

Exploring and Measuring Organizational Learning Capability and Competitive Advantage of Petroleum Industry Firms

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Received 1 January 2013; accepted 14 February 2013

Abstract

Organizational learning is important in today's dynamic and discontinuous environment of change. This study attempts to test the theoretical underpinning that organizational learning is related to competitive advantage. Through personal interviews and mailed

surveys, 94 responses from employees of the petroleum industry were used in the regression analysis. Empirical findings show that theoretically assumed dimensions of the learning organization and organizational learning contribute significantly towards the achievement of competitive advantage. Multiple regression analysis showed the existence of significant relationships between seven independent variables and the dependent variable of competitive advantage. Strategic thinking and team learning explained 59.2% and 22.3% of variance respectively in achieving a competitive advantage. A discussion of the results along with implications and recommendations are provided.

Key words: Learning capability; Competitive advantage; Organizational learning; Petroleum

Naveed Akhtar, Rasheed Ahmed Khan, Bahaudin G. Mujtaba (2013). Exploring and Measuring Organizational Learning Capability and Competitive Advantage of Petroleum Industry Firms. *International Business and Management*, 6(1), 89-103. Available from: <http://www.cscanada.net/index.php/ibm/article/view/j.ibm.1923842820130601.1170>
DOI: <http://dx.doi.org/10.3968/j.ibm.1923842820130601.1170>

INTRODUCTION

Modern firms must proactively and strategically work to survive and remain alive in a world of ever changing scenarios where scarce resources are becoming more and more costly to acquire. This period of immense competition necessitates the use of these costly resources optimally while exploiting their full potential without waste and rework (Mujtaba, Marschke, & Nguyen, 2012). In times of technological changes and the knowledge-based economy, organizations need not only to adapt quickly to changes but must also develop such mechanisms that help them to be ahead of traditional and non-traditional competitors. It has been suggested that organizations which are struggling should try to have a

learning organizational culture for creating, acquiring, and transferring knowledge and modifying management's behavior to reflect new knowledge and insights (Garvin, 1993). The importance of individual knowledge or building personal knowledge has its own place in the concept of a learning organization. Therefore to develop individuals and nurture a learning organizational culture, managers and leaders must facilitate the learning process in their companies. The learning organization process can result in a culture that achieves competitive advantage (De Geus, 1988) and intrapreneurial thinking (Sungkhawan, Mujtaba, Swaidan, & Kaweevisultrakul, 2012).

The public and private petroleum organizations of Pakistan are striving hard to plan and implement strategic efforts to become and remain competitive. Petroleum organizations are the most agile institutions of Pakistan which are often ahead in adapting and proactively searching for new areas to improve and think strategically. Yet, there is a need for tools that help organizations to measure, evaluate, and create strategic directions that are necessary to increase learning and to achieve a sustainable competitive advantage. It is also important for such organizations, like petroleum companies, to measure how successful are their strategic efforts. The normative theories on organizational learning and learning organizations do exist but empirical research in Pakistani context is essential and needed.

Extensive literature review on learning organizations (LO) points to a dire need for empirical work in the area of organizational learning (Huber, 1991) as most of the articles like that of Senge (1990) which provides insights or reflections (Bui & Baruch, 2010), and any empirical work is basically non-existent or limited to small numbers (Di Milia & Birdi, 2009). The researchers agree on the need for creating a tool to measure a learning organization (Garvin *et al.*, 2008; Bui & Baruch, 2010) that enables a firm to identify and facilitate successful change in an ever-changing and competitive environment. Bui and Baruch (2010) maintain that the quantitative applications in the learning organization literature are far less frequent and the knowledge development and progress in understanding phenomenon may be gained from both qualitative and quantitative methods.

The other concept of this study is competitive advantage. O'Brien defines competitive advantage as developing products, services, and/or capabilities that give a company or product a superior business position relative to its competition and other competitive forces (O'Brien, 2004, p. G-3). A competitive advantage is achieved from the strategy which is formed as a result of the industry analysis, and analysis of internal resources and competencies.

1. AIMS AND OBJECTIVE

The research questions for this study are: 1) what are the important dimensions of a learning organization that facilitate learning? 2) Does learning in an organization lead to a competitive advantage? 3) What types of relationships exist between a learning organization and competitive advantage?

The basic aim of this research paper is to explore those areas of organizational (OL) learning and learning organization (LO) which make an organization a competitive entity, and identify the empirical linkages between organizational learning and competitive advantage. Therefore, the objective of this research is to explore such contextual factors that can be considered for organizational learning and can be tested in Pakistan.

The article also provides expanded theoretical foundation and increases understanding to clearly articulate and understand the underlying structure of a learning organization. This research identifies the dimensions that facilitate or hinder OL processes and when instituted with strategic intent they build, enhance, and maintain individual and organizational capabilities in the long term. Moreover, these dimensions will help organizations to identify and test the level of their learning capability and assist managers to institutionalize these antecedents of organizational learning with strategic intent and direct organizations towards excellence.

2. ORGANIZATIONAL LEARNING (OL) AND LEARNING ORGANIZATION (LO)

This portion of the paper explores contextual factors from the literature that provide theoretical foundations to draw a framework. The concepts of organizational learning and learning organization are used interchangeably because the learning organization is the organization which is good at organizational learning (Tsang, 1997).

The highly competitive environment and increased customer demand and expectations have threatened the survival of organizations and put the firms in a mode of continuously finding the ways to succeed and achieve a sustainable competitive advantage. Managers follow different strategies to compete but the learning in the organizations can be the only best way of achieving a sustainable advantage. Senge (2006, 1990), Garvin (1993), and Goh (2003; 1997, 1993) have suggested few components which contribute towards learning and achieving a competitive advantage.

There is hardly any opposition to the argument that organizational learning is a competence which enables organizations to survive and develop competitiveness in today's ever changing environments (Hamel & Prahalad, 1993; Nonaka, 2007; Senge, 1990). Learning organizations

is a new idea that requires traditional organizations to shift to organizational development and growth. The concept of the LO and OL captured the attention of managers, researchers, and experts of human resource development (HRD). But this concept still requires the serious scholarly efforts and empirical research work.

Learning can help organizations align their strategic intentions, internal culture, structure, processes, and external competitive environment. Argyris and Schon (1978) proposed three major types of learning. First, single-loop learning involves detecting and correcting "errors" (performance gaps) so an organization can carry on or achieve its present policies or objectives. In single-loop learning, which is appropriate for the routine and repetitive jobs because it helps get everyday jobs done, outcomes are measured against organizational norms and expectations. Double-loop learning occurs when the organization is willing to challenge long-held assumptions about its mission, customers, capabilities, or strategies. The deutero-learning is concerned about how to carry out single-loop and double-loop learning. Deutero-learning is a proactive learning process where there is a continuous effort to strive for perfection (Argyris & Schon 1978, p.4).

A learning organization is an "organization that is continuously expanding its capacity to create its future" (Senge, 1990, p. 14). Senge maintains that 'the organization that will truly excel in the future will be the organization that discovers how to tap people's commitment and capacity to learn at all levels in an organization' (1990, p. 4). Senge (2006, 1990) proposed five disciplines for a learning organization: systems thinking, personal mastery, mental models, shared vision, and team learning. Personal mastery is the discipline of "continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively" (1990, p. 7). Mental models are "deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action" (Senge, 1990, p. 8). Team learning is viewed as 'the process of aligning and developing the capacities of a team to create the results its members truly desire' (Senge 1990, p. 236). Lastly, the shared vision means building a sense of commitment. Senge (2006) emphasized the role of a leader in a learning organization but not the traditional leadership styles.

According to Goh (1997), OL is a long-term activity that will build competitive advantage over time and requires sustained management attention, commitment, and effort. Goh discussed five core building blocks of a learning organization which are mission and vision, leadership, experimentation, teamwork, cooperation, and transfer of knowledge. Mission and vision gives a clear indication that the individual actions should be aligned with organizational goals and objectives, and make them responsible to apply creative energies. It provides empowerment for

decision making and innovation. Leadership in a learning organization means involving employees in decision making so that employees are encouraged to take calculated risks. Leadership should be viewed as coaches and facilitators and empower employees to make the best decisions. Experimentation, which usually requires questioning the status quo, is an important ingredient of a learning organization and should be rewarded and supported at all levels. Transfer of knowledge means that the knowledge is diffused throughout the organization regardless of the source of information creation and relevance so that creative thinking is fostered. Teamwork and cooperation brings the individual expertise and skills at one place to solve the problems.

Garvin (1993) stated five activities of the learning organization in his model of organizational learning which are systematic problem-solving, transfer of knowledge learning from experience and history, learning from others, and experimentation. Systematic problem-solving means that the "members of the same department or business-unit team, and the tools are applied to real problems facing the groups" (p. 82). This helps provide a common vocabulary for team members while demonstrating and reinforcing a consistent approach to problem solving. Experimentation means systematic and scientific approach to seeking knowledge "but unlike problem solving experimentation is motivated by opportunities and expanding horizons, not by current difficulties" (p.82). Learning from experience and history concerns the maintenance and assessment of the company history of success and failure and giving employees access to this record. Learning from others' perspective gives the opportunity to look outside the organization to see the best practices around the industry and incorporate them into the processes. Transfer of knowledge component stresses the idea of sharing of information across the departments so that maximum benefit can be achieved.

Gephart and Marsick (1996) identified six essential features of a learning organization: continuous learning at the systems level; knowledge generation and sharing; critical, systemic thinking; a culture of learning; a spirit of flexibility and experimentation; and being people centered. The systems level continuous learning entails the synthesis of people's knowledge and changing it into organizational memory. Knowledge generation and sharing from individual employees are encouraged and all employees have access to the strategic information. Critical, systemic thinking means that people are always encouraged to think in new ways and use productive reasoning skills systemically in order to see critically in order to identify assumptions. A culture of learning means a culture of trust and openness which encourages inquiry and dialogue to challenge assumptions. Learning and creativity are rewarded, supported, and promoted through various performance systems from the top down. A spirit

of flexibility and experimentation means the people are free to take risks, experiment, innovate, explore new ideas, and generate new work processes and products. People-centered approach of a learning organization reflects that people are taken care of and every individual is developed, supported and they also believe that the leadership plays an important role in the learning and development of individuals and teams.

According to Bennet and O'Brien (1994), the aim of a learning organization is to affect change and improvements in business and employees. They have discussed twelve key factors that influence an organization's ability to learn and change. These factors are strategy/vision, executive practices, managerial practices, climate, organization/job structure, information flow, individual and team practices work processes, performance goals/feedback, training/education, individual/team development, and rewards/recognition.

Garvin, Edmondson and Gino (2008) presented three building blocks for organizational learning and adaptability: a supportive learning environment, concrete learning processes and practices, and leadership behaviour that provides reinforcement.

Firstly, a supportive learning environment is further divided into four characteristics i.e. psychological safety, appreciation of differences, openness to new ideas, and time for reflection. Secondly, Concrete learning processes and practices involve the generation, collection, interpretation, and dissemination of information and experimenting with new ideas is encouraged. Concrete learning processes and practices are further divided into five sub-components: experimentation, information collection, analysis, education and training, and information transfer. Thirdly, leadership reinforces learning. Garvin, Edmondson and Gino (2008) noted that organizational learning is strongly influenced by the behaviour of leaders. People feel encouraged to learn when leaders provide opportunities to speak and facilitate the promulgation of 'dialogue and debate'. This is the job of leaders to entertain different views from employees and to encourage them to present new ideas and options. Other studies (Lei, Slocum, & Pitts, 1999; Goh & Richards, 1997; Garvin *et al.*, 2008) on LO are also of the view that there are certain factors that facilitate or hinder learning in the organizations. Lei *et al.* (1999) proposed few areas to foster learning in organizations: organizational design, organizational structure, decision-making processes, cross-functional teams, reward systems, management development, and corporate culture. They also highlighted the role of senior leadership in the development of organizational environment that facilitates internal change and OL. They think vision and mission are important ingredients to establish a learning, flexible, and responsive culture.

Goh and Richards (1997) identified five organizational characteristics and management practices that promote organizational learning: Clarity of purpose and mission that is understood throughout the organization, and each

employee should be committed to these goals; leadership commitment and empowerment means leaders help employees to identify performance gaps and then help set goals that encourage the search for knowledge to narrow and solve these performance gaps; experimentation and rewards means experimenting with new ideas must be encouraged, and risk-taking and innovation should be rewarded; transfer of knowledge means information acquired and distributed should be related with organizational problems and passed onto each unit and function. Communication should be clear, fast and focused. Teamwork and group problem solving means that employees share their knowledge and become aware of needs of others, and nature of work in different parts of the organization. Teams should have the ability to work cross-functionally.

Parek (2003) defines OL as "the process by which an organization acquires, retains, and uses inputs for its development, and the process results in an enhanced capacity for continued self-learning and self-renewal" (p. 657). His framework discusses eight components: holistic frame which enable managers to think systemically and identify patterns rather than discrete events; strategic thinking helps managers to view the strategic impact of each activity and to think of consequences of their actions; shared vision should be inspiring, linked with employee's goals, and generate commitment; empowerment is concerned with the appropriate authority, direction, and support to accomplish their task; information flow means that all critical and authentic information must be shared at all levels; emotional maturity means control over most parts of ones' destiny, optimism, self-discipline, commitment, and moderate risk-taking; learning means conducive environment that encourages dialogue and discussion, and people can present their ideas; and synergy means collaboration and teamwork where people are willing to suspend their assumptions and think together, and cross-functional teams are used throughout the organization.

All frameworks discussed are important characteristics of a learning organization. The following characteristics of a learning organization are chosen for empirical study: holistic thinking/systems thinking, strategic thinking, strategic learning, synergy, empowerment, knowledge/information flow, and internality.

3. COMPETITIVE ADVANTAGE

Competitive advantage, a multidimensional concept (Oster, 1999), is achieved through the industry analysis (Porter, 2008), resource-based view (Barney, 1991, Reed & DeFillipi, 1990; Fahy, 2000; Connor, 1985), culture (Grant, 1991; Barney, 1986b), technology (Burgelman & Grove with Mezia, 2006; Porter & Miller, 1985; Powel & Dent-Micallef, 1997), and through competencies (Prahala

& Hamel, 1990; King, Zeithaml, 2001). Competitive analysis (Porter, 1980) provides information about the economic forces operating in the external environment (Porter, 1980, 1985) whereas resource-based view analyzes internal capabilities and strengths possessed by the firm. It can be inferred that environmental analysis is necessary but the internal resource analysis is inevitable as it provides unique internal organizational information which is not available to other firms (competitors) in the industry and help design a unique strategy that is inimitable and cannot be substituted (Barney, 1991).

Competitive advantage means achieving better organizational performance than competitors (Porter, 1980) and performing different activities, or performing activities differently than the competitors is the essence of the strategy (Porter, 1996). According to Barney (1991), a sustained competitive advantage is achieved when a firm is implementing a value creating strategy not simultaneously being implemented by any current or potential competitor and when these other firms are

unable to duplicate the benefits of this strategy (Barney 1991, p. 102). Literature reveals that achievement of advantage manifest itself in improved organizational financial performance, reduction in cost, better reputation, and better brand image.

4. HYPOTHESES DEVELOPMENT

The systems thinking concept shows the interrelated patterns within a business and enable people to see the whole organization instead of focusing only on the parts. It gives a holistic picture of the system under study instead of considering just a snapshot. It helps people to solve the problems with a context of a larger scenario instead of fixing the problem as a discrete activity. A systems thinker is able to understand the interrelationship of activities happening inside the organization.

H1: *Holistic thinking is positively related with competitive advantage.*

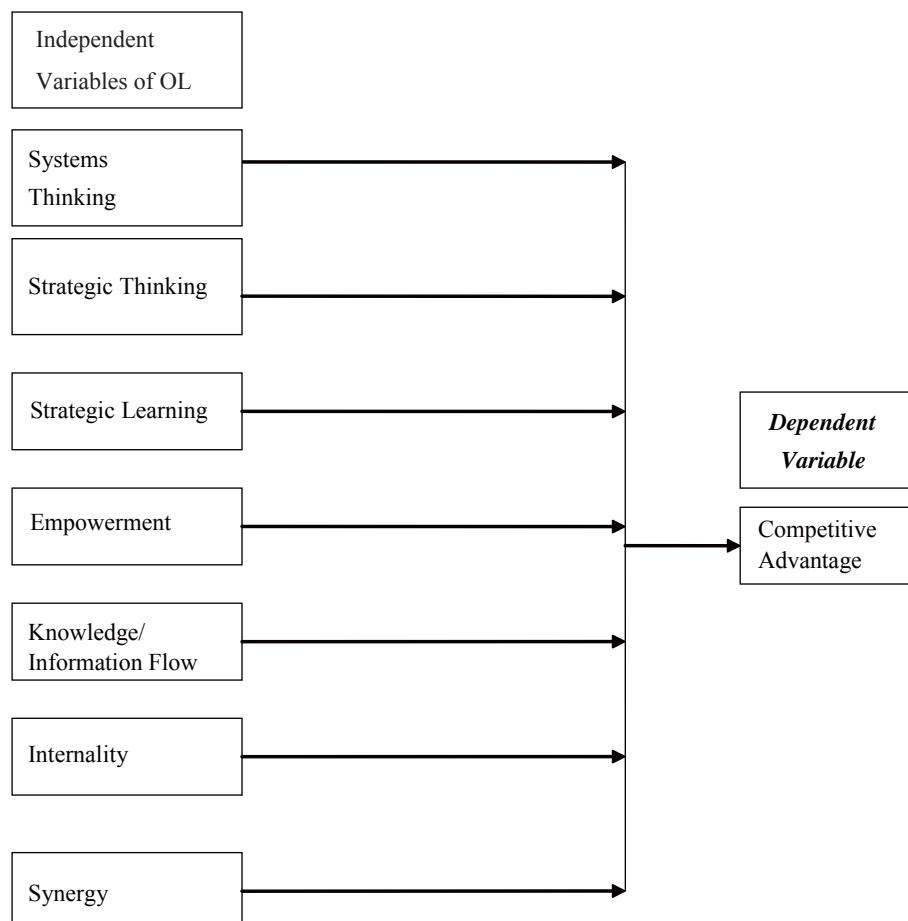


Figure 1
Diagrammatical Presentation of Theoretical Framework of OL-CA Model

The past experiences which form assumptions constitute a picture of the world in our mind and enable us to understand the events and to take actions accordingly. Managers understand the results of their actions and are able to prioritize their tasks as per organizational objectives. Managers should also provide a good learning environment. Manager should encourage employees to take action, present ideas and facilitate participation.

H2: *Strategic thinking is positively related to competitive advantage*

A shared vision is a common purpose which is understood across the organization and commits employee to the organizational cause. It helps people take initiative and risk. A clear shared vision increases commitment, enhances learning capability, and improves performance.

H3: *Shared vision enhances learning capability and is positively related to competitive advantage.*

Empowerment delegates authority and extends responsibility to achieve the organizational objectives. In a learning organization employees feel empowered and their personal goals are aligned with organizational objectives. Leaders create a learning environment where employees can experiment and where risk-taking is rewarded. People are encouraged to make decisions.

H4: *Leadership is directly related with the competitive advantage.*

In a learning organization the information flow is quick, and is spread across departments. Success in a department is shared in other departments. Strategic information is shared with all employees directly.

H5: *Knowledge flow is positively related with competitive advantage.*

People in the organizations are able to identify the gap between present position and desired position by seeing current reality more clearly and are aware of their organizational capabilities. It is assumed that people are willing to learn and work, and understand what is necessary for the organization to improve.

H6: *Internality is positively related with competitive advantage.*

A team is a synergistic whole with differing capabilities, directed towards a common goal. Within a team, people feel free to talk and are willing to listen to each other. The empowered people are free to make decisions. Team members perform coordinated actions, share responsibilities, respect and trust each other.

H7: *Synergy is positively related with competitive advantage.*

Organizations equipped with hi-tech research and development departments, tend to have low cost, and innovative products. Organizations are enjoying a good reputation and brand image. They are better financial performers as compared to their rivals. We assume that organizational learning is taking place in the petroleum industry and organizations of Pakistan and therefor OL should be leading to a competitive advantage.

H8: *Organizational learning is positively related with competitive advantage.*

5. RESEARCH DESIGN AND METHODOLOGY

The relationship of two concepts of organizational learning (OL) and competitive advantage (CA) is statistically examined through the following methodology. Validity is the ability of a research instrument to measure the concept, or what it is designed to measure. Validity and reliability of the instrument was measured. Data was summated before measuring the reliabilities. Validity was established through content validity and face validity. Content validity shows the adequate coverage of the subject matter (Cooper & Schindler, 2006) and is considered good when it represents the sample of the universe of the concept being measured (Sekaran, 2003). Content validity was determined in two steps: by carefully defining the scales; and by showing the measurement scale to five academicians, and three Petroleum Company's experts (Cooper & Schindler, 2006).

The concept studied here is organizational learning with the following dimensions: holistic thinking, strategic thinking/culture, strategic learning/mission, empowerment, knowledge/information flow, internality, and synergy. Each dimension must have its own identity and should be differentiated from other dimensions distinctly. Each dimension bears its own peculiar name and is operationally defined as a different dimension. It is also powered by the items or statements which are aimed at measuring the specific dimension that is operationally defined. The discriminant validity differentiates each dimension or variable from the other dimensions (Escribano & Bou-Llusar, 2005) in the scale clearly, and is measured through pairwise correlation (Dimovski, 1994; Venkatraman, 1989).

Reliability of the whole instrument is measured through Cronbach's coefficient alpha which is achieved if respondents attach same overall meaning to each of the items while measuring the same concept.

Multiple regression method was used to test organizational learning and competitive advantage model (OLCA-model) using standard and stepwise method. Multiple regression technique requires testing of assumptions before conducting the analysis (Chatterjee & Hadi, 2006). Henceforth, the analysis of the OLCA model and hypothesis testing was done.

6. TEST OF ASSUMPTIONS FOR REGRESSION ANALYSIS

The assumptions of independence of observations, normality, linearity and homoscedasticity, and multicollinearity was tested.

The normality assumption is concerned with the

normality in the data which assumes that all variables are normally distributed. Normality is assumed as the sample size is greater than 100 and it will not affect the regression model (De Vaus in Migdadi, 2002 as cited in Ali, 2007). However, Durbin-Watson (range 1.5 to 2.5) test, which is a statistical test of independence (Johnson & Wichern, 2006), was performed.

The second assumption is homoscedasticity. The larger sample size also shows that the data is normally distributed and the assumption of linearity and homoscedasticity is met. Third assumption is collinearity among the variables. Multicollinearity can be diagnosed through correlation matrix. High correlation among variables (> 0.80) indicates multicollinearity (Garson, 2009).

Multiple regression, standard and stepwise techniques were applied to OLCA model. Standard Regression techniques simultaneously evaluate the relationship between a set of 7-independent variables of OL and one dependent variable of competitive advantage. To select important predictors that exhibit a significant relationship with dependent variables of competitive advantage stepwise regression technique was applied (Jonson & Wichern, 2006).

A summary of the relationship between response (dependent variable) and predictor (dependent) variables (Chatterjee & Hadi, 2006) is shown through regression equation for H8. To estimate y-score, scores of all predictors are taken from column B under the Unstandardized Coefficients (Garson, 2009; Morgan, Leech, Gloeckner, & Barrett, 2004) and are presented through regression equation.

7. RESEARCH DESIGN

This study is non-contrived (non-experimental), cross-sectional and one-industry research design. The data was collected from officers of petroleum companies of Pakistan. The independent variable is organizational learning containing seven dimensions, and the dependent variable is competitive advantage.

Six petroleum companies out of a total 40 (i.e. approximately 15% of the population) were selected through random sampling method (Table 1). These organizations are chosen because of their knowledge-intensive nature and their critical role in the present

energy crises of Pakistan. Although some employees were hesitant to respond, the researchers adopted the snowball sampling techniques (Cooper & Schindler, 2006) to reach the respondents.

Sekaran (2003) found a rule that "in multivariate research (including multiple regression analysis), the sample size should be several times (preferably 10 times or more) as large as the number of variables in the study" (p. 296). Therefore, the sample size was determined sufficient since the number of variables are 8, including the seven independent and one dependent variables. So a sample of 200 officers of any gender was taken and deemed sufficient for this study.

8. QUESTIONNAIRE DEVELOPMENT

Commonalities from learning organization frameworks of different scholars were identified through extensive literature review on OL/LO and seven independent variables were selected which makeup the first part of theoretical framework. All concepts are operationally defined (Sekaran, 2003) and are supported by many authors (see Table 2). The research instrument has three parts. First part consists of the elements concerning the dimensions of predictor variables (independent variables, i.e. organizational learning). Second part contains elements concerned with the criterion variables (competitive advantage). Third part is about the personal information of the respondent.

The questionnaire of Parke (2003) on organizational learning was adopted. The second part, competitive advantage, was measured through self-developed questionnaire containing eight questions. Second part, response variables, are supported by many researchers such as Barney (2002, 1991), Porter (2008), Jashapara (2003), Venkatraman and Ramanujam (1986, 1987), and Venkatraman (1989) (see table 3).

The responses were measured on a 5-point Likert scale. The first part starts from fully true (5) to not fully true (1) whereas the responses start from very accurate (5) to not at all accurate (1). Data were analyzed using the SPSS software. All the incomplete questionnaires were discarded and not used in statistical analysis. Details of the questionnaires distributed and received are shown in table 4.

Table 1
Summary of Sample Companies

Strata's of the Petroleum Companies	Total No. of companies	No. of Sample companies	% of sample
Exploration and Production Companies	26	3	11.5%
Downstream Companies (Marketing)	10	2	20%
Refineries	4	1	25%
Total	40	6	15.00%

Table 2
Support for Dimensions of Organizational Learning

Dimension (s) of Organizational learning	Supporting Author (s)
Systems Thinking	Senge (2006, 1990), Goh (2003, 1998), Gephart & Marsick (1996)
Mental Models/Culture	Senge (2006, 1990), Garvin <i>et al.</i> (2008), Garvin (1993), Goh (2003, 1998)
Shared Vision	Senge (2006, 1990), Goh (2003, 1998)
Leadership	Senge (2006, 1990), Garvin <i>et al.</i> (2008), Garvin (1993), Goh (2003, 1998)
Knowledge/Information Flow	Garvin <i>et al.</i> (2008), Senge (2006, 1990), Goh (2003, 1998), Garvin (1993), Huber (1991)
Personal Mastery	Senge (2006, 1990), Goh (2003, 1998)
Team Learning	Senge (2006, 1990), Goh (2003, 1998),

Table 3
Support for Dimension (Item Wise) of Competitive Advantage Construct

Item (s) of Competitive Advantage	Supporting Author (s)
Reputation	Esring-Tena & Bou-Llusar (2005); Esring-Tena, Bou-Llusar & Rua-Puig (2001); Fahy (2000); Barney (1991, 1986)
Brand Image	Esring-Tena & Bou-Llusar (2005)
Market Share	Esring-Tena & Bou-Llusar (2005); Powell (1992); Bharadwaj, Varadarajan, & Fahy (1993)
Cost	Esring-Tena & Bou-Llusar (2005); Porter (1980, 1985); Powell (1992); Bharadwaj, Varadarajan, & Fahy (1993)
Research & Development (R & D)/Innovative	Esring-Tena & Bou-Llusar (2005); Powell (1992); Bharadwaj, Varadarajan, & Fahy (1993)
Economic Performance	Esring-Tena & Bou-Llusar (2005); Jashapara, A. (2003); Venkatraman, & Ramanujam (1987, 1986); Venkatraman (1989)

Table 4
Detailed Summary of Questionnaires Distributed

Strata's of the Petroleum Companies	No. of Questionnaires administered	No. of Questionnaires received	Discarded Responses	% of valid responses
E & P Companies	100	70	5	65.00%
Marketing Companies	50	17	2	30.00%
Oil Refineries	50	14	0	28.00%
Total	200	101	7	47.00%

The questionnaire consists of 63 items, out of which 13 items cover demographic data, 42 items are related to independent variables (IVs), 8 items cover dependent variable (DV), three are open-ended, and one question was regarding the comments/suggestion. All respondents were coded as per previous studies by Leech, Barrett and Morgan (2005). Moreover, all relevant items of a single construct are mentioned under its name, coded and all data were in numeric form. First word of the code is capital letter of English alphabet joined with numerical digits in order. First section is dedicated to the concept of organizational learning and has been subdivided into 7 dimensions. Each dimension consists of 6 items, except the dependent variable which has eight items. The third section asks for demographic information. Three open-ended questions asked are concerned with training and learning activities in the organization. One question was about additional comments/suggestions.

Data collection was done through personal interviews and mailed surveys (Cooper & Emory, 1995). Few questionnaires were self-administered and collected, and some were collected through personal network of friends who were working in this industry. Overall, 200 questionnaires were administered, 101 responses were received back with a response rate of 50% and 94 responses were found complete and used in the final study.

9. DATA ANALYSIS & RESULTS

Each of the research hypotheses was tested through regression analysis. Multiple regression analysis (standard and stepwise procedures) was conducted to identify which of the predictors have the most significant contribution in achieving a competitive advantage. All the items of each independent variable for systems thinking/holistic frame

(ST), strategic thinking, strategic learning, empowerment, knowledge/information flow, internality, and synergy were summated into single variables, and then all dimensions of organizational learning were further summated into a single independent variable of OL. The dependent variable was regressed with each dimension of OL to test hypothesis (H1 to H7). Moreover, the response variable was regressed on the summated independent variable of organizational learning (OL) to check the amount of strength explained by OL to achieve competitive advantage.

Regression analysis was applied to test hypotheses H1 to H8. Finally, the results of regression analysis, standard and stepwise are analyzed and explained. H8 which is last and confirmatory hypotheses is also tested in this section along with regression equation to highlight the contribution of each independent variable on the dependent variable. Stepwise method revealed that the independent variables explain the maximum variance in the dependent variable of competitive advantage.

9.1 Validity & Reliability Assessment

Cronbach's alpha was determined for seven independent variables (dimensions): systems thinking/holistic frame (ST), strategic thinking, strategic learning, empowerment, knowledge/information flow, internality, and synergy, and one dependent variable of competitive advantage (CA).

Data were summated dimension-wise before checking for reliability analysis. Reliabilities over 0.70 are acceptable and over 0.80 are good (Sekaran, 2003). The reliability coefficient of the instrument with seven dimensions (50 items) is 0.927 and all other constructs (dimensions) was above 0.80 (Table 5).

Content validity was determined in two steps (Cooper and Schindler, 2006); through literature review, and by

showing the instrument to academicians and industry experts from the petroleum companies, and changes were made accordingly.

Discriminant validity of all dimensions of OL was determined and found within range proving no collinearity. The cutoff value for discriminant validity is: < 0.85 (Harrington, 2009; Garson, 2008); < 0.60 (Leech et al., 2005); and Dimovski (1994) mention cut-off value for pairwise correlation is < 0.55 significant at < 0.05.

Results (Table 6) indicate the values of 28 pairs as follows: 5 are correlated at ≥ 0.50 , 3 are correlated at ≥ 0.6 , 1 is correlated at < 0.7 , 9 are correlated at ≥ 0.40 , others are $\geq .30$ except one which is correlated at 0.20, and all are significant at $p < 0.01$. Moreover, it is found that all correlations are positive providing additional proof for construct validity (Vekatraman, 1989). Hence, discriminant validity criteria are satisfied by these variables. This indicates that each dimension is distinctly different from the other dimensions.

Table 5
Inter-Item Consistency

Variables	Cronbach's Alpha (α)	No. of items
Systems Thinking (ST)	0.836	6
Strategic Thinking/Culture (StLrng)	0.838	6
Strategic Learning (StrLrng)	0.824	6
Empowerment/Leadership (Emp)	0.829	6
Knowledge/Information Flow (KNF)	0.826	6
Internality/Personal Mastery (INT)	0.828	6
Synergy/Team Learning (SYN)	0.843	6
Competitive Advantage (CA)	0.873	6

Table 6
Results of Discriminant Validity - Pairwise correlation (Pearson Correlation)

Constructs	Mean	Std. Deviation	ST	StrTh	StrLrng	Emp	KNF	INT	SYN	CA
ST	15.84	3.089	-							
StrTh	17.60	3.087	0.48**	-						
StrLrng	16.29	4.096	0.52**	0.49**	-					
Emp	15.53	3.317	0.52**	0.46**	0.60**	-				
KNF	15.45	4.273	0.22**	0.42**	0.71**	0.60**	-			
INT	15.14	3.530	0.50**	0.42**	0.57**	0.54**	0.64**	-		
SYN	15.51	4.175	0.36**	0.36**	0.49**	0.44**	0.42**	0.44**	-	
CA	24.34	4.990	0.30**	0.48**	0.20**	0.31**	0.18**	0.30**	0.32**	-

Note. N= 94. All variables are summated scores of the items that were loaded on a particular construct. **p<0.01 (2-tailed)

9.2 Regression Analysis: Testing of Underlying Assumptions

Before conducting the regression analysis fundamental assumptions were tested (Chatterjee & Hadi, 2006). Durbin-Watson test (Table 7) was performed for OL-CA

model to test the independence and was found within the range, i.e. between 1.5 and 2.5 (Johnson & Wichern, 2006).

The second assumption is the normality which is tested by checking the normal distribution of residuals, and symmetrical distribution of differences between

predicted and obtained scores. As Chatterje and Hadi (2006) recommend with a moderately large sample, these residuals should approximately have a standard normal distribution. Therefore, normality is assumed as the sample size is greater than 100 and it will not affect the regression model (De Vaus in Migdadi, 2002).

Third assumption of Multicollinearity is diagnosed by identifying the values of intercorrelations between the predictor variables (IVs) and response variables (DV). This assumption of multicolliearity is also proved through correlations (Table 2).

Hypotheses H1 to H7 were tested by performing standard regression analysis to explore the relationship of each dimension of OL with the dependent variable of

competitive advantage (see Figure 1). Stepwise regression identified the most significant independent variables which explain the best variance in the dependent variable. The validity of regression analysis depends on certain assumptions which are usually made about the data and the model. Henceforth, to test the final hypothesis H8 dependent variable was regressed on independent variable of OL to reveal the impact of independent variable of OL on dependent variable.

The results of linear regression supported the hypotheses H1 to H7. All hypotheses are significant at 0.01 indicating a strong relationship of all independent variables of OL with the dependent variables of CA (Figure 1).

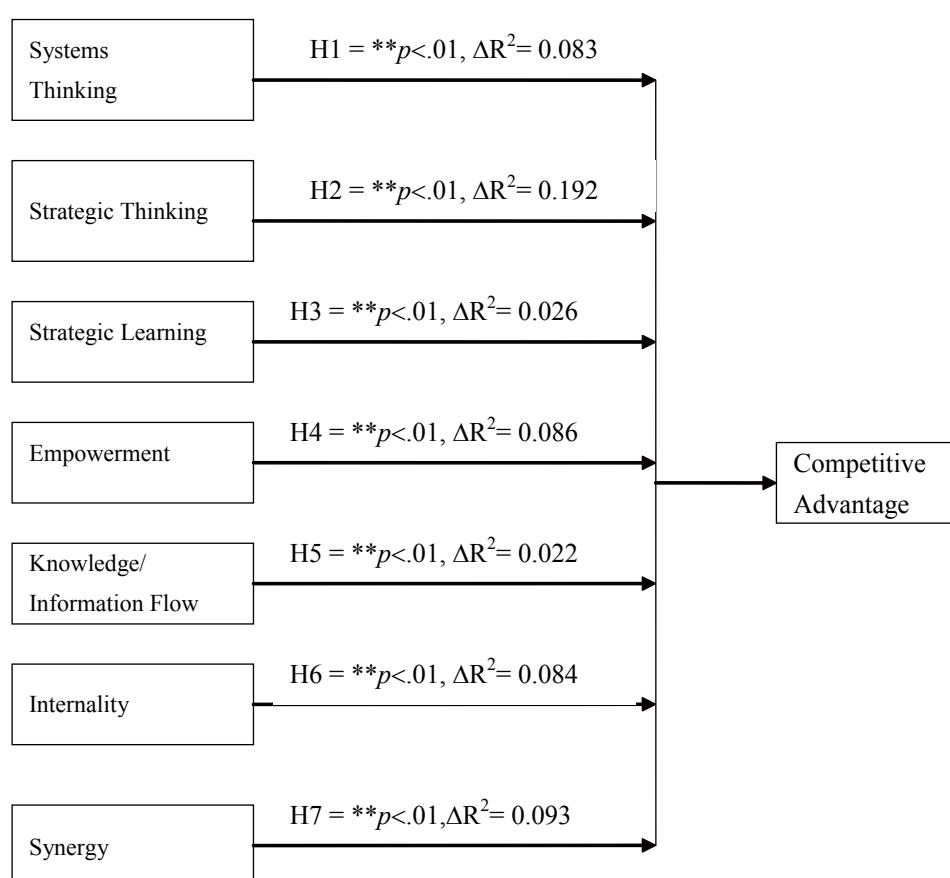


Figure 2
Regression Analysis Summary

Table 7
Analysis of Independency of Observations

Variable	Durbin-Watson
Systems Thinking/holistic thinking (ST)	1.98
Strategic Thinking (StrTh)	1.86
Strategic Learning (StrLrng)	2.06
Empowerment (Emp)	2.14
Knowledge Flow(KNF)	2.15
Internality (INT)	2.15
Synergy (SYN)	2.06

Results of regression analysis depict that all seven independent variables significantly predicted the achievement of competitive advantage, $F(7, 86) = 4.696$, $p < 0.001$. The p value depicts the goodness of fit. Table 8 reveals that in case of independent variable of strategic thinking (StrTh) the probabilities of the t statistic (3.236) for the b coefficients provided very strong evidence ($p < 0.05$) that the slopes associated with Strategic thinking were not equal to zero ($b \neq 0$). The b coefficients

associated with strategic thinking (0.592, $p < 0.05$) was positive, indicating a direct relationship with competitive advantage. Strategic thinking explained 59.2% of variance in achievement of competitive advantage.

For independent variable of synergy the probabilities of the t statistic (1.702) for the b coefficients provided strong evidence ($p < 0.1$) that slopes associated with synergy were not equal to zero ($b \neq 0$). The b coefficient associated with synergy (0.223, $p < 0.1$) was positive, indicating a direct relationship with competitive advantage. Synergy explained 22.3% of variance in the achievement of competitive advantage.

For the independent variables of systems thinking (ST), strategic learning (StrLrng), empowerment (Emp), knowledge/information flow (KNF), and Synergy (SYN), the probabilities of t statistic are .796, -1.386, .992, -0.876, and 1.154 for the b coefficients and provided little or no real evidence ($p > 0.1$) that the slopes related to ST, StrLrng, Emp, KNF, and SYN are not equal to zero.

The probability of the t statistic (2.691) for the b coefficients provided real evidence ($p < 0.001$) that the intercept was not equal to zero ($b \neq 0$). However, the coefficient associated with the intercept (8.203) indicated a direct relationship with competitive advantage. The intercept represented value of Competitive Advantage when all independent variables were equal to zero. The b coefficients associated with these variables (0.154, -0.247, and 0.192, -0.151, and 0.210 respectively) indicated direct relationships (in case of first, third and fifth variables) and inverse relationships (in case of second, and fourth variables) with competitive advantage. Due to their insignificant role, they explained only 15.4%, 24.7%, 19.2%, 15.1%, and 21.0% of the variation in the achievement of competitive advantage respectively.

Table 8
Coefficients of OL-CA Model (Standard Regression)
N = 94

(a)	B	SE	Beta	t	Sig.
Constant	8.203	3.049		2.690	0.009**
ST	0.154	0.194	0.096	0.796	0.428
StrTh	0.592	0.183	0.366	3.236	0.002*
StrLrng	-0.247	0.178	-0.203	-1.386	0.169
Emp	0.192	0.193	0.127	0.992	0.324
KNF	-0.151	0.172	-0.129	-0.876	0.383
Internality	0.210	0.182	0.149	1.154	0.252
Synergy	0.223	0.131	0.187	1.702	0.092***

Note. $R^2 = 0.227$, $F(7, 86) = 4.696$ ($p < 0.001$)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.1$

a. Dependent Variable: CA

The output of standard/simultaneous regression gave the following output for regression equation.

Competitive Advantage (CA) = Intercept + Slope1 (Systems thinking) + Slope2 (Mental models/Strategic thinking) + Slope3 (strategic learning) + Slope4

(empowerment) + Slope5 (knowledge/ information flow) + Slope6 (internality) + Slope7 (synerg) + random error

Or

$CA = \beta_0 + \beta_1 ST + \beta_2 StrTh + \beta_3 StrLrng + \beta_4 Emp + \beta_5 KNF + \beta_6 INT + \beta_7 SYN + \epsilon$

$CA = 8.203 + 0.154 ST + 0.592 StrTh - 0.247 StrLrng + 0.192 Emp - 0.151 KNF + 0.210 INT + 0.223 SYN + \epsilon$

Test of this part of OL-CA model (standard/simultaneous method) shows that comparatively among all independent variables the greatest influence on dependent variable of competitive advantage was explained by strategic thinking ($\beta = 0.592$), followed by the synergy ($\beta = 0.223$) (see Table 8).

9.3 Stepwise Multiple Regression Analysis

Stepwise multiple regression produced one model that significantly predicted the achievement of competitive advantage, $F(1, 92) = 23.152$, $p < 0.001$, and indicates that strategic thinking has the most significant contribution ($b = 0.725$, $P < .05$) to the prediction of variance in competitive advantage, as compared to the rest of predicting variables. Table 9 also shows that the probability of t statistic for b coefficient in the model provided strong evidence, i.e. $t = 4.304$, $p < 0.001$. The results of the model indicate that the slope associated with strategic thinking was not equal to zero ($b \neq 0$). The b coefficient associated (8.203) with strategic thinking is positive indicating a direct relationship with competitive advantage. The intercept represented value of competitive advantage when all independent variables were equal to zero. Results also indicate multiple R and adjusted R^2 for this model (Multiple $R = 0.201$ and adjusted $R^2 = 0.192$). Furthermore, table 9 indicates that 72.5% variance in competitive advantage was explained by strategic thinking in this model.

Table 9 also displays coefficients of intercepts of OL-CA model. The probabilities of the t statistic (4.304) for the b coefficients provided significant ($p < 0.01$) evidence that the intercepts were not equal to zero ($b \neq 0$).

Due to the results in stepwise output, six independent variables were excluded from the model because of little or no relationship with competitive advantage in presence of all other independent variables. These excluded variables are presented in Table 10 with their relevant values.

The collective analysis (stepwise) of all variables under OL-CA model reveals that strategic thinking alone has positive and significant contributions. Therefore, results indicate that strategic thinking must be focused when designing organizational strategies and organizational management development programs.

Regression Equation (stepwise)

$CA = \beta_0 + \beta_1 ST + \beta_2 StrTh + \beta_3 StrLrng + \beta_4 Emp + \beta_5 KNF + \beta_6 INT + \beta_7 SYN + \epsilon$

Model of Stepwise result: $CA = 11.584 + 0.725 StrTh$

Table 9
Stepwise Multiple Regression Analysis of OL-CA Model

(a)	Unstandardized coefficients		Standardized Coefficients		T
	B (b)	SE	Beta (b)		
Step 1	(Constant)	11.584	2.691		4.304**
	ST	0.725	0.151	0.448	4.812*

Note. $\Delta R^2 = 0.192$

* $p < 0.05$; ** $p < 0.01$

a. Dependent Variable: CA

Table 10
Excluded Variables of OLCA Model (Stepwise)

Model	Independent Variables	Beta In	t	Sig.
Step 1	Systems Thinking(ST)	.112	1.054	.295
	Strategic Learning (StrLrng)	-.041	-.383	.703
	Empowerment (EMP)	.131	1.254	.213
	Knowledge Flow(KNF)	-.010	-.099	.921
	Internality (INT)	.140	1.363	.176
	Synergy (SYN)	.183	1.852	.067
	Team Learning (TL)	0.083(b)	0.998	0.320

a. Predictors in the Model: (Constant), strategic thinking (StrTh)

b. Dependent Variable: Competitive Advantage (CA)

9.4 Regression Analysis of OL-CA Model

To observe and analyze the direct relationship of organizational learning (OL) with dependent variable of competitive advantage (CA), CA was regressed on OL. The results show that OL predicts the achievement of competitive advantage, $F(1, 92) = 15.213, p < .001$, and the significance level depicts that the model is fit. Results reveal a significant relationship between the independent variable of OL and the dependent variable of CA ($R^2 \neq 0$). The values of multiple R (.142) and adjusted R^2 (.133) indicate that organizational learning has a good relationship with competitive advantage, and will explain 13.3% of the variance in competitive advantage.

The probability of t statistic for b coefficient provides strong evidence, i.e. $t = 4.844, p < 0.001$, and indicates that the slope associated for organizational learning was not equal to zero ($b \neq 0$) (see table 11). The b coefficient associated with organizational learning (0.677) with adjusted $R^2 = 0.133$ was positive indicating a direct relationship with competitive advantage (CA). Organizational learning explained 67.7% of the variance in competitive advantage. The b coefficient associated with the intercept (13.573) indicated a direct relationship with competitive advantage. The intercept represented the value of competitive advantage when the independent variable of organizational learning was equal to zero.

Table 11
Coefficients of OL-CA (as summated variable)

(a)	Unstandardized coefficients		Standardized Coefficients		T
	B	SE	Beta		
Constant	13.573	2.82			4.844*
OL	0.677	0.174	0.377		3.900*

Note. $R^2 = 0.142, F(1, 92) = 15.213 (p < 0.001)$, Adjusted $R^2 = 0.133$

* $p < 0.01$

a. Dependent Variable: CA

The findings and the equation signify the application and practice of the concept of learning organization and organizational learning while conducting the strategic intervention programs and organizational development programs. The evidence indicates that organizational learning strongly affects the achievement of competitive advantage. Therefore, hypothesis H8 is supported. The

simple linear regression performed to test the second part of OLCA model gave the following output:

$$CA = \beta_0 + \beta_1 OL + \epsilon$$

$$CA = 13.573 + 0.677OL$$

The overall results, based on the work of Morgan,

Leech, Goeckner, and Barrett (2004), as well as Leech, Barrett, and Morgan (2005), reveal that the variable of strategic thinking (StrTh) with the employees of petroleum companies' sample significantly influenced the achievement of organizational learning of workers which further had a direct impact on the achievement of Competitive Advantage (CA).

CONCLUSIONS

The study aimed to test the theoretical underpinning that organizational learning is related to competitive advantage (Goh, 1997). Empirical findings show that theoretically assumed dimensions of the learning organization and organizational learning contribute significantly towards the achievement of competitive advantage. Research findings of the regression analysis revealed the impact of each component (independent variable) of a learning organization on achieving a competitive advantage. All hypotheses H1 to H7 are significant at < 0.01 .

Multiple regression standard model was found fit showing significant relationships ($R^2 \neq 0$) between 7 independent variables and the dependent variable of competitive advantage (i.e. $F(7, 86) = 4.696, p < 0.001$). The value of adjusted R^2 is 0.227, shows a significant and strong relationship. However, the most significant independent variables found are strategic thinking, and team learning which explained 59.2% and 22.3% of variance respectively in achieving competitive advantage.

Stepwise method revealed a single variable with a significant relationship ($R^2 \neq 0$) between independent variable of strategic thinking and dependent variable of competitive advantage (i.e. $F(1, 92) = 23.152, ps < 0.001$). Multiple R (0.201) and R^2 (0.192) characterized a significantly strong relationship.

Flexibility to change in any organization is considered a most important ingredient of a learning organization. Empirical findings reveal that OL practices exist in the petroleum organizations of Pakistan. Management can institutionalize the components of a learning organization strategically in their training programs as an important step to achieve excellent performance. Findings emphasize the importance of strategic thinking and synergy. The organizational culture should give prime support to these disciplines along with other disciplines of OL while preparing organizational improvement activities. The practice and integration of strategic thinking will inculcate the habit of challenging the basic assumptions (Argyris & Schon, 1978) and will foster generative learning in employees. The generative learning or double-loop learning modify the existing rules and policies and manifest itself in creative and innovative products, processes, and services which help in the achievement of competitive advantage.

RECOMMENDATIONS AND IMPLICATIONS

Statistical results reveal that organizations should nurture a learning culture where employee are willing to experiment and participate in decision-making. Training in the discipline of strategic thinking is recommended, along with the focus of building synergy by creating teams in the organization.

Research revealed some other areas that should be investigated. OL itself has few peculiar characteristics, i.e. flexibility to change, ability to create and innovate. Therefore researchers and academicians should study these areas.

The results indicate that the main contributors to OL are strategic thinking and synergy. Strategic thinking and synergy are the variables which should be practiced to further take advantage of these capabilities. Other areas of OL should be focused i.e. empowerment, knowledge flow, systems thinking, strategic learning, and internality should be incorporated in the training programs to optimally utilize the potential of all employees.

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