

Linking inter-organizational learning, innovation and performance in construction industry of Pakistan

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Abstract: The aim of this study is to observe the mediating role of innovation in relationship between Inter-organizational Learning and Performance. In the global competition of today's world, role of innovation has been increased also there is an immense demand of Inter-organizational learning for the performance of the organizations. The objective of this study is to highlight the important variables of the Inter-Organizational Learning in the construction industry. Survey design was adopted and distributed to construction organizations in Pakistan. Data analysis was done through SPSS 20 and Amos 20. The results were very good and all variables shown positive impact on Performance of construction industry of Pakistan.

Key words: *Inter-organizational learning; Innovation; Performance; Construction industry*

1. Introduction

The construction sector of Pakistan still in its learning stage covers a broad range of areas and uses traditional ways of construction (Khan et al., 2016). Construction sector contribute to economic development through job creation and competitive disciplining of markets. Innovation is the foundation of economic development and necessary for growing of construction industry (Fessehaie et al., 2016). Development of organizational learning and innovation are the variables which can enable construction industry to meet the challenges of the global competition. It is the use of new knowledge and investment in the creation as a base of economic transformation. However, innovation is a tough subject of research in management. It is required to be promoted for the betterment of the performance of the construction related organizations (Alaa Josef et al., 2016).

Organizations examine and understand their hard work for their performance. In the global competitive environment, innovation makes the difference, which forces the companies to concentrate on their corporate strategies, particularly on innovations (wang et al., 2016). Organizations must have to manage and develop Inter-Organizational learning process and encourage their partners and employees to share knowledge.

To expand the organizational knowledge assets, international organizations implement inter-organizational learning activities. Most of the organizations assert that inter-organizational learning as a key to achieve performance, core competencies belong to the overall learning of the

organization which can be attained through competencies, grow knowledge assets, marketing and allow collective learning (Abu Bakar et al., 2016).

1.1. Research questions

(a) What is the level of inter-organizational learning and innovation in construction industry of Pakistan in terms of:

- (i) Creation of modern resources.
- (ii) Improvement of existing resources.
- (iii) Promotion of inter-organizational learning and innovative activities.

(b) What are the antecedents of inter-organizational learning?

(c) Can innovation in existing practices increase the performance level of construction industry, through which these organizations can perform better.

1.2. Rationale of the study

In the previous studies, organizational learning was considered as independent variable for the performance of organizations, in this study inter-organizational learning is the focus of the study. This study was conducted to fill the literature gap in construction industry. In some way, from the theoretical perspective, this study would help Pakistani owned construction firms know whether how to increase the performance.

1.3. Significance of the study

The findings of this research will be included in the existing body of knowledge; it will also give a

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knowledge regarding the inter-organizational learning and innovation. This research will:

(a) Create understanding of the significance of an important variable i.e. innovation in construction industry.

(b) Give awareness of the factors that can contribute in the valuable adoption of innovation in construction industry.

(c) Improve the model and theory of innovation and inter-organizational learning in performance of construction industry.

(d) Give a concept and framework of inter-organizational and innovation learning in construction industry of Pakistan.

(e) Find out the problems in the implementation of innovation and inter-organizational learning in construction industry.

2. Literature review

The construction industry is an excessive value-added and extremely progressive industry. Research, progress and technology development in this field is recognized, character companies have no range and depth of capabilities to compete independently in such dynamic and competitive environments (Moran et al., 1993). Accordingly concentration has steadily enthusiastic about how networks of participating organizations can work together to enhance new initiatives. Collaboration among organizations is an essential characteristic for talents switch to take place. The construction enterprises have handiest lately began to reap the advantages associated to such collaborative efforts. To respond to the altering patterns of competition, person corporations of building enterprise are focusing on shut collaborative relationships with their accomplice organizations (Oliveira and Lopes, 2016).

2.1. Construction industry in Pakistan

Pakistani Construction Industry has a vital role in economic and social growth of the country. Development of the this sector has not been given too much importance as per the market demands in contrast to the potential share of Pakistani construction in the global and local economic market (Azhar et al., 2008). The major hurdles in improving the performance of Pakistani construction industry were found to be a lack of innovation and organizational learning (Farooqui et al., 2008). Better training and education is required to boost the development process, and tendency to treat the basis of the problems (Maloney et al., 2016).

2.2. Theory of absorptive capacity

There are many theories explaining the organizational learning, these theories are Interpersonal sensitivity (Hall and Bernieri, 2001), Emotional contagion (Hatfield and Cacioppo, 1994),

Human relation theory (Fiske, 1992), social cognitive theory (Turner, 1985). Absorptive capacity theory (Cohen and Levinthal, 1990) is unique in its elaboration and widely covering the relationship between organizations for innovation and learning. It is an ability of a firm to understand and utilize external resources of an organization for increased performance. Absorptive capacity relates to both intra and inter-organizational learning.

2.3. Concept of inter-organizational learning

Ever-changing environment is alarming the organizations to acclimatize to their shifting atmosphere and to get and maintain competitive advantage to cope with the market demands. Cohen and Levinthal, (1990) explored inter-organizational learning as a company's ability to be familiar with the value of novel, external information, and its application.

Organizations must develop their learning ability to accomplish and maintain competitive advantage and must be able to gain knowledge from their achievements and failures, from outside and from inside (Zhou and Li, 2012). With the help of inter-organizational learning, performance can be enhanced by the exchange of knowledge between organizations.

Importance of inter-organizational learning in studies of business management has continued to increase in recent years. Most of the research focuses on intra-organizational learning. A few studies research addresses inter-organizational learning (Manuj et al., 2014, Mirić et al., 2013, van Winkelen, 2010). Within this framework, inter-organizational learning has been considered vital for the performance of the organizations.

3. Research methodology

3.1. Research gap

Inter-organizational learning has been considered as predictor of performance. Based on literature review and research background I identified the gap that inter-organizational learning practice is not extensively used by construction industry. In Pakistani environment, there is a limited evidence of descriptive study on inter-organizational learning that can contribute in performance of organizations. Many researchers (Chen et al., 2006, Feller et al., 2013, De Martino et al., 2013) suggested in their future studies that there is a need to develop inter-organizational learning framework.

3.2. Problem statement

Inter-organizational learning can influence the performance. Moreover, innovation can play a vital role in increasing the performance of the organization. In Pakistan, organizational learning and innovation is getting popularity in many

organizations but inter-organizational learning in construction industry is not given too much importance even in other Pakistani organizations. Our construction industry can enhance its performance by increasing innovation and inter-organizational learning.

3.3. Research design

Research design is planned structure of the research that specifies the systems the and methods



Fig. 1: Model of the study

3.4. Hypothesis

H1: Inter-organizational Learning has significant impact on Innovation.

H2: Innovation has a significant positive association with Organizational Performance.

H3: Inter-organizational Learning and Performance have a significant positive relationship.

H4: Innovation significantly mediates the relationship between Inter-organizational learning and Performance.

3.5. Sampling design

Sampling is the procedure for selecting a proportion of the population to draw a valid conclusion regarding the population (Zikmund, Babin et al. 2010). For this study, a seven step sampling process was employed (Zikmund, Babin et al. 2010).

3.6. Target population and sample size

The population for this study is every employee of construction industry of Pakistan. A total of 700 survey forms were distributed among them 459 were received 61 forms were rejected and analysis was made on 398 sample size.

4. Results and conclusion

4.1. Cronbach's alpha

Cronbach's alpha or the reliability coefficients of the independent variable (Inter-organizational Learning), mediating variable (Innovation) and dependent variable (Performance) were obtained. The result indicates that the Cronbach's alpha seventeen items of Inter-organizational Learning is .890 whereas 18 items of Innovation shows .936 and 10 items of Performance shows value .915.

for data collection and analysis (Hirst, 2010). (Marzano et al., 1993). It identifies the type of study, sources of information, sampling approaches, dimension problems, methods for collecting data, and knowledge evaluation plans (Marzano et al., 1993). Study design is the strategy and the plan by which the purpose of the study is to be realized. It states the materials and methods which can be used for collection of data, analysis and results of the data (Nouara, 2015).

4.2. CFA

Suitability of the data set to conduct CFA was examined by the KMO index and Bartlett's test of sphericity. Table 5.8 showed that the KMO indices for experience, culture, innovation and business performance were higher than 0.5 as recommended by Hair, Black, and Babin (2010).

Table 1: Communalities

	Initial	Extraction
Innovation	1.000	.837
Performance	1.000	.786
IOL	1.000	.832

Extraction Method: Principal Component Analysis.

4.3. Descriptive statistics: Measuring mean and standard deviation

Descriptive statistics such as standard deviations and means were investigated for independent variable, mediating variable and dependent variables. The results are shown below:

For the five interval-scaled variables, the Pearson correlation matrix is attained. From the results, we find out that Inter-organizational Learning is positively correlated with Innovation and Performance.

$$IOL \text{ leads to Performance}$$

$$C = .809, SE = 0.44$$

Above relationship shows that the initial variable is correlated with the outcome. Performance is the criterion variable in a regression equation and IOL (Inter-Organizational Learning) is a predictor (estimate and test path c).

$$X (IOL) \text{ leads to } M (\text{Innovation})$$

$$a = .725, SE = .035$$

This shows that the initial variable is correlated with the mediator. Use M (Innovation) as the

criterion variable in the regression equation and X (IOL) as a predictor.

Table 2: Statistics

N	IOL			
	Valid	398	INNO	PERF
	Missing	0	0	0
Mean		3.5008	3.4560	3.5236
Median		3.5833	3.5000	3.6000
Mode		3.95	4.44	4.00
Std. Deviation		.71794	.72193	.85235
Skewness		-.417	-.263	.616
Std. Error of Skewness		.122	.122	.122

Table 3: Correlation of Variables

		INNO	PERF	IOL
INNO	Pearson Correlation	1	.767**	.811**
	Sig. (2-tailed)		.000	.000
	N	398	398	398
PERF	Pearson Correlation	.767**	1	.742**
	Sig. (2-tailed)	.000		.000
	N	398	398	398
IOL	Pearson Correlation	.811**	.742**	1
	Sig. (2-tailed)	.000	.000	
	N	398	398	398

Table 4: Regression analysis: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.682 ^a	.465	.463	.62441

a. Predictors: (Constant), IOL

Table 5: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	134.023	1	134.023	343.749	.000 ^b
	Residual	154.395	396	.390		
	Total	288.418	397			

a. Dependent Variable: PERF
b. Predictors: (Constant), IOL

Table 6: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.690	.156		4.426	.000
	IOL	.809	.044	.682	18.540	.000

a. Dependent Variable: PERF

Table 7: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721 ^a	.520	.519	.50082

a. Predictors: (Constant), IOL

Table 8: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	107.583	1	107.583	428.924	.000 ^b
	Residual	99.325	396	.251		
	Total	206.909	397			

a. Dependent Variable: INNO
b. Predictors: (Constant), IOL

Table 9: Coefficients^a

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.918	.125		7.335	.000
	IOL	.725	.035	.721	20.710	.000

a. Dependent Variable: INNO

Table 10: Descriptive statistics

	Mean	Std. Deviation	N
PERF	3.5236	.85235	398
IOL	3.5008	.71794	398
INNO	3.4560	.72193	398

Table 11: Correlations

Pearson Correlation		PERF	IOL	INNO
	PERF	1.000	.682	.767
	IOL	.682	1.000	.721
	INNO	.767	.721	1.000

Table 12: R Square change

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Change	Change Statistics			
						df1	df2	Sig. F Change	
1	.682 ^a	.465	.463	.62441	465	343.749	1	396	.000
2	.789 ^b	.622	.620	.52522	158	164.688	1	395	.000

a. Predictors: (Constant), IOL

b. Predictors: (Constant), IOL, INNO

Table 13: ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	134.023	1	134.023	343.749	.000 ^b
	Residual	154.395	396	.390		
	Total	288.418	397			
2	Regression	179.454	2	89.727	325.264	.000 ^c
	Residual	108.964	395	.276		
	Total	288.418	397			

a. Dependent Variable: PERF

b. Predictors: (Constant), IOL

c. Predictors: (Constant), IOL, INNO

Table 14: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.690	.156		4.426	.000
	IOL	.809	.044	.682	18.540	.000
2	(Constant)	.070	.140		.499	.618
	IOL	.319	.053	.269	6.018	.000
	INNO	.676	.053	.573	12.833	.000

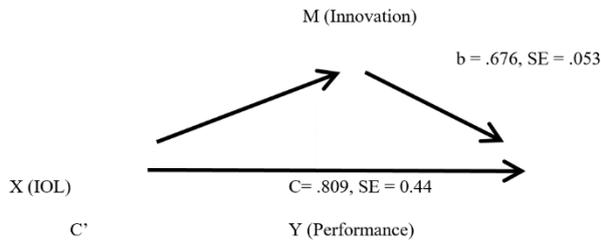
a. Dependent Variable: PERF

Table 14: Excluded Variables^a

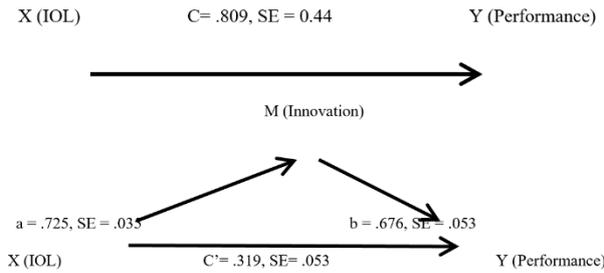
Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics	
					Tolerance	
1	INNO	.573 ^b	12.833	.000	.542	.480

a. Dependent Variable: PERF

b. Predictors in the Model: (Constant), IOL



Above figure shows the mediator affects the outcome variable. We used Y (Performance) as the dependent variable and X (IOL) and M (Innovation) as predictor variables (test and estimate path b). We correlated the mediator with the dependent;



Now we do the Sobel test. Sobel tests whether c - c' is significantly different from zero. It does so using paths a and b,

because $a*b = c - c'$
 $a*b = .725*.676 = .490$
 $c - c' = .809 - .319 = .490$
 $z\text{-value} = a*b / (b^2*sa^2 + a^2*sb^2)$ Baron, R. M., & Kenny, D. A. (1986).
 Result of sobel test z-value= 10.86091356

Z-value found by Sobel Test is more than 1.96 or less than -1.96, the null hypothesis is rejected and the mediating effect is evaluated as statistically significant.

Table 15: Sobel test

Variables	Relationship with	Nature of Relationship	Significance
Inter-Organizational Learning	Innovation	Positive	Significant
Inter-Organizational Learning	Performance	Positive	Significant
Innovation	Networks	Positive	Significant
Networks	Performance	Positive	Significant
Innovation	Performance	Positive	Significant
Networks	Innovation	Positive	Significant

5. Results

From the Correlation table, we conclude that our independent variables i.e. Inter-Organizational Learning and Innovation are positively correlated with the dependent variable i.e.; Performance All hypothesis have been accepted.

5.1. Accepted hypothesis

H1: Inter-organizational Learning has significant impact on Innovation.

H2: Innovation has a significant positive association with Organizational Performance.

H3: Inter-organizational Learning and Organizational Performance have a significant positive relationship.

H4: Innovation significantly mediates the relationship between Inter-organizational learning and Organizational Performance.

6. Conclusion

This paper aimed at the subject of Inter-Organizational Learning through Innovation and their effect on Performance. We surveyed construction industry employees whether how Inter-Organizational learning and Innovation increases the performance of the organization. The results revealed that Inter-Organizational Learning and Innovation has a positive effect on the performance of the construction industry of Pakistan. The entire hypothesis were accepted and both the independent and mediating variables shown a strong effect on Performance. Inter-Organization learning is considered to provide diverse opportunities for individual learning and development in an environment where individuals and groups work together in Inter-Organizational domain. Empirical evidence of the current study has supported the previous research and further validated these relationships. This means that though in construction industry there do exist some seek of learning which can be met through Inter-Organizational learning process for innovation as well as performance of the organization.

6.1. Future work

The model described in this article is exploratory and the empirical data base is still small. This situation is not unusual in an early stage of a model's life and should stimulate further research. This was not a funded project, due to limited resources; research is conducted with a small sample. In future same research may produce different result from large sample. Results are limited to Pakistan, so different results can be obtained in different countries.

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