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Facilitators of organizational learning in design

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Abstract

Purpose – The purpose of this paper is to determine the influence of organizational factors such as leadership commitment, incentives and interaction on learning outcomes defined as performance improvement and organizational climate.

Design/methodology/approach – Different aspects of knowledge acquisition, sharing and utilization were examined, related to outcomes. Design professionals in Vietnam construction firms were surveyed. The sample was 339 designers.

Findings – The impact of leadership commitment was significantly related to both performance and organizational climate. Incentives were only positively correlated with performance and staff interaction was only positive with organizational climate. The paper is supportive of many conceptual studies in the literature. The results show that each of these factors has a different role and impact on the organizational learning process and outcome.

Research limitations/implications – The limitations of this study are that the sample comes from only one industry in a developing country, and it uses an attitudinal survey. Replications of this analysis in other research contexts, industries, countries and organizational characteristics would enhance the generalizability of the findings.

Practical implications – From the practical perspective managers who would like to facilitate learning in the organization, improve performance and promote a better organizational climate should demonstrate their commitment to learning, provide incentives to use that learning and use a more collaborative approach.

Originality/value – This study provides empirical evidence for the importance of leadership commitment, incentives and staff interaction on the process and outcome of organizational learning.

Keywords Learning organizations, Organizational culture, Organizational performance, Construction industry, Leadership, Vietnam

Paper type Research paper

Introduction

In recent years, an emerging area of theory and practice has become identified as the "knowledge-based view of the firm" (Kale *et al.*, 2000; Grant, 1996; Nonaka, 1994; Kogut and Zander, 1992). Organizational knowledge is a resource that is critical for any firm to be successful. It is essential to a firm's ability to innovate and compete (Bollinger and Smith, 2001). A firm's knowledge should be identified as a strategic asset and managed in such a way that it contributes to the firm's performance and competitive position. Knowledge management includes a variety of activities for acquisition, organization, dissemination and exploitation of knowledge to create added value to the firm (Gupta and Lalatendu, 2000). To develop added value, organizational learning is necessary. In essence, organizational learning encompasses individual learning but not exclusively.

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Indeed, learning is a complex process, which can be viewed from different perspectives (Dodgson, 1993; Easterby-Smith, 1997).

The literature on this topic has grown rapidly over the past few years. However, most contributions focus on the conceptual level to describe the impact of learning organizations (Easterby-Smith and Araujo, 1999). From the management view, a number of studies have attempted to identify factors that facilitate the organizational learning outcomes in a variety of organizations (Appelbaum and Reichart, 1998; Teare, 1998; Solingen *et al.*, 2000; Stonehouse *et al.*, 2001). However, the majority of these studies either employed a normative perspective or are based on a qualitative approach. A comprehensive review of organizational learning indicated that there was limited empirical research on organizational learning, especially using a large sample survey (Easterby-Smith and Araujo, 1999).

This study assesses the organizational characteristics which facilitate the organizational learning process and how they affect learning outcomes. It employs a quantitative approach with a survey of 339 designers in construction and design firms in Vietnam.

This paper provides a brief review of the core concept of organizational learning. It identifies the organizational characteristics are potential learning facilitators. Hypotheses are specified to test the relationship between these facilitators, the learning process and learning outcomes. Hierarchical multiple regression analysis is employed to test the proposed hypotheses. A discussion of the empirical results is presented and managerial implications are considered.

Organizational learning

Organizational learning has been a significant area of study:

> All organizations learn, whether they consciously choose to or not – it is a fundamental requirement for their sustained existence. Some firms deliberately advance organizational learning, developing capabilities that are consistent with their objectives; others make no focused effort and, therefore, acquire habits that are counter-productive (Kim, 1993, p. 37).

This study adopts the definition provided by Probst and Buchel (1997): Organizational learning is "a process by which the organizations' knowledge and value base changes, leading to its improved problem solving ability and capacity for action". From this definition, there are two issues that need to be elaborated further. These are individual versus collective learning and the organizational learning process versus learning outcomes.

Individual learning versus collective learning

Organizational learning can be viewed as a metaphor derived from the understanding of individual learning. In fact, according to Kim (1993), organizational learning is ultimately derived from individual members. Theories of individual learning are crucial for understanding organizational learning. Organizational learning is more complex and dynamic than a mere magnification of individual learning. The level of complexity increases from a single individual to a large collection of diverse individuals. Although the meaning of the term "learning" remains essentially the same, the learning process is qualitatively different at the organizational level.

Learning occurs when knowledge is processed and a range of potential behaviors changed (Huber, 1991). Organizational learning is learning that occurs as knowledge is transformed from an individual to a collective level (Spender, 1996). Knowledge which is generated through double-loop learning supports a firm's ability to understand the consequences of past actions, respond to new environmental stimuli, and establish new mental models that override the existing ones (Argyris and Schön, 1978).

Solingen *et al.* (2000) argues that organizational learning encompasses different levels, such as, individual learning, team learning and organizational learning. In individual learning, each person takes responsibility for learning. In team learning, teams and work groups utilize the capability of each member for the benefit of all. Teams learn to share a common approach, supporting each other in individual learning objectives, and cooperating with other teams in the learning process. Individual learning becomes organizational learning when new knowledge is transferred across unit boundaries to others in the organization that can benefit from what has been learned (Hamel, 1991). Mills and Friesen (1992) point out that an organization learns through its members. People may be hired because of a specific competence and knowledge, which may be gained on the job or received in formal training. Learning is an individual phenomenon, which benefits the organization entirely through the individual. Individuals learn, if the individual doesn't use the knowledge or leaves the firm, then there is no impact. The organization, has learned nothing. Organizational learning needs to be systematized into practices and processes.

Because organizational learning is more than the sum of the learning of its individual members, this approach encompasses collective learning, including knowledge acquisition, sharing and utilization of both individually held and commonly shared knowledge. Both types contribute to learning outcomes.

The organizational learning process versus outcome

Organizational learning can be viewed as a cognitive process or as a result. When organizational learning is treated as a process, more attention is given to its dynamics, than whether learning results in positively valued outcomes. Nevis *et al.* (1995) proposed a three-stage model of a learning process which includes knowledge acquisition, knowledge sharing, and knowledge utilization. Knowledge acquisition is the development or creation of skills, insights, relationships. Knowledge sharing is the dissemination of what has been learned. Knowledge utilization is the integration of learning so it is broadly available and can be generalized to new situations. Knowledge and skill development takes place not only in the acquisition stage, but also in the sharing and utilization stages.

Organizational learning as a result, emphasizes performance improvement. Organizational learning is directed towards creating "useful" knowledge for the organization. Various proponents of the "learning organization", such as, Garvin (1993), and Senge (1990), also positively value learning. A learning organization enables its members to create positively valued outcomes, such as innovation, efficiency, and competitive advantage.

This study identifies the key organizational learning facilitators. It emphasizes the outcome perspective of organizational learning. This research also considers the process approach emphasizing acquisition sharing and utilization. Two important learning outcomes are assessed. One is instrumental and the other is conceptual.

Instrumental outcomes are defined by changes in the organization, products, services or processes. They may also be related to individual results related to problem solving or improved performance. Such outcomes are specific, tangible and quantitative results of the organizational learning process.

Conceptual outcomes reflect changes in the individuals positive perception of the work environment. They are a result of the interactions between individuals and the organizational learning process. Such changes may enhance individual self-esteem, improve communication, and increase performance. Conceptual outcomes are usually less tangible and less immediate (Preskill and Torres, 1999).

Organizational characteristics and organizational learning

Related to organizational characteristics, three factors are considered:

(1) leadership commitment;

(2) incentives system; and

(3) staff interaction in the workplace.

These factors are frequently mentioned in the literature (Stonehouse *et al.*, 2001; Solingen *et al.*, 2000) The organizational learning process includes three components, knowledge acquisition, knowledge sharing, and knowledge utilization. Learning outcomes are represented by two dimensions, performance improvement (an instrumental outcome) and organizational climate (a conceptual outcome).

Leadership commitment

Leadership commitment indicates the attitudes of a firm's leaders in supporting learning. The leader's role is to develop a shared vision, provide the resources needed, delegate authority, and celebrate learning successes (Senge, 1990). For successful learning, Appelbaumn and Reichards (1998) stress that leadership has a profound impact on the organization. Leaders who recognize knowledge as a critical resource have a positive attitude towards organizational learning (Stonehouse *et al.*, 2001). In reality, this attitude is manifested by the leader's commitment and practices to promote knowledge and learning.

Mills and Friesen (1992) point out that committed leaders would employ people who possess new and beneficial knowledge to the firm and are capable of knowledge sharing. Commitment involves fostering learning from both internal and external sources of knowledge. Leaders establish a learning culture including values such as courage, risk taking, empowerment, collaboration, listening, feedback, opportunities, and performance (Teare, 1998). This view is enforced by Nevis *et al.* (1995) who consider the link between organizational learning facilitators and learning orientations in which leadership commitment is at the heart of organizational learning activities. Leadership commitment has a strong impact on the process of organizational learning. This leads to the first hypothesis:

H1a. The greater the leadership commitment, the higher the performance improvement.

H1b. The greater the leadership commitment, the more positive the organizational climate.

The incentives system

The incentives system of a firm influences how its employees learn. A system, which rewards innovation and knowledge contribution encourages more learning. Firms in which employee performance is evaluated mainly based on results allows more freedom to learn new techniques. Utilizing new methods is often associated with reward. If this leads to positive performance evaluation, and rewards employees will learn more, if not no learning occurs in the organization. This relationship is considered in the second hypothesis

H2a. The more incentives to support learning, the higher the performance improvement.

H2b. The more incentives to support learning, the more positive the organizational culture.

Staff interaction

Learning is related to the socio-technical aspects of the organization. The emphasis is on the collaboration of the employees. If work is more collaborative, learning is achieved through the interaction of work groups and greater communication. This arrangement enables individuals and teams to generate and share relevant knowledge in the workplace (Stonehouse *et al.*, 2001). An organization that encourages people to communicate easily and openly will provide sufficient interaction to solve problems and share knowledge (Solingen *et al.*, 2000; Appelbaumn and Reichards, 1998). The essence of a team-based organization is the coordination of individual specialists. Managers cannot effectively coordinate if the requisite specialist knowledge is not shared (Grant, 1996, p. 118). By working in teams, knowledge can be shared among members. There is also a better understanding of counterparts, their needs and how they work in different parts of the organization, encourages better knowledge transfer (Senge, 1990; Garvin, 1993). The collaborative process and team development provide a good foundation for new knowledge acquisition and sharing. The third hypothesis examines this relationship:

H3a. The greater the staff interaction, the higher the performance improvement.

H3b. The greater the staff interaction, the more positive the organizational climate.

Organizational learning process and outcomes

Organizational learning is directed towards creating "useful" knowledge for the organization to achieve organizational goals such as productivity or innovation through shared experience and reflection on practice (Easterby-Smith, 1997). The organizational learning process, includes knowledge acquisition, sharing and utilization. Knowledge acquisition or sharing doesn't directly lead to a measurable result, i.e. performance improvement. Organizational knowledge is only available for other individuals to acquire and utilize. Tangible outcomes can only be realized through knowledge utilization. A supportive organizational climate facilitates the process of learning. Climate refers to a member's perceptions about the extent to which the organization is satisfying to work in (Deshpande and Webster, 1989). In fact, organizational learning and organizational climate are very much related (Nevis *et al.*,

1995). The link between the learning process and outcomes are assessed in the following hypotheses:

H4a. The higher the emphasis on knowledge acquisition, the greater the performance improvement.

H4b. The higher the emphasis on knowledge acquisition, the more positive the organizational climate.

H5a. The higher the emphasis on knowledge sharing, the greater the performance improvement.

H5b. The higher the emphasis on knowledge sharing, the more positive the organizational climate.

H6a. The more emphasis on knowledge utilization, the greater the performance improvement

H6b. The more emphasis on knowledge utilization, the more positive the organizational climate.

Research design

Measurement of the constructs

In order to examine the effects of organizational characteristics on learning, data was collected from designers in construction and related firms in Vietnam. Engineering design in construction was selected because it is a knowledge-intensive industry. It includes both routine and non-routine engineering activities that are project-based. This knowledge resides mostly in the design professionals who have the opportunity and advantage of sharing and utilizing new knowledge. Members can develop specified knowledge, and shared knowledge from different experienced professionals in designing projects (Grant, 1996; Zander and Kogut, 1996).

Because there is limited empirical research in organizational learning, measurement is a difficulty. The following measures were constructed based on operational definitions developed from the literature review.

Measuring organizational characteristics

Three constructs were used as indicators of organizational characteristics: leadership commitment, an incentive system, and staff interaction. The measurement of leadership commitment identifies the extent to which a firm's leaders emphasize the value of knowledge and are committed to knowledge management in the firm. Commitment includes a company vision that emphasizes learning and knowledge development, resources to support learning, active involvement in educational programmes, and rewarding successful learning (Senge, 1990; Appelbaum and Reichart, 1998).

An incentive system includes the rewards the firm provides to its members for innovation, learning and knowledge related activities. It identifies the extent to which a firm's reward policy is based on the learning process, not only outcomes. These indicators are also based on previous studies (Goh and Richards, 1997; Senge, 1990; and Slocum *et al.*, 1994).

Interaction emphasizes the extent and ease of communication, problem solving in the workplace, accessibility of information, and the level of cooperation and team-work among members (Stonehouse *et al.*, 2001; Solingen *et al.*, 2000).

Measuring the organizational learning process

The organizational learning process is measured by determining how learning activities occur within the firm. This includes three phases: knowledge acquisition, knowledge sharing, and knowledge utilization.

Knowledge acquisition is measured by how much new knowledge has been created or acquired by individuals in the firm, how much the staff have improved their professional knowledge, how often they reflect on their work, and learn from experience.

Knowledge sharing is assessed by how quickly a new skill or knowledge can be disseminated throughout the firm, how much and often knowledge is shared among the professionals, and how much the staff learns from this exchange.

Knowledge utilization considers how much professional staff try new approaches in their jobs, and how often they change their design methods or work process.

Measuring the learning outcomes

Learning outcomes are assessed by two constructs: performance improvement, and organizational climate. Performance improvement is measured by timesaving, cost reduction, individual and firm performance, and the level of innovation in the process. Organizational climate is measured by assessing the openness of communication within the firm, the positive attitudes of professionals to change, self-development and satisfaction with the work environment.

Methodology

The questionnaire consisted of 60 statements. The respondents were design professionals working in construction companies or design institutes. They were asked to rate the extent to of agreement with each statement based on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). Respondents were given the survey in Vietnamese developed through an extensive process of translation and back translation using professionals fluent in both English and Vietnamese.

The administration of the questionnaire was through two channels. First, a mail survey was sent to 1,200 construction firms and related institutes based on a business directory in Vietnam. A total of 129 responses were received. The effective response rate was about 10 percent. At the same time, questionnaires were directly sent to designers with a letter of support from the Ho Chi Minh City Government's Construction Department. This increased the number of respondents to 339.

Sample characteristics

The respondents worked in a wide range of design related firms. State-owned companies accounted for 54.6 percent (185), and the rest (45.4 percent or 154) included private, joint-stock and joint venture companies. Another feature of interest is the company's size. Company size is determined by the number of professional staff, number of design projects per year, and the size of a typical project in US dollars. The sample includes relatively small to medium companies. A company with more than

250-500 employees is defined as medium – 66 percent were medium size companies. A total of 77 percent of the companies had a design staff less than 30. The number of projects per year ranged from 2 to 320 projects, 52 percent were involved 10 to 40 projects. Project size ranged $600,000 to $60 million (49.6 percent) to over $120 million (30.1 percent). These characteristics will be considered further in the data analysis.

Factor analysis with a promax rotation was used to determine the key dimensions of the 60 variables in the survey. Promax is used because it is more stringent rotation approach and makes it easier to determine which factor loadings are statistically significant. The purpose of this was to verify the factors for further analysis. From This analysis 39 variables remained. These are the most specific and relevant indicators, process and outcomes. Hierarchical regression analysis was then used to assess the relationships of the organizational characteristics, and learning process with the dependent variables consisting of two learning outcomes. To test the influence of background characteristics, ownership, company size, project size, number of staff, and number of projects were included in the analysis. Performance is evaluated by the number of initiated time saved and increased productivity. Organizational climate measures the emphasis on continuous development, open communication and high commitment to work. Leadership is indicated by an appreciation of learning, vision and is actively involved in learning.

The second key factor is staff interaction including communication and cooperation to promote learning. Knowledge utilization relates to the application of new approaches and changes in operation. Knowledge sharing considers the ease and frequency of joint use. Acquisition includes trying new approaches based on self-reflection and the recognition of the value of the new learning.

Results and discussion

The results of factor analysis suggested an eight-factor structure. Items with loadings less than 0.5 were deleted. These eight factors (39 items) accounted for 61 percent of the total variance. Table I presents the factor loadings of the eight factors. Conceptually, for learning outcomes, performance improvement (factor 1) and organizational climate (factor 5) were identified. For the learning process, knowledge acquisition (factor 7), knowledge sharing (factor 6) and knowledge utilization (factor 3) were specified. Facilitators of organizational learning included leadership (factor 4), incentives (factor 8) and staff interaction (factor 2). The reliability coefficient estimates (Cronbach's alpha) of these factors ranged from 0.78 to 0.94 and their respective eigenvalues ranged from 19.70 to 1.40. This indicates an appropriate quality of measurement.

As shown in Table I, each factor comprises items which load highly (>0.50) with it, and each item loads highly on only one factor. These items are considered to be relevant indicators of their respective latent constructs.

Further examination of the correlation matrix (Table II) shows that there are significant linear associations among factors representing the independent variables such as leadership, incentive, interaction and performance.

Multiple regression was used in a hierarchical process in which three models were tested. In models (1a, 2a, 3a), the dependent variable is performance improvement. In models (1b, 2b, 3b), the dependent variable is organizational climate. In this analysis, each factor is defined as a new variable (a summated average score of all items within the factor). The results of this analysis are presented in Table III.

Table I. Results of the factor analysis

Items	Factor loadings							
	1	2	3	4	5	6	7	8
Factor 1: performance improvement								
Extensive innovation in design	0.992							
Extensive innovation in management	0.982							
Significant improvement in process	0.942							
Significant change in method	0.921							
Improve quality of performance	0.909							
Increase productivity	0.744							
Save costs	0.695							
Save time	0.522							
Get new project	0.512							
Factor 2: Interaction								
Good personal interaction		0.901						
Good cooperation		0.835						
Easy communication		0.796						
Easy access to information		0.783						
Problems sharing		0.675						
Factor 3: Knowledge Utilization								
Change methods			0.907					
Try new way			0.845					
Change procedures			0.737					
Apply new knowledge			0.721					
Factor 4: Leadership								
Personnel in charge				0.815				
Company's vision				0.760				
Leader involved				0.651				
Appreciate successful learning				0.651				
Factor 5: Organizational Climate								
Positive attitude to change					0.811			
Climate of open communication					0.740			
Continuous self-development					0.656			
Satisfied work environment					0.622			

(*continued*)

Items	Factor loadings							
	1	2	3	4	5	6	7	8
Commitment to complete work together					0.584			
Factor 6: Knowledge Sharing								
Learn from each other						0.848		
Exchange knowledge						0.802		
Knowledge sharing easily						0.778		
Knowledge sharing frequently						0.713		
Factor 7: Knowledge Acquisition								
Improve knowledge							0.726	
Develop new knowledge							0.659	
Self-reflect							0.638	
Improve competence							0.602	
Learn new knowledge							0.583	
Factor 8: Incentives								
Encourage to share experience								0.917
Incentives for innovation								0.897
Incentives for learning								0.712
Cronbach alpha	0.941	0.923	0.881	0.784	0.865	0.885	0.872	0.894
Eigenvalues	190.7	50.10	20.72	20.32	20.04	10.88	10.46	10.40

Table I.

In model 1 (a, b), the relationship between organizational learning process (i.e. knowledge acquisition, sharing and utilization) as independent variables and organizational learning outcomes (i.e. performance improvement and organizational climate) as dependent variables is considered. The results show that knowledge acquisition and knowledge utilization have significant impacts on both performance improvement and organizational climate. Moreover, knowledge sharing has a significant impact on organizational climate (model 1b), but not on performance improvement (model 1a). Overall, models 1a and 1b explain 35 percent of performance improvement and 38 percent of organizational climate.

In model 2, the organizational characteristics (i.e. leadership commitment, incentives system and staff interaction) were included in the analysis. The results in model 2a show that leadership and incentives also have a significant impact on the improvement of performance. In model 2b, where organizational climate is the dependent variable, the results show that acquisition, sharing, leadership, and staff interaction have a significant impact on the organizational climate. The variance explained increases to 42 percent of performance improvement and 45 percent of organizational climate.

In model 3, for exploratory purposes moderating variables were added as independent variables. They include ownership of the firm (a dummy variable with ownership = 1 for state-owned company and 0 for others); number of staff; company size; project size and number of projects. The results in model 3a show that in addition to knowledge acquisition, knowledge utilization, leadership and incentives, project size has a significant impact on performance improvement. The results in model 3b indicated that staff interaction is insignificant but company size, number of projects and ownership improve performance.

Model 3b also shows that private ownership and more committed leadership would lead to a better organizational climate. Both models 3a and 3b improved the outcomes of performance improvement (48 percent) and organizational climate (55 percent).

Comparing the models related to performance improvement (1a, 2a, 3a), knowledge acquisition and utilization consistently have a significant impact on the learning outcome. Leadership and incentives also have a significant direct impact on performance improvement. This suggests that these two characteristics may have an impact on organizational performance through the motivation process, not just through the learning process.

Considering the models related to organizational climate (1b, 2b, 3b) acquisition and sharing knowledge are significantly related, but knowledge utilization is not related

Table II.
Factor correlation matrix

Factors	1	2	3	4	5	6	7	8
1. Performance improvement	1.000							
2. Interaction	0.399	1.000						
3. Knowledge utilization	0.531	0.228	1.000					
4. Leadership	0.533	0.455	0.339	1.000				
5. Organizational climate	0.555	0.474	0.281	0.577	1.000			
6. Knowledge sharing	0.409	0.652	0.323	0.344	441	1.000		
7. Knowledge acquisition	0.415	0.591	0.153	0.447	0.516	0.439	1.000	
8. Incentive	0.591	0.590	0.398	0.648	0.491	0.503	0.497	1.000

Independent variables	Dependent variables: Model 1 Performance (a)	Model 1 Organizational climate (b)	Model 2 Performance (a)	Model 2 Organizational climate (b)	Model 3 Performance (a)	Model 3 Organizational climate (b)
Acquisition	0.354***	0.393***	0.171**	0.248***	0.201***	0.339***
Sharing	–	0.263***	–	0.188***	–	0.189***
Utilization	0.406***	0.137**	0.335***	–	0.286***	–
Leadership			0.173**	0.279***	0.141*	0.229***
Incentives			0.226***	–	0.300***	–
Interaction			–	0.151*	–	–
No. of staff					–	–
Company size					–	0.125*
Project size					0.145**	–
No of projects					–	−0.160**
Ownership (1,0)					–	−0.750***
R	0.595	0.625	0.657	0.673	0.698	0.755
Adjusted R square	0.350	0.385	0.425	0.446	0.477	0.558
F	92.108	71.437	63.460	68.967	47.417	46.899
Sig.	0.000	0.000	0.000	0.000	0.000	0.000

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p = 0.000$

Table III.
Hierarchical regression analysis

when leadership is included. Three background variables also had significant impacts on the organizational climate. Size was positively related, but with more projects, the staff feel the organization is a worst place to in which work. More projects mean more pressure to perform and increased stress. Typically, Vietnamese professionals prefer an easier atmosphere at work. State ownership is also negatively correlated with climate (Table IV).

To summarize the statistically significant impacts of the factors related to the organizational learning:

- Leadership commitment has a significant positive impact on both performance improvement and organizational climate.
- Incentives have a significant positive impact only on performance improvement.
- Staff interaction has a significant positive impact only on organizational climate,
- Knowledge acquisition has significant impact on both performance improvement and organizational climate.
- Knowledge sharing has significant impact only on organizational climate,
- Knowledge utilization has significant impact on performance improvement and organizational climate. The impact on organizational climate disappears when leadership and other organizational characteristics are included in the regression analysis.

These findings are supportive of past research results. The data analysis also found some unexpected results. First, the relationship of knowledge utilization, as a significant antecedent of organizational climate in model 1b was reduced when organizational characteristics were included in models 2b and 3b. Second, staff interaction also became insignificantly related with organizational climate when other variables were assessed. Although exploratory, these unexpected results call for more elaboration to understand the impact of those relationships.

The results suggest that learning outcomes and learning process should be considered in an integrative manner because they cannot be fully separated. Outcomes like performance improvement and organizational climate do not result only from the

Table IV.
Summary of hypothesis testing

Hypothesis		Result
H1a	Leadership commitment + performance improvement	Accepted
H1b	Leadership commitment + organizational climate	Accepted
H2a	Incentives + performance improvement	Accepted
H2b	Incentives + organizational climate	Rejected
H3a	Staff interaction + performance improvement	Rejected
H3b	Staff interaction + organizational climate	Accepted
H4a	Knowledge acquisition + performance improvement	Accepted
H4b	Knowledge acquisition + organizational climate	Accepted
H5a	Knowledge sharing + performance improvement	Rejected
H5b	Knowledge sharing + organizational climate	Accepted
H6a	Knowledge utilizations + performance improvement	Accepted
H6b	Knowledge utilizations + organizational climate	Accepted

learning process but may also be related to other specific organizational characteristics, such as motivation leadership style or team relationships.

Conclusions

This study provides empirical evidence for the importance of leadership commitment, incentives and staff interaction on the process and outcome of organizational learning. It is supportive of many conceptual studies in the literature. The results show that each of these factors has a different role and impact on the organizational learning process and outcome. Not all impacts of these organizational characteristics on learning outcomes can be determined from the organizational learning process.

From the management point of view, the results in this study suggest several meaningful implications. For those organizations that want to enhance organizational learning, the most important emphasis is the full commitment of leadership. From this commitment, supportive attitudes, behaviors and incentives will follow. This creates an environment in which knowledge acquisition, sharing and utilization will be facilitated. The organizational structure and operations should also be designed in such a way to maximize the interaction among staff in terms of knowledge and learning. Lastly, a learning culture and climate should be nurtured on a continuous basis. These findings about leadership commitment are similar to what might be expected in the USA. Collaborative approaches in Vietnam would be easier to implement because it is a group oriented culture compared to the individualistic American culture. In Vietnam incentives are likely to have more importance because of the lower socio-economic condition. Professionals respond more to financial rewards, than non monetary incentives.

Further study is necessary to clarify the importance of organizational facilitators. The three organizational characteristics investigated do not fully explain the variance of organizational learning process and learning outcomes. Although the importance of these factors has been empirically supported, more factors should be considered to determine the importance of the organizational learning process and its outcomes. The data analysis could be improved if a more powerful and comprehensive statistical approach was employed (e.g. structural equation modeling) to verify the measurement of the constructs and to have an overall assessment of the relationships among the constructs. The limitations of this study are that the sample comes from only one industry in a developing country, and it uses an attitudinal survey. Replications of this analysis in other research contexts, industries, countries and organizational characteristics would enhance the generalizability of the findings.

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