

The Effects of knowledge Creation Process on Organizational Performance: Evidence from Saudi Banking Sector

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Abstract:

Knowledge creation (KC) is considered an asset in competition and success. Nonaka and Takeuchi (1995) recommended a model of knowledge conversion to clarify the procedures of cooperation between explicit and tacit knowledge. A review of the relevant literature shows that no previous study used the Nonaka model to assess KC in Saudi knowledge-intensive firms in general and Saudi knowledge-intensive banks in particular. In addition, the appropriateness of applying the Nonaka model in various social settings is questionable. To fill these gaps, the aim of this study is to analyze the associations between knowledge creation processes (KCP) and organizational performance (OP) in knowledge-intensive banks. In order to create reliability between KC and performance, organizational creativity (OC) is added to the model. The emphasis is on the four modes of KC used in the Nonaka model, which are externalization, socialization, internalization, and combination. 214 self-administered questionnaires were distributed to investigate the extent to which Saudi banks perform KCP and performance activities. The data were verified through reliability, validity, and normality tests. Various statistical applications were used to analyze the survey data, namely factor analysis, Cronbach's alpha, and multiple regression equations. The empirical results of this study confirmed that OC was critical for improving performance in the banking sector. In addition, the externalization process had the most positive influence on OC, followed by internalization, socialization, and combination processes, respectively. Finally, this study backs the opinion that the Nonaka model (SECI) is universal, but the utilization of each process is subject to leadership support, type of task, and cultural context.

Keywords: knowledge creation, SECI, organizational creativity, organizational performance, banking industry.

INTRODUCTION AND BACKGROUND

The rapid development of information technologies (IT) and communication systems has increased the significance of knowledge about economic growth (Carrion *et al.*, 2004; Tseng, 2009). Knowledge has been perceived as a necessary asset in achieving competitive advantage (Wiig, 1997). The idea of knowledge management (KM) has been of interest to researchers and has been analyzed both hypothetically and practically (Bose, 2004; Choi and Lee, 2003; Chong *et al.*, 2006; Martin-de-Castro *et al.*, 2007; Nonaka, 1994; Oliver and Kandadi, 2006; Smith, 2004). Adopting the organizational method of KM as a primary concentration, Nonaka is one of the main management researchers to have a significant effect on it (Earl, 2001). The Nonaka model transfer personal knowledge into organizational forms by connecting it to an organization's knowledge system, and it is considered to be the central model of organizational knowledge creation (KC) because it includes an extensive variety of KM procedures such as codifying, producing, using, and exchanging knowledge (Aurum *et al.*, 2008; Grant and Grant, 2008; Mikic *et al.*, 2009; Rice and Rice, 2005). The utilization of Nonaka's KC model has been tested in various business settings, including the manufacturing, service, and IT sectors (Cabera, 2008; Eliufoo, 2008; Kamtsiou *et al.*, 2006; Li *et al.*, 2009; Lopez-Saez *et al.*, 2010; Martin-de-Castro *et al.*, 2008). Every previous study found that the coordinating all the knowledge creation processes (KCP) enhanced performance in firms. However, these prior analyses did not demonstrate the utilization of each mode of KCP in particular business settings, and especially not in the banking sector, an industry that affects the worldwide economy. Additionally, the appropriateness of the Nonaka model in various social settings is questionable (Glisby and Holden, 2003; Weir and Hutchings, 2005). Hence, this study aims to investigate the role of KCP in Saudi banks, and afterward examines the relationship between each KCP and the banks' performance.

The following two research questions will be addressed to accomplish the aims of this study:

RQ1: How are KCP linked to organizational creativity (OC) in Saudi banks?

RQ2: How is OC linked to organizational performance (OP) in Saudi banks?

LITERATURE REVIEW AND HYPOTHESES

KC is the initial step of KM (Shih *et al.*, 2010). In fact, by utilizing KCP, new thoughts emerge by combining existing information (Lee *et al.*, 2009). According to the theory of KC, which was introduced by Nonaka and Takeuchi (1995), knowledge is created by the SECI model which covers four modes, namely socialization, externalization, combination, and internalization. This procedure of KC depicts the dynamic contact between two types of knowledge, called explicit knowledge (EK) and tacit knowledge (TK), and it creates value for the firm through producing new thoughts (Lee *et al.*, 2009). Most scientists concur that information is a basic element for performance (Ramirez *et al.*, 2011), and that it is considerably more important for organizations' competitiveness (Nonaka *et al.*, 2006).

Socialization is defined as "the degree of tacit knowledge accumulation, extra-firm social information collection, intra-firm social information gathering and transfer of tacit knowledge" (Nonaka *et al.*, 2000). It brings about the change of old TK into new TK through shared knowledge (Li *et al.*, 2009). Through the externalization process, TK can be reformed into EK that is more comprehensible than TK (Nonaka, 1994). In the internalization process, people can acquire and become interested in information through demonstration or with different ways, such as training and learning by doing (Li *et al.*, 2009). In combination process, EK gathered from outside and/or inside the firm is reformed into new and efficient EK. The transformation of knowledge using the four modes of KC can help to achieve a competitive advantage (Grifith *et al.*, 2006). Thus, in this study, we aim to utilize the Nonaka model to investigate the impact of KCP on firm performance. OC was incorporated in our proposed model since it is the seed of all innovation (Amabile *et al.*, 1996).

Nowadays, the idea of OP is a critical topic for every business (Grifith *et al.*, 2006). According to Mills and Smith (2011), many firms have found that achieving performance relies not only on an effective plan of tangible assets, but also on the operative application of knowledge. In addition, many studies have found that KC is an essential part of effective firms (Nonaka and Takeuchi, 1995; Li *et al.*, 2009). Firms that apply the KCP can interface information in novel methods and give additional worth to clients by enhancing market aids (Li *et al.*, 2009). Yong *et al.* (2009) propose that when the firms are better at KC within the Nonaka model (SECI), they will be more effective in attaining improvement and return. Along these lines, creating new knowledge is fundamental since it has a beneficial outcome on performance (Li *et al.*, 2009).

Lee and Choi (2003) proposed that each of the SECI processes is an important driver of OC. However, previous studies showed that not all KCP had the same effect on OP, and the significance of each may vary from organization to organization (Ng *et al.*, 2011). Consequently, it is important to investigate which KCP might increase creativity in the Saudi banking industry. Accordingly, our study states the following hypotheses to be tested:

H1: Socialization affects OC positively.

H2: Externalization impacts OC positively.

H3: Combination affects OC positively.

H4: Internalization affects OC positively.

A firm's performance can be considered as the yield of a procedure that empowers OC (Sawhney and Prandelli, 2000). In this manner, changes in OC may prompt a better OP (Davenport, 1999; Quinn *et al.*, 1996; Shani *et al.*, 2000). In our study, we set the fifth hypothesis as follows:

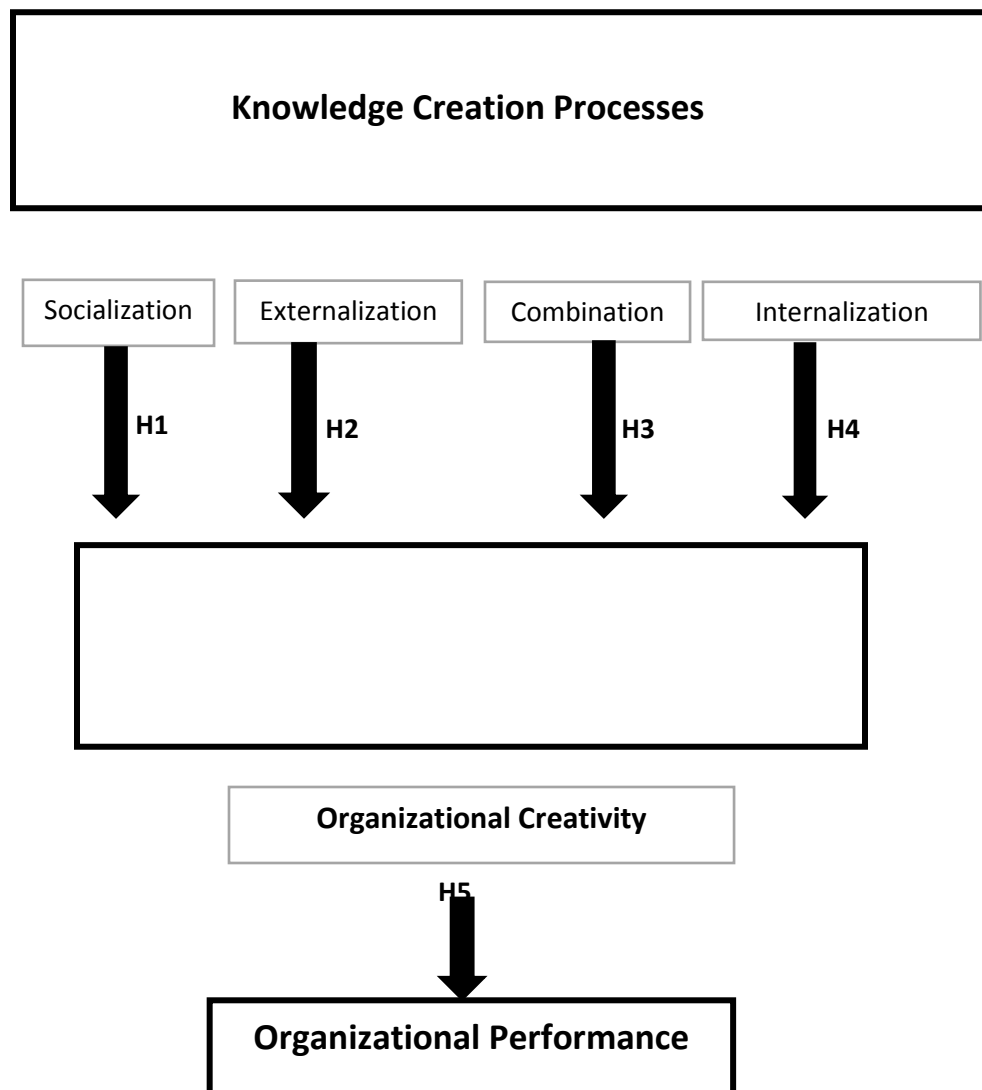
H5: There is a positive relationship between OC and OP.

RESEARCH MODEL

This study examines the relationship among KCP and OP that is mediated by OC. The emphasis is on KCP such as socialization, externalization, combination, and internalization in the setting of commercial banks working in the Kingdom of Saudi Arabia (KSA).

The SECI model of KC was utilized as the theoretical framework of this study (Nonaka and Takeuchi, 1995). The utilization of the KC model in different knowledge-intensive firms, for example, telecommunications, computer, electronics manufacturing, and broadcasting in the USA and Spain have been examined extensively (Martin-de-Castro *et al.*, 2008). Also, the theoretical support of the model validates the general instrument of KM in the banking sector; hence, it proposes a solid justification to utilize the model in this research. Figure 1 shows the research model that will be examined in this study.

Figure 1: The Research Model



RESEARCH METHODOLOGY

The present study utilizes the survey method for the data collection. In order to increase the reliability of the questionnaire and to save time and effort, the questions in the survey depend on the existing scales for the variables in our applied model. The determination of the variables is based on a sound hypothetical foundation and adjusted to the banking industry in KSA.

A stratified random sample is used from the selected banks, and Cochran's equation was utilized to determine the sample size. This equation stresses the reliability of the sample average in estimating the population average (Bartlett *et al.*, 2001). Two hundred and fourteen self-administered questionnaires were used to investigate the extent to which Saudi banks perform KCP in their performance activities.

In the social sciences, the regression method is the most broadly utilized procedure to estimate a wide range of dependent associations (Tabachnick and Fidell, 2007). It is a solid systematic instrument used to confirm which specific independent variables predict the variance of the dependent variable selected by the analysis (Hair *et al.*, 2006). Hence, multiple regressions can be used to obtain the power and path of the association among factors (i.e., dependent and independent variables), before the stated hypotheses are tested. In order to predict the comparative influence of KCP and OC on bank performance, the following regression equations are utilized:

- A. The relationships among organizational creativity (OC) and KCP [Socialization (S), Externalization (E), Combination (C), and Internalization (I)].

$$OC = \alpha + \beta_1 S + \beta_2 E + \beta_3 C + \beta_4 I + u$$

- B. The relationships between organizational performance (OP) and organizational creativity (OC).

$$OP = \alpha + \beta OC + u$$

ASSESSING MEASUREMENT MODELS

Normality is the most significant assumption in regression analysis, and it is necessary to show the nature of data distribution for the variables and their relationship to the normal distribution (Hair *et al.*, 2006). A failure of this assumption can lead to unpredictable regression coefficients (De Vaus, 2002). In order for a distribution to be thought of as normal, both the skewness and kurtosis of the distribution should be between -2.00 to +2.00 (Garson, 2009). The testing results confirmed that the data are normally distributed, with skewness and kurtosis values ranging from -0.965 to -0.636 and from 0.204 to 1.511, respectively (Table 1).

Validity and reliability evaluation are basic procedures that give the study credibility and reduce the likelihood of untrue outcomes (Winter, 2000). Cronbach's Alpha is the most used test for evaluating the reliability of the items. However, it is a factor of reliability and not a statistical test (Hair *et al.*, 2006). Hence, it is suggested that an examination of the inter-total correlations should be conducted (Pallant, 2007). The results of the Cronbach's Alpha and inter-total correlations are presented in Table 1. These results indicated that the items in each construct appeared to assess the constructs similar to those proposed in the research model since the values of the corrected inter-total items were greater than 0.30 (Pallant, 2007).

Table 1: Statistics for Reliability, Validity and Normality.

Measure / Acronym	Mean	SD	Cronbach's Alpha	Convergent Validity (Corrected Item-Total Correlation)	Normality	
					Skewness	Kurtosis
Socialization (S)	3.696	0.9476	0.691	0.574	-0.636	0.204
Externalization (E)	3.640	0.9377	0.823	0.653	-0.690	0.390
Combination (C)	3.514	1.0994	0.744	0.566	-0.911	1.511
Internalization (I)	4.005	0.7782	0.682	0.427	-0.729	0.957
Organizational Creativity (OC)	3.795	0.9067	0.810	0.598	-0.965	1.434

Before performing a statistical evaluation such as regression to test the hypotheses, it is important to confirm whether the gathered sample is fit for the suggested model (Thompson, 2004). The summary of results of the validity test is shown in Table 2.

Table 2: Summary of Validity Test for the Study**(A) Validity Test for Knowledge Creation Processes (KCP)****(A-1) Validity Test for Socialization (S): One factor is generated out of four.**

	Factor 1	Item-to-total correlation
S1	0.731	0.571
S2	0.671	0.535
S3	0.633	0.502
S4	0.381	0.319

(A-2) Validity Test for Externalization (E): One factor is generated out of five.

	Factor 1	Item-to-total correlation
E1	0.741	0.654
E2	0.667	0.592
E3	0.661	0.591
E4	0.664	0.597
E5	0.743	0.653

(A-3) Validity Test for Combination (C): One factor is generated out of four.

	Factor 1	Item-to-total correlation
C1	0.697	0.565
C2	0.676	0.557
C3	0.585	0.493
C4	0.617	0.513

(A-4) Validity Test for Internalization (I): One factor is generated out of four.

	Factor 1	Item-to-total correlation
I1	0.537	0.425
I2	0.555	0.438
I3	0.600	0.471
I4	0.652	0.502

(B) Validity Test for Organizational Creativity (OC): One factor is generated out of five.

	Factor 1	Item-to-total correlation
OC1	0.694	0.605
OC2	0.676	0.594
OC3	0.693	0.614
OC4	0.635	0.559
OC5	0.697	0.617

TESTING THE THEORETICAL HYPOTHESES**A. Results of the Multiple Regression Equation for OC vs. KCP.**

Table 3 summarizes the multiple regression results for the KCP and OC. The F-value indicates that the model as a whole has a significant analytical capability at $p > 0.01$. The values of the variance inflation factor (VIF) and tolerance measure are satisfactory since they are less than 10 and more than 0.1, respectively (Tabachnick and Fidell, 2007). Thus, the problem of multi-collinearity does not exist among the independent variables. In addition, all the estimated coefficients had a positive effect on creativity, and the independent variables (S, E, C, and I) represent 66.5% of the total variance of the dependent variable (OC). Table 3 also indicates that socialization, externalization, and internalization affect OC positively and significantly. Only the combination process does not have a significant level. Based on these results, H1, H2, and H4 were supported. However, H3 has been violated and therefore it is rejected.

Table 3: Summary of the Results of the Multiple Regression Equation for Organizational Creativity (OC) vs. Knowledge Creation Processes (S, E, C, I).

Independent Variables	Estimated Coefficient β	t-Test	Sig.	R ²	Adjusted -R ²	F-Value	Sig.	Co-linearity Statistics Tolerance VIF
Socialization	0.151	2.376	≤ 0.05	0.671	0.665	106.54	≤ 0.01	0.34 2.93
Externalization	0.404	6.508	≤ 0.01					0.33 3.02
Combination	0.051	0.898	-					0.46 2.16
Internalization	0.274	4.268	≤ 0.01					0.45 2.24

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

a. Dependent Variable: Organizational Creativity (OC).

B. Results of the Regressions Equation for Organizational Performance (OP) vs. Organizational Creativity (OC)

Table 4 summarizes the regression results for OP vs. OC. The estimated coefficient of organizational creativity had a positive and significant effect on the overall performance of the banking sector in Saudi Arabia. It contributes positively at $p < 0.01$ and represents 46.5% of the total variance in organizational performance. This indicates that H5 has not been violated, and therefore it was supported.

Table 4: Summary of the Results of the Regression Equation for Organizational Performance (OP) vs. Organizational Creativity (OC).

Independent Variable	Estimated Coefficient β	t-Test	Sig.	R ²	Adjusted -R ²	F-Value	Sig.
Organizational Creativity	0.490	13.655	≤ 0.01	0.468	0.465	186.495	≤ 0.01

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

b. Dependent Variable: Organizational Performance (OP).

DISCUSSION AND CONCLUSION

To accomplish the study's aim, five hypotheses were created. In order to address these hypotheses, two research questions were produced. Table 5 provides a summary of the research hypotheses in relation to the research questions. The empirical results of the regression analysis show that four hypotheses (H1, H2, H4, and H5) are supported, whereas one hypothesis (H3) was rejected.

Table 5: Summary of the Research Questions and Hypotheses

Research Questions	H#	Hypothesis	Results
RQ1	H1	Socialization positively influences organizational creativity.	Supported
	H2	Externalization positively influences organizational creativity.	Supported
	H3	Combination positively influences organizational creativity.	Rejected
	H4	Internalization affects organizational creativity positively.	Supported
RQ2	H5	Organizational creativity positively influences organizational performance.	Supported

The application of the Nonaka model in Saudi banks demonstrated that KC theory is a Japanese marvel, as well as be suitable in the developing nation's firms to some degree. These results are in line with those reported in Glisby and Holden (2003), Andreeva and Ikhilchik (2011), and Haag *et al.* (2010), who propose that KC theory is generally relevant. In the following, we show how KCP are occurring in Saudi banks through the four KC modes in light of the multiple regression analysis.

Socialization process: The results demonstrate that socialization is the main antecedent for exchange of TK in the sample of Saudi banks. Bank representatives were included in socialization during face-to-face interactions at work. About 73.8% of the respondents acknowledged that they try to find out others' ideas, opinions, or concepts during rotation across departments while 73.3% of employees acknowledged that they encourage others to express their thoughts, ideas, and concepts during cooperative projects across directorates.

The exchange of TK through social cooperation in Saudi banks additionally affirmed the qualities of a collectivist society. Solid, durable gatherings and sound good stipulations were shown (Hofstede and Hofstede, 2005). This finding is supported by Rodrigues *et al.* (2006) in that socialization can be accomplished with discussions between individuals when they share thoughts and encounters. The finding suggests that the work environment and community is a capable empowering influence on learning, sharing and trade, as it energizes the types of participation and collaboration that are critical in the KCP.

Externalization process: Transforming TK into EK can be accomplished through encouraging innovative and helpful discussions among individuals and groups. The results of this study demonstrate that the TK of employees and partners was transformed into EK by face-to-face and online discussions in the Saudi banks. Approximately 76.1% of the respondents agreed that the bank generally embraces groupware and others have learned to use other coordinated effort instruments. These results support Salmador and Bueno (2007) study, who proposed that externalization can be accomplished when individuals get assistance from specialized wordings and expert dialect in routine interchanges with each other in the establishment.

Combination process: The combination procedure changed the current EK that was gathered from the databases or information repositories into a more modified and clearer knowledge. The KM framework in the selected banks in Saudi Arabia does not use any technique to smooth the advance of gathering and upgrading new data or sorting out uncertain ideas during banking processes. It is possible that this is the reason the combination process has an insignificant effect on organizational creativity in the present study. This result is in agreement with Schulze and Hoegl (2008), who contend that the combination of existing EK does not prompt particularly novel thoughts, but rather upgrades the current processes.

Internalization process: The internalization process in KC encourages analyzing existing and new thoughts (or ideas) with individual involvement in order to comprehend its meaning. It helps personal knowing by doing by conducting experiments and sharing results with entire departments. In this study, 77.1% % of the respondents agreed that the bank embraces learning by doing, and 76.7% of them agreed that the bank is forming teams and conducting experiments and sharing results with entire sections of the bank. In addition, 69.6% of employees understand the thoughts of others better by training. These results are in agreement with Nonaka and Takeuchi (1996) and Tsai and Li (2007).

As indicated by Nonaka and Takeuchi (1996), internalization is firmly identified with learning by doing. According to Tsai and Li (2007), employees have a tendency to internalize recently learned information as the basis for next-time uses at work and at out-of-work training.

OC and performance: Creativity is the route by which information is made and exchanged while performance as described by Daft (2000) and Ricardo and Wade (2001) are the organization's ability to utilize its resources efficiently to attain its objectives. In this study, we used OC as the intermediate outcome, which gives a basic insight into the comprehension of organizational viability and survival (Swap *et al.*, 2001). Our

results show that OC and the bank's performance have a positive and significant relationship. These findings are in agreement with Davenport, (1999), Quinn, *et al.* (1996), Shani, *et al.* (2000), and Lee and Choi, (2003).

From a pragmatic perspective, the connections among KC, OC, and OP may give some insight into how firms can adapt KCP to support their performance. The use of the Nonaka model for assessing KC in Saudi knowledge-intensive firms in general, and in Saudi knowledge-intensive banks specifically does not exist other than this study.

In spite of the fact that this study answered its research questions and tested its hypotheses, it is not without limitations. Time and cost limits constrained the researcher to direct examinations between Saudi banks and banks in other developed nations, which have different cultures. This study was done in two banks located in the eastern province of Saudi Arabia. Subsequently, the extent of this study was restricted and results may create some generalization issues. Therefore, in order to overcome these issues, more work is required in order to attain a far-reaching longitudinal outline in the future, as a series of observations over a definite time period will allow specialists to identify causal connections, and then conduct further experiments.

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