PROJECT CULTURE WITHIN CONSTRUCTION PROJECTS: A LITERATURE REVIEW

Jian Zuo [1] and George Zillante [2]

ABSTRACT

In recent years culture has become one of the most studied topics in construction management research. Some studies have investigated the influence of culture at different levels such as national culture, industry culture, organizational culture and professional culture. Few studies however, have focused on culture at the project level and its influence on construction project management practice.

Project culture is raised as a general concept in some academic papers and industry reports. These studies indicate that project culture is very important for the processing of construction projects however they do not provide a clear definition of project culture. In addition, there is no model that specifically examines the project culture of each construction project. This paper reviews the literature about cultural studies in a construction projects context, especially the culture at project level and concludes by suggesting a modified version of one current and generally used organizational culture model.

KEY WORDS

Project culture, Construction projects, Organizational culture.

INTRODUCTION

The construction industry has long been criticised for its poor performance and confrontational disputes. Cultural shifts are promoted to improve the effectiveness and competitiveness of the construction industry (APCC 1997, RCBCI 2002, Latham 1994, Egan 1998) and Lean Thinking has been identified as one of agents to catalyze this cultural change (Kumaraswamy et al. 2002).

A number of studies have been undertaken to investigate the influence of culture at the different levels (e.g. national culture, organizational culture) on construction management practice (Loosemore and Muslmani 1999, Chan and Tse 2003). In the construction context, cultural studies have also been undertaken at both the industry and professional levels. For instance, adversarial relationships, fragmented approaches and confrontational relationships are identified as forming the culture within the construction industry (McGeorge and Palmer 2002). There are differences between cultures of the different professions involved in construction projects (Liu and Fellows 1999). However, there are not many studies that focus on the culture at the project level and their influence on construction project management practice. As a project-based industry, the construction industry needs more insights on the cultural issues at the project level.

This paper reviews the literature on project culture from a Lean Production context. The main objectives are:

1) to provide a general understanding of the concepts of project culture
2) to highlight the most commonly employed approaches used to investigate project culture; and
3 to identify gaps in the literature, to provide suggestions for further research and to propose a theoretical framework for project culture.

1 PhD Candidate, School of Natural and Built Environments, University of South Australia, North Terrace, Adelaide, South Australia 5000, Australia, Phone +61 8 8302 1858, FAX +61 8 8302 2252, Jian.Zuo@postgrads.unisa.edu.au

2 Associate Professor, School of Natural and Built Environments, University of South Australia, North Terrace, Adelaide, South Australia 5000, Australia, Phone +61 8 8302 2379, FAX +61 8 8302 2252, George.Zillante@unisa.edu.au

LEAN PHILOSOPHY AND ITS APPLICATION IN CONSTRUCTION CONTEXT

Originally derived from the Toyota Production System, Lean Production is recognised as the most efficient production system in the world today. In the lean approach, production systems are designed to maximize value and minimize waste and a temporary production system should be designed, controlled, and improved for delivering the products to customers (Ballard et al. 2001).

In essence, lean thinking focuses on reducing unnecessary efforts by removing non-value-adding activities in the production system. All activities that can not add value to the whole system are viewed as waste and should be eliminated.

In 1992, Koskela introduced the application of lean production to construction in his seminal report: Application of the New Production Philosophy to Construction. Based on his literature review and field study, Koskela concluded that construction should adopt lean principles and that this adoption would be a fundamental paradigm shift for the construction industry. Furthermore, he identified four key peculiarities of construction that affect the adoption of lean principles in the construction industry viz: one-of-a-kind product, site production, temporary multi-organization and regulatory authorities.

Since then, a number of academic papers and reports have been published to discuss how this new production philosophy could be better implemented in the construction industry. A construction project is a temporary production system (Bertelsen 2004) and is physically linked to the supply chains that exist independently of the project (Ballard 2000). If this is understood, supply chains may be reconfigured, and in turn result in the reduction of both costs and lead times. It is generally accepted that lean thinking brings in advantages by pushing the operational culture towards reduced waste and greater efficiencies (Egan 1998, Kumaraswamy et al. 2002). The goal of lean construction is to better meet customer needs while using less of everything (Howell 1999). However, as a new way to manage construction, Lean Thinking shifts participants' attentions from how each activity is managed to how a unique value for the customer can be reached and delivered.

Furthermore, lean production helps to improve system reliability, which is fundamental for trust to occur (Howell and Ballard 1998). Being identified as an important factor for successful projects, trust can be achieved via collaborative approaches (e.g. partnering and alliancing) by shifting all the parties' attitudes from seeking to maximise individual gains to the continuous search for solutions that benefit all participants (Ng et al., 2002). Similarly, lean thinking supports the development of teamwork and a willingness to shift the burden along supply chains (Howell, 1999). As a result, waste can be reduced by having compatible objectives and common goals and a high level of trust.

It is also suggested that lean thinking can act as an agent for cultural change in the construction industry by moving it from the current backward, multi polar adversarial position to a more cooperative and coalescent state (Egan 1998, Kumaraswamy et al. 2002).

At the same time, associations like the Lean Construction Institute and the International Group for Lean Construction emerged to provide a platform for the scholars in this field to discuss and exchange ideas. Lean construction has also become a formal study subject and is now being taught in both undergraduate and graduate curriculum by instructors at institutions of higher education around the world (Ballard and Howell 2003, as cited in Abdelhamid 2004).

ORGANIZATIONAL CULTURE IN LEAN PRODUCTION

The implementation of Lean Manufacturing involves changing the business processes of companies and *cultural readiness* is identified as one of the critical requirements for any significant business process change (Kettinger and Grover 1995, as cited in Motwani 2003). The concept of cultural readiness means that there is an appropriate organizational culture to facilitate the integration of individual learning with organizational learning; while open communication and information sharing can promote a common culture and innovative behaviour in the organization (Motwani, 2003).

Using the data from New United Motor Manufacturing (NUMMI), an automobile plant which implemented Lean Manufacturing, Rothenberg (2003) observed that there was a culture of participation, collaboration and trust within NUMMI, and this increased the social capital of specialists in the organization. "A careful period of union/management negotiation at the plant's birth, stringent employee selection criteria, and training to socialize workers into this culture increased worker fit with the more cooperative Toyota management philosophy" (Rothenberg 2003, p.1799).

McBridge (2004a) points out that the failure to implement the Toyota Production System (TPS) or Lean Manufacturing is a result of manage-

ment's inability to create a true Lean culture. In order to sustain Lean, there is a need for a continuous improvement culture rather than simply embracing the Lean tools. The lean culture within TPS is illustrated as follows:

"At Toyota everyone within the organization … is challenged to use their initiative and creativity to experiment and learn. … All areas of the organization … are staffed with carefully selected individuals, and the company gives them directives to improve their processes and increase customer satisfaction. Toyota invests time and money into their employees and has become the model for a true learning organization. The importance of teams and teamwork is a way of life: team building training is required, and it is put to practice daily" (EMS Consulting Group July 2004 Toyota Culture TPS Lean Culture Article).

He further suggests that everyone in the company must be involved in the transformation of culture and middle managers could be used as change agents to drive this transformation. A lean culture encourages employees to make suggestions and changes in the company, empowering employees to take control and ownership of their work and make is better (McBridge 2004b).

PROJECT CULTURE IN GENERAL

The management literature sheds light on project culture from the perspective of project management. According to Gareis and Huemann (2000), project culture is one of the project objectives during the project management process. It is the project manager's responsibility to shape a project culture that simulates teamwork and high levels of personal motivation as well as a capacity to quickly identify and resolve problems that threaten project work (Gray and Larson 2000, Widmen 2001). Korzilius (1988) stresses that it is very important to establish a unified and strong project culture for successful projects because the lack of a unified culture can be detrimental to the attainment of the overall project objectives. Being identified as one dimension of the project environment, the culture developed within a project is often a reflection of the leadership and organizational structure which is adopted for the project (Widmen 2001).

In the construction context, there are a number of statements regarding project culture in construction projects, however they do not go on to measure or assess the impact of project culture, e.g. a constructive project culture should be developed in order to produce effective project teams (Walker 2002); "…the advantage of a strong project culture in construction projects (is) enhanced effectiveness….that contributors learn to live together and are less parochial, and that it reconciles conflicts" (Newcombe 1997, as cited in Walker, 2002, pp. 129). Kwan and Ofori (2001) point out that the project prehistory and prior working relationships have the most significant impact on project culture. An ideal project culture in construction projects should be cooperative and collaborative (Cooperative Research Centre (CRC) for Construction Innovation 2004, Phua 2004).

The research conducted by the CRC for Construction Innovation (2004) suggests that the success of projects, particularly alliancing projects, is predicated on developing a collaborative project culture. Using case studies, interviews and questionnaires, CRC for Construction Innovation researchers Rowlinson and Cheung (2004) argue that there is a mismatch between organizational cultures of the investigated government departments and the culture of the project which they are working for; "project personnel expect to operate in an environment displaying a task culture but perceive that they are working in a role culture" (CRC newsletter June 2004 Issue 10). Further research has been conducted to investigate whether this mismatch results in the low level of commitment observed in the surveyed personnel.

Key Performance Indicators (KPIs) affect the project culture through influencing how project participants work together during the project process. As compilations of data measures used to assess the performance of a construction operation, Key Performance Indicators are the methods management uses to evaluate employee performance of a particular task (Cox et al., 2003). Typically the actual performance is compared with the estimated performance in terms of effectiveness, efficiency, and quality in terms of both workmanship and product.

In a typical project management system, the performance of each participant (or participating party) is evaluated and then rewarded based on their own contribution to the project. As a result, participants may compete with each other for their own benefits and individual objectives rather than the common goals (objectives of the project). This type of project culture is destined to be detrimental to the success of the project.

Construction projects are usually procured by competitive tendering. This competition, compounded with the different objectives of the contracting parties and the practice of improper risk allocation, have created adversarial relationships and resulted in a poor culture (APCC 1997, Latham 1994, Egan 1998).

The way that project participants behave within the project environment will be different and depend on the focus of management on different

KPIs. This leads to different cultures. Xiao and Proverb (2002) point out that the organizational culture dominated by short-term financial consideration, will have a negative influence on the quality performance of contractors and lead to uncooperative, antagonistic and suspicious relationships with clients and other parties in the project.

EFFORTS TO MEASURE PROJECT CULTURE

Anderson (2003) applies the organizational culture model and instrument developed by Harrison (1972) and advanced by Handy (1978, 1985) to assess the culture at both the project level and the organizational level. The results show that a stronger task-oriented culture, which has been accepted as the most appropriate project culture, improves the budget performance of a project, while having no direct influence on the other performance parameters of the project e.g. schedule, participants' satisfaction, functionality, etc. To reach a task-oriented culture, hierarchical elements of the project must be eliminated by adopting a flatter project organization structure, group decision making and open and efficient communication. This approach can increase both responsiveness and flexibility.

Thomas et al. (2002) employ the standard Competing Values Framework model as well as the instrument developed by Cameron and Quinn (1999) to assess the project culture of thirteen Australian construction projects. This research found that Clan type cultures correlate with better quality outcomes whereas market cultures, more common on construction projects, are found to correlate with weaker quality outcomes. Thomas et al. (2002) further explain the results as:

Market culture is results orientated. Within this culture, the management styles are focused on short-term goal attainment and project managers are 'hard-driving' and competitive. This type of culture focuses on the individual and his/her ability to produce. These forms are not conducive to developing co-operative, open, team environments, but rather, adversarial, conflict-ridden projects concerned with individual, or organizational, self-preservation.

Clan culture places a premium on team cohesion, consensus and morale. Managers are people oriented with a mentor or facilitator style. They recognized and were receptive to the needs of the individual and the team as a whole. It logically follows that this approach to managing projects is most likely to nurture an environment conducive of proactive, committed, and open team working." (Thomas et al. 2002, p.10).

The authors suggest that the project culture on construction projects should be shifted from the current common market culture to a clan culture. They argue that a project culture should be designed to align organizational goals and objectives with those of the individual participants (which helps to reduce conflicts), to enhance communication and coordination and to increase the ease with which project objectives are achieved.

The above approach used to measure the project culture, is simple and easy to employ. To assess the project culture in one construction project, we only need to choose one available instrument of a well-established organizational culture model and then distribute this instrument to participants of this project. This approach does not address the special characteristics of construction projects as they differ from organizations in many ways. When compared with organizations and projects in other industries, construction projects are undertaken by a relatively large number of independent firms thereby creating a potential for conflict between the needs of each firm and of each project (Murray et al. 1999, Walker 2002). The different cultures exist not only within the different organizations but also within the different professional groups (Liu and Fellows 1999, Riley and Clare-Brown 2001).

On the other hand, there may be some elements of project culture that the above approach misses. For instance, the project culture may be influenced by both national culture and organizational culture of the participants (Egginton 1996).

In addressing above issue, Kumaraswamy et al. (2001) suggest a framework to explain and analyse the origins and formation of the project culture in construction projects. In this framework, a typical project culture is derived from a set of four overlapping sub-cultures (see figure 1):

a) organizational sub-cultures that are influenced by national culture, industry culture, ownership, and historical factors;
b) operational sub-cultures such as quality culture, safety culture, learning culture, etc;
c) professional sub-cultures that are influenced by the type of members, origin and history, type of task/function, etc; and
d) individualistic sub-cultures that are influenced by national culture, ethnic factors, social status, religion, etc.

Among a number of components contributing to each sub-culture, one or more sub-cultures may dominate, depending on their 'relative strengths' (Kumaraswamy et al. 2002). Accordingly Hofstede's cultural model should be used to assess the culture in each sub-culture and then to assess the whole project culture. This approach

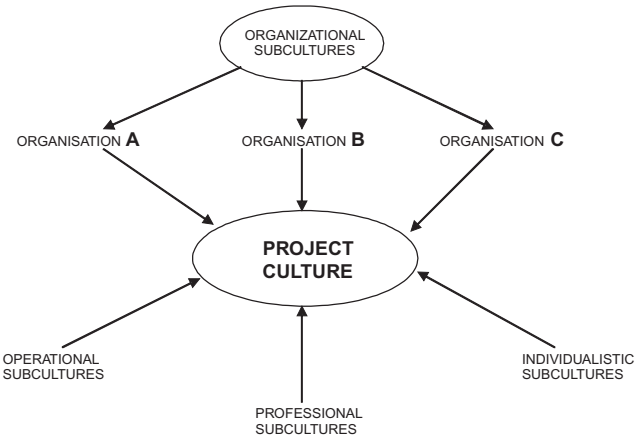

Figure 1: Sources of typical Construction Project Culture (Source: Kumaraswamy et al. 2001, p 6)

will enable a comparison of the contributions of each source and end-results.

LIMITATIONS OF THE PREVIOUS STUDIES

It should be noted that there are some limitations of previous studies that have been conducted to investigate project culture.

Firstly, there is no clear definition of project culture, especially in the context of construction projects. An ambitious concept results in the difficulties to conceptualize and then measure the project culture.

Secondly, the simple approach to apply the original instrument of a well-established organizational culture model to measure the project culture of construction projects (e.g. Thomas et al., 2002) is limited, as these general management-derived organizational culture models have little consideration for the specific characteristics of construction projects. For instance, the integration between the functional departments of one organization, which is stressed in numerous organizational culture models, (e.g. Cameron and Quinn 1988, Harrison 1972, Handy 1985) should be modified to suit construction projects because the integration of the different functions (services) in construction projects is essential for good constructability (CII Australia 1996, Kog et al. 1999, Arditi et al. 2002).

Thirdly, the framework proposed by Kumaswamy et al. (2001, 2002) is too complex to measure project culture by applying Hofstede's cultural model in each sub-culture and its contributory components and, finally in the project culture itself. As there are a number of organizations as well as specialists involved in a typical construction project, it is not difficult to realize that there will be a large number of resources needed to diagnose the whole project culture. As previously noted, this method of investigating project culture is more easily said than done and a more detailed and construction-specific evaluation methodology needs to be developed.

In summary, measuring the project culture in one construction project requires a relatively simple, easy to use and context-specific framework. This framework is proposed in the next section.

PROPOSED DEFINITION AND CONCEPTUAL FRAMEWORK

CONCEPTUALIZE PROJECT CULTURE

With reference to the previously mentioned well-recognized definition of organizational culture (e.g., Hofstede 2001, Schein 1985), this paper defines project culture as:

> *"the shared values, basic assumptions and beliefs that the participants involved in a project hold that determine the way they process the project and the relationship with each other in the project environment"*

At the same time, it is proposed to establish a conceptual framework based on the modification of well-established organizational culture models to accommodate the specific characteristics of construction projects. The instrument will be distributed to key project participants to examine the elements of the project culture in each construction project according to the proposed definition.

WHY A MODIFIED ORGANIZATIONAL CULTURE MODEL?

There are numerous studies that refer to projects as temporary organizations (e.g., Lundin 1995, Packendorff 1995, Engwall 2003, and Söderlund 2004). Turner and Müller (2003) re-define project as:

> *"A project is a temporary organization to which resources are assigned to undertake a unique, novel and transient endeavour managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change." (Turner and Müller 2003, p7)*

In construction projects context, Cherns and Bryant (1984) identify temporary multi-organizations (TMOs) as the nature of the construction projects (see also Liu and Fellows 1999, Murray et al. 1999).

Therefore, the project culture framework that is employed in this study is based on well-established and well-recognized organizational culture models with necessary modifications to accommodate the specific characteristics of the construction projects. This framework does not

attempt to capture all culture values/components/traits in the construction projects. Instead, those key components of the project culture, which are possibly responsible for the success of construction projects in terms of time performance, high quality, client satisfaction, etc, will be identified in this framework. The relationships between the project culture and the project performance will help the project managers and the stakeholders involved in a construction project to improve the effectiveness of the project (team) and hence the possibilities for successful outcomes.

PROPOSED CONCEPTUAL FRAMEWORK

The project culture conceptual framework proposed in this paper is based on modifying a well-established organizational culture model to accommodate the specific characteristics of the construction projects. The most widely cited definition of organizational culture is what Schein (1985 pp. 9) defined as: "a pattern of shared basic assumption that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems".

Specifically, Quinn (1988) refined this definition as the set of values and assumptions that underlie the statement—"This is how we do things around here". Subsequently, Cameron and Quinn (1999) established a Competing Values Framework to diagnose the organizational culture. In this model, they identified two dimensions of organizational culture—Internal Focus and Integration vs. External Focus and Separation; Flexible and Discretion vs. Stable and Control. The mixture of these two dimensions generates four different culture profiles within the organization: Clan, Adhocracy, Hierarchy, and Market, which are respectively support oriented, innovation oriented, rules oriented, and goal oriented. This conceptual model has gained support from various studies that provide empirical evidence (e.g. van Muijen et al. 1999) and has been applied in project culture studies in the construction context (Thomas et al. 2002).

Table 1: Proposed Project Culture Conceptual Framework

The way participants process the project	Fragmented	The design and construction function are separated and constructability is seldom considered during the project process.
	Integrated	Inputs of various contributing parties (e.g. design, construction, consultant, etc) are encouraged in the early stage of project process.
	Stable	The project participants prefer a stable project environment and feel uncomfortable with risk. Core values are always emphasized during the process of project. The approach to undertake the project is consistent and predictable.
	Flexible	The way a project is processed is very flexible and easy to change. Innovative approaches, which include risk-taking, are encouraged and rewarded in the project process. Failure is viewed as an opportunity for learning and improvement
The relationship between participants in the project environment	Short-term relationship	Short-term focused. The relationship between the project participants is project-based and one-off. The participants seldom care about each other.
	Long-term relationship	Strategic focused. There are continuous relationships between the project participants. The client would like to use the same organizations to provide service in future projects. Future business is expected.
	Contractual relationship	The contract documents are critically important for the project process and resolving conflicts. Project participants tend to employ legal methods to solve these conflicts.
	Trust-based relationship	Project participants believe that trust is critical to the relationships with each other. If conflicts arise, inter-personal relationships are often been used to solve the conflicts. The contract is not viewed as a discreet transaction but more of a continuation of previous and future transactions.
	Adversarial attitude/behaviour	Conflicts always arise during the course of projects. Less effort is made to obtain a common goal between various project participants in terms of the construction project. Project participants fight each other on behalf of their respective interests.
	Co-operative attitude/behaviour	There are few conflicts during the course of projects. Emphasis is placed on aligning the objectives of different participants and organizations to a common goal—the objectives of project. Teamwork is popular. The project participants collaborate with each other.

Given the foregoing, it is appropriate to establish the project culture conceptual framework based on Cameron and Quinn (1999)'s Competing Values Framework. Using this well-recognized organizational culture model, as well as considering the specific characteristics of construction projects, the project culture conceptual framework is proposed as as per Table 1.

CONCLUSIONS

This paper reviewed the literature on project culture both in a general and in a construction context. Generally, the culture within one construction project influences the behaviour of the participants and also the performance of the project. Although there is no clear definition of project culture, it is generally accepted that an appropriate project culture (e.g. positive, strong, co-operative, and collaborative) should be developed and maintained within each project environment for in order to promote improvement and performance of a project. At the same time, Lean Thinking is recognized as a catalyst to promote cultural change and to create a positive project culture by facilitating participants to focus on satisfying client's requirements at the project level. By suggesting a modification of a well-established and well-recognized organizational culture model, this paper proposes a clear definition and a conceptual framework for project culture in the construction context.

Further research is needed to make this theoretical model operational. Firstly, other organizational culture models (than Cameron and Quinn (1999)'s Competing Values Framework) need to be reviewed in order to supplement the conceptual framework of project culture. Secondly, an extended literature review should be conducted to capture the elements of each dimension of the project culture proposed in the above framework. Thirdly, preliminary interviews should be conducted to help determine what industry professionals think about project culture and to supplement the elements missed in the previous studies. Finally, a questionnaire survey of a relatively large population should be conducted in order to capture empirical evidence about project culture in the construction context.

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