Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 35 (2017) 136–147

International Journal of Project Management

www.elsevier.com/locate/ijproman

Effect of organizational culture on delay in construction

David Arditi [a], Shruti Nayak [a], Atilla Damci [b,*]

[a] Department of Civil, Architectural and Environmental Engineering, Illinois Institute of Technology, Chicago, IL, USA
[b] Department of Civil Engineering, Istanbul Technical University, Istanbul, Turkey

Received 19 February 2016; received in revised form 17 October 2016; accepted 27 October 2016
Available online 16 November 2016

Abstract

Delay is one of the most common problems in the construction industry. This study aims to explore the relationship between a construction company's organizational culture and delay. A questionnaire survey was administered to construction companies located in the U.S. and India in order to collect data on their organizational culture and the amount of delay that they experienced in their projects. The results of this study show that construction organizations in the U.S. are dominated by "clan" culture whereas those in India are dominated by "market" culture. The study also shows that the percentage of delay relative to project duration is lower in the U.S. compared to India. Despite the fact that delays are caused by a multitude of reasons often mentioned in the literature, statistical analysis indicates that there is also a significant relationship between organizational culture and the magnitude of delays. This relationship could be useful for a construction company in cultivating an organizational culture that is expected to reduce project delay. It could also be of benefit to international contractors relative to their expectations vis-à-vis time performance in projects undertaken in different countries.

Keywords: Organizational culture; Delay; Scheduling

1. Introduction

Delay has always been one of the major problems in the construction industry. Delay in a construction project has severe consequences on most project goals (Enshassi et al., 2010; Kazaz et al., 2012). Over the years, professionals and researchers have investigated various aspects of delays such as their contribution to disputes and adverse relationships among the project participants (Al-Khalil and Al-Ghafly, 1999), their causes and entitlement issues (e.g., Fallahnejad, 2013; Mahamid et al., 2012; Abd El-Razek et al., 2008), their effects in project performance (e.g., Sambasivan and Soon, 2007; Odeyinka and Yusif, 1997; Aibinu and Jagboro, 2002), and delay analysis techniques (e.g., Hegazy and Menesi, 2008; Shi et al., 2001; Arditi and Pattanakitchamroon, 2006, 2008). Regardless of the issues investigated, delays' magnitude, causes, and remedies may be different in different countries. For example, studies exist in the literature (e.g., Al-Kharashi and Skitmore, 2009; Sambasivan and Soon, 2007; Frimpong and Oluyowe, 2003) revealing that different causes of delay are experienced in different countries. In addition to studies that point to causes that are beyond the control of the project participants (e.g., adverse weather conditions and a declining economy), and causes that are initiated by the owner (e.g., design changes and delayed payments), quite a few studies found that many of the causes of delays are contractor-related (e.g., poor site management, subcontractor problems, poor scheduling, financial difficulties, and limited experience).

The specific question to be answered here is: "Why do construction companies experience different causes of delay in different countries?" Some researchers claim that a possible reason is national culture. For example, according to Lewis (2005), the perception of time is different in different cultures. In some western cultures (e.g., the U.S. and the Anglo-Saxon world in general), there is a linear vision of time and individuals cannot

* Corresponding author.
E-mail address: damcia@itu.edu.tr (A. Damci).

http://dx.doi.org/10.1016/j.ijproman.2016.10.018
0263-7863/00/

bear to be idle. Individuals dominated with western cultures think that things are done more efficiently if they do one thing at a time within a fixed schedule. In contrast, in some eastern cultures (e.g., India and Asian countries in general), individuals perceive time as cyclic, not linear, where the same opportunities or risks will present themselves in the future. Individuals dominated by eastern cultures do not prefer to make quick decisions or to treat a current deal on its present merits (Lewis, 2005). On the other hand, according to Naoum et al. (2015), organizational culture affects the approach to decision-making, the quality of communication, and working relationships. Can it also affect the delays experienced in different circumstances? This leads to the question: "Can it be that the different causes of delay experienced in different countries are related to the culture of construction companies?"

Even though there are signs of a possible relationship between time and organizational culture, none of the studies in the literature discusses whether there is a relationship between a construction company's organizational culture and the delay they experience in their projects. The objective of the study is to fill this gap. It is hypothesized that the organizational culture of construction companies may affect delays in the projects undertaken by these companies. Understanding the relationship between organizational culture and delay could be useful in cultivating the right organizational culture that can reduce delay in construction projects. It is important to explore this relationship particularly because of the great impact of the construction industry on the economy of a country. Reducing delay in construction projects will effectively increase construction productivity and will affect the economy positively.

In order to investigate the relationship between the organizational culture of construction companies and delay in their construction projects, the situations in the U.S. and India are investigated in this study by surveying personnel working in the scheduling departments of construction companies in the respective countries. There are two reasons for performing the study in the U.S. and India. The first one is related to the magnitude of delay in construction projects in these two countries. According to a report prepared by the United States Government Accountability Office (2013), the delays experienced by the Department of Veteran Affairs in their largest medical-center construction projects ranged from 14 to 74 months, resulting in an average of 35 months per project. On the other hand, the annual report published by the Ministry of Statistics and Programme Implementation (2016) states that the time overrun in construction projects in India ranges from 1 to 261 months. These two reports show that the range of delays in the U.S. and India substantially differs from each other. The second reason is related to the national culture of the U.S. and India. A widely quoted study by Hofstede et al. (2010) about national culture revealed that American and Indian individuals' scores on the dimensions of national culture are quite different. Therefore, two countries that are radically different from each other in terms of culture and delay in construction are the best candidates to be elected for this study.

The next section presents an overview of delay in construction, organizational culture in general, and organizational culture in the construction industry. This is followed by outlining the research methodology and discussing the findings of this study. Finally, the paper ends with a conclusion that summarizes the findings, makes recommendations for schedulers, discusses the limitations of the study, and provides future research directions.

2. Theoretical background and literature review

2.1. Delay in construction

Even though achieving substantial completion within the specified period in the contract is an obligation for a contractor, construction time can be affected by unexpected events during the execution of the project. Unexpected events may be contractor-related (e.g., ineffective project planning and scheduling, rework due to errors), owner-related (e.g., change orders, delay in progress payments), consultant-related (e.g., lack of experience of consultant in construction projects, inaccurate site investigation), labor-related (e.g., absenteeism, low productivity), design-related (e.g., omissions in project design, design errors), material-related (e.g., late delivery of materials, escalation of material prices), equipment-related (e.g., equipment breakdowns, improper equipment), project-related (e.g., complexity of the project, changed conditions), and external-related (e.g., natural disasters, changes in government regulations and laws) (Arditi and Robinson, 1995; Shi et al., 2001; Kim et al., 2005; Sweis et al., 2008; Gunduz et al., 2013a). The delay caused by these unexpected events in an activity can occur in three forms (Keane and Caletka, 2015): (1) delay to commencement, (2) extended duration, and (3) suspension during performance. Delays can be categorized into three groups, namely (1) excusable compensable delays, (2) excusable non-compensable delays, and (3) non-excusable delays. An excusable compensable delay can be defined as the delay that is caused by actions that are outside of the contractor's control but within the owner's control (e.g., owner-directed changes, design revisions). Having an excusable compensable delay entitles the contractor to an extension of time and financial recovery. An excusable non-compensable delay is caused by actions for which neither the owner nor the contractor is responsible (e.g., severe weather conditions, labor strikes). This type of delay entitles the contractor to an extension of time only. A non-excusable delay is the delay that is solely caused by the contractor (e.g., lacking the proper equipment to perform the work, improper allocation of resources). Since the contractor is responsible for the delay, the contractor will not be entitled to an extension of time or damage compensation (Arditi and Pattanakitchamroon, 2006; Gould, 2012; Keane and Caletka, 2015).

There is extensive literature on causes of delay in construction. In this study, thirty-nine journal papers were reviewed in order to provide a better understanding to the causes of delay in construction. Table 1 presents the major causes of delay in projects undertaken in twenty-three different countries, and sheds light on the most and least common causes of delay in construction. The most common causes of delay in construction are delays in owner

Table 1
Major causes of delay in the construction industry.

Researchers	Country	Causes of delay																
		Poor site management and supervision	Problems related to subcontractors	Poor planning and scheduling	Inadequate contractor experience	Late delivery of materials	Design changes during construction / Change orders	Incomplete or improper design	Contractor's financial difficulties	Delays in contractor's payment by owner	Shortage of materials / equipment / manpower	Unforeseen geological conditions	Difficulties in obtaining permits and excessive bureaucracy	Weather condition	Slow decision-making process	Economic problems (e.g., inflation, fluctuation)	Poor contract management	Poor labor productivity
Ruqaishi and Bashir (2013)	Oman	*	*	*		*												
Gunduz et al. (2013a, 2013b)	Turkey	*		*	*	*	*											
Fallahnejad (2013)	Iran		*			*						*						
Doloi et al. (2012)	India					*	*	*	*				*					
Kazaz et al. (2012)	Turkey						*		*	*								*
Mahamid et al. (2012)	Palestine									*	*		*					
Yang and Wei (2010)	Taiwan			*	*		*			*								
Kaliba et al. (2009)	Zambia						*			*						*		
Al-Kharashi and Skitmore (2009)	Saudi Arabia					*		*		*								
Tumi et al. (2009)	Libya						*	*	*		*				*			
Toor and Ogunlana (2008)	Thailand		*	*	*			*										
Sweis et al. (2008)	Jordan						*		*		*							
Abd El-Razek et al. (2008)	Egypt						*		*	*							*	
Sambasivan and Soon (2007)	Malaysia	*	*	*	*					*								
Alaghbari et al. (2007)	Malaysia									*	*				*			
Assaf and Al-Hejji (2006)	Saudi Arabia						*	*		*								
Abdul-Rahman et al. (2006)	Malaysia			*			*	*		*	*							
Aibinu and Odeyinka (2006)	Nigeria		*					*	*	*	*							
Faridi and El-Sayegh (2006)	UAE	*		*				*			*				*			
Lo et al. (2006)	Hong Kong	*		*								*						
Koushki et al. (2005)	Kuwait						*			*								
Ahmed et al. (2003)	United States						*	*					*					
Frimpong and Oluyowe (2003)	Ghana								*	*		*				*	*	
Odeh and Battaineh (2002)	Jordan	*			*					*								*
Al-Momani (2000)	Jordan					*	*	*				*		*		*		
Al-Khalil and Al-Ghafly (1999)	Saudi Arabia									*		*	*					
Mezher and Tawil (1998)	Lebanon		*				*	*					*					
Couto and Teixeria (2007)	Portugal							*					*					
Kaming et al. (1997)	Indonesia			*			*											*
Chan and Kumaraswamy (1997)	Hong Kong	*			*							*						
Chan and Kumaraswamy (1995)	Hong Kong	*										*			*			
Ogunlana et al. (1996)	Thailand					*		*			*				*			
Assaf et al. (1995)	Saudi Arabia						*	*	*	*					*			
Mansfield et al. (1994)	Nigeria									*	*					*	*	
Semple et al. (1994)	Canada						*							*				
Dlakwa and Culpin (1990)	Nigeria									*						*		
Okpala and Aniekwu (1988)	Nigeria									*	*						*	
Arditi et al. (1985)	Turkey								*	*	*							
Baldwin et al. (1971)	United States		*				*				*	*		*				
Frequency		8	7	9	6	7	18	14	9	20	12	8	6	3	6	5	4	3

payments to the contractor, design changes during construction, incomplete or improper design, and shortage of materials/equipment/manpower. On the other hand, the least common causes of delay are weather conditions, poor labor productivity, and poor contract management.

The studies presented in Table 1 also reveal that different causes of delay are experienced in different countries. For example, if one reviews Table 1, one can see that the causes of delay experienced in Hong Kong (e.g., poor site management and supervision, unforeseen geological conditions) are completely different from the causes of delay experienced in Nigeria (e.g., contractor's financial difficulties, delays in owner payments). Some might argue that having different causes of delay in Hong Kong and Nigeria is predictable, since they are located in different regions. However, even if causes of delay in two countries that are located in the same region are examined, different causes of delay can be observed in each country. For example, Taiwan and Hong Kong are located in the same region. Yang and Wei (2010) state that design changes during construction and delays in owner payments are the most experienced causes of delay in Taiwan. On the other hand, Chan and Kumaraswamy (1995, 1997) and Lo et al. (2006) state that poor site management and supervision and unforeseen geological conditions are the most common causes of delay in Hong Kong.

Some of the studies in Table 1 are conducted in the same country, but their findings include different causes of delay. For example, there are three different studies from Malaysia. Sambasivan and Soon (2007) state that poor site management and supervision, problems related to subcontractor, poor planning and scheduling, inadequate contractor experience and delays in owner payments are the most common causes of delay in Malaysia. On the other hand, Alaghbari et al. (2007) state that shortage of materials/equipment/manpower, slow decision-making process and delays in contractor's payment by owner are the most common causes of delay in Malaysia. Another study conducted by Abdul-Rahman et al. (2006) reveals that design changes during construction, incomplete or improper design, delays in contractor's payment by owner, and shortage of materials/equipment/manpower are the most experienced causes of delay in Malaysia. Only one of the causes of delay, namely, delays in owner payments to the contractor, is stated in all three studies.

In sum, the studies in Table 1 reveal that different causes of delay can be experienced in different countries or in projects within the same country. This finding may be a sign that a factor related to companies such as organizational culture (rather than national culture) influences causes of delay in construction projects.

2.2. Organizational culture

Organizational culture has been a focus of debate for researchers and professionals since the 1980s, which led to several studies over the years (e.g., Deal and Kennedy, 1982; Cooke and Lafferty, 1983; Schein, 2004; Cameron and Quinn, 1999). Schein (2004, p. 17) defines the culture of a group as "a pattern of shared basic assumptions that was learned by a group 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." Cameron and Quinn (2011) state that organizational culture is the major distinguishing feature of successful companies such as Toyota and General Electric. Even though organizational culture is not the only factor that affects the success of a company, developing a corporate culture supersedes these factors such as corporate strategy, market presence, and technological advantage. It does this by facilitating a common interpretation system for organization members, making clear to members what is expected, creating continuity, binding organization members together, and energizing forward movement. Professionals and researchers commonly acknowledge that organizational culture has a vigorous impact on the long-term performance of organizations. It must be noted however that there is still a need for guidelines, frameworks, or tools that allow establishing and adjusting as necessary the organizational culture, hence enhancing the performance of the organization (Schein, 2004; Trice and Beyer, 1993, Cameron and Quinn, 2011).

There are several studies that propose theoretical models and measurement tools for organizational culture, such as Askansasy et al.'s (2000) Organizational Profile Questionnaire (OPQ), Glover et al.'s (1994) Cultural Assets Profiles (CAPS), O'Reilly et al.'s (1991) Organizational Culture Profile (OCP); Maull et al.'s (2001) Personal, Customer Orientation and Cultural Issues (PCOC); Cooke and Lafferty (1983) Organizational Culture Inventory (OCI); and Cameron and Quinn's (1999) Organizational Culture Assessment Instrument (OCAI). A number of studies have attempted to apply some of those theoretical models and measurement tools to construction, health, financial, and other types of organizations. For example, Giritli et al. (2013) used Cameron and Quinn's (1999) OCAI to examine the link between leadership and organizational culture in the Turkish construction sector; Love et al. (2000) used Glover et al.'s (1994) CAPS in their framework for the implementation of total quality management in construction organizations; Bellou (2010) used O'Reilly et al.'s (1991) OCP to examine how values comprising organizational culture impact employees' job satisfaction; Xenikou and Simosi (2006) used Cooke and Lafferty (1983) OCI to examine the relationship between transformational leadership and organizational cultural orientations.

2.3. Organizational culture in the construction industry

Researchers and professionals in different fields have recognized the role of organizational culture in the performance of organizations (e.g., Ankrah, 2007; Deal and Kennedy, 1982; Peters and Waterman, 1982; Kotter and Heskett, 1992). The participants of the construction industry made this subject a focus of debate as they have become aware of its significant role. However, the majority of the studies have focused on the organizational culture profiles of construction-related organizations

in different countries. For example, Ankrah and Langford (2005) investigated the organizational culture of architectural and contracting firms in Scotland; Jaeger and Adair (2013) explored the organizational culture of firms that are involved in construction project management in the Gulf Cooperation Council countries; Oney-Yazici et al. (2007) examined the cultural profile of architectural and contracting firms in Turkey; and Zhang and Liu (2006) investigated the organizational culture of construction enterprises in China. These studies led professional and researchers to explore the use of organizational culture in order to improve other aspects of construction. For example, Hartmann (2006) addressed the motivational aspects of organizational culture on innovative behavior in a contracting firm; Koh and Low (2008) examined the implementation of total quality management practices from an organizational culture perspective; Cheung et al. (2011) investigated improving the performance of construction organizations considering the organizational culture perspective; Liu (1999) discussed job satisfaction through organizational culture; Giritli et al. (2013) demonstrated the interplay of organizational culture and leadership; and Fong and Kwok (2009) investigated the knowledge management systems of contracting firms operating in Hong Kong from an organizational culture perspective.

The review of the literature reveals that the relationship between organizational traits such as culture and delay in construction has never been discussed. This study was undertaken partly in response to the absence of such research.

3. Research methodology

The literature review revealed that different causes of delay are experienced in different countries. The question that comes up at this point is whether the different causes of delay experienced in different countries are related to the culture of construction companies. In order to find an answer to this question, it is hypothesized that a relationship exists between the organizational culture of construction companies and delay in their construction projects. In order to test this hypothesis, first, a questionnaire was developed to collect information about the organizational culture of construction companies and the amount of delay that the companies experience in their projects. The questionnaire was developed in the light of a literature review and was divided into two parts.

The first section of the questionnaire recorded information about the organizational culture of the respondent organizations. Even though there are several theoretical models and measurement tools for organizational culture, several researchers used Cameron and Quinn's (1999) measurement tool named "Organizational Culture Assessment Instrument" (OCAI), an established, validated, and well recognized measure of organizational culture that has been used extensively across many different settings. For example, the organizational culture of construction companies was investigated using OCAI in China (Zhang and Liu, 2006), Finland (Nummelin, 2006), the U.S. (Oney-Yazici et al., 2006), Turkey (Giritli et al., 2006, 2013; Oney-Yazici et al., 2007), Hong Kong (Fong and Kwok, 2009), the United Arab Emirates (Naoum et al., 2015), the Gulf Cooperation Countries (Jaeger and Adair, 2013), Singapore (Yong and Pheng, 2008), Scotland (Ankrah and Langford, 2005), Sri Lanka (Rameezdeen and Gunarathna, 2003) and in international construction (Ozorhon et al., 2008a, 2008b; Low et al., 2015). Therefore, OCAI as opposed to any of the other tools currently available to researchers was selected in this study to compare the organizational culture in construction companies, as it has an excellent track record in studying the organizational culture profiles of construction organizations in several studies.

OCAI (Cameron and Quinn, 2011) defines four major culture types of organizational culture, namely, "clan" culture, "adhocracy" culture, "hierarchy" culture, and "market" culture.

- An organization that is dominated by "clan" culture attaches great importance to teamwork, participation, consensus, morale and loyalty. Success is defined in terms of sensitivity to customers in "clan" culture oriented organizations
- "Adhocracy" culture encourages creativity, experimentation, innovation, and individual initiative. Gaining unique products and being a product leader are the criteria of being successful in organizations that are dominated by "adhocracy" culture
- "Hierarchy" culture leads to an organization that has a formalized structure, formal rules and policies. Success is defined in terms of dependable delivery and smooth scheduling in "hierarchy" culture oriented organizations
- "Market" culture focuses on getting the job done which brings goal-oriented competition along. Reputation and market leadership are main concerns of success in "market" culture oriented organizations

The relative importance of these culture types in each sample (i.e., in the U.S. and in India) was measured by collecting the respective respondents' assessments of six attributes of organizational culture (i.e., dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis, criteria for success). Respondents did this by rating four statements that measure each attribute. For each attribute, the scores of clan, adhocracy, market, and hierarchy type cultures add up to 100%. For a thorough discussion of OCAI, the statements used to assess the attributes, and the calculation of the scores, readers are directed to Cameron and Quinn (2011).

In the second section of the questionnaire, respondents were asked to rate the magnitude of delay in the last project in which they were involved expressed as a percentage of the scheduled project duration. The respondents were also asked to provide information about the proportion of the delay caused by the owner. The questionnaire was administered to the top 400 contractors in the U.S. listed by *Engineering News Record* (ENR) and the construction companies listed in the Builders Association of India (BAI) Membership Directory. The questionnaire was emailed to professionals employed in the scheduling departments of the construction companies. A total of 400 messages were e-mailed to U.S. companies with a link to the questionnaire and 38 were returned yielding a response rate of 9.50%. A total of 652 questionnaires were e-mailed to Indian

companies, out of which 46 valid responses were obtained with a response rate of 7.05%.

Finally, statistical analysis (Mann Whitey U test by using IBM SPSS Statistics 21) was performed on the collected data to discuss the relationship between organizational culture and delay in construction. The collected data were first analyzed by calculating the overall arithmetic mean scores of the four dimensions of organizational culture, (i.e., clan, hierarchy, market, and adhocracy) for the U.S. and Indian companies separately. After calculating the overall mean scores, the Mann Whitney U test was performed to examine the differences in the dimensions of organizational culture in construction companies located in the U.S. and India. The Mann Whitney U test is a nonparametric test that compares the central locations of two population distributions when there are two independent random samples from these populations (the U.S. and India data). It is based on combining the scores of the samples and ranking them in ascending order (Carver and Nash, 2006; Newbold et al., 2012). The null hypothesis is that there is no difference between the ranks of the U.S. and India populations. In order to test this null hypothesis, the Mann Whitney U statistic and Z value must be calculated by using the following formulas (Newbold et al., 2012):

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \tag{3.1}$$

$$E(U) = \mu_U = \frac{n_1 n_2}{2} \tag{3.2}$$

$$Var(U) = \sigma_U^2 = \frac{n_1 n_2 (n_1 + n_2 + 1)}{12} \tag{3.3}$$

$$Z = \frac{U - \mu_U}{\sigma_U} \tag{3.4}$$

where n_1 = the size of the U.S. sample; n_2 = the size of the India sample; R_1 = the sum of the ranks of the U.S. sample, $\sigma^2{}_U$ = the variance of the Mann–Whitney U, and μ_U = the mean of the Mann Whitney U. After calculating the Z value, it can be decided whether to reject or accept the null hypothesis according to the significance level that is chosen (e.g., $\alpha = 0.05$).

4. Findings and discussion

4.1. Comparison of the organizational culture of construction companies located in the U.S. and India

The findings of this study reveal that "clan" culture dominates in construction companies located in the U.S. (Fig. 1). Oney-Yazici et al.'s (2006) study of American contractors also supports this result. The "clan" culture is observed in a friendly work place where the organization is held together by loyalty. The organization attaches great importance to teamwork, participation, and consensus. Sensitivity to customers and concern for people are the indicators of success (Cameron and Quinn, 2011). It is observed that the organizational culture of the respondent construction companies in the U.S. is also consistent with the national culture of the U.S. as measured by Hofstede et al. (2010). According to Hofstede et al. (2010), in the U.S. culture, hierarchy is established for convenience. This leads to an organization where managers are accessible and information is shared frequently in an informal and direct manner.

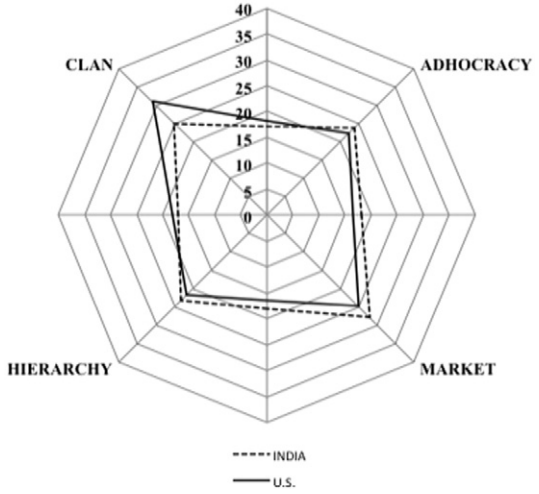

Fig. 1. Overall culture profiles of American and Indian construction companies.

On the other hand, the mean scores of the dimensions of organizational culture show that respondent Indian construction companies are dominated by "market" culture (Fig. 1). The market culture represents a results-oriented organization where an emphasis on winning holds the organization together. Common concerns of the organization are getting the job done, success, market leadership and reputation. Success is defined in terms of market share and penetration (Cameron and Quinn, 2011). This finding is consistent with Hofstede et al.'s (2010) contention that Indian society has both collectivistic and individualistic traits due to their preference for a larger social framework and due to a dominant religion/philosophy (Hinduism). It is commonly claimed that individualism is related to competitiveness, which in turn is an important indicator of success in "market" culture (Giritli et al., 2013; Nummelin, 2006).

The difference in the dominant organizational cultures of respondent construction companies in the U.S. and India makes sense, because a study conducted by Dastmalchian et al. (2000) argues that unpredictability in the market has a positive effect on "market" culture and a negative effect on "clan" culture. According to the findings of Dastmalchian et al.'s (2000) study, it is likely that organizations operating in unpredictable markets would attach more importance to result-oriented methods often observed in "market" culture. If one examines the indicators of economic stability for the U.S. and India, one will see that the U.S. is more stable than India (International Monetary Fund, 2014). Having a more stable economy may have led construction companies in the U.S. to a "clan" culture, while a less stable, more volatile economy may have led construction companies in India to a "market" culture.

A Mann Whitney U test was performed to examine the differences in the dimensions of organizational culture in construction companies located in the U.S. and India. It was observed that there is a statistically significant difference at $\alpha = 0.05$ in three of the four dimensions of organizational culture. These dimensions are indicated by an asterisk (*) next to the mean scores in Table 2.

Finding a statistically significant difference between U.S. and Indian construction companies related to "clan" and "market" cultures makes sense because the U.S. and India are dominated by "clan" and "market" cultures, respectively. The statistically significant difference in "hierarchy" culture might be related to the different national cultures of the U.S. and India. According to Hofstede et al.'s (2010) study, organizations in the U.S. have hierarchy only for convenience and employees are expected to display initiative. On the contrary, Indian organizations appreciate hierarchy and employees expect to be told what to do. This difference in the perception of hierarchy in the U.S. and India is consistent with the result of the Mann Whitney U test.

In order to examine the organizational culture of respondent construction companies more thoroughly, the scores of each of the individual attributes of organizational culture (i.e., dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis, criteria for success) were plotted in Fig. 2. The plots for each of the individual attributes of organizational culture show the extent to which attributes reflect the dominant culture. In a congruent culture, each attribute would emphasize the dominant culture and show a particular pattern of similarity (Cameron and Quinn, 2011). It is found that all attributes emphasize the dominant culture (i.e., "clan") in the U.S., whereas for Indian construction companies, all attributes except organizational glue and strategic emphasis highlight the dominant culture (i.e., "market") (Fig. 2).

4.2. Relationship between the organizational culture of construction companies and project delay

According to the results presented in Table 2, construction companies located in the U.S. and India have different dominant organizational cultures. Can this be one of the reasons why they experience different levels of delay in their projects? It is worth exploring the relationship between organizational culture and delay in construction. This relationship is assessed based on the delay (expressed in percentage of scheduled project duration) experienced by the respondents in their last project and the proportion of the delay that was caused by the owner. The findings presented in Table 3 indicate that American construction companies experienced less delay in their projects than Indian construction companies did. Indeed, according to Table 3, 74% of American construction companies completed their projects with less than 5% delay, while this percentage was 35% for Indian construction companies. This finding shows that American construction companies outperform Indian construction companies in completing projects on schedule.

The results in Table 4 show that according to 60% of the responding American construction companies, 50% or more of the delays are caused by the owner. On the other hand, only 30% of the responding Indian construction companies stated that 50% or more of the delays was caused by the owner. Assuming that the frequency and magnitude of delays caused by uncontrollable events such as adverse weather conditions are roughly the same for the U.S. and India, this finding reveals that delays caused by the owner are more common than delays caused by the contractor in projects undertaken in the U.S. It also shows that American construction companies perform better than Indian construction companies do because they experience less delay. The stronger performance of construction companies in the U.S. where the organization is dominated by "clan" culture, and the weaker performance of construction companies in India where the organization is dominated by "market" culture, are consistent with the findings of Thomas et al.'s (2002) study that concludes that performing below or above average has a strong correlation with "market" and "clan" culture, respectively. The reason for this fact may lie in the characteristics of these organizational cultures. Organizational culture has a significant impact on decisions made by employees, relationships between employees (e.g., clan culture provides an environment like an extended family), and leadership styles of managers. For example, Giritli et al. (2013) found that the managers of contracting companies with different cultural characteristics tend to adopt different leadership styles to lead their employees; Low et al.'s (2015) findings reveal that organizational culture of a contracting company has an

Table 2
Mean scores of dimensions of organizational culture.

Dimensions of organizational culture	Culture types							
	Clan		Adhocracy		Market		Hierarchy	
	U.S.	India	U.S.	India	U.S.	India	U.S.	India
Dominant characteristics	30.71	26.36	22.80	23.47	26.55	26.91	19.92	23.31
Organizational leadership	33.92	20.89	22.71	21.55	23.75	35.38	19.61	22.16
Management of employees	27.96	24.26	24.05	24.45	27.43	29.17	20.54	22.11
Organizational glue	32.67	26.70	22.27	26.20	24.23	25.78	20.82	21.30
Strategic emphasis	28.47	26.85	21.21	24.88	25.38	23.43	24.92	24.82
Criteria for success	32.93	25.42	19.92	21.97	22.23	27.09	24.90	25.50
Overall organizational cultural profile	31.11 *	25.07 *	22.16	23.76	24.93 *	27.96 *	21.79 *	23.21 *

* Statistically significant difference at $\alpha = 0.05$.

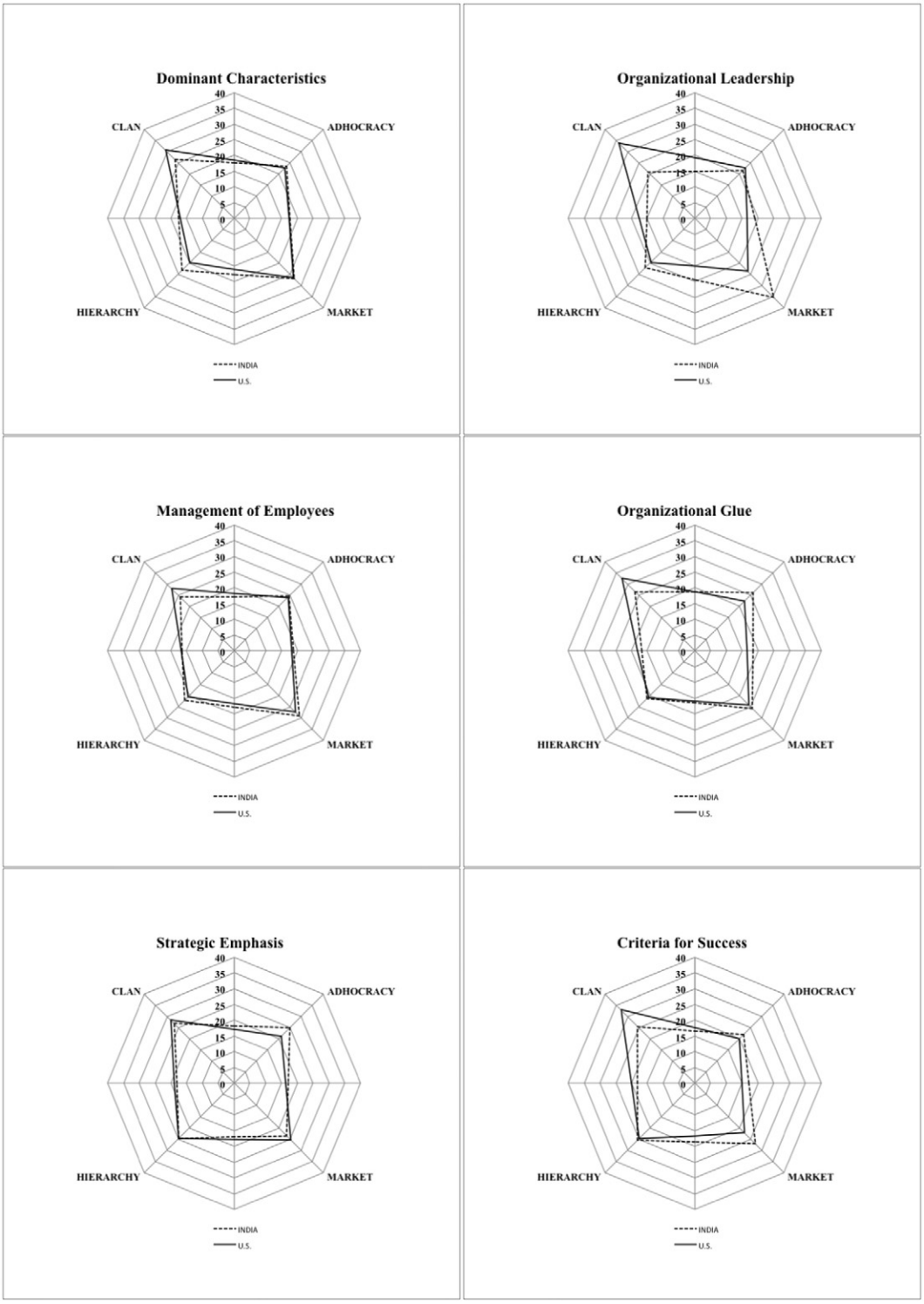

Fig. 2. Culture profiles of companies according to dimensions of organizational culture.

impact on international bidding decisions. Therefore, having an organizational culture that is aligned with the cultural characteristics of employees can be a significant advantage in achieving success. For example, teamwork, employee involvement programs, and corporate commitment to employees are the major characteristics of an organization that is dominated by "clan" culture. Cameron and Quinn (2011) state that these characteristics are not new to Americans and that Americans have been exposed to these characteristics for decades. Besides, Hofstede et al.'s (2010) contention that American managers rely on individual employees and teams for their expertise supports the idea that the cultural characteristics of the American society are consistent with the characteristics of "clan" culture. It is most likely that this coherence enhances

Table 3
Percentage of delay in the last project completed by respondents.

Delay in percentage of contract duration	U.S.		India	
	Number of respondents	Percentage (%)	Number of respondents	Percentage (%)
No delay	10	26	3	7
0–5%	18	47	13	28
5–10%	4	11	10	22
10–15%	3	8	8	17
15–20%	3	8	1	2
>20%	–	–	11	24
Total	38	100	46	100

communication and coordination in American construction companies that participated in this study. Having efficient communication and coordination in the organization probably helped with having less delay in projects. On the other hand, in Indian construction companies, inconsistency between organizational culture and employees' cultural characteristics may have a negative effect on performance. In "market" culture oriented organizations such as those in India, emphasis on winning holds the organization together. However, Indian society has not only individualistic but also collectivistic traits (Hofstede et al., 2010). Since collectivism is important for an Indian individual, it is likely that this individual would find loyalty to be enough for success, whereas performance in a "market" culture oriented organization is based on winning at any cost and requires much more than just loyalty.

In sum, the findings of this study contribute to a better understanding of the relationship between organizational culture and delay in construction projects. The low percentage of delay experienced by "clan" culture-dominated construction companies suggests that a construction company pursuing a "clan" culture may help prevent delays in their projects. Additionally, the findings also showed that "market" culture dominated construction companies experience more delay in their projects. Construction companies should take extra organizational culture-related actions to prevent delay in their projects. According to Cameron and Quinn (2011), "clan" culture can be achieved if decisions are made by consensus not by competition through teamwork, in a supportive environment. In the scheduling environment, these conditions translate into the following recommendations:

- *Encouraging participation and consensus in decisions*: Managers of scheduling departments should encourage their subordinates' participation in decisions on scheduling issues and seek consensus on solutions. Consensus can be achieved by injecting individual schedulers' experiences into the scheduling process, and by referring to a lessons-learned system whenever possible. Construction companies that manage the decision-making process wisely may be successful in preventing delays.
- *Management of environment through teamwork*: It is a common fact that establishing a schedule for large and complex construction projects is difficult because the schedule affects the activities of a multitude of parties in a project team, including designers, consultants, the general contractor, and the many subcontractors. For a successful schedule that is implementable, input should be received from all the members of this project team, making them not only involved in scheduling activities but also making them directly and jointly responsible for the time-related objectives set in the work schedule. Through effective teamwork of all parties in the project team, a scheduling department may develop a schedule that has the commitment of all parties in the project. Establishing a schedule that has been developed by the project team for the benefit of the members of the team will definitely help with preventing delays.
- *Providing a supportive work environment*: Schedulers who have access to reliable and realistic input about activity details, precedence relationships between activities, estimated durations of activities, resource availabilities, and weather statistics should be able to develop reliable and realistic work schedules. This information can be obtained mostly from the various participants to the project, making their support essential in the development of a work schedule that has the approval and the commitment of the entire project team. This kind of positive work environment that is supportive to the scheduling effort is expected to significantly impact schedulers' performance, potentially resulting in efficient schedules.
- *Discouraging a competitive work environment*: Even though it is commonly assumed that competition, which is the main concern of "market" culture, triggers motivation and enhances employee performance, it may also hinder collaboration, which is the main concern of "clan" culture. As mentioned in the preceding bullet points, it is through close collaboration between schedulers and the rest of the project team that a schedule can be developed that is accepted and willingly implemented by all parties concerned, hence increasing the likelihood of completing the project on schedule.

Table 4
Percentage of delay caused by owner.

Percentage of delay caused by owner	U.S.		India	
	Number of respondents	Percentage (%)	Number of respondents	Percentage (%)
0–25%	11	29	25	55
25–50%	4	11	7	15
50–75%	7	18	8	17
75–100%	16	42	6	13
Total	38	100	46	100

Overall, it was found that organizational culture has an impact on the schedule performance of a construction company. It is recognized that organizational culture is not the only factor that affects causation and magnitude of delay in a construction project. The other factors may include contractor-related (e.g., rework due to errors), owner-related (e.g., change orders), consultant-related (e.g., lack of experience of consultant in construction projects), labor-related (e.g., absenteeism), design-related (e.g., design errors), material-related (e.g., late

delivery of materials), equipment-related (e.g., equipment breakdowns), and project-related (e.g., complex project) issues. There may also be external factors (e.g., natural disasters) (Arditi and Robinson, 1995; Shi et al., 2001; Kim et al., 2005; Sweis et al., 2008; Gunduz et al., 2013a). In addition to taking the measures recommended by many researchers and practitioners relative to these factors, construction companies may want to consider cultivating a "clan" culture if they want to complete their projects on schedule.

5. Conclusion

The relationship between organizational culture and delay in construction was explored in this study by administering a survey to construction companies in the U.S. and India. The hypothesized difference in the organizational culture of construction companies in the U.S. and India was verified, as findings of the survey indicate that "clan" culture is the dominant organizational culture in American construction companies and that "market" culture is the dominant organizational culture in Indian construction companies. In addition, Mann Whitney U test results revealed that there is a statistically significant difference between the organizational cultures of American and Indian construction companies.

The survey results also indicated that American construction companies experience less delay in their projects than Indian construction companies. In addition, a high proportion of this delay is caused by owners in American projects but by construction companies in Indian projects.

The results of this study suggest that organizational culture is associated with delay in construction. The presumed effect of organizational culture on the magnitude of delay is supported by the findings of this study. It follows that construction companies that are dominated by "clan" culture in the U.S. perform better than "market" culture oriented construction companies in India in preventing contractor-caused delays. However, one should not ignore that "clan" culture has some disadvantages. For example, having a friendly work environment in an organization that acts like an extended family may lead employees to relax rather than work hard. In addition, because "clan" culture focuses on consensus to maintain group harmony, some employees may hold themselves back from discussing challenging solutions in order not to disturb group harmony, hence reducing the chances of reaching creative solutions (Strain, 2015). It should be also noted that the alignment of the organizational culture with the local culture of the country is important. In other words, American companies that embrace the "clan" culture may have less delay in their projects in the U.S., but this does not mean that they would achieve less delay if they undertake projects in India.

The findings of the studies performed so far indicate that different causes of delay are experienced regardless of the national cultures in different geographical regions. However, none of these studies has explored the relationship between organizational culture and delay in construction. The major contribution of this study is revealing the relationship between organizational culture and delay in construction. Higher executives of international companies should be prepared for different organizational cultures, hence different potentials for delay. Actually, it would be presumptuous and quite incorrect to argue that the only factor that affects causation and magnitude of delay in a construction project is solely the organizational culture of the construction company. Indeed, as seen in Table 1, delay may have multiple causes in different projects, different types of contracts, and different locations. Construction company executives should no doubt recognize the typical local causes of delay and take actions accordingly, but they should also note that construction companies' organizational culture is part of the delay equation. Actually, this empirical study provides evidence that a relationship between organizational culture and delay does exist. If they understand the relationship between organizational culture and delay, construction company executives may be able to cultivate an organizational culture that may help to prevent company-driven delays. For example, in India, companies may experience less delay if they are able to cultivate a "clan" culture and discourage a "market" culture in their organizations by encouraging participation and consensus in decisions, managing the environment through teamwork, providing a supportive work environment, and discouraging a competitive work environment.

Additional research including construction companies in other countries possibly dominated by other organizational cultures (i.e., adhocracy and hierarchy cultures) may shed further light on the effects of organizational cultures on construction delays in different countries. Considering that in some instances owner-caused delays dominate delays in construction, future research could also investigate the relationship between construction owners' organizational culture and delays.

References

Abd El-Razek, M.E., Bassioni, H.A., Mobarak, A.M., 2008. Causes of delay in building construction projects in Egypt. J. Constr. Eng. Manag. 134 (11): 831–841. http://dx.doi.org/10.1061/(ASCE)0733-9364(2008)134:11(831).

Abdul-Rahman, H., Berawi, M., Berawi, A., Mohamed, O., Othman, M., Yahya, I., 2006. Delay mitigation in the Malaysian construction industry. J. Constr. Eng. Manag. 132 (2):125–133. http://dx.doi.org/10.1061/(ASCE)0733-9364(2006)132:2(125).

Ahmed, S.M., Azhar, S., Castillo, M., Kappagantula, P., 2003. Construction Delays in Florida: An Empirical Study. Planning Consultant State of Florida Department of Community Affairs.

Aibinu, A.A., Jagboro, G.O., 2002. The effects of construction delays on project delivery in Nigerian construction industry. Int. J. Proj. Manag. 20 (8):593–599. http://dx.doi.org/10.1016/S0263-7863(02)00028-5.

Aibinu, A., Odeyinka, H., 2006. Construction delays and their causative factors in Nigeria. J. Constr. Eng. Manag. 132 (7):667–677. http://dx.doi.org/10.1061/(ASCE)0733-9364(2006)132:7(667).

Alaghbari, W., Kadir, M.R.A., Salim, A., Ernawati, 2007. The significant factors causing delay of building construction projects in Malaysia. Eng. Constr. Archit. Manag. 14 (2):192–206. http://dx.doi.org/10.1108/09699980710731308.

Al-Khalil, M.I., Al-Ghafly, M.A., 1999. Important causes of delay in public utility projects in Saudi Arabia. Constr. Manag. Econ. 17 (5):647–655. http://dx.doi.org/10.1080/014461999371259.

Al-Kharashi, A., Skitmore, M., 2009. Causes of delays in Saudi Arabian public sector construction projects. Constr. Manag. Econ. 27 (1):3–23. http://dx.doi.org/10.1080/01446190802541457.

Al-Momani, A.H., 2000. Construction delay: a quantitative analysis. Int. J. Proj. Manag. 18 (1):51–59. http://dx.doi.org/10.1016/S0263-7863(98)00060-X.

Ankrah, N.A., 2007. An Investigation into the Impact of Culture on Construction Project Performance. (PhD Thesis). University of Wolverhampton.

Ankrah, N.A., Langford, D.A., 2005. Architects and contractors: a comparative study of organizational cultures. Constr. Manag. Econ. 23 (6):595–607. http://dx.doi.org/10.1080/01446190500126973.

Arditi, D., Pattanakitchamroon, T., 2006. Selecting a delay analysis method in resolving construction claims. Int. J. Proj. Manag. 24 (2):145–155. http://dx.doi.org/10.1016/j.ijproman.2005.08.005.

Arditi, D., Pattanakitchamroon, T., 2008. Analysis methods in time-based claims. J. Constr. Eng. Manag. 134 (4):242–252. http://dx.doi.org/10.1061/(ASCE)0733-9364(2008)134:4(242).

Arditi, D., Robinson, M.A., 1995. Concurrent delays in construction litigation. Cost Eng. 37 (7), 20–30.

Arditi, D., Tarim-Akan, G., Gurdamar, S., 1985. Reasons for delays in public projects in Turkey. Constr. Manag. Econ. 3 (2):171–181. http://dx.doi.org/10.1080/01446198500000013.

Askansasy, N.M., Broadfoot, L.E., Falcus, S., 2000. Questionnaire measures of organizational culture. Handbook of Organizational Culture and Climate. Sage.

Assaf, S.A., Al-Hejji, S., 2006. Causes of delay in large construction projects. Int. J. Proj. Manag. 24 (4):349–357. http://dx.doi.org/10.1016/j.ijproman.2005.11.010.

Assaf, S.A., Al-Khalil, M., Al-Hazmi, M., 1995. Causes of delay in large building construction projects. J. Manag. Eng. 11 (2):45–50. http://dx.doi.org/10.1061/(ASCE)0742-597X(1995)11:2(45).

Baldwin, J.R., Manthei, J.M., Rothbart, H., Harris, R.B., 1971. Causes of delay in the construction industry. J. Constr. Eng. Div. 97 (2), 177–187.

Bellou, V., 2010. Organizational culture as a predictor of job satisfaction: the role of gender and age. Career Dev. Int. 15 (1):4–19. http://dx.doi.org/10.1108/13620431011020862.

Cameron, K.S., Quinn, R.E., 1999. Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework. Addison-Wesley, New York, NY, USA.

Cameron, K.S., Quinn, R.E., 2011. Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework. John Wiley and Sons, San Francisco, CA, USA.

Carver, R.H., Nash, J.G., 2006. Doing Data Analysis with SPSS Version 14. Thomson Brooks/Cole, USA.

Chan, D.W.M., Kumaraswamy, M.M., 1995. A study of the factors affecting construction durations in Hong Kong. Constr. Manag. Econ. 13 (4):319–333. http://dx.doi.org/10.1080/01446199500000037.

Chan, D.W.M., Kumaraswamy, M.M., 1997. A comparative study of causes of time overruns in Hong Kong construction projects. Int. J. Proj. Manag. 15 (1):55–63. http://dx.doi.org/10.1016/S0263-7863(96)00039-7.

Cheung, S.O., Wong, P.S.P., Wu, A.W.Y., 2011. Towards an organizational culture framework in construction. Int. J. Proj. Manag. 29 (1):33–44. http://dx.doi.org/10.1016/j.ijproman.2010.01.014.

Cooke, R.A., Lafferty, J.C., 1983. Level V: Organizational Culture Inventory. Human Synergistics, Plymouth, MI.

Couto, J.P., Teixeria, J.C., 2007. The evaluation of the delays in the Portuguese construction. CIB World Building Congress, pp. 292–301.

Dastmalchian, A., Lee, S., Ng, I., 2000. The interplay between organizational culture and national cultures: a comparison of organizational practice in Canada and South Korea using the competing values framework. Int. J. Hum. Resour. Manag. 11 (2):388–412. http://dx.doi.org/10.1080/095851900339927.

Deal, T.E., Kennedy, A.A., 1982. Corporate Cultures: The Rites and Rituals of Corporate Life. Addison-Wesley Pub. Co., Reading, Mass.

Dlakwa, M.M., Culpin, M.F., 1990. Reasons for overrun in public sector construction projects in Nigeria. Int. J. Proj. Manag. 8 (4):237–241. http://dx.doi.org/10.1016/0263-7863(90)90032-7.

Doloi, H., Sawhney, A., Rentala, S., 2012. Analysing factors affecting delays in Indian construction projects. Int. J. Proj. Manag. 30 (4):479–489. http://dx.doi.org/10.1016/j.ijproman.2011.10.004.

Enshassi, A., Arain, F., Al-Raee, S., 2010. Causes of variation orders in construction projects in the Gaza Strip. J. Civ. Eng. Manag. 16 (4):540–551. http://dx.doi.org/10.3846/jcem.2010.60.

Fallahnejad, M.H., 2013. Delay causes in Iran gas pipeline projects. Int. J. Proj. Manag. 31 (1):136–146. http://dx.doi.org/10.1016/j.ijproman.2012.06.003.

Faridi, A.S., El-Sayegh, S.M., 2006. Significant factors causing delay in the UAE construction industry. Constr. Manag. Econ. 24 (11):1167–1176. http://dx.doi.org/10.1080/01446190600827033.

Fong, P.S.W., Kwok, C.W.C., 2009. Organizational culture and knowledge management success at project and organizational levels in contracting firms. J. Constr. Eng. Manag. 135 (12):1348–1356. http://dx.doi.org/10.1061/(ASCE)CO.1943-7862.0000106.

Frimpong, Y., Oluyowe, J., 2003. Significant factors causing delay and cost overruns in construction of groundwater projects in Ghana. J. Constr. Res. 4 (2), 175–187.

Giritli, H., Oney-Yazici, E., Topcu-Oraz, G., Acar, E., 2006. Organizational culture: a comparative analysis from the Turkish construction industry. CCIM2006 Sustainable Development through Culture and Innovation, 26–29 November 2006. UAE, Dubai, pp. 1–9.

Giritli, H., Oney-Yazici, E., Topcu-Oraz, G., Acar, E., 2013. The interplay between leadership and organizational culture in the Turkish construction sector. Int. J. Proj. Manag. 31 (2):228–238. http://dx.doi.org/10.1016/j.ijproman.2012.06.010.

Glover, J., Shames, G., Friedman, H., 1994. Developing Cultural Assets. Cultural Assets Management Inc.

Gould, F., 2012. Managing the Construction Process: Estimating, Scheduling, and Project Control. Pearson Education Inc., USA.

Gunduz, M., Nielsen, Y., Ozdemir, M., 2013a. Fuzzy assessment model to estimate the probability of delay in Turkish construction projects. J. Manag. Eng. 31 (4). http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000261.

Gunduz, M., Nielsen, Y., Ozdemir, M., 2013b. Quantification of delay factors using the relative importance index method for construction projects in Turkey. J. Manag. Eng. 29 (2):133–139. http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000129.

Hartmann, A., 2006. The role of organizational culture in motivating innovative behavior in construction firms. Constr. Innov. Inform. Proc. Manag. 6 (3), 159–172.

Hegazy, T., Menesi, W., 2008. Delay analysis under multiple baseline updates. J. Constr. Eng. Manag. 134 (8):575–582. http://dx.doi.org/10.1061/(ASCE)0733-9364(2008)134:8(575).

Hofstede, G., Hofstede, G.J., Minkov, M., 2010. Cultures and Organizations: Software of the Mind: Intercultural Cooperation and its Importance for Survival. McGraw-Hill, USA.

International Monetary Fund, 2014. Global financial stability report. http://www.imf.org/external/pubs/FT/GFSR/2014/01/index.htm (Jun. 16, 2015).

Jaeger, M., Adair, D., 2013. Organizational culture of construction project managers in the GCC countries. Eng. Constr. Archit. Manag. 20 (5):461–473. http://dx.doi.org/10.1108/ECAM-01-2012-0004.

Kaliba, C., Muya, M., Mumba, K., 2009. Cost escalation and schedule delays in road construction projects in Zambia. Int. J. Proj. Manag. 27 (5):522–531. http://dx.doi.org/10.1016/j.ijproman.2008.07.003.

Kaming, P.F., Olomolaiye, P.O., Holt, G.D., Harris, F.C., 1997. Factors influencing construction time and cost overruns on high-rise projects in Indonesia. Constr. Manag. Econ. 15 (1):83–94. http://dx.doi.org/10.1080/014461997373132.

Kazaz, A., Ulubeyli, S., Avcioglu-Tuncbilekli, N., 2012. Causes of delays in construction projects in Turkey. J. Civ. Eng. Manag. 18 (3):426–435. http://dx.doi.org/10.3846/13923730.2012.698913.

Keane, P.J., Caletka, A.F., 2015. Delay Analysis in Construction Contracts. John Wiley & Sons, UK.

Kim, Y., Kim, K., Shin, D., 2005. Delay analysis method using delay section. J. Constr. Eng. Manag. 131 (11), 1155–1164.

Koh, T.Y., Low, S.P., 2008. Organizational culture and TQM implementation in construction firms in Singapore. Constr. Manag. Econ. 26 (3), 237–248.

Kotter, J.P., Heskett, J.L., 1992. Corporate Culture and Performance. Free Press; Maxwell Macmillan Canada; Maxwell Macmillan International, New York, Toronto.

Koushki, P.A., Al-Rashid, K., Kartam, N., 2005. Delays and cost increases in the construction of private residential projects in Kuwait. Constr. Manag. Econ. 23 (3):285–294. http://dx.doi.org/10.1080/0144619042000326710.

Lewis, R., 2005. When Cultures Collide: Leading across Cultures. Nicholas Brealey Publishing, USA.

Liu, A.M.M., 1999. Culture in the Hong Kong real-estate profession: a trait approach. Habitat Int. 23 (3), 413–425.

Lo, T.Y., Fung, I.W.H., Fung, K.C.F., 2006. Construction delays in Hong Kong civil engineering projects. J. Constr. Eng. Manag. 132 (6):636–649. http://dx.doi.org/10.1061/(ASCE)0733-9364(2006)132:6(636).

Love, P.E.D., Treloar, G.J., Ngowi, A.B., Faniran, O.O., Smith, J., 2000. A framework for the implementation of TQM in construction organisations. In Second International Conference of the CIB Task Group, Vol. 29, pp. 328–337.

Low, W.W., Abdul-Rahman, H., Zakaria, N., 2015. The impact of organizational culture on international bidding decisions: Malaysia context. Int. J. Proj. Manag. 33 (4):917–931. http://dx.doi.org/10.1016/j.ijproman.2014.10.010.

Mahamid, I., Bruland, A., Dmaidi, N., 2012. Causes of delay in road construction projects. J. Manag. Eng. 28 (3):300–310. http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000096.

Mansfield, N.R., Ugwu, O.O., Doran, T., 1994. Causes of delay and cost overruns in Nigerian construction projects. Int. J. Proj. Manag. 12 (4): 254–260. http://dx.doi.org/10.1016/0263-7863(94)90050-7.

Maull, R., Brown, P., Cliffe, R., 2001. Organisational culture and quality improvement. Int. J. Oper. Prod. Manag. 21 (3):302–326. http://dx.doi.org/10.1108/01443570110364614.

Mezher, M.M., Tawil, W., 1998. Causes of delays in the construction industry in Lebanon. Eng. Constr. Archit. Manag. 5 (3):252–260. http://dx.doi.org/10.1108/eb021079.

Ministry of Statistics and Programme Implementation, 2016. The annual report 2015–16. http://mospi.nic.in/Mospi_New/upload/mospi_annual_report_2015-16.pdf (Jun. 18, 2016).

Naoum, S.G., Alyousif, A.R.T., Atkinson, A.R., 2015. Impact of national culture on the management practices of construction projects in the United Arab Emirates. J. Manag. Eng. 31 (4), 04014057. http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000265.

Newbold, P., Carlson, W., Thorne, B.M., 2012. Statistics for Business and Economics. Pearson, UK.

Nummelin, J., 2006. Measuring organizational culture in construction sector-Finnish sample. CCIM2006 Sustainable Development through Culture and Innovation, 26–29 November 2006, Dubai, UAE.

Odeh, A.M., Battaineh, H.T., 2002. Causes of construction delay: traditional contracts. Int. J. Proj. Manag. 20 (1):67–73. http://dx.doi.org/10.1016/S0263-7863(00)00037-5.

Odeyinka, H.A., Yusif, A., 1997. The causes and effects of construction delays on completion cost of housing project in Nigeria. J. Financ. Manag. Prop. Constr. 2 (3), 31–44.

Ogunlana, S.O., Promkuntong, K., Jearkjirm, V., 1996. Construction delays in a fast-growing economy: comparing Thailand with other economies. Int. J. Proj. Manag. 14 (1):37–45. http://dx.doi.org/10.1016/0263-7863(95)00052-6.

Okpala, D., Aniekwu, A., 1988. Causes of high costs of construction in Nigeria. J. Constr. Eng. Manag. 114 (2):233–244. http://dx.doi.org/10.1061/(ASCE)0733-9364(1988)114:2(233).

Oney-Yazici, E., Arditi, D., Uwakweh, B.O., 2006. Organizational culture in U.S. construction companies. CCIM2006 Sustainable Development through Culture and Innovation, 26–29 November 2006, Dubai, UAE, pp. 219–228.

Oney-Yazici, E., Giritli, H., Topcu-Oraz, G., Acar, E., 2007. Organizational culture: the case of Turkish construction industry. Eng. Constr. Archit. Manag. 14 (6):519–531. http://dx.doi.org/10.1108/09699980710828996.

O'Reilly, C.A., Chatman, J., Caldwell, D.F., 1991. People and organizational culture: A profile comparison approach to assessing person-organization fit. Acad. Manag. J. 34 (3):487–516. http://dx.doi.org/10.1080/0144619042000326710.

Ozorhon, B., Arditi, D., Dikmen, I., Birgonul, T., 2008a. Implications of culture in the performance of international construction joint ventures. J. Constr. Eng. Manag. 134 (5):361–370. http://dx.doi.org/10.1061/(ASCE)0733-9364(2008)134:5(361).

Ozorhon, B., Arditi, D., Dikmen, I., Birgonul, T., 2008b. The role of organisational culture in construction company alliances. Int. J. Hum. Res. Dev. Manag. 8 (3):177–191. http://dx.doi.org/10.1504/IJHRDM.2008.018786.

Peters, T.J., Waterman, R.H., 1982. In Search of Excellence: Lessons from America's Best-Run Companies. Harper & Row, New York.

Rameezdeen, R., Gunarathna, N., 2003. Comparison of cultures in consultant and contractor organizations in construction industry. Built-Environ. Sri Lanka 3 (2), 59–66.

Ruqaishi, M., Bashir, H.A., 2013. Causes of delay in construction projects in the oil and gas industry in the Gulf cooperation council countries: a case study. J. Manag. Eng. 31 (3). http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000248.

Sambasivan, M., Soon, Y.W., 2007. Causes and effects of delays in Malaysian construction industry. Int. J. Proj. Manag. 25 (5):517–526. http://dx.doi.org/10.1016/j.ijproman.2006.11.007.

Schein, E.H., 2004. Organizational Culture and Leadership. John Wiley & Sons, San Francisco; CA; USA.

Semple, C., Hartman, F.T., Jergeas, G., 1994. Construction claims and disputes: causes and cost/time overruns. J. Constr. Eng. Manag. 120 (4):785–795. http://dx.doi.org/10.1061/(ASCE)0733-9364(1994)120:4(785).

Shi, J., Cheung, S., Arditi, D., 2001. Construction delay computation method. J. Constr. Eng. Manag. 127 (1):60–65. http://dx.doi.org/10.1061/(ASCE)0733-9364(2001)127:1(60).

Strain, M., 2015. The disadvantages of clan culture in business. http://smallbusiness.chron.com/disadvantages-clan-culture-business-34708.html (Dec. 3, 2015).

Sweis, G., Sweis, R., Abu Hammad, A., Shboul, A., 2008. Delays in construction projects: the case of Jordan. Int. J. Proj. Manag. 26 (6):665–674. http://dx.doi.org/10.1016/j.ijproman.2007.09.009.

Thomas, R., Marosszeky, M., Karim, K., Davis, S., McGeorge, D., 2002. The importance of project culture in achieving quality outcomes in construction. Proceedings IGCL-10 Gramado Brazil, pp. 1–13.

Toor, S., Ogunlana, S.O., 2008. Problems causing delays in major construction projects in Thailand. Constr. Manag. Econ. 26 (4):395–408. http://dx.doi.org/10.1080/01446190801905406.

Trice, H.M., Beyer, J.M., 1993. The cultures of work organizations. Prentice-Hall; Englewood Cliffs, NJ; USA.

Tumi, S.A., Omran, A., Pakir, A.H., 2009. Causes of delay in construction industry in Libya. The International Conference on Economics and Administration, Faculty of Administration and Business, University of Bucharest, Romania.

United States Government Accountability Office, 2013. Report to the Chairman, Committee on Veterans' Affairs, House of Representatives—VA construction—additional actions needed to decrease delays and lower costs of major medical-facility projects. http://www.gao.gov/assets/660/653585.pdf (Jun. 18, 2016).

Xenikou, A., Simosi, M., 2006. Organizational culture and transformational leadership as predictors of business unit performance. J. Manag. Psychol. 21 (6):566–579. http://dx.doi.org/10.1108/02683940610684409.

Yang, J., Wei, P., 2010. Causes of delay in the planning and design phases for construction projects. J. Archit. Eng. 16 (2):80–83. http://dx.doi.org/10.1061/(ASCE)1076-0431(2010)16:2(80).

Yong, K.T., Pheng, L.S., 2008. Organizational culture and TQM implementation in construction firms in Singapore. Constr. Manag. Econ. 26 (3): 237–248. http://dx.doi.org/10.1080/01446190701874397.

Zhang, S.B., Liu, A.M.M., 2006. Organizational culture profiles of construction enterprises in China. Constr. Manag. Econ. 24 (8):817–828. http://dx.doi.org/10.1080/01446190600704604.