ORGANISATIONAL LEARNING AS A PERFORMANCE DRIVER IN CONSTRUCTION COMPANIES

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A learning organisation is an organisation skilled at creating, acquiring, transferring knowledge and modifying its behaviour to reflect new knowledge and insights (Garvin, 1993). Major competency of a learning organisation is its flexibility and adaptability. Therefore, it is expected that as the learning ability of an organisation increases, its performance should also increase in the long run. The objective of this paper is to present preliminary findings of an ongoing research about the importance of organisational learning as a performance driver in the Turkish construction industry. In this study, two indicators have been defined for measuring learning potential and performance in construction companies. In order to measure the ability of an organisation to learn, a model that simulates linkages between the sources, mechanisms, values and policies that support learning has been constructed. Each item, defined as an enabler of organisational learning within the model, is listed in a questionnaire. Respondents are asked to denote the importance of these items for organisational learning as well as how frequently/effectively they are used within the organisation. Following are the major headings of the questionnaire: Sources for individual learning, mechanisms/systems used to convert individual knowledge into corporate knowledge (team learning, sharing/storage of information, use of IT for handling information etc.), learning from other parties and existence of an organisational setting that supports learning. An index that takes into an account the utilisation of learning sources and mechanisms as well as existence of a suitable organisational culture is calculated for each respondent company. Performance is also measured by a subjective reporting approach using volume of contract awards and profitability as performance indicators. In this paper, the model used to simulate organisational learning will be presented and how it can be used to increase learning in construction companies will be discussed.

Keywords: learning mechanisms, organisational learning, performance drivers.

INTRODUCTION

"Knowledge companies" and "intelligent enterprises" are nothing new; all companies have been founded on knowledge. However, some companies have consciously defined systems and intended strategies for management of knowledge. The success of those companies that aim to increase their intellectual capital and organisational intelligence demonstrate the importance of "learning capability" as a major source of competitive advantage. A learning organisation is defined as an organisation skilled at creating, acquiring, transferring knowledge and modifying its behaviour to reflect new knowledge and insights (Garvin, 1993). Huber (1991) further denotes that the change in actions may not be necessary but he stresses the point of *potential change* in behaviour. Thus, organisational learning (OL) is about management of knowledge and improving organisational memory so that the organisation learns how to improve itself in the light of past experiences and information gathered from the external sources. OL is a process that is based on both individual action and organisational

structure. OL is about how organisational routines, rules and procedures structure individuals' new ways of thinking and performing tasks in the organisation. While individual learning is important as a foundation for collective learning, in the long run, it is of limited value to the company. Argyris (1999) argues that growth of knowledge of individuals in an organisation is necessary but not enough for achievement of organisational learning. What the individuals learn should be accessible to others at the company and added to the organisational intelligence. Duncan and Weiss (1979) differentiate individual learning and organisational learning depending upon behaviourist theory. They argue that individual learning occurs when people give a different response to the same stimulus, but OL occurs when groups of people give same response to different stimuli. According to Senge (1990), an environment that supports dialogue between individuals, teamwork, individual mental models and a shared vision is prerequisite for OL in an organisation. Furthermore, management of knowledge and corporate memory are also required for OL. Egbu (2000) denote that knowledge management and OL are not independent concepts and both are multi-layered, multi-facet concepts in driving organisational innovations for sustainability of competitive advantage. Consequently, the efficiency of utilisation of internal and external sources for knowledge acquisition and learning mechanisms to form organisational intelligence determine the learning ability of an organisation together with adequacy of organisational culture, structure and strategies that permit OL. A learning organisation needs practices and mechanisms to capture what is happening in the business environment, analyse it in the light of experience, document information, make it available to others for current and subsequent use, and finally, measure the organisation's rate and level of learning in order to ensure that improvements have actually been made (Olve *et al.*, 2000). If learning ability of an organisation is high, its ability to adapt to and capitalise on changes in its internal and external situation is also expected to be high. Therefore, learning capability constitutes a major source of competitive advantage for those companies operating in dynamic markets with high rate of change, like the construction industry.

OL in construction companies have been studied extensively in literature by many researchers and the relation between OL and related philosophies/management topics received much attention. Love *et al.* (2000) suggests that Total Quality Management (TQM) requires a commitment for learning and further identified TQM as a means to a learning organisation. Vakola and Rezgui (2000) explored the relationship between Business Process Restructuring (BPR), organisational learning and innovation, concluding that innovation which is an outcome of OL and BPR, has a potential to bring competitive advantage in the construction industry. Holt *et al.* (2000) argued that improving customer satisfaction lies in the ability of organisations to form alliances for mutual learning. Orange, Boam and Burke (1998) proposed a cross learning approach between partners in the construction industry to facilitate learning from others and offered a collaborative virtual environment for all parties associated with a project. Hakansson, Havila and Pedersen (1999) presented the results from a study about learning within business relationships formed around an ordinary construction project and concluded that the extent which learning takes place seems to be highly related with the existence of connections between the relationships. Kululanga *et al.* (1998) examined the learning mechanisms used by construction companies to imbibe knowledge and other stimuli from their internal and external environments and analysed utilisation rate of these mechanisms within the UK construction sector. Kululanga *et al.* (2001) further developed a framework to

measure construction contractors' OL and prepared a model that can be used by companies to check their weaknesses in becoming learning organisations.

It has been pointed out by many researchers that, as a result of increased learning, performance improvement over time is possible in the construction industry (Mason, 1993; Love *et al.*, 2000). Robinson *et al.* (2001) proposed a conceptual framework to link knowledge management strategy to business performance in construction organisations. Similarly, the aim of this current paper is to develop a framework to measure OL ability and performance, so that the relation between them can be proved empirically. Lack of a systematic approach for measurement of OL capability has been denoted to be a general problem in the literature on organisational learning (Garvin, 1993; Huemer and Ostergen, 2000; Kululanga *et al.*, 2001). The major objective of this research is to present a simplified model for measurement of OL and define indices which reflect learning ability and performance of a construction company. The necessary information to calculate those indices will be gathered by a questionnaire study. Finally, the aim is to find out if there exists a significant correlation between business performance and OL ability of a company. Within the context of this paper, the model and corresponding survey questions will be described by giving particular emphasise on difficulty of measuring OL ability in construction companies.

DIFFICULTIES IN THE MEASUREMENT OF OL

The role of environment: There has been a continuous debate between theorists about whether learning is an adaptive process or a pre-planned process. Contingency theorists assume organisations as open systems affected by their environment and argue that nature of information processing requirements is governed by uncertainty of environment. Also, resource dependence theory states that environment and organisation are two independent systems where the organisation has no control over the environment, which implies that learning follows from stimuli stemming from outside the organisation. Therefore, OL can be described as a rational and pre-planned process where an organisation tries to predict the changes in the environment and behaves accordingly. However, as noted by Huemer and Ostergen (2000), organisations have an active role in constructing the context in which they are embedded and they have an active intervention in the environment. OL is a matter of interpretation of the environment rather than predicting changes in the environment. An organisation has a choice of selecting the markets it is going to operate in it. The environment and organisation thus, are not independent and a model that simulates OL in an organisation should take into account of this issue.

Management of knowledge: Knowledge is information combined with experience, context, interpretation and reflection (Davenport *et al.*, 1998). Generally, there are two alternative theories about what knowledge management is about (Sveiby, 1997) managing information and managing people that emphasises the role information and people for effective management of knowledge, respectively. In fact, OL contains both dimensions. It is both about handling data and training people. What is necessary for OL is a structure to surround people and data. In order to model OL effectively, structure, people and data components should all be considered. In addition to this, Davenport (1997) defines the term "information ecology" to stress the role of environment for management of knowledge. Information ecology, which is the totality of environment and conditions under which an organisation lives, should be analysed to understand the organisational knowledge and how it can be managed.

Type of knowledge: Organisational knowledge consists of tacit and explicit knowledge. As the learning capability is about how organisational knowledge is turned into productive knowledge, a measurement system should take into account of both tacit knowledge, which is present in the minds of individuals, and codified knowledge, which is recorded and communicated throughout the organisation. By checking the availability of necessary databases, one can measure the extent of codified knowledge whereas it is impossible to measure what is in the mind of individuals. While trying to model OL, there are several assumptions made about this issue. For example, it is usually assumed that if learning sources are used effectively and frequently, organisational knowledge is formed and turned into productive knowledge.

OL strategy: It is apparent that the right climate should exist within a company so that learning sources and mechanisms are utilised effectively, and organisational learning is facilitated. Also, as stated by Senge (1990), companies should have an OL strategy. Developing the discipline of dialogue within the organisation, building team learning skills, encouraging multi-cultural and global mindsets and changing mental model relative to learning are proposed strategies to increase OL. A model for measurement of OL should be able to check if the right climate exists for OL as well as intended and implemented OL strategies. Measuring the organisational culture is a highly complicated task in itself. Also, all strategies are parts of a wider strategic perspective and higher-level objectives of a company. Thus, it is not easy to separate OL from other strategic management activities within the organisation.

THE RESEARCH METHODOLOGY

Although the above-mentioned difficulties exist for measurement of OL ability, frameworks should be developed to model OL process in construction companies, for companies to check their OL capabilities and improve their learning ability by removing the bottlenecks. Moreover, constructing such models can facilitate determination of significance of OL as a performance driver, enabler of TQM, BPR etc. In the presence of the above-mentioned difficulties, a model that takes into account of basically people, information and structure dimensions has been developed and further used to link business performance with OL ability.

Measurement of OL ability

The framework that will be used to measure OL in construction companies is given in Figure 1. The framework has three major components: sources, mechanisms and an organisational setting (structure, culture, strategies). Sources are further categorised in two groups; internal and external sources. Learning mechanisms are the tools or mediums that can be employed to create, share, distribute and interpret knowledge coming from internal and external sources. They are the mechanisms, which are used to manage organisational knowledge. Organisational setting is comprised of the structure, culture and strategies in a company. As noted by Kululanga *et al.* (2001), developing a culture of organisational learning does not come by chance but is a consequence of deliberate company actions. So, existence of those actions should be checked to decide on the appropriateness of organisational setting for OL.

The framework given in Figure 1 has been used as a foundation to prepare the contents of the questionnaire study. Thus, the questionnaire has been designed to measure OL along three dimensions (namely, sources, mechanisms and organisational

setting) defined within the framework. As a summary, the following two questions are tried to be answered;

- How frequently learning sources and mechanisms are utilised within the organisation?

- Does an organisational setting (culture, structure and strategies) exist to facilitate OL?

The questionnaire is comprised of ten pages and an information sheet about the aim of the questionnaire and major definitions of OL precedes it. In the first part, there exist some questions about general company information (turnover, age, level of joint venturing etc.) and its performance in the last three years. The forthcoming parts of the questionnaire about the sources and mechanisms for OL are summarised in Table 1. In these parts of the questionnaire, the mechanisms and sources are defined, and the respondents are asked to state how frequently the mechanisms are used as well as the availability of some information sources. Also, the respondents themselves will determine the importance of each learning tool.

The aim is to find out what the actual contributors of OL are, rather than guiding the respondents about what they should be. After finding the average significance rating for each source/mechanism considering all of the responses, the OL ability for each company can be calculated by multiplying frequency/availability rating by average significance rating for each item and adding them up. In order to calculate the OL index, organisational setting should also be analysed.
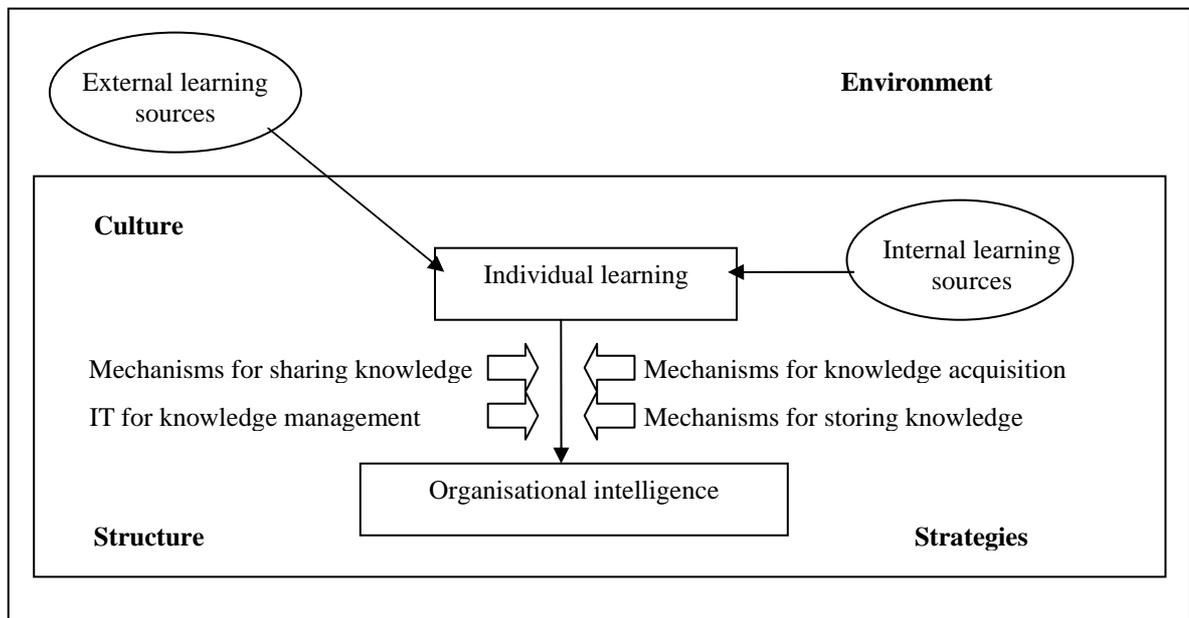

Figure 1: The OL framework

Table 1: Summary of major parts of the questionnaire about sources and mechanisms for OL

Part 1. Individual Learning Sources	Frequency (1-5 Likert scale)	Significance[1] (1-5 Likert scale)
Seminars		
Internet		
Congresses, exhibitions, trade shows etc.		
Technical publications (books, journals, reports etc.)		
Academic work by individuals		

Part 2. Learning from other parties	Frequency (1-5 Likert scale)	Significance[1] (1-5 Likert scale)
Clients (national, international)		
JV partners (national, international)		
Competitors (national, international)		
Universities		
Consultants		
Governmental bodies that are related with construction sector		
International organisations like World Bank etc.		
Organisations like Chamber of Civil Engineers etc.		
Associations like Turkish Contractors' Association etc.		

Part 3. Corporate knowledge acquisition mechanisms	Used or not (Yes/No)	Significance[1] (1-5 Likert scale)
Internal benchmarking		
Competitive benchmarking		
Value chain analysis		
Post project evaluation		
Environmental scanning		

Part 4. Knowledge storing mechanisms	Availability (Yes/No)	Frequency of utilisation of databases	Significance[1] (1-5 Likert scale)
Storage of data about productivity, unit costs, subcontractor performance, performance of personnel, competitor information, market intelligence etc.			

Part 5. Individual knowledge sharing mechanisms	Frequency (1-5 Likert scale)	Significance[1] (1-5 Likert scale)
Teamwork		
Regular-formal meetings		
Unplanned-informal meetings		
Internal seminars-presentations		
Brainstorming sessions		
Job rotation		
Informal meetings during social events		

Part 6. Knowledge sharing by IT	Availability (Yes/No)	Significance[1] (1-5 Likert scale)
Intranet		
On-line access to databases		
Decision support systems (using databases from different divisions)		
Web-based project management		

[1]Significance rating is an importance rating that reflects the contribution of each item to OL.

There are 18 stated hypothesis about the culture, structure and strategies to determine if the right climate exists for OL within an organisation. Respondents are required to evaluate the validity of these hypotheses for their own company using a Likert scale of 1 to 5. Validity of the hypothesis summarised below are tested within the questionnaire:

- Increasing OL is a part of long-term strategic plans.

- A shared vision exists within the company.

- There is a long-term commitment for OL.

- Contents of strategic plans and objectives are shared among employees.

- A democratic management style exists within the company.

- Proposals and criticisms of personnel are encouraged and taken into account during decision-making.

- A reward system to encourage OL exists within the company.

- Necessary funds and time are reserved for professional training and personal growth of each employee.

- Knowledge is perceived as one of the most valuable assets.

- OL is one of the major sources of competitive advantage for the company.

- Personal development and learning is a part of everyone's job.

- An organisational setting that encourages innovation and creativity exists within the company.

- Employees are encouraged to propose and try new ideas.

- Employees feel themselves as a part of the organisation.

- An environment for collaboration, information sharing and mutual learning exists between the company and its competitors.

- Financial as well as non-financial tools are used to motivate employees.

- An effective communication medium and channels exist within the company.

- There is mutual trust and collaboration between the employees.

Finally, the overall learning ability is measured by an OL index, which is a function of both effective utilisation of OL sources/mechanisms and existence of an organisational culture appropriate for OL.

Measurement of performance

Performance measurement systems are mainly based on quantification of financial indicators about profitability, revenues etc. using accounting data. However, financial measures are claimed to be short-term indicators and insufficient for understanding the dynamic business environment in which construction companies operate (Robinson *et al.*, 2001). Also, financial information is not easily accessible as the managers are usually reluctant to give this confidential data. There is a growing concern in construction industry that performance is a multi-dimensional measure that has a wider dimension than solely the financial perspective. The Balanced Scorecard approach developed by Kaplan and Norton (1996) provides an effective measurement system based on customer, internal business, learning and growth perspectives as well as the financial perspective. Performance according to each perspective can only be calculated if initially set objectives are known and the overall performance of a company can only be determined if the relative importance of different objectives are stated.

Within the context of this research, it has been assumed that learning is a performance driver just like technical competency, financial capability etc. and the final outcomes are considered rather than the drivers during performance measurement. It has been assumed that performance about all perspectives is reflected in the financial outcome. The financial performance is measured by using a subjective reporting approach (Dess and Robinson, 1984) rather than hard financial data. Respondents are required to evaluate their company against major competitors by considering their performance over the last 3 year time period. Two performance criteria have been defined; first, "the growth in contract awards" and the second, "profitability". By using a Likert scale, respondents are required to evaluate the performance of their companies according to these criteria. The overall performance is calculated by multiplication of each performance value by the importance rating attached to it and adding them up. So, the respondents assign importance ratings to each performance criteria again using a Likert scale and overall performance rating can be calculated by taking into account of relative importance of each criterion for each company.

Consequently, the relation between performance and OL in the Turkish construction industry is planned to be found by using these measurement systems and questionnaire results. Also, age, size, level of alliancing and international experience will be used as control variables.

Current state of the research
The questionnaire has been designed, three pilot studies have been conducted to test its efficiency and finally, they have been posted to 120 construction companies. The target population has been defined as the medium-large scale Turkish construction companies, majority of which are the members of the Turkish Contractors' Association (TCA). Currently, number of completed and returned questionnaires is 35.

CONCLUSIONS

OL can lead to significant cost reductions, improve quality and increase competitiveness. In order to investigate the significance of OL as a performance driver in construction companies, a questionnaire has been designed. For this purpose, a conceptual model has been developed for the measurement of OL ability and a subjective reporting approach has been utilised as the performance measurement method. Measurement of OL requires modelling of company-environment interactions within defined information ecology by taking into account of people and organisational culture dimensions. The OL framework proposed within this research project is used to measure OL ability along three perspectives; learning sources, mechanisms/tools and the organisational setting (culture, structure and strategies). OL ability is assumed to be high if the sources are used effectively to acquire knowledge; knowledge is stored and shared within the organisation to form corporate intelligence, and further used to improve decision-making within an organisational setting that encourages learning. An OL index is defined by using this framework and based on the questionnaire findings; existence of a possible correlation is searched between OL and performance indices. Research findings can further be used to identify the most significant enablers (sources, mechanisms, strategies etc.) of OL and propose strategies to increase OL in Turkish construction companies.

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