KNOWLEDGE SHARING, INNOVATION AND FIRM PERFORMANCE: EVIDENCE FROM TURKEY

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Abstract

The aim of this study is to determine relationship between knowledge sharing, innovation and firm performance. In the current study, a survey was conducted on a total of 150 high-tech companies operating in Istanbul, Ankara and Antalya. In the analysis results, it is seen that innovation speed and quality affect both the operational and financial performance of firms. In other words, as innovation speed and quality increase, so does the operational and financial performance of firms. Another important finding obtained in the current study is that explicit knowledge sharing, and tacit knowledge sharing have a positive effect on firm performance. A high level of innovation encompasses new products, processes or applications in most company activities. As a result, innovation can create a competitive advantage by creating synergy in the activities of companies and encourage creativity.

Keywords: Innovation Speed and Quality, Explicit and Tacit Knowledge Sharing, Firm Performance

JEL Classification: L25, O31, O33

1. Introduction

Information economy is an economy shaped on the basis of innovation. One of the key concepts that trigger the new economy is innovation that requires the continuous renewal of products, systems,

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processes, marketing and people (Kavak, 2009: 618). Innovation is a particular function of entrepreneurship. Innovation refers to the entrepreneur's ability to generate prosperity by creating new resources or by increasing the potential of existing resources (Drucker, 1998).

Innovation speed refers to a drastic change from more traditional patterns to today's rapidly changing business environments. Innovation speed is a crucial element for competitiveness. Innovation speed is a socially complex, shaped team that cannot be easily developed or imitated by competitors. Innovation speed enables companies to connect closely with their customers and to meet their needs and increasing speed of competition, technological advances in the market and shorter product life cycles force companies to innovate faster (Tatikonda and Montoya-Weiss, 2001; Slater and Mohr, 2006; Heirman and Clarysse, 2007; Lynn, 2008; Wang and Wang, 2012).

Innovation quality, which has a strong relationship with quality concepts such as innovation, creativity and standardization, can be explained by concepts such as innovation quality, efficiency, reliability, timing, costs and degree of innovation (Kessler & Chakrabarti, 1996; Kessler and Bierly, 2002; Allocca and Kessler, 2006; Wang and Wang, 2012). Innovation quality refers to the relative importance of an innovation in terms of physical, psychological and social satisfaction in the consumer’s consumption system. The existence and continuity of innovation quality is very important for the sustainability of enterprises in both short and long term (Aslan, 2014: 43-44).

In the current study, the relationship between knowledge sharing and firm performance was investigated. In the current study, a survey was conducted on a total of 150 high-tech companies operating in Istanbul, Ankara and Antalya. To this end, a scale with high reliability developed by Zhining Wanga and Nianxin Wang (2012) and accepted in the international literature was used.

The current study consists of five sections. In the second section following the introduction, the conceptual framework is explained. In the third section, the purpose, method, sampling and data collection tools of the study are discussed, and hypotheses are formulated. In the fourth section, the results of the regression and correlation analyses conducted to reveal the relationships between innovation, knowledge sharing, and firm performance are presented. In the last section, a general evaluation of the study is presented.

2. Conceptual framework

Information sharing is the transfer or dissemination of information from one person, group and organization to another person, group and organization. This definition comprehensively involves both explicit and tacit knowledge sharing. Therefore, knowledge sharing occurs in a complex manner. Knowledge, which is a valuable asset in an intense competitive environment, is not occasionally and randomly shared and it is very important how those who have knowledge share it, with whom and when they share it. Knowledge should be actively shared with those who use the knowledge in the organization because the circulation speed of knowledge is becoming increasingly important for the competition of organizations (Öztürk, 2005). Knowledge sharing, an information-centred activity, is the main tool by which employees can contribute to mutual exchange of knowledge, innovation and ultimately competitive advantage (Wang and Noe, 2010). Knowledge sharing becomes individual or group knowledge through the process of internalizing and socializing the organizational knowledge (Wang and Wang, 2012). Knowledge sharing practices throughout the organization are very important in terms of protecting valuable heritage, learning new techniques, solving problems, creating basic competencies and initiating new situations (Law and Ngai, 2008; Hsu, 2008; Huang, Chen and Stewart, 2010; Hu, Horng and Sun, 2009).

Explicit knowledge sharing refers to sharing of ready-to-use knowledge available in a certain format including scientific formulas, product properties, texts, graphs, pictures, computer software, diagrams and procedures. Explicit knowledge can be easily transferred through information technologies as knowledge whose accuracy is generally accepted (Demirel, 2007). The greater the extent to which explicit knowledge is available in the organization, the greater the use of this knowledge in the production; thus, more competitive advantage can be created. Explicit knowledge includes transferring all kinds of knowledge that can be documented, archived and encoded (Nonaka, Krogh and Ichıjo, 2002).

Tacit knowledge, on the other hand, includes talent and technical knowledge. Tacit knowledge can be shared to increase internal motivation for socialization and establishing friendship. Tacit knowledge and personal experience are claimed to be acquired by the individual through social interaction. Tacit knowledge is personal and

can be shared through social interaction. Therefore, social interaction is argued to facilitate the sharing of tacit knowledge among the workers of an organization. The difficulty of imitating tacit knowledge by rivals makes it a very important resource for sustainable competitive advantage (Aydıntan, et al., 2010).

Knowledge sharing leads to disseminating innovative ideas and plays a critical role in the emergence of innovation within the organization. Employee performance is influenced by many factors in the organization while affecting the general performance of the organization (Özdede, 2010). Seen from this perspective, performance is both the product of the interaction of individuals with each other and an element affecting this interaction. Performance functions can therefore be analysed at many different levels. These functions are surrounded by organizational features as well as by individual perceptions. Social networks provide an environment for the dissemination of knowledge and the development of innovations. When all team members share their knowledge with each other in a communication process through these networks, the climate of innovation culminates. This special communication process occurs through the exchange of ideas and the sharing of new ideas (Turgut, 2013).

There are many studies proving the positive impact of knowledge sharing on firm performance (Nonaka and Takeuchi, 1995; Coakes, 2006; Holste and Fields, 2010; Huang, Davison and Gu, 2010). In the studies exploring the relationship between innovation and firm performance, it has been stated that companies with high innovation will be more successful in responding to the needs of customers and developing new capabilities that enable them to achieve better performance or profitability. In other words, empirical findings have been reported suggesting that innovation has a positive impact on firm performance (Robinson, 1990; Brentani, 2001; Jenny, 2005; Tidd, Bessant and Pavitt, 2005; Singh, 2008; Clifton, Keast, Pickernell and Senior, 2010; Liao, Wang, Chuang, Shih and Liu, 2010; Yavuz, 2010; Vaccaro, Parente and Veloso, 2010; Erdem, 2011).

3. Method

The purpose of the current study is to determine the relationship between knowledge sharing and firm performance. To this end, a survey study was conducted on 150 high-tech firms with equity

capital of 250.000 TL and over and operating in Istanbul, Ankara and Antalya. In the study, regression, correlation analyses and descriptive statistics were used. A scale with high reliability developed by Wang and Wang (2012) and adapted to Turkish by Aslan (2014) was used in the current study. The scale used in the current study consists of two parts.

In the first part, there are 10 items aiming to determine the innovation level of firms; 5 of these items are for eliciting data about innovation speed and 5 items for eliciting data about innovation quality. There are also 6 items related to explicit knowledge sharing and 7 items related to tacit knowledge sharing. Moreover, there are 10 items related to firm performance; 6 of them are related to operational performance and 4 of them are related to financial performance. All these items are five-point Likert type items. In the second part of the scale, there are items about high-tech firms and their administrators.

In Table 1, Cronbach Alpha coefficients calculated for the sub-dimensions of the scale are given. As the Cronbach Alpha values calculated for the six sub-dimensions of the scale were found to be higher than the critical value of 0.70 (Nunnly and Bernstein, 1994), the sub-dimensions in the scale are accepted to be reliable. In the original scale developed by Wang and Wang (2012), the Cronbach Alpha coefficients calculated for the sub-dimensions were found to be ranging from 0.89 to 0.97. Aslan (2014) found the Alpha coefficients of the scale adapted to Turkish as varying between 0.81 and 0.95.

Table 1

Reliability of the Scale

Factors	Number of Items	Cronbach Alpha
Explicit Knowledge Sharing	6	0,893
Tacit Knowledge Sharing	7	0,803
Innovation Speed	5	0,886
Innovation Quality	5	0,952
Operational Performance	6	0,888
Financial Performance	4	0,960

Source: Authors

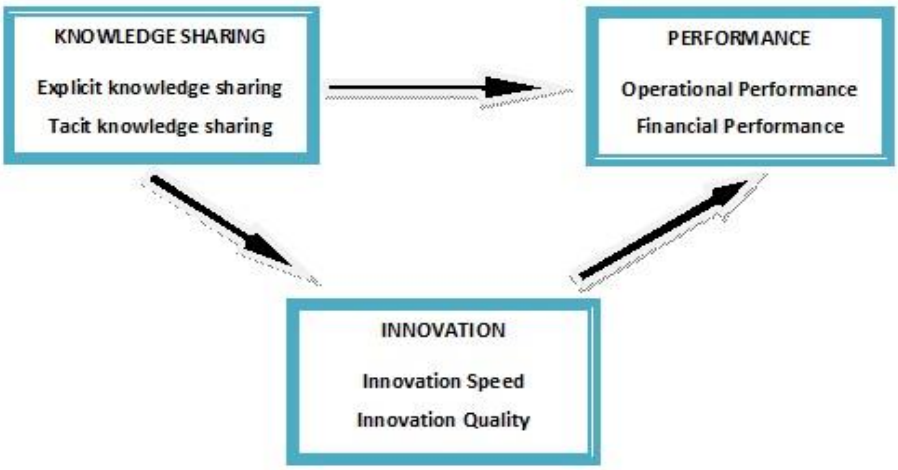
In order to determine whether the data obtained from the sub-dimensions of knowledge sharing, innovation and performance of the five-point Likert scale was distributed normally, Kolmogorov-Smirnov

analysis was run and as a result, it was found that the data were distributed normally for all the sub-dimensions (p>0.05).

The model and hypotheses of the study developed in light of all these findings are presented below.

Figure 1

Research Model



Source: Wang and Wang (2012)

$H_{1a.}$ There is a positive relationship between the firm's innovation speed and operational performance.

$H_{1b.}$ There is a positive relationship between the firm's innovation speed and financial performance.

$H_{2a.}$ There is a positive relationship between the firm's innovation quality and operational performance.

$H_{2b.}$ There is a positive relationship between the firm's innovation quality and financial performance.

$H_{3a.}$ There is a positive relationship between the firm's explicit knowledge sharing and innovation speed.

$H_{3b.}$ There is a positive relationship between the firm's explicit knowledge sharing and innovation quality.

$H_{4a.}$ There is a positive relationship between the firm's tacit knowledge sharing and innovation speed.

$H_{4b.}$ There is a positive relationship between the firm's tacit knowledge sharing and innovation quality.

$H_{5a.}$ There is a positive relationship between the firm's explicit knowledge sharing and operational performance.
$H_{5b.}$ There is a positive relationship between the firm's explicit knowledge sharing and financial performance.
$H_{6a.}$ There is a positive relationship between the firm's tacit knowledge sharing and operational performance.
$H_{6b.}$ There is a positive relationship between the firm's tacit knowledge sharing and financial performance

4. Research findings

In this section of the current study, the results of the regression and correlation analyses conducted to test the relationships between knowledge sharing, innovation and firm performance and descriptive statistics of the firms and administrators are presented and discussed.

In Table 2, the descriptive statistics of the firm administrators are presented. Majority of the participating administrators are males; are in the age group 31-50 and have education at the undergraduate and graduate level. Moreover, length of service in the organization and professional experience of majority of them are 8-15 years.

Table 2

Descriptive Statistics of the Participants

Gender	***f***	***n***
Male	118	78,7
Female	32	21,3
Age	***f***	***n***
20-25 years old	3	2,0
26-30 years old	13	8,7
31-40 years old	93	62,0
41-50 years old	37	24,7
51-60 years old	4	2,7
Education Level	***f***	***n***
High school and lower	8	5,3
Undergraduate	118	78,7
Graduate	24	16,0
Length of Service in the Organization	***f***	***n***
0-3 years	3	2,0
4-7 years	13	8,7
8-11 years	82	54,7
12-15 years	36	24,0

16-21 years	11	7,3
21 years and more	5	3,3
Professional experience	***f***	***n***
0-3 years	3	2,0
4-7 years	6	4,0
8-11 years	76	50,7
12-15 years	46	30,7
16-21 years	11	7,3
21 years and more	8	5,3
TOTAL	**150**	**100,00**

Notes: f= frequency; n= number of observations
Source: Authors

In Table 3, the descriptive statistics of the firms are given. A significant number of the participating high-tech firms have 50-549 workers and 12 years and longer length of operation in the sector. In the current study, all the sectors using high technology are included.

Table 3

Descriptive Statistics of the Firms

Sector	***f***	***n***
Information and Communication	15	10,00
Electronic, Mechatronics etc	24	16,00
Machine Industry	27	18,00
Petrochemical-Plastic	26	17,33
Medical	18	12,00
Chemical	32	21,33
Others	8	5,33
The Number of Workers	***f***	***n***
11-49 People	20	13,3
50-249 People	97	64,7
250 People and more	33	22,0
Length of Operation in the Sector	***f***	***n***
0-3 years	1	,7
4-7 years	2	1,3
8-11 years	24	16,0
12-15 years	40	26,7
16-21 years	35	23,3
21 years and longer	48	32,0
TOTAL	**150**	**100,00**

Notes: f= frequency; n= number of observations
Source: Authors

In Table 4, descriptive statistics related to knowledge sharing, innovation and performance are shown. When the results are examined, it is seen that operational performance is higher than financial performance and the innovation speed and innovation quality means are close to each other. Moreover, the tacit knowledge sharing mean is higher than the explicit knowledge sharing mean.

Table 4

Descriptive Statistics related to Knowledge Sharing, Innovation and Performance

ITEMS	Mean	Std. Dev.
1. Our firm is faster in producing new ideas compared to its rivals.	3,98	0,88
2. Our firm is faster in introducing new products to the market compared to its rivals.	3,91	0,87
3. Our firm is faster in developing new products compared to its rivals.	3,93	0,94
4. Our firm is faster in developing new processes compared to its rivals.	3,9	0,87
5. Our firm is faster in solving problems compared to its rivals.	4,23	0,89
Innovation Speed (IS)	**3,99**	
1.Our firm is better at producing new ideas compared to its rivals.	3,84	0,86
2.Our firm is better at introducing new products to the market compared to its rivals.	3,85	0,91
3.Our firm is better at developing new products compared to its rivals.	3,84	0,92
4.Our firm is better at developing new processes compared to its rivals.	3,87	0,84
5.Our firm is better at administrative improvements compared to its rivals.	3,88	0,88
Innovation Quality (IQ)	**3,86**	
1.The people working in this firm generally share reports and official documents with other workers.	2,74	1,44
2.The people working in this firm generally share the reports and documents they themselves have prepared with other workers.	2,95	1,41
3.The people working in this firm generally collect reports and official documents from other workers.	2,92	1,34
4.The people working in this firm are generally encouraged for knowledge sharing.	4,09	0,92
5.Various training and development programs are organized for the people working in this firm.	4,15	0,96

6.Information technologies created for knowledge sharing facilitate the work of the people working in this firm.	4,32	0,78
Explicit Knowledge Sharing (EKS)	**3,52**	
1.The people working in this firm share their experiences with other workers.	4,07	0,84
2.The people working in this firm generally collect knowledge about other workers' experiences.	3,90	0,83
3.The people working in this firm generally share knowledge about each other.	3,81	0,87
4.The people working in this firm generally collect knowledge about each other.	3,61	0,98
5.The people working in this firm generally share knowledge related to their fields of expertise.	4,05	0,86
6.The people working in this firm generally collect knowledge related to others' fields of expertise.	3,61	1,00
7.The people working in this firm share what they have learned from past mistakes with each other, when necessary.	4,40	0,75
Tacit Knowledge Sharing (TKS)	**3,92**	
1.Our firm is better in terms of consumer satisfaction compared to its rivals.	4,19	0,74
2.Our firm is better in terms of quality compared to its rivals.	4,31	0,77
3.Our firm is better in terms of cost management compared to its rivals.	4,19	0,80
4. Our firm is better in terms of adaptation to change compared to its rivals.	4,19	0,78
5. Our firm is better in terms of efficiency compared to its rivals.	4,21	0,75
6. Our firm is better in terms of asset management compared to its rivals.	4,07	0,82
Operational Performance (OP)	**4,19**	
1.Our firm's average profit obtained from investments is better than its rivals.	3,73	0,89
2.Our firm's average profit is better than its rivals.	3,61	0,87
3.Our firm's profit increase is better than its rivals.	3,64	0,95
4.Our firm's average sales income is better than its rivals.	3,65	0,93
Financial Performance (FP)	**3,66**	

Source: Authors

In Table 5, the results of the correlation analyses are shown. When these results are examined, it is seen that there is a significant and positive correlation between innovation speed and quality and operational and financial performance. In other words, as the innovation speed and innovation quality of firms increase, so does their operational and financial performance.

Table 5

Correlation Table

Variables	OP	FP	IS	IQ	EKS	TKS
OP	1					
FB	,530**	1				
IS	,683**	,439**	1			
IQ	,619**	,496**	,824**	1		
EKS	,307**	,234**	,330**	,359**	1	
TKS	,430**	,288**	,433**	,407**	,347**	1

*Notes: ** Correlation is significant at the 0.01 level (2-tailed)*
Source: Authors

There is a positive correlation between explicit knowledge sharing and tacit knowledge sharing and operational and financial performance. With increasing knowledge sharing, the performance of firms increases. Similarly, there is a positive correlation between explicit knowledge sharing and tacit knowledge sharing and innovation speed and quality. In other words, with increasing knowledge sharing, innovation speed and quality also increase.

In Table 6, the results of the regression analysis are presented. When the results are examined, it is seen that explicit knowledge sharing and tacit knowledge sharing and innovation speed and innovation quality, which are the independent variables, affect the operational performance and financial performance of firms, which are the dependent variables in the current study. In other words, there is a positive and significant correlation between explicit knowledge sharing and tacit knowledge sharing and innovation speed and quality and the operational and financial performance of firms.

Table 6

Regression Analysis Results

Hypotheses		Expectation	p	Explanations
H_{1a}	**IS → OP**	,540**	**0,000**	**Accept**
H_{1b}	**IS → FP**	,278*	**0,023**	**Accept**
H_{2a}	**IQ → OP**	,294*	**0,021**	**Accept**
H_{2b}	**IQ → FP**	,418**	**0,000**	**Accept**

Hypotheses		Expectation	p	Explanations
H_{3a}	**EKS → IS**	,205**	**0,009**	**Accept**
H_{3b}	**EKS → IQ**	,248**	**0,002**	**Accept**
H_{4a}	**TKS → IS**	,362**	**0,000**	**Accept**
H_{4b}	**TKS → IQ**	,321**	**0,000**	**Accept**
H_{5a}	**EKS → OP**	,190*	**0,022**	**Accept**
H_{5b}	**EKS → FP**	,183*	**0,035**	**Accept**
H_{6a}	**TKS → OP**	,367**	**0,000**	**Accept**
H_{6b}	**TKS → FP**	,235**	**0,005**	**Accept**

*Notes: *Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)*

Explicit knowledge sharing and tacit knowledge sharing affect innovation speed and quality. In other words, there is a positive correlation between explicit and tacit knowledge sharing and innovation speed and quality. With increasing sharing of knowledge in firms, their innovation also increases. As a result, all the hypotheses formulated in the current study have been satisfied.

5. Results

In the current study, the relationship between innovation, knowledge sharing, and firm performance were investigated. To this end, a survey study was conducted on a total of 150 high-tech firms operating in İstanbul, Ankara and Antalya. In the study, regression and correlation analyses were employed.

When the results of the analyses are examined, it is seen that innovation speed and quality affect both the operational and financial performance of firms. In other words, as innovation speed and quality increase, so does the operational and financial performance of firms. A high level of innovation encompasses new products, processes or applications in the majority of company activities. As a result, innovation can create a competitive advantage by creating synergy in the activities of companies and encourage creativity.

Another important finding obtained in the current study is that explicit knowledge sharing, and tacit knowledge sharing have a positive effect on firm performance. Knowledge sharing at the same time makes positive contribution to innovation speed and innovation quality. As a conclusion, knowledge sharing facilitates innovation processes and is important in terms of the emergence of innovative ideas within the organization.

There are some limitations of the current study investigating the relationships between knowledge sharing, innovation and firm performance. The current study employed the survey model to investigate these relationships. In a survey study, it is always possible to encounter errors related to content, sampling, measurement and responding, which is also true for the current study. This makes it difficult to make some generalizations on the basis of the obtained results. Moreover, the data collected in the current study are limited to high-tech firms operating in İstanbul, Ankara and Antalya. Another limitation of the current study is the inclusion of only 150 firms and that factor analysis was not conducted in the study. Future research can investigate the same issue on different sectors and samplings and on firms of different size.

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