

## Creativity, organizational learning, and operation

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**Abstract.** The propose of this paper Describing the relationship between creativity and operation and pretends a strong positive relationship between organizational learning and both operation and creativity. However, few empirical studies analyze these relationships together. This article explores those relationships using SEM with data from 205 Persian firms. The findings prove that both variables — organizational learning and creativity — contribute positively to business operation, and that organizational learning affects creativity. Another finding of this study is the number of employees and manager of employees and managers of the firm, industry and environmental turbulence moderate these relations.

**Keywords:** Creativity, Organizational learning , Operation

### 1. Introduction

This study attempts to address the weaknesses of the preceding literature and analyzes the relationships between organizational learning, creativity and operation together in a single model. This study focuses on the organizational learning process and uses a complete measure of creativity. In addition, this paper analyzes the likely moderating effect of the employees and manager of employees and managers numbers of firm , industry and environmental turbulence on the relationships between organizational learning, creativity and operation. The article starts with a review of the literature on these topics and a description of the model proposals. Then, the article presents the design of the study to test the model and the findings of this study. In the last section, the article discusses the manager of employees and managerial and academic implications of the study, its limitations and recommendations future research.

#### 1.1. Creativity and operation

Since the purpose of this article is to analyze how organizational learning influences the whole creativity activity of the firm, the present study adopts a broad concept of creativity that includes the adoption of any new product, process and administrative creativity.

Despite the likely detrimental effects resulting to a creativity orientation and some conflicting evidence, theory and most of the empirical studies suggest a positive relationship between creative activity and firm operation.(Ahmadi,2009)

H1. Organizational creativity relates positively to firm operation.

#### 1.2. Organizational learning and operation

Empirical findings are consistent with theory and provide evidence that supports the positive relationship between organizational learning and operation. However, these conclusions are not conclusive, since their samples and measures for both organizational learning and operation are very different. Therefore, more research would be of interest. The second hypothesis takes into account the theoretical arguments and the findings of empirical research.

H2. Organizational learning relates positively to operation.

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### **1.3. Organizational learning and creativity**

Organizational learning enhances the assimilative capacity of the firm. Creativity also needs the transformation and exploitation of existing knowledge. That requires that employees share information and knowledge. Conclusions of previous studies are difficult to generalize because of the differences among their main purpose, samples, methodologies and the measures they use. Some qualitative studies show that organizational learning enhances creativity.

H3. Organizational learning relates positively to organizational creativity.

### **1.4. Moderators in the relationships between organizational learning, creativity and operation**

In order to study the relationships between organizational learning, creativity and operation in greater depth, this article analyzes now the likely moderating effect on these relationships of some internal and external variables: employees and manager of employees and managers of industry and environmental turbulence. The literature frequently cites these variables as antecedents of creativity and operation and some studies suggest that they can moderate the relationships proposed in the present study. In summary, firm number of employees and manager of employees and manager, industry and environmental turbulence moderate the relationship between organizational learning and both creativity and operation, and the relationship between creativity and operation.

H4. Employees and manager of employees and managers firm, industry and environmental turbulence moderate the relationships between organizational learning, creativity and operation.

## **2. Method**

### **2.1. Data collection and sample**

The sample includes 205 firms located in a south region of Iran that have more than 15 employees. 57% of them belong to the manufacturing sector and 43% to the service sector.

The present study employs a personal interview, using a structured questionnaire, to collect data. The number of valid questionnaires the authors obtained was 98, yielding a response rate of 20.9%.

#### Measures

The three key constructs of this study are organizational learning, creativity and operation.

### **2.2. Organizational learning**

This study uses LISREL 8.50 to estimate the measurement model. The results suggest a good fit of the second-order specification for the measure of organizational learning ( $\chi^2 = 117.19$ ,  $df = 61$ ; goodness-of-fit index [GFI] = 0.96; root mean square error of approximation [RMSEA] = 0.044; comparative fit index [CFI] = 0.98; Tucker–Lewis index [TLI] = 0.97; incremental fit index [IFI] = 0.98). The GFI, CFI, TLI and IFI statistics exceed the recommended threshold level of 0.90 (Hoyle and Panter, 1995). The RMSEA is nearly 0.050 and the root mean square residual [RMR] and standardized RMR are 0.029 and 0.035, respectively, which indicates an acceptable fit.

### **2.3. Creativity**

The results suggest a reasonable fit of second-order specification for this measure of creativity ( $\chi^2 = 54.50$ ,  $df = 24$ ; GFI = 0.98; RMSEA = 0.051; CFI = 0.99; TLI = 0.98; IFI = 0.99). GFI, CFI, TLI and IFI all exceed the recommended threshold level of 0.90 (Hoyle and Panter, 1995). The RMSEA is nearly 0.050 and the root mean square residual [RMR] and the standardized RMR are 0.029 and 0.035, respectively.

#### Operation

The results suggest a good fit of the second-order specification ( $\chi^2 = 28.83$ ,  $df = 17$ ; GFI = 0.99; RMSEA = 0.033; CFI = 0.99; TLI = 0.99; IFI = 0.99). The RMSEA is below 0.050 and the root mean square residual [RMR] and the standardized RMR are 0.016 and 0.027 respectively, which are acceptable levels. To assess the unidimensionality of each new construct, this study conducts a confirmatory factor analysis of the ten constructs, employing 30 items (Anderson and Gerbing, 1988). The measurement model provides a reasonable fit to the data ( $\chi^2 = 659.05$ ,  $df = 360$ ; GFI = 0.91; RMSEA = 0.042; CFI = 0.96; TLI = 0.95; IFI

= 0.96). The present study measures firm the number of employees of the firm .For measuring industry, the study uses a dummy variable (0 = service, 1 = manufacturing).

### 3. Analysis and results

The study uses structural equation modeling (SEM) to test the hypotheses. Figure 1 shows the proposed structural model. The analysis includes conventional maximum likelihood estimation techniques to test the model ( Jöreskog and Sörbom, 1996). The fit of the model is satisfactory ( $\chi^2 = 780.80$ ,  $df = 392$ ;  $GF I = 0.90$ ;  $RMSEA = 0.046$ ;  $CFI = 0.94$ ;  $TLI = 0.94$ ;  $IFI = 0.94$ ), suggesting that the nomological network of relationships fits the data — another indicator of support for the validity of the measurement scales ( Churchill, 1979). In terms of the hypotheses ( Table 7 ), the findings for H 1 (Creativity → operation;  $\beta_{95} = 0.57$ ,  $p < 0.01$ ) suggest that creativity has a positive and significant effect on operation, supporting the widespread idea that creativity is a key driver of company success.

The findings also provide support for H 2 (Organizational learning → operation;  $\gamma_{91} = 0.26$ ,  $p < 0.01$ ) and H 3 (Organizational learning → creativity;  $\gamma_{51} = 0.66$ ,  $p < 0.01$ ), showing that the organizational learning has a positive effect on both operation and creativity. Finally, H 4 states that number of employee and manager of employees and managers, industry and environmental turbulence moderate the relationships between organizational learning, creativity and operation. To test these moderating effects this research uses the two- group comparison of structural equation modeling. This study splits the sample into two groups along the median of the levels of each variable (with the exception of industry, since this variable is dichotomous). One group contains firms with the higher levels of each moderator and the other group contains firms with lower levels. Then, the analysis includes a two-group comparison to examine the existence or not of differences in structural parameters between high and low values of these variables.

The first step constrains the parameter from hypothesized relationships ( $\beta_{95}$ ,  $\gamma_{91}$  or  $\gamma_{51}$ ) to be equal. In the second step, they do not constrain the parameter. If the difference between the two tests is significant (chi-square difference), that means that the variable used for splitting the sample moderates the relationship studied. The analysis repeats this method to study the possible moderating effect of the four variables in the three relationships included in this study model (see Table 8). Table 8 shows that, although the relationships between organizational learning, creativity and operation are significant and positive for all the groups, the four variables studied influence how intense these relationships are. Thus, they moderate the relationships between the three main constructs of the model, confirming H 4.

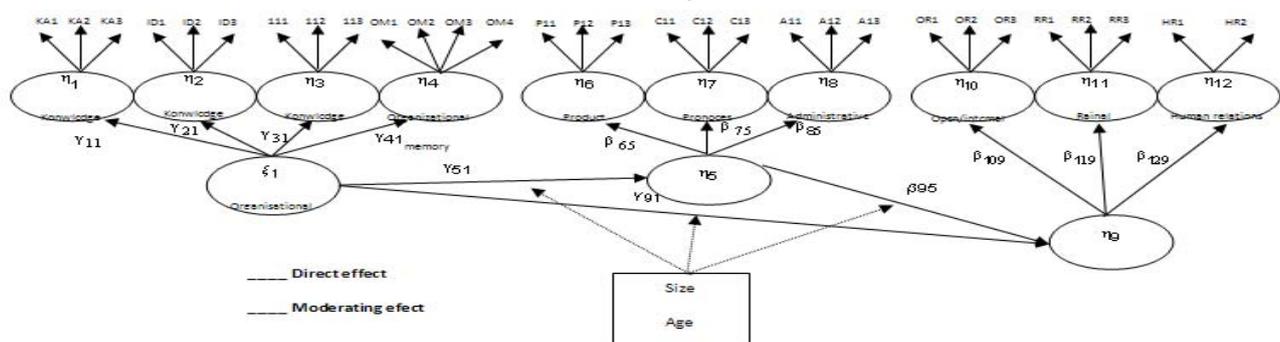


Fig.1. A model of the relations between organizational learning, creativity and operation.

According to the findings, the relationship between creativity and operation is positive for all the groups but this relationship is stronger when firms are bigger, older and belong to manufacturing industry, which is consistent with previous research. However, the relationship is less strong when the firm operates in turbulent environments. In contrast with this, the findings concerning the relationship between organizational learning and operation indicate that this relation is always positive but stronger for smaller and younger firms, services and in high turbulent environments. These results are only partially consistent with the previous literature. Finally, the findings confirm that size, number of employees and managers , industry and environment moderate the relationship between organizational learning and creativity but their moderating effects are not always as expected. In particular, they show that the positive relationship between

organizational learning and creativity is more intense in the group of firms that are smaller, older, operating in environments that are more turbulent and in the service sector.

#### 4. Discussion

The findings of this study provide additional evidence to previous literature that creativity has a positive effect on operation (Bierly and Chakrabarti, 1996; Brown and Eisenhard, 1995; Caves and Ghemawat, 1992; Damanpour and Evan, 1984; Damanpour et al., 1989). Also, the findings show a positive relationship between organizational learning and operation (Baker and Sinkula, 1999; Bontis et al., 2002; Darroch and McNaughton, 2003; Keskin, 2006), and between organizational learning and creativity (Forrester, 2000; Hult et al., 2004; Hurley and Hult, 1998). The findings show that the effect of organizational learning on creativity is stronger than its effect on operation.

Table 7 -Construct structural model.

Link number of employees and managers s in model	Hypothesis		Standardized parameter estimates		
	number	Sign	parameter	estimate	T-value
Creativity → operation Organizational learning → creativity Organizational	H1	+	$\beta$ 95	0.57	5.13***
learning → operation	H2	+	$\gamma$ 51	0.66	8.78***
Second-order construct Organizational learning → acquisition Organizational learning → distribution Organizational learning → interpretation Organizational learning → or. memory	H3	+	$\gamma$ 91	0.26	2.94***
Creativity → product creativity			$\gamma$ 11	0.78	10.27 ***
Creativity → process creativity			$\gamma$ 21	0.88	13.92***
Creativity → administrative creativity			$\gamma$ 31	0.82	14.73 ***
Operation → open/internal results			$\gamma$ 41	0.51	8.56 ***
Operation → rational results			$\beta$ 65	0.77	11.46 ***
Operation → human relations results			$\beta$ 75	0.80	11.95 ***
			$\beta$ 85	0.65	10.94 ***
			$\beta$ 109	0.74	7.72 ***
			$\beta$ 119	0.74	8.52 ***
			$\beta$ 129	0.53	7.62 ***

Fit statistics for the measurement model of 30 indicators for thirteen constructs:  $\chi^2$  (392) = 780.80 ; GFI = 0.90; RMSEA = 0.046; CFI = 0.94; TLI (NNFI) = 0.94.\*\*\* P < 0.01.

Table 8 -Moderating effects of size, number, sector and environmental turbulence.

	Overall R	size			number			sector			Environmental turbulence		
		Low	High	$\chi^2$ difference	Low	High	$\chi^2$ difference	services	industry	$\chi^2$ difference	Low	High	$\chi^2$ difference
Creativity → operation	0.57***	0.42***	0.70***	$\chi^2$ (1) = 1	0.46***	0.75***	$\chi^2$ (1) = 1	0.28**	0.63***	$\chi^2$ (1) = 2	0.56***	0.43***	$\chi^2$ (1) = 15.27*
Organizational learning → operation	0.26***	0.39***	0.18***	$\chi^2$ (1) = 81	0.36***	0.07***	$\chi^2$ (1) = 12	0.48***	0.24**	$\chi^2$ (1) = 18	0.28**	0.38***	$\chi^2$ (1) = 139.41*
Organizational learning → creativity	0.66***	0.69***	0.63***	$\chi^2$ (1) = 17	0.65***	0.74***	$\chi^2$ (1) = 22	0.69***	0.64***	$\chi^2$ (1) = 35	0.73***	0.50***	$\chi^2$ (1) = 182.85
R <sup>2</sup> (creativity)	0.44	0.47	0.39		0.42	0.54		0.47	0.41		0.54	0.25	
R <sup>2</sup> (operation)	0.59	0.55	0.68		0.56	0.65		0.51	0.42		0.62	0.49	

The positive effect of organizational learning on both creativity and operation is greater for smaller firms. Bigger companies usually have more resources to invest in creativity. These results seem to show that number of employees and managers allows the company to develop organizational routines that help them to conduct their activities more efficiently and, therefore, obtain better operation. However, in younger firms, the lack of consolidated routines means that creativity requires more effort from the organizational learning process. The findings show that the positive effect of creativity on operation is lower for the group of firms in highly turbulent environments, but that in this type of environment the positive effect of organizational learning on both creativity and operation is greater. These findings, on the one hand, seem to provide support for those who argue that market turbulence increases the risks of investment in creativity (March, 1991). On the other hand, these results are consistent with the idea of previous literature that firms facing uncertainty and changing environments should promote organizational learning in order to adapt to these changes (Lei et al., 1999; McGill and Slocum, 1993). In summary, the present study contributes to the literature, first, by examining together, in a same model, the links between organizational learning, creativity and operation, and by using broad measures of all of them. Second, this study provides strong support for these links and show that they are significant and positive regardless of firm size, number of employees and managers, industry or environmental turbulence, although these variables influence how intense the relationships between them are. Third, the present study uses a sample of Persian companies, a context in which the empirical literature is especially scant. The findings of this study have implications for practitioners..

## 5. References

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