DESIRABLE MANAGEMENT PRACTICES AND CULTURAL VALUES FOR CONSTRUCTION QUALITY ASSESSMENT SYSTEMS (CONQUAS): METHODOLOGY FOR DEPLOYMENT

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Using descriptive statistics from a sample of 24 UK Construction related organizations currently utilizing various modes of quality systems within their construction projects; this paper investigates the desirable management practices and cultural values for the deployment of Construction Quality Assessment Systems (CONQUAS). All the Management Practices scored medium levels (means score > 3.00) of readiness with the highest being 'Motivation and Rewards' and 'Vision'. On the other hand, the most important cultural values for CONQUAS deployment were found to be 'Harmony with People' and 'Harmony with Universe'. The least important (mean score < 3.00) cultural values were 'Respect for Authority' and 'Interdependency'. The findings suggest that the integration of cultural values and management practices as observed within the Eastern environment can be transferred within the Western environment with Total Quality Management (TQM) as the leverage for the deployment of CONQUAS. This would contribute to the enhancement of the quality performance within the UK Construction Industry. This paper concludes by presenting the methodology for assessing and communicating the levels of consideration of the management practices and cultural values desirable for the CONQUAS deployment. The findings indicate that the methodology is both reliable and valid.

Keywords: assessment, cultural values, quality systems, quality assessment systems, total quality management.

INTRODUCTION

This paper presents the findings of an ongoing investigation into the awareness of Construction Quality Assessment (CONQUAS) approach within the UK construction Projects (Sim, 2006). Although previous studies have tried to address the comparison of quality between eastern and western countries, however the emphasis has being more on qualitative whereas this study bridges the knowledge gap by providing a valid methodology for assessing the 'management and cultural' readiness of the eastern quality systems within the western context through the general application of management practices and cultural value indices. The main objectives of this paper are to identify the desirable management practices and cultural values for the deployment of Construction Quality Assessment Systems (CONQUAS) within the UK Construction related environment. Against this background and with the growing of international trade, customers have had a wider choice of products and services

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from around the world. Wider choices have elevated quality requirements and pose another challenge. In this dynamic and competitive marketplace, companies are under tremendous pressure to become more customer-orientated and more cost effective and to continuously improve quality. There is therefore a need for quality management system that is ease of use, adaptable and flexible.

LITERATURE REVIEW

The literature review establishes that much has already been written on CONQUAS within the Malaysian and Singapore context, however little research has been conducted to investigate the levels of awareness of this quality system within the UK context. The authors acknowledge that several studies (Barad, 1995, Ahmed et al., 2005, Low and Leong, 2001, and Xiao and Proverbs, 2002) have tried to address the comparison of quality between the east and western countries, however the emphasis is more on qualitative whereas this study bridges the knowledge gap by providing a valid methodology for assessing the readiness of the eastern quality systems within the western context through the generation of the indices reported in this paper.

Introduction to CONQUAS

According to Kristensen and Juhl (1999), Quality awards models are operational benchmarking tools that can be used by companies in their internal educational programme and in their self assessment process. On the aggregate level it is obvious model for comparing best practices between countries. With the efforts expended by the Construction Industry Development Board (CIDB) Singapore to raise the quality awareness within the industry, quality has gained new level of recognition. Building Construction Authority (BCA) Singapore has developed a kind of quality assessment system called 'Construction quality assessment system' or simply CONQUAS. (BCA, 2000). The primary purpose of CONQUAS is to have effective change management in quality management. Abraham et al (1998) in discussing the key factors predicting effectiveness of cultural change and improved productivity stated some guidelines for effective change management. They are vision, communication, recognition and awards, management practice, system support and quality and behavior. Other authors such as Nadler (1981) discussed various types of change such as those incremental and the change focus only on specific subsystem of the organization and strategic change. Other purposes of CONQUAS include Competitive Advantage (Kam and Tang 1997); Studies and trials conducted to fine tune its new test technique and assessment standards (BCA, 2000). Accordingly the three main objectives of CONQUAS are to have quality assessment system for construction projects; make quality assessment objective by measuring constructed works against workmanship standards and specification and; enable quality assessment to be carried out systematically within reasonable cost and time. It is also acknowledged as the 'de facto' national yardstick for the construction industry. The objectives of CONQUAS according to Balakrishan (2002), were to benchmark the quality of construction works against the workmanship, standards and specification.

METHOD

To investigate the desirable Management Practices and Cultural Values for CONQUAS deployment, the following research method was employed. This is achieved by reporting on the sample, instrument, reliability and validity issues, and data analysis employed.
Sample
The sample for the study consisted of 120 UK constructional related organizations randomly selected from the FAME database. A total of 32 organizations responded giving a response rate of 27%. Eight of the responses were unusable due to incomplete data. The analyses are based on the remaining 24 organizations. Of the 24 usable responses, 2 (8.33 per cent) were from organizations with less than 10 employees, the majority (41.67%) of the respondents (10) had between 50-100 employees. This is followed by 5 respondents in the more than 100 hundred categories with 4 respondents having a range of 11-49 employees. This demonstrates that the majority of the respondents are considered to fall under small and medium sized companies. On average, each organization employed 68.26 employees. Table 1.0 shows the frequency of the respondents according to their positions.

Table 1: Background of respondents

<table>
<thead>
<tr>
<th>Position of Respondents</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Manager and Assistant Manager</td>
<td>8</td>
<td>33.33</td>
</tr>
<tr>
<td>Construction Project Manager</td>
<td>11</td>
<td>45.83</td>
</tr>
<tr>
<td>Architect</td>
<td>2</td>
<td>8.33</td>
</tr>
<tr>
<td>Contract Executive</td>
<td>1</td>
<td>4.17</td>
</tr>
<tr>
<td>Senior Quantity Surveyor</td>
<td>2</td>
<td>8.33</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100</td>
</tr>
</tbody>
</table>

The information in Table 1.0 shows that the position of individual respondents were assessed and the majority of the respondents workers were sixteen quality managers and assistant quality managers (33.33%), eleven construction project managers (45.83%), two (8.33%) and another two (8.33%) with remainder being Architects and Senior Quantity Surveyors. While there is only 1 (4.17%) Contract Executive. The Architect(s) and Senior Quantity Surveyor were accepted as valid respondents based on their experience in the construction industry (more than ten years). Furthermore, each had been involved in the construction industry for a considerable period with a maximum of forty years and minimum of three years. This implies that they had enough knowledge and practical experience within the quality management system.

Instrument
The data collection instrument was a self-administered structured questionnaire. The questionnaire was pre-tested by sending it to randomly selected UK Construction related organizations. Based on the feedback, the questionnaire was modified. The instrument is grounded in Abraham et al. (1998) effective management of complex change and the ‘cultural values’. This was divided into three parts as follows: demographics, management practices survey and cultural values survey. The first part (demographics) sought information pertaining to the size of organization, years of service (experience) of the respondent including position of respondent. The questionnaire used in this part was designed to measure the level of consideration of management practices and comprised six items namely: (1) vision; (2) system support; (3) quality and behaviour; (4) management practices; (5) motivation and rewards; and (6) communication.

Each item in the management practice instrument was measured from a range of (1) representing low level of consideration to (5) representing high level of consideration. Thus (3) represented neutrality, i.e. neither low nor high level of consideration. The third part sought to measure the desirable cultural values comprised five items namely: (1) harmony with people; (2) harmony with universe; (3) interdependence; (4) flexibility; and (5) respect for authority. Each item in the cultural values
instrument was measured on a similar scale as the management practices instrument ranging (1) to (5).

**STATISTICAL METHODS**

The primary focus of the study presented in this paper was to assess the levels of management practices and cultural values within the UK construction related organizations. *Statistical Package for Social Sciences* (SPSS) computer program was used to analyses the data generated by the research question. Frequencies and measures of central tendencies were used for the analysis. According to Wetzel (2005), descriptive statistics are concerned with taking data and turning it into useful and consumable information. The overall reliability of the Management Practice instrument as adapted from Abraham *et al.* (1998) had high cronbach alpha coefficient value ($a = 0.702$) thus indicating a high reliability of scales as values are > 0.7. (Nunnally, 1967). Unfortunately the Cultural Values instrument had low reliability (0.235). This item displayed a weak positive relationship to the total indicates the question that is poor on reliability and thus affecting the findings from the whole scale.

**METHODOLOGY FOR ASSESSMENT**

One of the objectives of this study was to develop a valid methodology for assessing the desirable levels of consideration for management practices and cultural values for CONQUAS deployment. In order to achieve that, a set of indices are generated in order to depict and communicate the practices and values in a hexagonal format. The following section discusses the formulae generated in the computation of management practices and cultural value indices.

**COMPUTATION OF DESIRABLE MANAGEMENT PRACTICE INDEX (MPI) AND (CVI)**

The *Management Practice Index* (MPI) and *Cultural Value Index* derived to summarize the desirability of each management practice and cultural values respectively was computed as

$$\text{(CVI)}\ MPI = \frac{\sum w}{AxN} \quad \text{Equation 1.1}$$

Where:

- $w =$ weighting as assigned by each respondent in a range 1 to 5, where 1 implies 'very low consideration' and 5 implies 'very high consideration';
- $A =$ the highest weight (5);
- $N =$ the total number in the sample.

A low Management Practice or Cultural Value index indicates that the management practice or cultural value is least desired for CONQUAS deployment, and conversely a high index indicates that the importance of the Management Practice or Cultural Value.
RESULTS AND DISCUSSION

Desirable management practices
The means and standard deviations for the six management practices for the SME’s constructional related organizations are shown in Table 2. For the Management Practices, the means ranged between 3.00 and 3.63. A score of 4 or more indicates a high level of consideration would be provided for the deployment of the management practice and would equally be of more concern.

Table 2: Analysis of Management Practices desirability

<table>
<thead>
<tr>
<th>Management Practices</th>
<th>Mean</th>
<th>S.D</th>
<th>MPI</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1=Vision</td>
<td>3.42</td>
<td>1.176</td>
<td>0.684</td>
<td>2</td>
</tr>
<tr>
<td>MP2=Management Practice</td>
<td>3.08</td>
<td>.881</td>
<td>0.616</td>
<td>4</td>
</tr>
<tr>
<td>MP3=System Support</td>
<td>3.00</td>
<td>.885</td>
<td>0.600</td>
<td>5</td>
</tr>
<tr>
<td>MP4=Motivation and Rewards</td>
<td>3.63</td>
<td>1.173</td>
<td>0.726</td>
<td>1</td>
</tr>
<tr>
<td>MP5=Communication</td>
<td>3.38</td>
<td>1.096</td>
<td>0.676</td>
<td>3</td>
</tr>
<tr>
<td>MP6=Quality and Behaviour</td>
<td>3.00</td>
<td>1.022</td>
<td>0.600</td>
<td>6</td>
</tr>
<tr>
<td>Average</td>
<td>3.25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Mean responses from the questionnaire, interpreted as 1 = low, 5 = high

A score of less than 2.0 indicates that the organizations would not give the particular management practice any consideration. The average scores given by respondents for each management practice were calculated. The higher the mean, the more likelihood of the management practice being deployed by the respondents. The three most important practices (with the highest means) are: Motivation and Rewards (mean = 3.63, Rank=1st); Vision (mean = 3.42, Rank=2nd); and Communication (mean = 3.38, Rank=3rd). The results of the survey (Table 2.0) are now discussed.

Vision
The results confirm that motivation for CONQUAS really needs to be governed by vision from management practice point of view. According to Abraham et al. (1998) Vision is the perceived clarity of goals, means and values for change. The higher mean score indicates that Vision is possibly one of the most important elements in CONQUAS deployment. This can be equated to leadership as used in other studies. This finding is consistent with Chileshe and Watson (2003) who found that Leadership in TQM requires the manager to provide an inspiring vision, make strategic directions that are understood by all and to instil values that guide subordinates.

Management practice
Management Practices dealt with the identification of a critical mass of top level support for change, and the action by this key group to initiate and manage the change process. Management practice had the fourth highest overall mean (mean score = 3.08) for CONQUAS deployment. The results prove that motivation for CONQUAS really needs the support from the management practice itself.

Systems support
System support analysis investigates the way in which the change process is supported through transition management network, appropriate financial and human resources, and clear timetable, for achievement of construction project target and induction process. The low ranking is hardly surprising as other studies (Chileshe, 2004; Watson and Chileshe, 2003 a, b) found training and human resource management related
issues to have a low priority among construction organizations seeking TQM implementation. This finding is contrast with the study by Tan (1997) who states that for TQM to work; the workforce must not only be trained, but must be "trusted" to make informed decisions on how to improve the work process continuously.

**Motivation and rewards**

Motivation and Rewards (M&R) was the highest ranked and only one of the practices that scored a mean of more than 3.5 (mean score = 3.63). This investigated the motivation for respondents in adapting to the new quality culture, and the rewards used to support that culture. Ishikawa (1985) identified one source of human motivation at work as task Motivation and social Motivation. Task motivation is the good feeling that comes from accomplishing things and seeing them actually work. Social motivation is the energy that comes from co-operation from others on a shared task and the incentive provided by recognition from others. Rewards, on the other hand, viewed as "monetary" and "esteem" might be considered motivation force in this particular study. The findings for the motivation factors are consistent with Lo (2002) who provided a scenario of negative feedback from eastern construction contractors claiming Quality Management System (QMS) is a burden to the normal operation, but later concluded that the incentives for QMS are to improve quality image of a company and to satisfy client requirement.

**Communication**

Communication was third ranked (mean score = 3.38). This measures the extent to which various communication approaches were used to emphasize a quality theme and the effectiveness of each of the approaches.

**Quality and Behaviour**

Quality and Behaviour was identified as the weakest area and least considered (rank = 6th; mean = 3.00) in comparison to other management practices. “Quality and Behaviour” defined as providing some output variables where respondents could record their perceptions of tangible gains achieved through the change to a quality orientation. Having provided the descriptive statistics for the management practices that require consideration for the assessing the readiness of CONQUAS deployment, the following section identifies the desirable Cultural Values for the deployment of CONQUAS.

**Desirable cultural values (CV)**

Table 3.0 summarizes the descriptive statistics such as the mean, standard deviation and the computed indices of these cultural values necessary for the deployment of CONQUAS. The ranking of the desirability is based on the mean score. The higher the mean, the more desirable in the deployment process.

<table>
<thead>
<tr>
<th>Cultural Values</th>
<th>Mean</th>
<th>S.D</th>
<th>CVI</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV1= Flexibility</td>
<td>2.86</td>
<td>1.466</td>
<td>0.572</td>
<td>3</td>
</tr>
<tr>
<td>CV2= Harmony with People</td>
<td>3.09</td>
<td>1.411</td>
<td>0.618</td>
<td>1</td>
</tr>
<tr>
<td>CV3= Harmony with Universe</td>
<td>3.00</td>
<td>1.206</td>
<td>0.600</td>
<td>2</td>
</tr>
<tr>
<td>CV4= Interdependence</td>
<td>2.65</td>
<td>1.434</td>
<td>0.530</td>
<td>4</td>
</tr>
<tr>
<td>CV5= Respect for Authority</td>
<td>2.30</td>
<td>1.428</td>
<td>0.460</td>
<td>5</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>2.78</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note1: Mean responses from the questionnaire, interpreted as 1 = low, 5 = high
The two most important cultural values (with the highest means) are harmony with people (mean = 3.09); and harmony with universe (mean = 3.00). The results of the survey (Table 4.0) are now discussed as follows:

**Flexibility**
This factor was ranked 3rd (mean = 2.826). This is low in comparison to ‘Harmony with people’ and ‘Harmony with Universe’. It will therefore have a lesser impact on cultural value towards the deployment of CONQUAS. Yang (1986) in his discussion of the temperamental characteristics of Chinese personality, pointed out that the Chinese have been characterized as valuing common sense approach and utilitarian ways of thinking. Many of the problem solving tools used in quality management requires pragmatic minds, which are able to adapt to changing situations in the environment. (Noronha, 2002).

**Harmony with people**
This was found to be the most important (mean = 3.09; rank = 1st). This finding is consistent with literature as the successful implementation of group activities such as quality control circles depends on the synergistic effect that harmonious human relations can bring about. Furthermore, quality management stresses on total participation and involvement for the good of the entirety, the harmonious relationships between management and labour and among co-workers are essential. (Noronha, 2002)

**Harmony with universe**
‘Harmony with universe’ ranks the second highest (mean = 3.00) culture factor to implementation of CONQUAS just after ‘Harmony with People’. Noronha (2002) described the ancient Chinese were primarily peasants and their sowing and harvesting relied much on the occurrence of natural phenomena and the nature of the four seasons. Quality management is essentially a long term journey with substantial hardships at beginning which Juran, 1988 (in Noronha, 2002) calls ‘sporadic spikes’. This positive view on uncertainty provides the basis for a healthy attitude toward quality assessment systems.

**Interdependent**
This principle is described as ‘doing favours’ which can be considered as ‘social investments’ for which future returns are expected. (Noronha, 2002) this value is related to customers and contractor relationships. To provide defective goods and low quality is actually to lose business in front of peers and customers. On the other hand, to provide high quality goods and services is to do others favour and to maintain reciprocal treatments. This factor was ranked fourth (mean value = 2.652) thus demonstrating a lesser effect on deployment of CONQUAS.

**Respect for authority**
The mechanism of the relations is based on the rules of proper behaviour or propriety, so that rights and responsibilities for each are entailed. In quality management, top management should take the lead role in disseminating quality consciousness down the organization hierarchy. When authority is valued, top management visions and directives are more easily and smoothly accepted. Respect for Authority’ ranks the second to lowest culture factor to implementation of CONQUAS. This is shown by the mean value of only 2.304. The result of analysis by Noronha (2002) suggested that culture values such as adaptability, harmony with people, interdependence and respect
for authority are found to be positively associated with Quality Management Systems (QMS). While on the other hand, the values of ‘Harmony with universe’ may incorporate passive fatalism. This finding is partly confirmed by this particular research. It suggests that harmony with universe do not contribute much towards the nurturing of a quality climate.

COMMUNICATING THE LEVELS OF CONSIDERATION FOR CONQUAS DEPLOYMENT

Based on the findings in Table 2, mean scores of the six management practices are plotted in form of a ‘Hexagonal Radar’.

![Hexagonal Radar Profile](source: Chileshe and Sim, 2007)

The total scores for the sample are taken as the industry median, and three organizations falling into the three categories of High (H), Medium (M) and Low (L) are selected to be depicted on the ‘Hexagonal Radar’ Profile shown in Figure 1. The deploying and scoring the levels of considerations for CONQUAS for the three categories is based on Chileshe (2004) as follows where MMPS is Mean Management Practice Score and RMPI = Relative Management Practice Index: High Level (MMPS = 4.0-5.0, RMPI = 0.8-1.0), Medium Level (MMPS = > 3.0-4.0, RMPI within the 0.6-0.8 range) and Low level is where MMPS is less than 3.0 with the associated RMPI < 0.6. The Hexagonal below (Figure 1) communicates the relationship of the management practices. It is evident that there was a marked difference in the consideration of the management practices deemed as necessary for CONQUAS deployment by the three groups of organizations. However, in the study there was a significant level of achievement of CONQUAS management practices by the medium and high level organizations.

CONCLUSIONS

This research aimed to identify the desirable management practices and cultural values for the deployment of Construction Quality Assessment Systems. Data from 24 construction companies were used to identify the desirable management practices and cultural values for the deployment of CONQUAS within the construction industry. The study provided a raft of contributions, both theoretical and practical. The application of the relative management practice index will prove particularly useful as benchmarks for comparison with other organizations having formal quality systems.
Quality Manager’s can use this model as well as Senior Management to assess their strengths and weaknesses on the management practices necessary for the effective deployment of CONQUAS. In conclusion, it can be argued that 'new is good' concept has permeated human mind to think that CONQUAS is new and therefore is good', the data would not be very reliable and research findings have been biased to a certain degree. The extensive literature review managed to identify some cultural values such as harmony with people and harmony with universe which may interrupt the successful implementation of CONQUAS. Although the descriptive statistics used in this research paper are taken from within the UK Construction Industry, the impact of Management Practices and Cultural Values and its associated benefits of CONQUAS deployment are universal and of interest to the Construction Industry universally.

REFERENCES


Sim, Y.L., (2006), An Investigation into the awareness of the Construction Quality Assessment System (CONQUAS) within the UK Construction Organizations, MSc Dissertation, Sheffield Hallam University, Sheffield.


