

A CULTURAL PROFILE OF CONSTRUCTION PROJECT ORGANIZATIONS IN THE UK

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There is a common belief that the culture of the construction industry has an impact on its performance. The culture of the construction industry at the project level is often associated with such attributes as fragmentation, antagonism, mistrust, poor communication, short-term mentality, blame culture, casual recruitment, machismo and sexism. Whilst such associations are helpful to the extent that they focus attention on the failings of the industry and point to aspects that need to be improved, they are often arbitrary making it difficult to systematically assess the impact of culture on performance. As part of a wider study to empirically examine the impact of culture on performance, construction project organizations (CPOs) were profiled to determine their cultural orientations. Analysis of the data collected through a questionnaire survey revealed five principal cultural dimensions of *workforce*, *performance*, *team*, *client* and *project orientation*. Results of a cluster analysis based on these five dimensions of culture yielded five clusters of project organizations. Profiles of the five clusters of CPOs are compared and contrasted and implications for project management and performance outcomes are discussed.

Keywords: cluster analysis, construction project organizations, organizational culture, project performance.

INTRODUCTION

The extent to which a construction project is delivered to the specified requirements is contingent on a number of factors, one of which is the process employed in delivering the project. When the process goes wrong, built facilities end up defective, over-budget, late, aesthetically, environmentally, and functionally inadequate, possibly leading to litigation, and general stakeholder dissatisfaction. The quest for improvement thus requires an evolution of the process of delivery (Riley and Clare-Brown, 2001). To achieve this evolution, various ideas such as lean thinking, partnering and supply chain management have been introduced into construction. Underlying many of these new approaches is the need for a fundamental change in the attitudes of participants, nature of relationships between project participants, and their approaches to work. Many have therefore called for a change in the culture of the industry (cf. Egan, 1998), and this study was undertaken to profile construction project organizations (CPOs) and empirically determine what their cultures actually are, and where improvements can be made.

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WHAT IS CULTURE?

Culture has over 164 definitions (Allaire and Firsirotu, 1984) reflecting very divergent views, and also reinforcing the view that the concept of culture exists in a constant state of change. The first use of the term in its true anthropological sense is attributed to Edward Tylor who defined culture as “that complex whole which includes knowledge, belief, art, morals, laws, custom, and any other capabilities and habits acquired by man as a member of society” (Rooke, 2001). More detailed reviews of some of the various concepts of culture are presented in Keesing (1974), Smircich (1983), Allaire and Firsirotu (1984), and Ankrah and Proverbs (2004). Common themes running through many definitions are that culture is learned and shared, is determined by contextual factors, has common underlying basic problems, and shapes attitudes, perceptions, and behaviours (Ankrah and Proverbs, 2004). From this, culture may be defined as that unique configuration of solutions – embodied in attitudes, behaviours and conditions – that a CPO and its members adopt in dealing with various organizational problems at the project level. Essentially it is about human functioning.

The culture of the construction project organization and project delivery

According to Newcombe (2003), the stakeholders within the CPO interact with the project in two primary arenas; cultural and political, with the cultural arena represented by the ideology or shared values of the project participants. The culture of the CPO is often associated with such attributes as fragmentation, antagonism, mistrust, poor communication, short-term mentality, blame culture, casual approaches to recruitment, machismo and sexism (Egan, 1998; Dainty *et al.*, 2002; Serpell and Rodriguez, 2002). These attributes are in turn associated with project outcomes like litigation, poor health and safety (H&S) performance, and inferior quality. Whilst such associations are helpful to the extent that they focus attention on the failings of the industry, and point to aspects that need to be improved, they are sometimes arbitrary and often based on no more than anecdotal evidence, and as such do not provide a useful systematic basis for assessing the real impacts of culture. This suggests a need for systematic empirical research. Some researchers who have attempted to examine some of these associations include Fenn *et al.* (1997), Cooper (2000), Ngowi (2000), Thomas *et al.*, (2002), and Phua and Rowlinson (2003), and Zuo and Zillante (2006). Carrying forward this research agenda, and going beyond the stereotypical attributes with which the culture of the CPO is often associated, this research sought to empirically profile CPOs to determine their cultural orientations.

Diagnosing culture

An assessment of culture requires the identification of aspects important to culture (Hofstede, 2001). Such aspects are typically referred to as *dimensions* of culture. Various dimensions have been advanced for studying culture and many of these (64 in total) are catalogued in Ankrah *et al.* (2005). These include dimensions of culture proposed by researchers like Hofstede (2001) including *inter alia* uncertainty avoidance, power distance, individualism or groupism, masculinity or femininity, normative or pragmatic, parochial or professional, open or closed system, loose/tight or overt/suppressed control, process or results orientation, employee or job orientation. However within the context of the construction project, it has been argued in Ankrah *et al.* (2005) that some of these dimensions are inappropriate. To identify which dimensions are most relevant within a construction project context, the various dimensions were considered in the light of the unique problems of the construction industry as captured in the major construction industry reports that have been

published over the years, especially the landmark Egan (1998) report, which have examined the problems of the construction industry, and have in the main recounted the same industry failures time and time again. The Egan (1998) report identified problems with leadership, client focus, team and process fragmentation, delivering quality and commitment to people. The dimensions of culture (from the literature as captured in Ankrah *et al.* (2005)) associated with these problems are outlined in Table 1. These dimensions were chosen to coincide with dimensions proposed by construction industry experts in a report prepared by CRISP Culture and People Task Group (CRISP, 2002) on a research strategy for culture and people in construction.

Table 1: Dimensions associated with the Egan (1998) agenda for change

Industry problems	Related dimensions
Leadership	Leadership, Control, Professionalism, Participation (decision-making), Communication, Exercising authority
Client focus	Communication, Client education, Respect for client, Sensitivity to client/customer's needs, Monitoring client satisfaction
Team integration	Communication, finger-pointing, Participation, Collaborative working, Openness, Conflict, Subcontracting, Partnering
Delivering quality	Learning & innovation, Emphasis on quality, Performance measurement & continuous improvement, Driving the schedule, Doing things right
Commitment to people	Health & safety, Site tidiness, Respect & Support for workforce, Training, Retention, Commitment to people, Recognizing performance

These dimensions thus formed the basis for diagnosing culture in this research. In assessing each of these dimensions, the concept of reciprocal determinism from Bandura's social cognitive theory (Wood and Bandura, 1989) which specifies that human functioning is determined by the reciprocal interaction of the cognitive, behavioural and situational context, was adopted as a theoretical framework. Diagnosis of culture therefore involved assessing attitudes and perceptions, behaviours and the situational conditions in respect of each dimension.

METHOD

A quantitative approach was adopted for this study involving a survey research design with data collected by means of a questionnaire survey of contractors with the unit of analysis being most recently completed construction projects. The questionnaire was designed to elicit information about the project in respect of project features and cultural orientations. In constructing the questionnaire, each dimension was addressed by three questions querying the attitudes, behaviours and conditions in line with the theoretical framework. Table 2 shows a sample of the questionnaire items.

Table 2: Sample of questionnaire items

Variable	Measurement
Contact and communication with client (C1)	How important was it to the project organization to have lots of contact and communication with the client – on Likert scale of 1-5 (no importance – utmost importance) During this project there was very little contact or communication with the client – on Likert scale of 1-5 (strongly disagree – strongly agree) The project arrangements were such that there was limited access to the client to discuss project-related issues – on Likert scale of 1-5 (strongly disagree – strongly agree)
Site tidiness (W7)	How important was it for the project organization that the site was tidy – on Likert scale of 1-5 (no importance – utmost importance) On this project workers always cleaned up their work area and kept the site tidy – on Likert scale of 1-5 (strongly disagree – strongly agree) The project arrangements were such that there were clear rules about keeping work areas clean and tidy – on Likert scale of 1-5 (strongly disagree – strongly agree)

Analysis involved the use of principal component factor analysis to derive a set of underlying dimensions which could then form the basis for categorizing the CPOs using cluster analysis. This approach has been utilized in research on culture like Hofstede’s (2001) seminal work on culture.

The sampling frame used in the survey was drawn from a database of contractors listed in the UK Kompass (2006) register. A total of 551 questionnaires were mailed out to participants for completion. 85 questionnaires were returned representing a response rate of 15.42%. 64 of these questionnaires were analysed in this report.

RESULTS AND DISCUSSION

The profile of projects captured in this survey is presented in Table 3. Most of the projects captured in this survey were private sector new work in the building category, specifically housing and commercial building projects. This outcome is consistent with DTI (2005) statistics. Most of these projects were considered by respondents to be either moderately complex or simple.

Table 3: Characteristics of construction projects surveyed

Project type		Number of Projects	Percentage of Projects (%)
Proj_type1	Public	24	43
	Private	32	57
Proj_type2	New work	34	61
	Refurbishment	16	28
	Redevelopment	5	9
	Demolition	1	2
Proj_type3	Civil Engineering	10	19
	Building	44	81
Proj_type4	Commercial	13	25
	Housing	13	25
	Industrial	7	13
	Infrastructure	6	11
	Leisure	3	6
	Education	3	6
	Health	2	4
Mixed use	6	11	

In terms of location, all the UK regions were represented, with the majority (41%) being procured by traditional procurement arrangements. This finding is consistent with RICS (2006). Contract prices ranged from £15K to £100M with durations from three weeks to five years. This is a reflection of the range of projects undertaken in the construction industry, from simple jobbing projects to complex mega projects. Median contract price and duration of the projects were between £0.86M – £2.00M and 9 – 12 months respectively, consistent with RICS (2006) and DTI (2005). The performance ethos was in the order; health and safety (H&S)–quality–cost–time with H&S as most important and time as least important objective.

The culture of CPOs

Respondents were asked to indicate on a scale of 1 to 5 the extent to which certain attitudes, behaviours and conditions existed on the construction project. Means and standard deviations for each of the dimensions assessed are summarized in Table 4.

Principal component factor analysis was applied to these cultural variables to develop a parsimonious set of dimensions suitable for the subsequent analyses. It has been

specified in Hair *et al.* (1998) that the preferable sample size for factor analysis is 100 or larger. However it has also been argued in Field (2000) that under certain circumstances the sample size may not be critical. For instance it has been argued *ibid* that if a factor has four or more loadings greater than 0.6 then it is reliable regardless of sample size. Again, where all communalities are greater than 0.6, samples less than 100 may be perfectly adequate (*ibid*). It has also been demonstrated through empirical research (Arrindell and van der Ende, 1985 in Field, 2000) that subject-to-variable ratios made little difference to the stability of factor solutions. The above arguments demonstrate that there is as yet no definitive verdict on what an appropriate sample size should be. Indeed there is even evidence of published research where factor analysis has been performed on similar or much less data (cf. Kaming *et al.*, 1997; Liu, 1999; Leung *et al.*, 2004). Therefore whilst the potential biases associated with a small size as highlighted in Lingard and Rowlinson (2006) are noted and whilst recognizing also that the debate on sample size is on-going (cf. Hair *et al.*, 1998; Field, 2000; Osborne and Costello, 2004), the application of factor analysis for data reduction purposes was considered acceptable. To further test the suitability of the data, the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) and Bartlett test of sphericity were obtained. These two tests provide the minimum standard that should be passed. The MSA obtained was 0.776, with .50 specified as a minimum (Hair *et al.*, 1998). With the Bartlett test, a significant result was obtained ($p < 0.001$).

To achieve the most representative and parsimonious set of factors possible, a five component solution was extracted based on the percentage of variance criterion (Hair *et al.*, 1998) which specifies that for social science research selecting a solution that accounts for 60% of the total variance is satisfactory. In this research, this coincides with five components which account for 63.863% of the total variance. The varimax rotated components are shown in Table 4.

Variables like motivating workforce (W4), emphasis on teamwork (T3), free and open communication (T7), site tidiness (W7), recognizing good performance (W8), keeping operatives informed (L5), participation (L4), and communication (L6) were loaded highly and positively on component one. This component was therefore labelled *workforce orientation*. The highly loaded variables on component two were safeguarding health and safety (W6), providing performance feedback (P4), on-time delivery (P6), and quality and getting it right first time (P8). All these dimensions relate to the delivery of projects to specified standards, making this component indicative of *performance orientation*.

Component three had the variables blame culture (T8), access and approachability (L1), information sharing (T5), and trust (T2) highly loaded on it giving an indication of *team orientation*. The variables educating client (C3), monitoring client satisfaction (C4), precedence of client's needs (C5), and contact and communication with client (C1), all clearly making reference to relations with the client, were highly loaded on component four which was therefore labelled *client orientation*. Component five was significantly loaded by the variables identification with project (T6), subcontracting (W1) and waste elimination (W5), and was therefore labelled *project orientation*.

Table 4: Rotated component matrix showing descriptive statistics of dimensions of culture

		Mean	Std. Dev.	Component				
				1	2	3	4	5
W4	Motivating workforce	3.51	.624	0.816				
T3	Emphasis on teamwork	3.58	.676	0.803				
T7	Free and open communication	3.77	.706	0.757				
W7	Site tidiness	3.86	.702	0.755	0.410			
W8	Recognizing good performance	3.31	.803	0.744				
L5	Keeping operatives informed	3.38	.692	0.733				
L4	Participation	3.19	.720	0.728				
L6	Communication	3.62	.722	0.715				
T4	Dealing with conflict by compromise	3.54	.670	0.695				
T1	Collaborative working	3.94	.615	0.685				
W5	Training	3.58	.834	0.677	0.534			
L2	Supportiveness and appreciation	3.68	.622	0.658				
W3	Respect for all workers	4.07	.678	0.653				
P9	Environmental friendliness	3.58	.698	0.627				
C2	Research into end-user needs	3.65	.851	0.618			0.424	
P2	Learning on project	3.39	.572	0.607	0.406			
L3	Control of workers' behaviour	3.48	.727	0.586				
W2	Showing concern for workers	4.22	.620	0.581	0.413			
C6	Respect for client	4.36	.661	0.528		0.422	0.458	
W6	Safeguarding health and safety	4.22	.677		0.773			
P4	Providing performance feedback	3.51	.638		0.651			
P6	On-time delivery	3.93	.565		0.611			
P8	Quality and getting it right first time	3.94	.604					
P3	Monitoring performance	3.46	.567		0.535			
T8	Blame culture	2.05	.720		0.480			
L1	Access and approachability	4.34	.623			-0.831		
T5	Information sharing	3.92	.636			0.730		
T2	Trust	3.64	.650			0.581		
P1	Innovation	2.88	.653	0.439		0.532		
P7	Driving down cost	3.48	.587			-0.465		
C3	Educating client	3.55	.774	0.410			0.749	
C4	Monitoring satisfaction	3.87	.707				0.683	
C5	Precedence of client's needs	3.78	.700			0.473	0.646	
C1	Contact and communication	4.16	.824				0.553	
T6	Identification with project	3.19	.604					0.716
W1	Subcontracting	3.40	1.068					-0.568
P5	Waste elimination	3.36	.635					0.506

Typologies of project culture

A useful statistical technique for deriving typologies is cluster analysis (cf. Hofstede, 2001). This technique classifies cases into relatively homogeneous groups such that cases in a group are similar to each other but are distinctly different from cases in other groups (SPSS, 2004). Hierarchical clustering of the data yielded five clusters labelled clusters A, B, C, D and E. Mean orientations of the clusters were obtained and a web chart (Figure 1) was plotted to illustrate the differences in cultural orientations. From this Figure, the biggest differences in cultural orientation between the clusters appear to be along the workforce and team orientations.

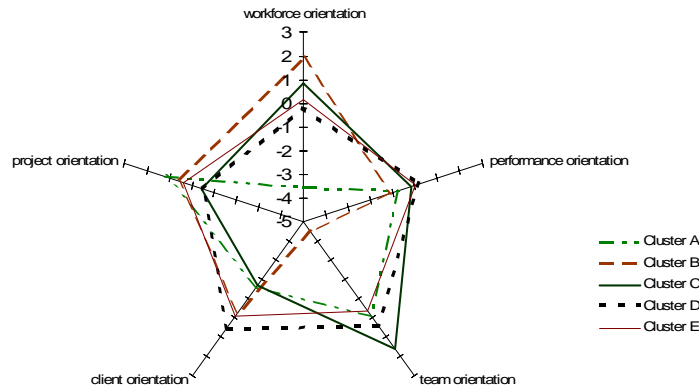


Figure 1: Cultural orientations of the five clusters of CPOs

To test the significance of the apparent differences shown on the web chart, the Kruskal-Wallis test was employed to analyse the variance in the orientations of the five clusters. As shown in Table 5, the results provide strong evidence that the five clusters differ significantly along four dimensions *viz*: workforce, team, client and project orientations. Cultural profiles of the five clusters are discussed below.

Table 5: Kruskal-Wallis Test Statistics for differences between clusters

	workforce orientation	performance orientation	team orientation	client orientation	project orientation
Chi-Square	16.212	2.560	30.211	20.844	13.684
df	4	4	4	4	4
Asymp. Sig.	.003	.634	.000	.000	.008

Profiles of the clusters

Relative to the others, cluster A has the lowest workforce orientation implying that CPOs within this cluster do not put as much emphasis and effort into motivating the workforce, teamwork, maintaining free and open communication on site, site tidiness, recognizing good performance, keeping operatives informed of project developments, and workforce involvement in planning and decision-making. But it has the highest project orientation implying that these CPOs demonstrate the greatest sense of identification with the project, use of direct labour and emphasis on waste elimination. This cluster also has a relatively low client orientation.

Relative to the others, cluster B has the highest workforce orientation implying that CPOs in this cluster put the greatest emphasis and effort into motivating the workforce, maintaining free and open communication on site, site tidiness, recognizing good performance, keeping operatives informed of project developments, and workforce involvement in planning and decision-making. However these CPOs exhibit the lowest team orientation with much more finger-pointing, less accessible and approachable management, less information sharing, and a lower degree of trust.

Cluster C has the highest team orientation implying that CPOs in this cluster put the greatest emphasis and effort into avoiding finger-pointing, more accessible and approachable management, more information sharing, and promoting a higher degree of trust among participants. These CPOs however also have the lowest client orientation with the least effort put into educating the client, monitoring client satisfaction, giving precedence to the client’s needs, maintaining contact and communication with the client. These CPOs also have a high workforce orientation.

Cluster D has the highest client orientation with CPOs within this cluster putting the most emphasis and effort into educating the client, monitoring client satisfaction,

giving precedence to the client's needs, and maintaining contact and communication with the client. Together with cluster C, this cluster has the lowest project orientation with the lowest sense of identification with the project, use of direct labour and emphasis on waste elimination.

Relative to the other clusters, Cluster E has a cultural profile that practically coincides with the average orientation along the dimensions of culture assessed. CPOs in cluster E therefore have a culture that is neither higher than average or lower. These CPOs constitute the largest proportion of projects.

Clearly, there is enough evidence to hypothesize that there are significant differences in the cultures of CPOs working on different construction projects in the UK.

Implications for project management and performance

Although this article has not directly explored the implications of these cultural differences through empirical analysis of the data, it is still possible to speculate on some of the potential outcomes of having such cultural orientations. The extant literature is quite instructive, and provides some indication of how the differences observed in cultural orientations are potentially likely to reflect in project delivery and performance. For instance, it is widely recognized that workforce orientation is necessary for goal commitment, organizational effectiveness and participant satisfaction (Leung *et al.*, 2004; Mullins, 2005), and that key aspects of workforce orientation including a climate of openness and encouragement of employees are factors that support learning (Kululanga *et al.*, 2001). This suggests that CPOs with a high workforce orientation such as those in cluster B are more likely to achieve positive outcomes in terms of learning, goal commitment, effectiveness and participant satisfaction, whilst those in cluster A are more likely to find these outcomes harder to achieve.

Because of the fragmented nature of construction, a high team orientation with better integration, cooperation and coordination has been identified as a prerequisite for project success (Cicmil and Marshall, 2005). It leads to an environment where there is trust, open communication and free exchange of information (Baiden *et al.*, 2006). It reduces the propensity for litigation (Fenn *et al.*, 1997) with obvious implications for satisfaction. This implies that CPOs with a high team orientation such as those in cluster C are more likely to experience positive outcomes in terms of 'project chemistry', litigation and participant satisfaction. It is also widely recognized that customer-focus is a precursor to success, and as a result, it has been argued that contractor organizations must be customer-focused (Bryde and Robinson, 2005). In Dainty *et al.*'s (2005) study on competencies of project managers (PMs), high performing managers were found to show a marked propensity for seeking information about the real underlying needs of clients, and for dealing with customer service problems rapidly and efficiently. This implies that unlike cluster C, CPOs with a high client orientation such as those in cluster D are more likely to achieve positive outcomes in terms of client satisfaction and PMs performance.

Higher project orientation implies that project participants identify more with the project, there is less subcontracting, and more effort is put into waste elimination. It has been noted in Hsieh (1998) for instance that there is a tendency for subcontracting to divide the CPO into "islands" with conflicting interests. It has also been noted *ibid* that subcontracting practices are inimical to waste elimination and improved productivity, and that subcontractors are notorious for poor housekeeping. These aspects if not properly attended to, can increase 'opportunities' for accidents and

therefore have negative consequences on H&S on site (Sawacha *et al.*, 1999), leading to de-motivation and consequently absenteeism. This implies that unlike clusters C and D, CPOs with a high project orientation (cluster A) are more likely to achieve positive outcomes in respect of waste reduction, productivity and H&S.

These inferences provide interesting hypotheses that can be examined in greater detail in subsequent research. There is no right or wrong cultural profile. Each typology has cultural orientations that potentially have both positive and negative consequences. It is important therefore to be aware of the potentially negative orientations so that steps can be taken to mitigate their impacts on project delivery and performance.

CONCLUSION

The research has revealed cultural profiles of CPOs in the sample that are broadly indicative of the orientations that develop on construction projects in the UK. It can be concluded from these results that there are indeed significant differences in the cultures of CPOs working on different construction projects in the UK, with significant differences occurring along workforce, team, client and project orientations. The paper has considered some of the potential consequences of having these orientations. Although the research has not addressed the issues of *why* and *how* such cultural profiles develop, these findings are still useful for those seeking change in the culture of the construction industry as it clearly identifies those areas where improvements are possible. Whether or not such improvements in orientation will yield the expected performance improvement however requires further investigation.

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