seeking it directly or by having it delivered unprompted. Knowledge sharing involves organisational members who willingly contributed their knowledge for organisational memory. When knowledge is shared among employees, the flow of knowledge and information becomes smoother and faster, and this will help to provide faster feedback to the management authorities, resulting in prompt decision-making (Chen & Huang, 2009).

For firms that are effective in sharing their knowledge within the organisation, the circulation of information is likely to be greater, enabling the firm to develop new systems, procedures, and better administrative innovation. Following past studies (i.e. Chen & Huang, 2009; Zheng, 2005).

## **2.6 Knowledge Application Effectiveness and Administrative Innovation**

Knowledge application, also termed as knowledge utilisation or knowledge implementation, refers to the mechanism for an organisation to store, retrieve and access knowledge quickly and easily in order to allow knowledge to be used to adjust strategic direction, solve new problem, and improve efficiency (Gold et al., 2001). Most scholars agree that knowledge application enables an organisation to use and make knowledge become more active and relevant for the firm. This in return will create value and result in competitive advantage for the firm. Knowledge must flow into actions in order to be useful and beneficial to the organisation (Demarest, 1997). Knowledge application can be viewed from various sources, such as when employees apply the firm's internal knowledge to their individual and team work, when the organisation apply information sourced from external to improve, planning process, administrative system and organisational-integrated mechanisms (Chen & Huang, 2009). The effective application of knowledge will contribute to greater administrative innovation. Knowledge application effectiveness helps to ensure that the effort expended in managing and maintaining knowledge within organisation remains cost-effective and create value for the firm. With this fact, firms will be able to update its core competence, leading to greater administrative innovation. In line with previous literature (Chen & Huang, 2009; Zheng, 2005).

## **2.7 Research Hypotheses**

In this research one main hypothesis and 3 sub- hypotheses suggested and were studied.



H1: Knowledge management effectiveness will be positively related to administrative innovation.

H1a: Knowledge acquisition effectiveness will be positively related to administrative innovation.

H1b: Knowledge sharing effectiveness will be positively related to administrative innovation.

H1c: Knowledge application effectiveness will be positively related to administrative innovation.

## 2.8 Research framework

The framework of research presented in figure 1.

### **Knowledge Management effectiveness**

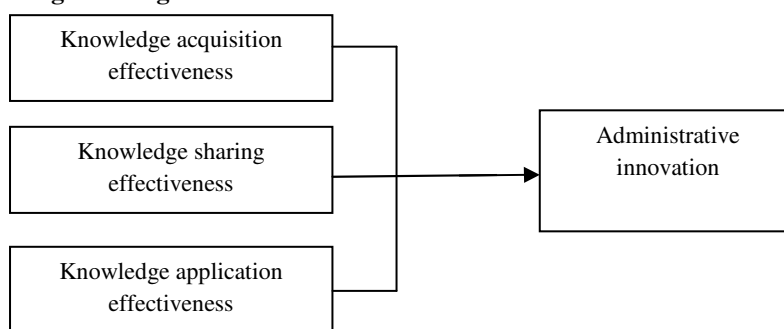


Fig.1-Research framework of the study.

## 3. Methodology

### 3.1 Sample and Data Collection

Total firms in Shiraz industrial zone were 234. The sample of this research selected by simple random sampling from firms which were placed in shiraz industrial zone. Among firms 85 of them were selected and questionnaires were distributed to their staffs and high and middle managers which were 477 persons .

### 3.2 Measurement

The independent variables in the present study relates to knowledge management effectiveness, comprising of three dimensions: knowledge

acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness. Each dimension was measured using 5 items adopted from Zheng (2005), its Cronbach's alpha was 0.92. All measures of knowledge management effectiveness are based on a 7-point Likert scale ranging from (1) "strongly disagree" to (7) "strongly agree". The mean score for each construct will serve as an indicator of the level of knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness respectively. The dependent variable is administrative innovation, measured using four items adapted from Chew (2000), its Cronbach's alpha was 0.85. A similar seven-point response format was used. An index for administrative innovation was computed by taking the mean score of all the items used to measure administrative innovation. A higher mean score indicates higher administrative innovation.

### 3.3 Method of Analysis

Multiple regression analyses were employed to test the hypotheses.

## 4. Results

### 4.1 Mean, Standard Deviations, and Correlations of the Study Variables

Descriptive statistics such as mean scores, standard deviations, reliabilities, and intercorrelations of the study variables are shown in Table 1.

**Table 1:** Descriptive statistics, correlations, and reliabilities of the study variables

Variable	Mean	S.D.	KAE	KSE	KApE	ADI
KAE	4.81	0.82	(0.89)			
KSE	4.74	0.86	0.82**	(0.91)		
KApE	5.02	0.87	0.77**	0.80**	(0.94)	
ADI	5.23	0.94	0.61**	0.58**	0.55**	(0.85)

Note: Values in parentheses indicate Cronbach's alpha; KAE denotes Knowledge Acquisition Effectiveness, KSE denotes Knowledge Sharing Effectiveness, KApE denotes Knowledge Application Effectiveness, and ADI denotes Administrative Innovation.

\*\*  $p < 0.01$ , \*  $p < 0.05$ .

With reference to Table 1, the participating firms judged their level of administrative innovation ( $M = 5.23$ ,  $S.D. = 0.94$ ) to be relatively high. The level of knowledge application effectiveness ( $M = 5.02$ ,  $S.D. = 0.87$ ) was found to be slightly higher than knowledge acquisition effectiveness ( $M = 4.81$ ,  $S.D. = 0.82$ ) and knowledge sharing effectiveness ( $M = 4.74$ ,  $S.D. = 0.86$ ). The correlations among the knowledge management effectiveness dimensions were statistically significant, ranging from 0.77 to 0.82 ( $p < 0.01$ ). The correlations between the three knowledge management effectiveness dimensions and administrative innovation were also significant, ranging from 0.55 to 0.61 ( $p < 0.01$ ). The reliabilities of the study variables were high ranging from 0.85 to 0.94. Reliability coefficients that exceeded 0.80 were considered good (Sekaran, 2003).

## 4.2 Hypotheses Testing

In this study, administrative innovation was regressed against the three dimensions of knowledge management effectiveness (knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness) in a two-step manner. In the first step, the two control variables were entered into the equation. In the second step, the three dimensions of knowledge management effectiveness were entered. The results of the regression analysis are depicted in Table 2.

**Table 2:** Results of regression analysis: Impact of KME on ADI

Predictors	Model 1 Std. $\beta$	Model 2 Std. $\beta$
<b>Step 1: Control variables</b>		
Firm Size	0.05	0.08
Years of firm's operation	0.06	0.08
<b>Step 2: Knowledge Management Effectiveness</b>		
Knowledge acquisition effectiveness		0.31**
Knowledge sharing effectiveness		0.21
Knowledge application effectiveness		0.16
$R^2$	0.01	0.41
Adjusted $R^2$	-0.01	0.40
$R^2$ change	0.01	0.41
F-value	0.48	23.01**
F-change	0.62	37.81**

Note: \*\*  $p < 0.01$ , \*  $p < 0.05$ .

Control variables (firm size and years of firm's operation) explained 1.0the variation in administrative innovation. On adding the three model variables, the R<sup>2</sup> increased to 0.41 indicating that the three dimensions of knowledge management effectiveness contributed an additional 40.0The F-change (37.81) was also significant ( $p < 0.01$ ). Of the three dimensions of knowledge management effectiveness, only knowledge acquisition effectiveness was found to be positively and significantly related to administrative innovation ( $\beta = 0.31$ ,  $p < 0.01$ ). Both knowledge sharing effectiveness and knowledge application effectiveness had no relationship with administrative innovation. The results provided support for hypothesis H1 only.

## 5. Discussion, Implications, and Limitations

The purpose of the current study is to examine the effect of knowledge management effectiveness (comprising of three dimensions: knowledge acquisition effectiveness, knowledge sharing effectiveness, and knowledge application effectiveness) on administrative innovation of firms within the Shiraz manufacturing industry. The statistical results revealed that of the three sub-hypotheses, only one sub-hypothesis (H1a) was supported. This provided partial support for the main hypothesis. In other words, only knowledge acquisition effectiveness has a significant and positive effect on administrative innovation. The finding is consistent with past studies (Chen & Huang, 2009; Zheng, 2005). Knowledge acquisition effectiveness increases a firm's innovative capability leading to greater administrative innovation. On the other hand, both knowledge sharing effectiveness and knowledge application had no relationship with administrative innovation. One possible reason for the non-relationship between knowledge sharing effectiveness and administrative innovation may be due to the fact that staffs are conservative in sharing their knowledge because of their unassuming and unassertive nature (Abdullah, 1992). Besides, even though the mean score for knowledge sharing effectiveness ( $M = 4.74$ ) was judged to be moderate, this value was the lowest among the three dimensions of knowledge management effectiveness. This may have attributed to the non-significant finding.

One possible explanation for the lack of a relationship between knowledge application effectiveness and administrative innovation could be because the sampled manufacturing firms comprised of a combination of foreign-owned (35.1) and joint-venture firms (20.2) are relatively aggressive in their knowledge application activities because of their comprehensive organisational learning system. In contrast, a majority of locally-owned firms lacks a systematic and comprehensive learning mechanism that encourages knowledge application among its members. Nevertheless, the level of knowledge application was perceived to be relatively high ( $M = 5.02$ ) probably due to the fact that about 55.3% are in the joint-venture category. However, in the statistical analysis, the combined effects of the knowledge application systems in these local firms may have contributed to the non-significant relationship between knowledge application effectiveness and administrative innovation.

The findings from this investigation offer both theoretical and practical implications. In terms of theory, our results demonstrate the applicability of the knowledge-based view that recognises the organisation as the key element in the creation and application of knowledge (Grant, 1997; Nonaka, 1994). The different performances in administrative innovation are due to firms' different capabilities in developing and deploying knowledge. From the practical perspective, the results suggest that organisations should acquire knowledge effectively to stimulate administrative innovation. Knowledge acquired from external sources especially specialised knowledge, are apparently to increase firms' innovative capabilities, enabling firms administrative innovation to be more feasible. As such, managers in manufacturing firms should encourage continuous learning activities and provide cross-functional training where employees are able to acquire multiple skills and knowledge for better administrative innovation.

Three main limitations were identified in this research. First, the study employs a cross-sectional approach, which will restrict the ability to prove the direction of the causality between knowledge management effectiveness and administrative innovation. Thus, it is preferable to have sufficient time lapse between the times knowledge management effectiveness was first surveyed to the time administrative innovation

was measured. This could be achieved through the use of a longitudinal approach. Second, this study employed the subjective measure of administrative innovation based on respondents' own perception. Such measure may not objectively reflect an organisation's actual administrative innovation. Researchers can explore these aspects in their future studies. Third, this study focused on manufacturing firms alone located in Shiraz industrial zone. The findings obtained may not be generalised to other samples across other industries in other parts of Iran. The same research also could be replicated in other industries and regions.

## 6. Conclusion

It can be concluded, knowledge acquisition effectiveness contributed significantly towards explaining the administrative innovation. Our sample comprised of manufacturing firms in Shiraz. As argued by Gold et al. (2001), through knowledge acquisition effectiveness, employees are able to develop their breadth of knowledge, generate new understandings, and further provide feedbacks to improve the administrative mechanisms in the organisations, thereby promoting administrative innovation.

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