

Quality Planning Process of Construction Contractors: Case Studies in Sri Lanka

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Abstract: Within quality management efforts, modern organisations pay more attention to improving the quality planning process. However, construction contractors in developing countries such as in Sri Lanka still lag in their practice of effective quality planning. Thus, the key research question of this study was "how do Sri Lankan construction contractors approach quality planning?" Within this question, the study's primary objectives were to explore whether the Sri Lankan construction contractors practice quality planning effectively and the extent to which they are ready to implement strategic quality planning. The research method adopted for this study was qualitative and used three case studies representing three major contractors in Sri Lanka. The study revealed that ISO 9000 is the most popular quality management system practiced by Sri Lankan construction contractors. The contractors are not yet ready to implement strategic quality planning due to several barriers. Building on these case study findings, several prerequisites for the successful implementation of strategic quality planning are proposed that will be useful for contractors who operate in similar environments.

Keywords: Strategic quality planning, Construction industry, Contractors, Case studies

INTRODUCTION

The construction industry is now a highly dynamic sector, and its operating environment, industry structures and product characteristics are changing at an ever-increasing pace (Dansoh, 2005). With the changing economic environment, managers of construction companies and projects look for emerging new construction management philosophies. Many organisations in various industries have turned to quality as a reliable management tool in the competitive market environment that leads to higher project performance. The construction industry is also moving towards higher quality, and contractors are forced to upgrade the quality of their services (Pheng and Hong, 2005). Dina, Abd-Hamida and Brydeb (2010) reveal how quality systems in construction lead to project performance as well as financial and organisation performance. Barrett (2000) emphasises that a combination of sound formal systems and strong relationships is essential to achieve high quality in the project environment of construction, both within companies and across the supply network.

According to Barrett (2000), in the construction industry, quality can be considered as the satisfaction of an entire range of performance criteria owned by an interacting host of stakeholders and mediated by a range of mechanisms, including regulation and market forces. Arditi and Gunaydin (1997) describe the stakeholders related to quality in the construction industry as designers, constructors, regulatory agencies and the owners. Yasamis, Arditi and Mohammadi (2002) discuss quality in construction at the corporate and project levels. At the corporate level, the authors argue that construction companies

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should design and deliver quality management based on the company's core values. Project-level quality in construction is derived by the customer's satisfaction with the constructed facility and the contracting service. Considering these two levels, this study focuses on quality in construction at the corporate level.

Beecroft (1999) emphasises that quality, like any other dimension of business, must be strategically managed at the corporate level. Many quality improvement efforts focus solely on quality improvement tools and the methodology for improving specific processes; however, these efforts often ignore their impact on the overall business. Srinidhi (1998) described that many firms practicing independently sound management methods to implement higher quality fail because these methods are either not aligned with the firm's strategy or not properly coordinated with each other. Therefore, the studies establish that effective quality management cannot be practiced in isolation from other initiatives or the overall strategy of the firm.

Madu and Kuei (1993) and Tummala and Tang (1996) have identified that strategic quality management as a comprehensive and strategic framework linking profitability, business objectives and competitiveness to quality improvement efforts will allow the delivery of customer satisfaction. Thus, strategic quality planning (SQP) is attained when strategic planning and quality planning are merged into one seamless process resulting from the free flow of information between strategic planners and quality planners (Calingo, 1996). Although SQP seems to be naturally linked to success, the concept of SQP is still being developed in the construction industry. Nevertheless, SQP will likely gain greater awareness in the future and will be targeted by an increasing number of professionals and contracting firms (Pheng and Hong, 2005). Thus, construction contractors need to be ready for and aware of effective quality planning processes such as SQP. Accordingly, the primary objectives of this study were to explore whether the Sri Lankan construction contractors are practicing quality planning effectively and the extent to which they are ready to implement strategic quality planning. Drawing from the study's literature review, the next section describes the quality planning process.

QUALITY PLANNING PROCESS

Many organisations currently invest in quality improvement programmes. However, the literature has revealed that many companies felt that the quality improvement programmes had fallen short of their expectations and that these programmes were not generating the anticipated improvements (Lam, 1997). The key reason for this gap between quality improvement expectations and the realisation of benefits is the absence of an effective quality planning process before its implementation (Juran and Godfrey, 2000). Thus, quality planning is identified as the most significant phase in a corporate quality management process requiring more attention.

Quality planning is a disciplined process to ensure that a structured sequence of activities is completed. These activities will ensure that an organisation can provide a quality product on time, at the lowest cost and to the customer's specific specifications. Juran (1988) sees quality planning as part of the quality trilogy of quality planning, control and improvement. According to Juran's

quality planning road map, the key elements of implementing company-wide strategic quality planning are identifying the customers and their needs, establishing optimal quality goals, creating measurements of quality, planning processes capable of meeting quality goals under operating conditions and producing continuing results in an improved market share.

Many other quality planning methodologies have been developed. In particular, the quality planning process is emphasised in quality management approaches, such as total quality management (TQM) and the International Standardisation of Organisations (ISO). However, Srinidhi (1998) argued that many firms that independently practice various quality management methods fail because these methods are not aligned with the strategic planning of the organisation. According to Ford and Evans (2000), the initial emphasis of strategic quality planning on planning for quality through projects resembled the approach of Juran (1988). Leonard and McAdam (2002) further emphasise that organisations need to integrate quality planning and strategic planning to avoid conflict between the two plans because the quality plan will likely to lose out and could result in several disruptive effects, such as a further emphasis on quality measurements, tension between financial and quality goals and non-involvement of employees and customers in strategic planning (Farhan, 1999). Thus, the current research on quality planning highlights the importance of strategic quality planning.

The construction industry is viewed as industry with a poor emphasis on quality compared to other sectors, such as the manufacturing and service sectors. In addition to criticisms of the final product, the industry's processes, people and materials are under tremendous pressure to provide a higher quality of construction, as described in the previous section. Despite the perceived importance of the topic and the value of the quality planning process, very little empirical research has been undertaken on quality planning, and the SQP process in particular, in the construction sector (Lam, 1997). Studies that directly focus on the quality planning process of Sri Lankan contractors were not found. An undergraduate study by Kumara (1997) has explored the suitability of ISO for Sri Lankan contractors, but information on current practices is still unavailable. This research gap triggered this study, and the next section sets forth the research method adopted for the empirical investigation.

RESEARCH METHOD

This study's research problem prompted a qualitative research study. Qualitative approaches are essentially descriptive and inferential, focusing primarily on the type of evidence (what people tell you, what they do) that will enable an understanding of the current situation. This study considered qualitative research approaches based on the nature of the research problem. In particular, this research adopted the case study research approach. According to Yin (1994), a case study offers an in-depth investigation into a contemporary phenomenon in its real-life setting, wherein the boundaries between phenomenon and context are not clearly evident.

A pilot study was first conducted to fully develop the research problem and data collection instruments before conducting the detailed case studies. In the pilot study, data were collected by unstructured interviews with five key people that had knowledge of construction quality management. These people consisted of a project manager, a quality assurance manager, a manager on human resources and skill development, and two general managers from two private quality consultant organisations. The pilot study was focused on identifying the context of the research problem to develop the interview guidelines and select theoretically significant cases.

Accordingly, three large-scale contracting organisations were selected for the detailed case studies. The organisations were selected based on the recommendation of the pilot study interviewees such that compared to other contracting organisations, these three contractors implement quality management at a satisfactory level. Furthermore, the selected organisations successfully practice both quality and strategic planning processes successfully, which is necessary to reach the study's second objective, namely to explore the possibilities of integrating the two processes through strategic quality planning. See Table 1 for a brief description of the cases.

Table 1. Brief Description of the Selected Cases

Project	Organisation A	Organisation B	Organisation C
Number of years in the field	66 years	24 years	28 years
Annual turnover (Sri Lankan Rupees)	One billion	Seven billion	Five billion
Specialisation areas	Buildings and civil construction.	Buildings and all civil construction.	Buildings and civil construction.
Number of employees	400 staff and labourers are on sub contract basis	500 staff and labourers are on sub contract basis	400 staff and 300 direct labourers and others are on sub contract basis.
Number of ongoing projects	seven projects	20–35 projects	eight projects

In the case studies, semi-structured interviews were used as the main data collection method by targeting key personnel from each construction organisation, such as quality assurance managers, chief executive officers and general managers. See Table 2 for the interview sample.

Table 2. Interview Sample

Organisation	Interviewees	Abbreviated to
A	A1 – Senior manager – Technical services	Senior manager
	A2 – Senior Engineer – procurement and contract monitoring	Senior engineer
	A3 – Quality assurance officer	QAO
B	B1 – Deputy general manager construction	DGM
	B2 – Quality assurance manager	QAM
	B3 – Deputy manager estimating	DME
C	C1 – Chief executive officer	CEO
	C2 – Quality assurance manager	QAM
	C3 – Divisional head internal and local building projects	Divisional head

In the data analysis process, a content analysis was first used to analyse the data (see an example coding structure in Figure 1). Computer-aided qualitative data analysis was used to support this coding process.

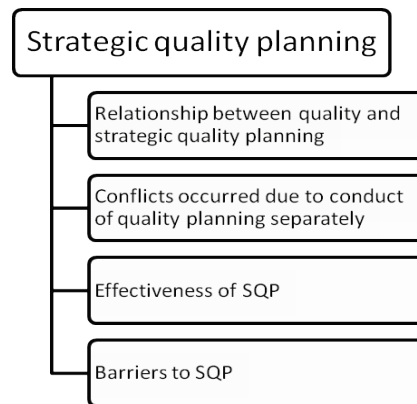


Figure 1. An Example Coding Structure for Strategic Quality Planning

Next, the cognitive mapping technique was used to display the data and to obtain a holistic view of the data (a cognitive map is offered in Figure 3). The next section presents the key research findings.

RESEARCH FINDINGS

In this section, the key findings found through the cross-case analysis are presented under two sub-sections: current quality planning practice and the scope of strategic quality planning.

Current Practice of Quality Planning in Construction Organisations

According to the data from the case studies, all three of the organisations were practicing the ISO quality management system with slight variations and additions (see Table 3).

Table 3. Quality Systems Practiced in Construction Organisations

Organisation	Quality Systems
A	ISO 9000: 2001, 5S at head office
B	ISO 9000: 2001, 5S at head office and sites, quality circles
C	ISO 9000: 2000, 5S at head office and sites, quality circles

Some reasons for the popularity of the ISO quality management system in the construction sector were identified through the case studies. For example, the main reason for its popularity is the regulation made by the Institute for Construction Training and Development (ICTAD), which is the main body in Sri Lanka that registers and grades construction contractors. According to the ICTAD, having an ISO certification is a mandatory requirement. Other reasons for which the ISO quality management system is popular were mentioned by the senior engineer of organisation A: "a major advantage is we can easily adopt the ISO quality management system according to our requirements. It is more flexible than other quality management systems. In ISO, the main principle is we write what we do and we do what is written. Therefore, it is easy to control the system from top to bottom". These reasons were further strengthened by the CEO of organisation C: "(ISO) gives a broader picture. For example, when we take six sigma, it is focused on productivity improvement. But in ISO, it does not look at the quality of the output; it improves the process of quality management. When you improve the process, it automatically improves the quality of the output". Apart from these reasons, the majority of interviewees agreed that the ISO certification has a good reputation within society. Therefore, most of the clients are now willing to award their contract to ISO-certified contractors. In general, the above factors are the reasons for which the ISO quality management system is popular among most of the contractors in Sri Lanka. Furthermore, the contractors used tools such as 5S and quality circles to improve quality within their organisations.

Because the three case studies adopted a similar quality management system, a common quality planning process could be identified across the three cases. This generic quality planning process is illustrated in Figure 2.

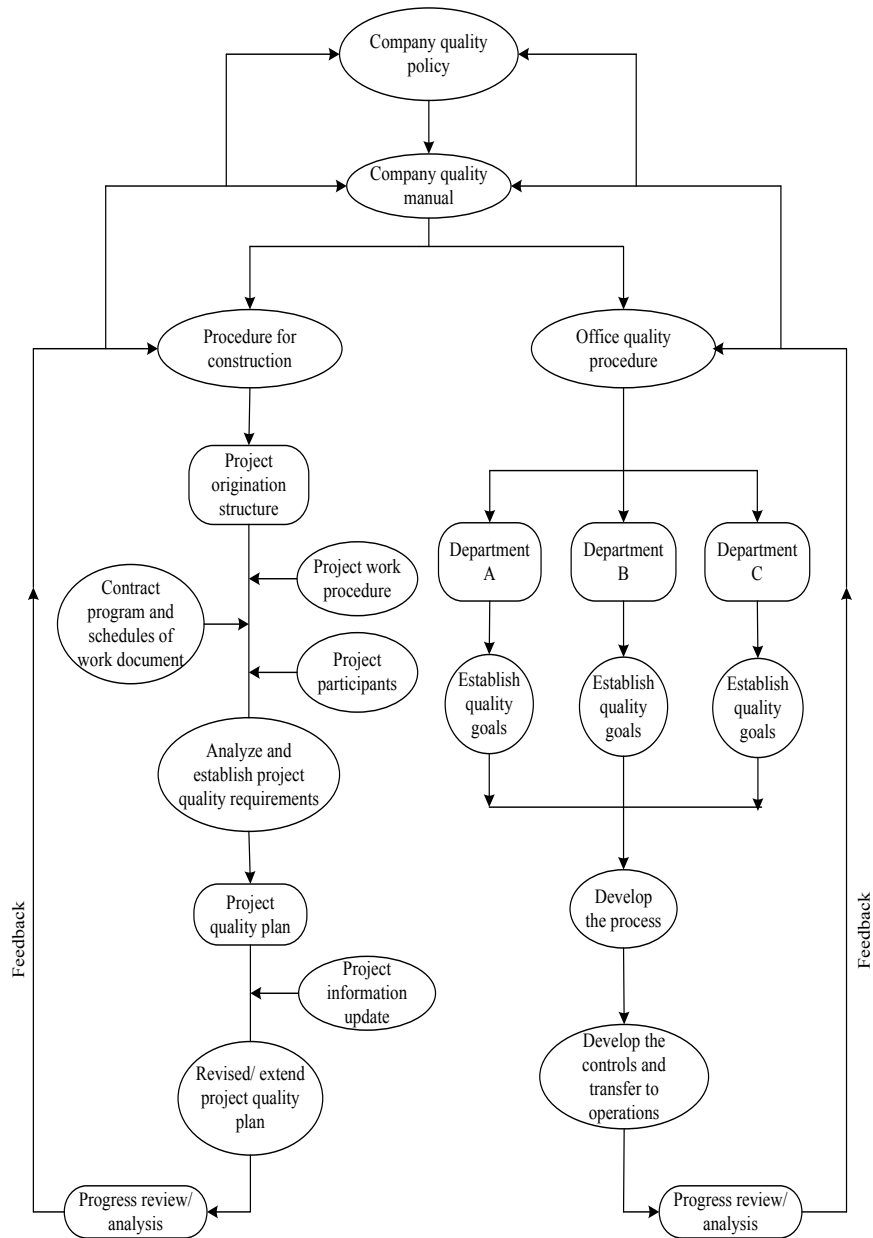


Figure 2. Generic Quality Planning Process Practiced by the Case Study Organisations

As shown in Figure 2, all three of the organisations have developed a quality policy for their organisations. The DGM of organisation C explained their quality policy as follows: "we are dedicated to providing quality products and services satisfying the

needs and expectations of each customer with a creative, self-motivated and dedicated team, united under a rewarding and healthy environment, ensuring continual improvement with a view of establishing a lasting social and environmental sustainability". Organisation A has developed quality policies for their ready-mix concrete as well as their aggregate production and asphalt concrete plants in addition to their corporate quality policy.

Next, as shown in Figure 2, all of the organisations have developed a quality manual based on their quality policy and company requirements. Quality objectives or goals have been developed for each department and construction project based on the quality policy, the quality manual and the requirements of the organisation. According to organisation A, the quality goals of the quantity surveying division are to increase the rate of bidding certification, while those of the human resource and development division are to ensure accident-free work sites and to reduce company turn over and the utility cost of the organisation. The quality goals of the finance and accounts division are related to time payments to customers and reducing customer complaints.

The project quality plan is developed according to the quality manual and policy (see Figure 2). Each project consists of quality objectives. The quality assurance department then analyses the progress of each department. The results of the progress analysis are presented during the management review meetings, and feedback is given to the managers of each department and project. The results and feedback of the internal and external audits also help to develop the quality planning process through corrective and preventive actions.

Within this generic quality planning process, data were collected to explore how formal or informal key aspects of the quality planning process are adopted within each case. Table 4 offers a summary of these findings as disclosed by each respondent.

These findings illustrate that the quality planning process practised within the case study organisations is a flexible, regular-scheduled, process-emphasised process with a significant amount of documentation (see Table 4). The progress reviews of the quality planning process are conducted at the scheduled time periods. For example, organisation B conducts internal and external audits every three and six months, respectively. Organisation C conducts management review meetings at the end of every month and internal and external audits every six months. The interviewees explained that there could be progress reviews when the top management makes a special request. Because these progress reviews are scheduled on a regular basis, the time limit of these reviews is strict, and a specific time period is allocated to conduct the progress reviews. The quality assurance manager and his staff typically prepare the progress review report, and this report is often formally presented to the management and staff through the management review meetings and audits. Finally, the progress is presented through presentations and reports using facts and figures. In organisation A, the quality assurance manager, department heads and other key decision makers are the parties involved in developing the quality goals and procedures for each department or construction project.

Table 4. Formality of Quality Planning Process

Key Aspects of Quality Planning		Degree of Formality	A1	A2	A3	B1	B2	B3	C1	C2	C3
1	Nature of planning procedures	Uniform			✓				✓	✓	
		Flexible	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Emphasis of planning on	Process	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Results	✓			✓					✓
3	Documentation in planning process	Massive	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Ten-page plans or less									
4	Participants for the planning process	Numerous	✓				✓				✓
		Decision-makers only		✓	✓	✓		✓	✓	✓	
5	Communication in planning process	Restricted									
		Open dialogue	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Progress reviews	Scheduled regularly	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Scheduled as needed		✓							
7	Time limits on reviews	Strict	✓	✓	✓		✓		✓	✓	✓
		As many time as needed				✓		✓			
8	Presentation of reviews	Formal	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Informal									
9	Decisions at reviews	Optional		✓						✓	
		Compulsory	✓		✓	✓	✓	✓	✓		✓
10	Decisions of planning based on	Data, numbers, facts	✓	✓	✓		✓	✓	✓	✓	
		Business intelligence				✓					✓

Most of the interviewees revealed that there is a significant amount of documentation to be followed in the current practice of quality planning. They insisted that it is the most difficult part of quality planning, as there is a significant amount of documentation to be maintained throughout the process. Furthermore,

the discussions about quality planning are typically open dialogues, and therefore, anyone in the organisation can present their views on the quality planning process and its results. At the end of the each quality planning progress review, decisions regarding the next stage must be made to minimise faults and improve good actions. The emphasis on the planning process rather than its results was the most significant aspect of the ISO quality management system adopted by these organisations.

Scope of Strategic Quality Planning in Construction Organisations

In this section, the scope of strategic quality planning and its issues are discussed using the cognitive map provided in Figure 3.

All of the interviewees agreed that there is a relationship between quality and strategic planning. According to the opinion of the QAM of organisation B, "both strategic and quality planning focus on setting long-term and short-term objectives and specifying the necessary operational processes and related resources to fulfil those objectives. Therefore, both planning processes consider the future of the organisation".

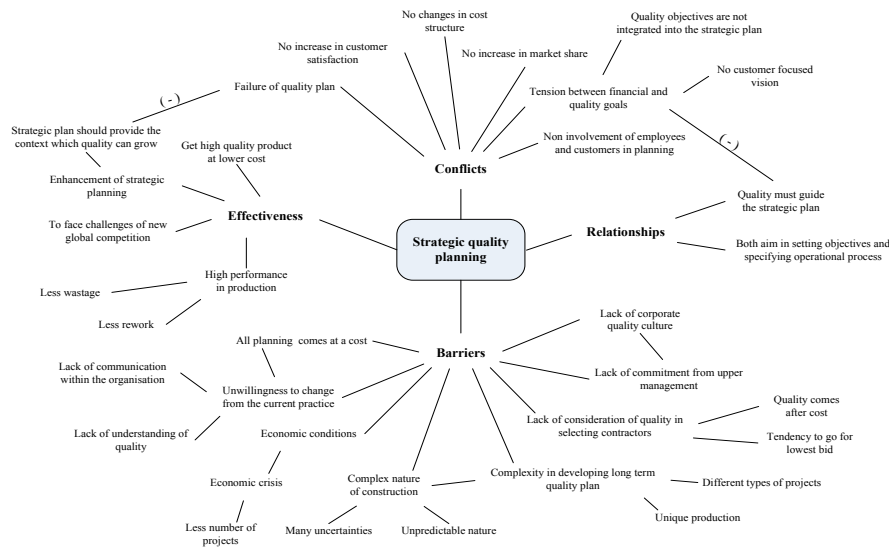


Figure 3. Cognitive Map for Strategic Quality Planning

The senior manager of technical services for organisation C explained situations in which quality and strategic planning clash because they are not integrated. According to this interviewee, "for example, to improve the delivery of ready-mix concrete, we need two more concrete mixtures, but the management is not willing to allocate capital for it under the current economic conditions, so there is a conflict between quality plan and the strategic plan. In this situation, we have to plan according to what we receive based on the strategic plan, but we cannot sacrifice the quality, and if the quality plan is going to fail, we cannot be in business anymore". This indicates that the separation between the quality and

strategic planning processes can create tension between the financial and quality goals. Further, the DGM of organisation B noted that, "although we take many efforts to improve the organisation, sometimes, these efforts will end up without expected results. The reason for this is there is no customer-focused vision, and quality objectives are not integrated into the company's strategic plan". He further emphasised that to avoid such conflicts, the organisation must have a quality-centred vision.

According to the senior manager of organisation A, "quality planning should be integrated into the strategic plan. In our strategic plan, we decide to improve the quality up to some required level. It is a strategic decision related to quality. We decide how to improve or carry out our work according to the quality policy at the strategic planning stage. From the strategic plan, we transfer those objectives to the functional plans and finally transfer them to the operational plans, which are carried out at the project level". He further explained, "we have not developed the quality plan as a strategic quality plan, but knowingly or unknowingly, we have integrated quality into our strategic plan. Therefore, the concept of strategic quality planning is embedded in our organisation, but we have not reached up to the level to develop the quality plan as a strategic quality plan in a more effective manner".

A similar statement was given by the divisional head of organisation C: "I think to become a successful contractor, a quality plan must be integrated into the strategic plan. Quality must guide the strategic planning process. Though we have not developed a strategic quality plan, our vision is based on quality. For example, our vision is 'we are committed to provide a quality service at an affordable price and affordable time'."

The views of the case study participants denote that these contractors are aware of the benefits of strategic quality planning and that they have already set the foundation of this concept in their planning approach. However, they have not proceeded further due to several barriers, which are discussed below.

Several barriers were identified through case studies that obstruct the development of a strategic quality plan in the construction organisations of Sri Lanka. Most of the interviewees agreed that the main barrier is the difficulty in developing a long-term quality plan. According to the opinion of the senior engineer of organisation A, "we developed a quality plan annually and set targets or quality goals to achieve within a one-year period. In construction, the production is unique and project-based. Therefore, it is difficult to develop a long-term quality plan by considering all of the projects of an organisation". This was further explained by the CEO of organisation C. According to his view, the strategic quality planning concept is more suitable to the manufacturing industry rather than construction industry because in construction, the environmental conditions, market conditions and product characteristics differ from project to project. Thus, the temporary nature and dynamic environment of the construction industry are major barriers to developing a strategic quality plan.

Another barrier is the economic conditions in the country and worldwide. As explained by the senior manager of organisation A, "the current economic conditions in the country and in the world in general have serious impacts on the construction industry. Many changes are happening in the world market, and massive contracting companies go bankrupt due to the financial crisis all over the world. Even we have fewer projects in hand, and we are facing severe financial

difficulties to maintain our staff and organisation. So in a situation like this, it is difficult to predict the future and develop a strategic plan for the next three to five years". Most of the interviewees agreed with this fact and emphasised that they can develop effective plans if the economic environment is supportive.

Another barrier to introducing strategic quality planning is the lack of consideration of quality when selecting contractors for a project. For example, according to the explanation of the senior engineer of organisation A, "in the manufacturing industry, people buy products mainly based on the quality of the product. But in construction, most of the time, customers select the producer or contractor according to the price. Clients are always willing to award the contract with the lowest contract sum. The consideration of the quality of the contractor comes after the cost of the project, so we do not feel that there is a significant necessity to develop a long-term quality plan or strategic quality plan. After all, planning comes at a cost."

In summary, the case studies revealed that most of the managers do not recognise strategic quality planning as essential. They further disclosed that the quality systems that they currently practice are sufficient to compete in the local construction industry. Therefore, there is a significant reluctance to change from the current practice because they believe that such planning will incur more time and cost. Other barriers identified through this study are the lack of commitment of upper management, the lack of communication between the parties and the absence of a corporate quality culture in the organisation. The next section offers the key conclusions of this study.

CONCLUSION

The aim of this study was to explore the ways in which Sri Lankan construction contractors approach quality planning. The study was conducted using three case studies of main contractors in Sri Lanka.

The research findings revealed that the Sri Lankan construction organisations used in the case studies were poorly exposed to different quality approaches. ISO was the most widely practiced quality management system in the Sri Lankan construction organisations. Most of the organisations were aware of the concept of strategic quality planning. While they believed in a quality-centred strategic plan, none of the organisations have developed a strategic quality plan. The findings indicated several barriers for strategic quality planning, including a lack of corporate quality culture and the complexity in developing a long-term quality plan. The case studies also showed that most of the organisations are reluctant to change from their current practice because clients are not driving a quality-based contractor selection process. The empirical findings showed that the economic crisis further distracts from the development of a strategic quality plan. In summary, the findings concluded that Sri Lankan contracting organisations are not ready for strategic quality planning yet.

Building on the findings of this study, the following conclusions can be made for the construction industry. The research findings revealed that most of the major Sri Lankan contractors were practising ISO. The common quality planning process identified across the case studies will be useful for other contracting organisations, especially the lower graded contractors who do not have any quality system in

practice. However, even the major contractors mainly succeed in the local market. They could fail when competing with foreign construction organisations, which practice the latest quality management and planning approaches. Therefore, it is important to conduct training programmes to improve the knowledge of Sri Lankan contractors in these areas and adopt quality planning approaches that are practicable and attractive enough to compete in wider markets. The concept of strategic quality planning must be further researched, and a process that suits the construction industry while overcoming the identified barriers should be developed to achieve better results on quality investments.

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