

## Studying the influence of learning capability on knowledge acquisition

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**Abstract.** In management literature there are lots of articles that study the role of organizational learning in knowledge management. However the majority of them focus on types of learning styles that the source of knowledge is internal and the subject of learning is an exploration. In this paper, the influence of learning capability on knowledge acquisition in situations where the source of knowledge is external and the subject of learning is imitation-based is analyzed. To achieve this aim, using multi case study methodology, several large Iranian Oil & Gas projects that have succeeded or failed in knowledge acquisition are studied. Through this research we find that in imitation based situation, three latent variables such as management commitment, openness, and knowledge sharing, form the required learning capability. Furthermore, we find that while the purpose of learning is imitation based, single loop learning dominates the learning process.

**Keywords:** organizational learning, knowledge transfer, knowledge acquisition, learning capability

### 1. Introduction

In 1963 Richard Cyert and James March [1] coupled together the two words of “Learning” and “Organization”. For the first time the phenomenon of “organizational learning” was being introduced in management literature, thus generating massive research in this field. The majority of these researches have focused on developing the concept of organizational learning [2-4], and learning organization [5-8], while the remaining researches have dealt with the use of learning concept in different management related aspects. Studying the role of organizational learning in organizational change and innovation [9], company's performance and productivity [10, 11], and knowledge transfer [12] are a few of many examples. In spite of them, the analysis of the effect of organizational learning on different organizational aspects is still making a considerable contribution to this field.

The present research is an attempt to study the influence of organizational learning on knowledge acquisition. To achieve this aim, through an in-depth multi-case study, several large Oil & Gas Iranian projects that have succeeded or failed in knowledge acquisition are studied. The thing that distinguishes this research from previous ones is the study of learning capability on knowledge acquisition in situations where the source of knowledge is external and the purpose of learning is imitation based.

### 2. Research background

#### 2.1. learning style

There are various ways of thinking about learning in organizations [10]. Yeung, [13] based on the incorporation of the dimensions of direct experience vs. experience of others and exploration vs. Exploitation, empirically identifies a typology of four basic learning styles: experimentation, competency acquisition, benchmarking, and continuous improvement as shown in Fig. 1.

As, the basic sources (direct experience and the experience of others) and the basic purposes (exploring new territory or existing opportunity) of each learning style is different, the companies need to develop

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distinctive types of learning capability for each quadrant. Furthermore, most of the researches in organizational learning have been dedicated to innovative pioneering processes, while much less attention has been paid to imitation learning [14].

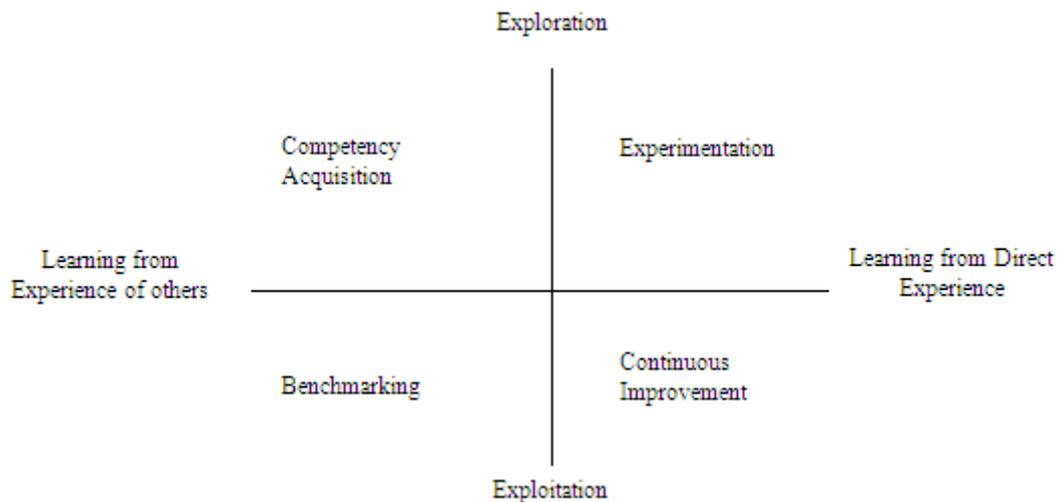


Fig. 1: Typology of Organizational Learning Types [13, 36]

## 2.2. Learning capability

Although many authors on organizational learning have shown implicitly the importance of learning capability, it is yet difficult to find an explicit definition of the concept [10]. Senge [8, 45] defines learning capabilities as skills and proficiencies that enables people to consistently enhance their capacity to produce results that are important to them. In a similar way, Argyris [3] defines double loop learning, for learning how to learn. Dave [14] asserts, learning capability represents the capacity of managers within an organization to generate and generalize ideas with impact. Yeung [13, 13] depicts learning capability as a company's ability to (1) generate ideas (2) generalize those ideas, and (3) identify learning disability.

## 2.3. Dimensions of Learning capability

There is an agreement that learning capability is a multidimensional construct [16]. According to Goh [17,18] learning capability has five dimensions such as (1) clarifying vision and objectives, (2) management commitment and empowerment (3) experimentation (4) knowledge transfer (5) team working and problem solving. Gomez [16] measures learning capability via four dimensions: (1) managerial commitment (2) systems perspective (3) openness and experimentation, and (4) knowledge transfer and integration. Chiva [19] develops a five dimensional model for measuring organizational learning capability. He claims organizational learning capability can be measured by (1) experiment (2) ability to take risk (3) interaction with environment (4) dialogue (5) participatory decision making. A summary of dimensions of learning capability studied by several authors is illustrated in Table 1.

## 3. Methodology

A multi-case study methodology was used for the empirical analysis. A thorough literature review guided the design of the questionnaire. A pre-test was carried out through several personal interviews with project managers to validate the questionnaire.

The questionnaire was sent to a sample of 263 people involving five large Iranian projects in Oil & Gas industry. Our sample consists of a variety of projects in different phases of exploration, development and production. Each project was handled by cooperation of a number of international companies and NIOC<sup>1</sup> through Joint venture, Buy back, and Service contractor. The international companies involved in each project were responsible for providing required knowledge in areas of basic and detailed design, project management, and consulting. On the other hand, NICO was responsible for execution. After finishing the

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project, all the technical and managerial documents that were provided during the project, were consolidated and delivered to owner.

Table 1: Dimensions of learning capabilities

	Akgun [20]	Phan [21]	Perito [10]	Loopez [22]	Chiva [19]	Gomez [16]	Calantone [23]	Hult [26]	Goh [17, 18]
Management commitment	*				*	*			*
Shared vision							*		
Clarifying vision & objective									*
Knowledge storage			*						
Commit to learn		*					*		
Learning Flow		*						*	
Knowledge interpretation				*					
Openness & experiment	*	*			*	*	*		*
System perspective	*					*		*	
Team working								*	*
Conversation					*				
Reward system		*							
Taking risk					*				
Knowledge transfer	*			*		*			*
Knowledge sharing	*	*				*	*		
Knowledge exploration		*							
Environment interaction					*				
Organizational memory				*				*	

The measurement of the analysis variables were built on a multiple-items method. Each item was based on a five point Likert scale.

Learning capability has been measured as a multidimensional construct. The construct is built upon Gomez's [16] four dimensions model and incorporated with the factors reviewed in Table 1. The four items of management commitment, system perspective, openness and experiment, and knowledge sharing and transfer are treated as indicators of the learning capability. For each dimension a series of sub items are defined and included in the questionnaire.

Acquired Knowledge has been measured through eight indicators: (1) basic and detailed design, (2) project management, (3) procurement and storage, (4) HSE, (5) processes, (6) standards, (7) commissioning, and (8) maintenance. The participants were questioned as to whether the knowledge of each field is learnt and institutionalized by NICO at the conclusion of each project.

#### 4. Research analysis and results

The proposed latent variable model with all structural paths is illustrated in fig 2. Using LISREL 8.51, we performed a confirmatory factor analysis (CFA) to determine the validity of the construct. Because of the complexity of model, we conduct three separate CFA: one for Learning capability dimensions, one for acquired knowledge and one CFA for the full model. The statistical significance of each factor loading was assessed by its t-value. Furthermore, a series of goodness-of-fitness test ( $\lambda^2$ , GFI, AGFI, RMSR) were

performed to evaluate model fitness. Based on these tests and theoretical lens, the inappropriate items were discarded and a new re-specified model with acceptable fitness indices was developed.

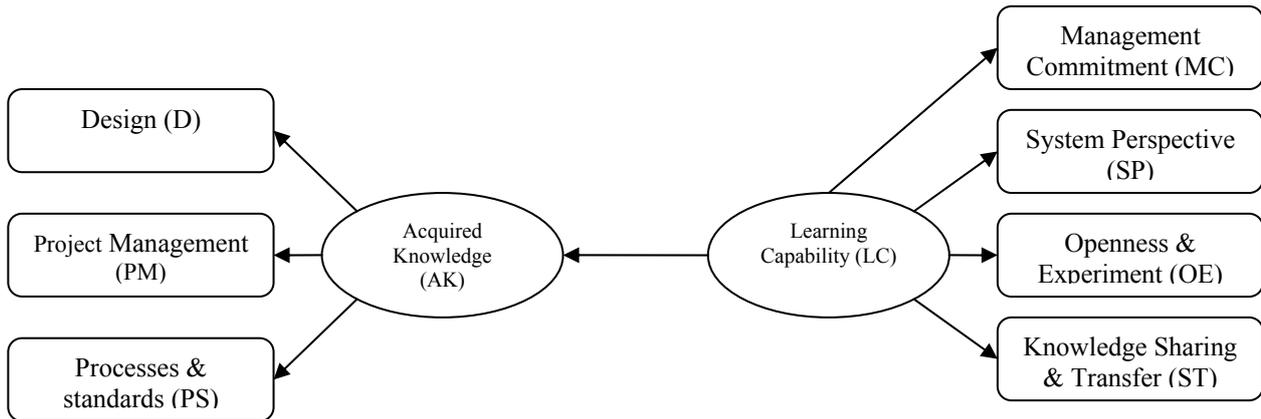


Fig 2: Structure model of learning capability and knowledge acquired in NIOC

The pattern and structural loading indicate that the "management commitment", "openness and experiment", and "knowledge sharing and transfer", respectively have the highest effect on learning capability, as Gomez [16] claims in his research. Moreover among the items that constitute management commitment, "reward system" is loaded more than others. In a similar way, "free dialogue climate" has the higher impact on "openness and experiment". "Knowledge sharing & transfer" is affected greatly by "teamwork". On the other hand, the pattern loadings indicates that the acquired knowledge in NIOC's projects consist of three dimensions of "design", "project management" and "Processes & standards" respectively.

The coefficient for the path from learning capability to acquired knowledge is at the significant level of .05. Moreover, analysing the coefficients from leaning capability's dimensions to "acquired knowledge" leads us to the following conclusions:

First, the result of analysis emphasizes the importance of "management commitment" in knowledge acquisition for "Process & standards", and "Project Management" respectively. Additionally, among the measures which constitute "management commitment", three measures such as "highlighting organizational achievement for employees", "shared vision", and "management commitment for training", greatly influence knowledge acquisition.

Second, "openness and experiment" is the next factor that significantly influences all areas of acquired knowledge. Similarly, "providing an atmosphere of free dialogue and discussion", and "considering the ideas provided by external sources as a useful thing for learning" have the most important role. However, the item of "experimentation of new idea as a way of improving" which is related to generative learning is not significantly meaningful.

Third, the results of path analysis emphasize the role of "standardization" and "document management system" for acquiring knowledge of design.

Forth, among those dimensions that constitute "system thinking", the ones which help people to enhance their capabilities for innovation and creative learning are not meaningful for all three dimensions of acquired knowledge. Therefore, it is concluded that double loop learning which dealt with creativity and innovation is less applicable for the style of benchmarking.

## 5. Conclusion

The results of this research leads us to conclude that in situations, where the source of knowledge is external and the purpose of learning is imitation based, single loop learning [3] dominates the learning process. As the double loop learning is the guiding idea of many organizational learning tools like learning organization, it is essential that current organizational learning tools and disciplines are properly modified for this situation.

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