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Published in:
Proceedings of the 2nd International Conference of the CIB Task Group 29 (TG29) : challenges facing the construction industry in developing countries

A Framework for the Implementation of TQM in Construction Organisations

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Abstract

Total quality management (TQM) has been recognised as an enabler for performance improvement in the construction industry. Many construction organisations have embraced the philosophy and techniques of TQM with enthusiasm, while others have been reluctant because of the perceived increases in costs and disruption it may cause. This paper presents empirical findings from eight contracting organisations that have adopted TQM practices in response to competitive and environmental pressures. Using the NIES 'How To' model developed by the Australian Government's National Industry Extension Scheme, the paper describes the reasons why the contractors adopted TQM, the associated planning and implementation issues they encountered, barriers and benefits with its implementation. Findings from the case studies reveal that when implementing TQM contractors need to align their culture with the objectives of their TQM program if it is to form part of an effective and successful strategy for performance improvement. The paper suggests that contractors should undertake cultural audits before implementing TQM (or any other type of change program) so that corporate objectives and behaviours can be aligned to the goals of the TQM program. A cultural audit process for achieving effective TQM implementation is proposed. The case studies offer a learning opportunity for contractors who are, or are in the process of, adopting TQM.

***Keywords**: Australia, change, culture, cultural audit, contractors, NIES model, TQM.*

INTRODUCTION

Projects in the Australian construction industry are plagued by time and cost overruns (e.g. Gyles, 1992). As a result, the industry has become an adversarial business. For over a half a decade the construction industry has been going through a period of intense introspection as a result of numerous Government initiated reports in Australia (e.g. DISR, 1998), which have been critical of its poor performance and productivity. To address these problems, it has been suggested that the construction industry re-engineers its work practices and implements concepts such as lean production and supply chain management. The need for change has been further exacerbated by the increasing need to address sustainability issues such as

reducing rework and material waste produced on construction sites. The industry's problems will remain until each organisation involved in the procurement of construction begins to takes the responsibility for initiating changes within their own organisations (Love *et al*., 2000a). According to Nesan and Holt (1999) such change can be initiated through the effective implementation of total quality management (TQM). However, many organizations in the Australian construction industry have eschewed implementing TQM practices because short-term benefits are relatively minimal (Jaafari, 1996). While some construction organisations may be sceptical about the benefits to be gained from TQM, there have been reported examples of organisations that have enjoyed significant performance improvements, such as reduced rework and increased profits (Love and Li, 2000).

To gain an understanding about how and why Australian contractors are using TQM, a case study research approach was adopted. A case study approach has particular applicability to exploring quality practices because it can provide contextual detail, which is often missing from other research methods such as a survey. In fact, empirical and qualitative studies that have focused on the process and cultural factors associated with implementing TQM in construction have been limited in Australia. This paper adds to the growing body of empirically based literature on TQM in construction by presenting the experiences of eight Australian contracting organisations that have adopted quality management practices. Using the NIES 'How To' model developed by the Australian Government's National Industry Extension Scheme the paper describes the reasons why the contractors adopted TQM, the associated planning and implementation issues they encountered, barriers and benefits with its implementation. A cultural audit process for achieving effective TQM implementation is proposed. The case studies offer a learning opportunity for contractors who are, or are in the process of, adopting TQM.

TQM, CHANGE AND CULTURE

Research into the application of TQM in the construction industry has been ubiquitous in the last decade (e.g. Seymour and Low, 1990; Burati and Kalidindi, 1991; Chan, 1996; Ahmad and Sein, 1997; Arditi and Gunaydin, 1998). However, few authors have acknowledged that the implementation of TQM requires an organisation to change its culture so it can readily adapt to and take advantage of quality practices. If a construction organisation fails to change its culture, then TQM may not provide the benefits as initially expected (Griffis, 1992).

Atkinson (1990) states that effect of TQM on organisational culture should not be underestimated, as it radically influences an organisation's strategy and is geared to changing culture in the long term. Atkinson (1990) further states that effective cultural change is the key to successfully implementing TQM. Low and Chan (1998) note that type of power in organisations, the distribution of authority, the degree of empowerment, organisation politics, employee's resistance to change, leadership style and conflict within construction organisations can severely affect the implementation and maintenance of a quality management system. They suggest that in order to implement an effective quality management system, diverse management factors such as support of senior management, appropriate leadership style, the cultivation of employee's behaviour and attitude, open communication and feedback must be considered.

Nesan and Holt (1999) have suggested that organisations in the construction industry tend to be reactive to environmental changes being imposed on them (due to economic, political, social and technological pressures), and as a result the industry has been criticised for its poor performance in relation to other industries. The authors suggest that each organisation involved with the procurement of construction facilities should adopt a change strategy that views change as a continuous process so that their organisation can readily adapt to environmental pressure. Love *et al*. (1998) suggest that TQM can be used to create an organisation where change is considered the norm, rather than a reactionary response to environmental pressures.

Fundamentally, the adoption of TQM requires organisations to implement change throughout their entire organisation (Oakland and Shoal, 1996). According to Lewin (1958) organisational change can occur at three levels:

1. Changing the individuals who work in the organisation e.g. skills, values, attitudes, and behaviour (individual strategy).
2. Changing various organisational structures and systems (system and structure strategy).
3. Directly changing the organisational culture or interpersonal style (cultural strategy).

Nadler and Tushman (1988) on the other hand suggest that organisational change could be considered as operating at two levels. The first level being fundamental large-scale change in the organisations strategy and culture and the second level being concerned with modest changes that improve an organisation's performance, yet do not change the organisation at the fundamental level. Roberts and Thomson (1995) argue that models for total quality are transformative, in the sense that successful implementation of TQM philosophy involves the adoption of an on-going set of disciplines that gradually affect the way people think and interact. In addition, Roberts and Thomson (1995) maintain that TQM philosophies can leave an organisation fundamentally different from the way it was before it started the TQM program. Atkinson (1990) states that the effect of TQM upon an organisations culture should not be minimised, as it is a radical change to an organisation's strategy that is geared to changing culture in the long term.

Beckhard and Harris (1987) suggest that large-scale organisational change can be conceptualised by assessing the organisation's current situation (present state), determining the desired future (future state) and planning ways to reach the desired future, and implementing the plans (transition state). Kanter (1985) states that the failure to achieve transformative change (such TQM implementation) has more to do with the lack of integrating and institutionalising strategies than with problems inherent with innovation.

RESEARCH METHODOLOGY

The objective of the research was to assess TQM implementation initiatives in a number of contracting organisations to explain and identify similarities and differences in the implementation approach, benefits achieved, difficulties experienced and critical success factors. The field study was based on the guidelines suggested by Yin (1989) and thus focused on contractor selection, focus of inquiry, which sought richness in data and data gathering procedures.

Field study design and contractor selection

The study reported in this paper was carried out in Australia, where a total of ten contracting organisations were approached about the nature of the research. Eight expressed an interest and a meeting was then arranged with the general manager and other senior managers (such as the construction manager) to discuss the research and objectives. The contractors used for the study were considered to be well-established contractors who are capable of procuring a wide range of construction facilities (building and civil engineering). Each contractor has several offices throughout Australia and overseas. Table 1 provides characteristics about the contractors used for this study. For reasons of confidentially the author cannot provide any more detail than that presented in Table 1. The information that was provided by senior management are only estimates so as to provide the reader with an idea about the size the organisations involved with the research.

Table 1: Characteristics of eight contractors involved in the research

ID	Turnover for 1998/99 ($M)	No. of staff	Year TQM initiated	Certification to AS 3900/IS9000
A	490	300	1988	Certified to dual standards in 1993 Currently pursuing ISO 9000:2000
B	280	300	1990	Certified to dual standards in 1993
C	350	200	1991	ISO 9000 in 1994
D	680	500	1985	Certified to dual standards in 1993 Currently pursuing ISO 9000:2000
E	550	400	1986	Certified to dual standards in 1993 Currently pursuing ISO 9000:2000
F	350	200	1990	ISO 9000 in 1994 Currently pursuing ISO 9000:2000
G	185	85	1991	ISO 9000 in 1996
H	275	120	1989	ISO 9000 in 1994

Data collection

Interviews were used as the primary source of data collection to focus the investigation and to ensure that a consistent line of inquiry was followed (Yin, 1989). An interview guide was designed on the 'NIES TQM How To' model, which was developed as part of the Australian Government's National Industry Extension Scheme (DITRD, 1992). The NIES model is based on a set of core principles that describe the key aspects of TQM. According to this model the central focus of TQM is the customer who has expectations that must be satisfied by the supplier. The ability of the supplier to satisfy customer expectations is primarily influenced by three basic interacting factors: *people*, *systems* and *variation*. An understanding of the relationship between these interacting factors is conveyed through three principles:

1. All people serve customers through and within a system.
2. All systems are adversely affected by variation.
3. Variation impedes the ability of people in the system to satisfy customers.

These three concepts of TQM require the adoption of seven management imperatives for developing and maintaining a competitive advantage:

1. Quality is defined in terms of customer perceptions.
2. The system is improved by improving processes within the system.
3. Suppliers and contractors are treated as partners in the system.
4. Statistical thinking and methods are used to manage and reduce variation.
5. All people are creatively involved in continuous improvement of the system.
6. Continuous improvement activities are integrated within the strategic and annual planning cycle.
7. Continuous improvement is led, managed and supported at all levels in the organisation.

The NIES model was designed to collect both quantitative and qualitative data. To complete the collection of information, several visits were made to each contracting organisation. Discussion with senior management focused on the overall strategy of the organisation, the basis of competitive advantage, competition, and reasons for implementing TQM. Following the interviews with senior management, the focus of the interviews shifted to exploring issues concerning planning for, implementation of and scope of the TQM program. At this stage interviews were conducted with estimating managers, design managers,

business development managers, quality managers, project managers, and several contract administrators and site engineers. Each interview lasted for one to two hours.

FINDINGS AND DISCUSSION

The major findings from the case studies are presented and focus on the following themes:

- motivation for embarking on TQM;
- planning and implementing of TQM;
- barriers to the implementing of TQM; and
- major benefits and barriers of TQM;

Motivation for embarking on TQM

From the interviews it was found that the reasons for implementing TQM varied between the contractors. However, the main reason for some contractors for embarking on some form of TQM process was attributable to environmental pressures rather than the value-laden philosophy of being customer driven. This is an interesting finding since the importance of customers is part of any contemporary definition of TQM (e.g. Oakland and Sohal, 1996). Goodstein and Burke (1991) made a similar observation in their research stating that organisations tend to change primarily because of external pressure rather than an internal desire for change. Despite variations in the primary reason for adopting TQM and in some cases several attempts at its introduction, none of the contractors have disbanded TQM.

For contractors A, B, C, D, F and G the managing director (MD) was the catalyst for embarking on TQM. According to Low and Chan (1998) it is difficult to introduce any organisational change program (particularly TQM) without having senior leadership support. The distinguishing feature of leadership support in these cases was that these managers were passionate in their belief that TQM was strategy for gaining and sustaining a strategic competitive advantage in their marketplace. Each MD, however, reported that there was initially resistance from employees to the changes required by TQM, which meant that considerable time and effort of was spent leading (driving in some instances) the change initiative.

All of the contracting organisations viewed TQM initiatives as part of the means to respond to the competitive environment in which they were operating in and part on an on-going process to improve their organisational performance. There was also recognition that to compete effectively, the organisation should first focus on issues such as improving the way in which they managed projects, marketing (specifically service quality) and increasing employee autonomy through empowerment initiatives. Essentially, it was perceived by senior management that TQM was a means to obtain such improvements.

PLANNING AND IMPLEMENTATION OF TQM

Contractors A and D had previously made several attempts at introducing TQM initiatives within their organisation, but they had not been entirely successful. The common factor that had led to their failure was that the responsibility for implementing the TQM process was given to the Quality Manager, who was not part of the line management responsibility within the organisation. In addition, it was found that TQM had not been integrated into the strategic planning systems of the organisations. Employees in these construction companies did not perceive the program as being part of the organisations corporate vision for quality and consequently had lacked enthusiasm for change. The reasons why the TQM program were considered to be ineffective was primarily due to lack of a clearly shared mental model of quality and a lack of shared values and vision amongst employees in both organisations.

Contractors B C, and E experienced an evolutionary approach to implementing continuous improvement programs by creating an awareness of TQM and encouraging the involvement of employees through the

formation of teams. Employees were provided with training about the philosophy of TQM and its related practices. This served not to raise an awareness of the benefits of TQM but also addressed specific issues such as training in team building, process improvement and problem solving skills.

Benefits and barriers to implementing TQM

A major benefit of initiating a TQM program reported by all contractors was that there was an increasing awareness and focus by all employees on satisfying both internal and external customers. There was an increasing focus by top management on the activities and the needs of lower level employees in the organisation. Other benefits reported included improved:

- project performance (e.g. reductions in rework, waste);
- client satisfaction (e.g. repeat clients);
- marketshare;
- relations with customers/suppliers (e.g. partnering);
- staff morale (training and education);
- measurement of performance (e.g. internal and external benchmarking); and
- organisational competitiveness (e.g. success in bidding).

All contractors reported that the benefits of TQM were not visible during the early stages of implementation. Contractors that had started their TQM initiatives in the late 1980s and early 1990s and had not realised the financial benefits/rewards TQM can offer until the late 1990s and early 2000. Interestingly, no contractor had in place a comprehensive system for accurately measuring total costs and benefits of TQM. Rather the benefits were reported on an *ad hoc* basis. Employees (particularly those who were site based) showed resistance to the introduction of TQM for a host of reasons, which included fear of the unknown, perceived loss of control, personal uncertainty, 'it may mean more' syndrome, and an unwillingness to take 'ownership' and be committed to change. Other barriers that were identified included:

- perceived threat to foreman and project manager roles;
- disinterest at the site level;
- lack of understanding of what TQM was, particularly on site;
- geographically dispersed sites;
- fear of job losses;
- inadequate training;
- plan not clearly defined;
- employee scepticism; and
- resistance to data collection (e.g. rework costs, non-conformances material waste, etc.).

The findings reported in this paper also confirm the findings of Tucker *et al.* (1996) who found that contractors were not aware of a single barrier to the adoption of quality management practices – rather they gave a wide range of responses for the barriers to implementing TQM.

One barrier reported by all contractors can be described as 'cultural pluralism'. Senior management perceived that TQM would be understood as a process by all employees, which overlooked the fact that a unitary notion of culture did not accurately reflect the realities or organisational life in Australia. In particular, contractors suggested that language and cultural barriers were a major problem in communicating the principles of the TQM. This was because they had superimposed TQM over an existing organisational structure and processes without recognising that they needed to align the goals of the TQM program with the behaviour and values of employees. In particular, older employees who had spent their working life being rewarded on different performance criteria and a different economic measure were not interested in TQM, as they primarily perceived it to be a management fad. This was also linked to the issue of the perceived threat to hard-won supervisory and managerial roles. Contractor D reported that a previous attempt to introducing TQM processes had created a climate of disinterest that permeated throughout all levels of the organisation. Contractors A, B, C, D, and G found that employees did not perceive the TQM

program as part of their organisations corporate vision for quality, but rather as something that was being delivered by the rhetoric of functional managers (e.g. construction managers, contracts managers). For contractors A and F they found it necessary to position the TQM program so that it was perceived by employees as being mainstream to the activities of their organisations. Both contractors achieved this over a four-year period whereby TQM was incorporated into the annual strategic planning cycle.

The contracting organisations identified a number of lessons they had learnt from the introduction of a TQM programme, which are included:

- TQM should be implemented by line managers;
- a quality improvement system has a role in improving the morale of employees;
- there needs to be a link between information technology and quality systems;
- continued commitment to education and training;
- TQM needs to be defined and integrated with the organisations business strategy; and
- there needs to be complete commitment from the MD and senior manager team to implementing TQM. Management must drive the TQM program and gain the support from all employees by making their leadership visible.

Alignment of culture with TQM

A TQM programme requires changes to structures and systems that demand new behaviours by individual and groups (Low and Chan, 1998; Holt *et al*., 2000). According to Beer and Walton (1990) for TQM to be successful it must be accompanied by the development of leadership, human skills and shared values that are consistent with the purpose of structures and systems that are introduced. Wilkinson *et al*. (1993) suggest that a possible reason as to why the organisational adaptation of TQM does not occur successfully is because leaders make often structural and system changes without realising that culture also needs to be nurtured and integrated with current organisational practices. Similarly, Westbrook and Barwise (1994) stated that continuous improvement implementations that are not underpinned by cultural change might not experience the performance improvements initially anticipated. Hence cultural change or at least a version of it must be woven into a planned change in structure and power relationships (Anthony, 1994; Low and Chan, 1998).

Methods of implementing a new organisational strategy such as TQM initiatives require different change strategies and techniques at the individual, structure/systems, and cultural level. It is therefore suggested that an analysis of an organisation, using culture-auditing tools may help with the design of a successful TQM implementation program. An important part of the successful implementation of TQM is to review the current practices, behaviours and attitudes in the organisation and assess the fit with the TQM philosophy. Conducing a company audit to assess organisational culture can provide data to pinpoint required changes that need to be undertaken at various levels throughout the organisation. In addition, the national culture needs to be carefully studied because it has been shown that certain core elements of the national culture should be incorporated in the TQM programme to ensure its success (Ngowi, 2000). It is suggested that this is necessary for successful transformational change and to facilitate the introduction of TQM. If behaviours can be aligned with the fundamentals necessary for TQM implementation, the likelihood of success is increased.

The elements of a TQM programme that can be affected by the culture of the organisation are:

- intra-and-inter organisational cooperation (relationships with internal and external customers and suppliers);
- use of statistical analysis tools in managing processes and operations (e.g. the measurement of rework costs, material waste);
- providing support and encouragement for continuous improvement (e.g. training); and
- good record keeping and documentation (e.g. QA).

Before implementing TQM management will need to determine whether a change in culture or a change in the behaviour of the organisation's employees is needed. For many organisations a change in behaviour may be considered sufficient. However, sustained commitment is more likely if employees share the same mental models of quality in the organisation. A cultural audit can enable senior management leadership to identify assets as well as liabilities in their culture (Glover *et al*., 1994). This can be done by carefully reviewing the results and determining which aspects are assets of the existing culture and are contributing to the TQM mission and goals of the organisation. Simultaneously, the organisational leadership can identify those aspects of culture, which are impeding organisational performance (liabilities). Given a set of corporate objectives and behaviours that contractor would want its employees to exhibit, a process for achieving effective TQM implementation is presented in Figure 1.

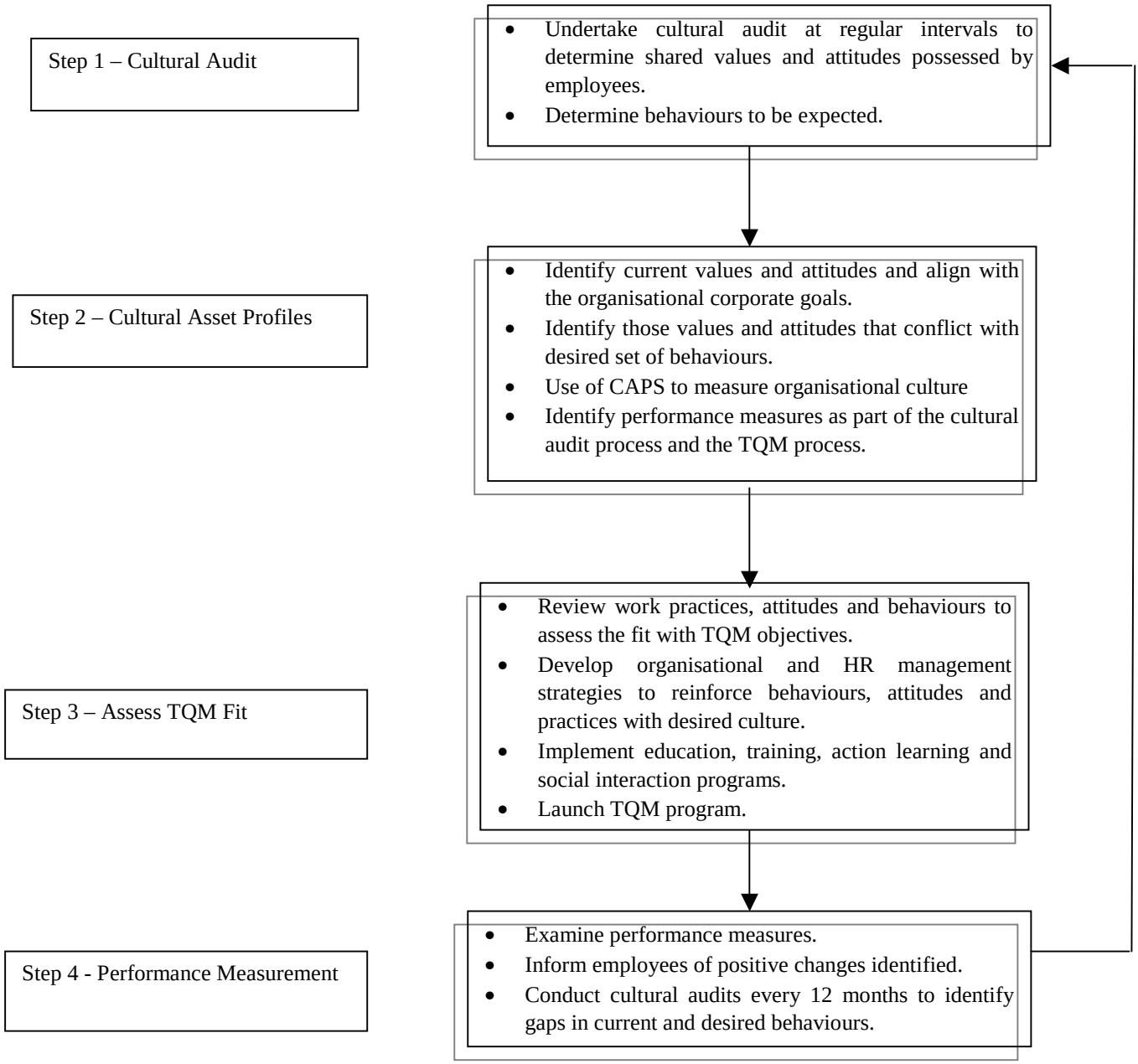

Figure 1: The cultural audit process for TQM implementation

Cultural audit process for TQM implementation

In step 1 a cultural audit is undertaken to determine the organisations common shared values and the attitudes and behaviours possessed by employees. It is envisaged that the audit can provide a basis of descriptive profiles of the organisation's culture. As contractors invariably do not have the in-house expertise to carry out such cultural audits, the author suggests that an external management consultant should be employed to undertake such a task.

In step 2 the current values and attitudes that are aligned with the organisations corporate goals are identified. Those attitudes that conflict with the desired set of behaviours should also developed. Once these have been identified it is suggested that those that need to be developed should be also determined. By undertaking these tasks, a basis for analysing the alignment of the culture with the organisation's vision and goals for quality can be undertaken. Glover *et al.* (1994) developed the Cultural Assets Profiles (CAPS), which is a multi-method approach to measuring an organisation's culture from a quantitative and qualitative perspective. Structured interviews, focus groups, document analysis, a survey and participant observations, and individual ratings from an on-site study are used to determine an organisation's culture. The CAPS system is particularly useful for strategic planning and to reduce the risk of organisational change failures (Glover *et al*., 1994).

In step 3 current work practices, behaviours and values of the organisation are reviewed to assess the fit with TQM objectives. Thus, it may be necessary to develop organisational and human resource management strategies to reinforce behaviours, attitudes and practices in the organisation to align with the desired organisational culture. Consequently, this is likely to require extensive education and training, action learning exercises and social interaction (Holt *et al*., 2000).

In step 4 performance measures of for the cultural audit are examined and employees are informed of positive changes that are identified. Areas that do not perform as expected are investigated and the appropriate actions are taken to ensure that performance is improved. It suggested that contractors who have implemented or about to implement TQM should regularly undertake cultural audits every 12 months or so they can identify gaps in current and desired behaviours and therefore maximise their investment in TQM.

CONCLUSION

Total quality management philosophy extends beyond management systems related to the production process. It embraces the philosophy, principles, processes, practices and procedures necessary for providing customer satisfaction as well as achieving significant improvements in productivity and business performance. Commitment and perseverance from senior management and all employees is necessary when embarking on the quality journey. Contractors must realise that results will not happen overnight; it will take time for the organisation to adapt, change and learn.

This paper has presented the experiences of eight contracting organisations in Australia that had embraced TQM. The reasons why the contractors adopted TQM, the associated planning and implementation issues they encountered, benefits achieved and the limitations and difficulties with its implementation were identified and discussed. In general the MD was found to be the catalyst for introducing and driving the TQM initiative because of environmental pressures being imposed on the organisation. The benefits/rewards of implementing TQM were found to emerge ten years after the initial decision to adopt TQM. These benefits included reduced rework, increased marketshare and improved client satisfaction, all of which are important for sustaining a competitive advantage. Most contractors however experienced difficulties with implementing TQM because it was not aligned to the organisations current structure and processes and the behaviour and values of employees. In considering these points, it was suggested that contractors should perform a cultural audit before implementing TQM so that corporate objectives and behaviours can be aligned to the goals of the TQM program. A process for conducting a cultural audit was proposed, which may help contracting organisations to better understand how they make the most of change

strategy such as TQM. Although the study reported in this paper was carried out in Australia, which is not a developing country per se, the lessons learned are very relevant to developing countries because they face the same dilemmas when introducing TQM, which has become universal in the face of globalisation.

ACKNOWLEDGEMENTS

The author would like to thank the contracting organisations for their participation in this study. Without the cooperation and support from the senior management of these organisations the research could not of been undertaken. The author would also like to acknowledge the financial support provided by the Australian Research Council.

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