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International Journal of Project Management 30 (2012) 827–838

International Journal of Project Management

www.elsevier.com/locate/ijproman

Contractors' perception of the use of costs of quality system in Malaysian building construction projects

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Received 14 March 2011; received in revised form 1 December 2011; accepted 8 December 2011

Abstract

While conforming on the findings of prior researches regarding quality cost system in building companies, current research successfully illustrates the contractors' perceptions on the importance of the quality cost system and the barriers that may constrain the implementation of the system for recording and collecting quality cost data. A postal and email surveys were undertaken on Malaysian building companies, focusing on the benefits and difficulties associated with the implementation of quality cost system. Statistical analyses based on Chi-Squared test and Relative Importance Index techniques were used to investigate the significance of the findings and determine the relative importance of the factors. The most important benefit of measuring quality costs is "getting management attention and increase quality awareness" as perceived by the sample of the study. The possible barriers that may affect the management's decision to implement quality cost system are identified and grouped into three categories, which are culture and knowledge; system; and company. The study suggests that the level of the site staff's knowledge should be as important as that of the management to successfully collect and record quality costs data. The findings of this research will raise the level of awareness and sensitize managers and those involved with building industry about the importance of quality cost system and collecting quality costs data.

Keywords: Cost of quality; Quality cost system; Building construction; Quality management; Relative Importance Index

1. Introduction

The main purpose of project management is to address the stakeholder needs and expectations; thus, dissatisfactions of a project's stakeholders lead to extra time and cost (Tam and Le, 2007). In addition, the successful companies must deliver projects on time and within budget, and meet specifications while managing project risk (Raymond and Bergeron, 2008). Achieving the stakeholder's satisfaction and the completion of project within predefined time, cost and quality constraints is not an easy task in building construction (Al-Tmeemy et al., 2011). Likewise, the process of measuring quality costs is often difficult due largely to the complexity of construction processes (Aoieong et al., 2002). Hence, many economic and mathematical models have been developed to track quality costs; for example: Quality Performance Management System (CII, 1990); Quality Performed Tracking System (Davis et al., 1989); Quality Cost Matrix (Abdul-Rahman, 1995); Process Cost Model (Aoieong et al., 2002); and Construction Quality Costs Quantifying System (Low and Yeo, 1998). Unfortunately, these models have been of little use and many companies still do not have a quality cost system in place (Kazaz et al., 2005; Love and Irani, 2003; Miguel and Pontel, 2004).

The importance of quality management is quite noticeable in project management literature (Choi et al., 2009; Din et al., 2010). Also the need for companies to capture and assess quality costs data has been well-established in previously published literatures (Abdelsalam and Gad, 2009; Dale and Plunkett, 1999; Morse and Roth, 1987; Tam and Le, 2007). Several researchers (Miguel and Pontel, 2004; Schiffauerova and

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doi:10.1016/j.ijproman.2011.12.001

Thomson, 2006b; Sower and Quarles, 2003) stated that many companies appreciate the necessity of the quality cost system; however, they continue to lack one. As a result, the companies are not able to recognize how much they lose because of poor quality (Schiffauerova and Thomson, 2006b). This implies a gap between existing theory and practical application regarding quality management.

In Malaysia, the application of the cost of quality concept in the construction industry is a relatively new field of interest. Hence, the economics' sense of improving quality is not well understood within the players of the building construction industry. It is no surprise therefore that some building contractors may avoid quality improvement processes believing that these processes add only time and cost to the process of construction. In the same time, less satisfactory performance in the construction industry has led to the belief that construction projects cannot be completed within budget and desired quality (Abdul-Rahman et al., 1996). This paper attempts to gain a deeper understanding of quality cost practices in the Malaysian building construction projects. Major issues that this study set out to establish were to study the perceptions of the contractors as to the benefits of collecting quality cost measurements and the barriers to adopt quality cost system. This study is very timely as CIDB of Malaysia has mandated ISO 9001 certification as a requirement for G7 contractors since first January 2009. It is therefore anticipated that registration with ISO 9000 will be increased and will become a norm rather than an exception. This implies that it is imperative for construction companies to adopt continuous improvement and change conventional management practices into a new paradigm to achieve high performance.

A literature search was used to generate the usefulness of collecting quality costs and the possible barriers for adopting quality cost system, which were administered to the building construction companies via a postal and e-mail surveys. The findings from this research significantly contributed towards enriching the boundary of existing knowledge to achieve a quality costs culture within building construction. Understanding the significance of quality costs system inspires the managers and contractors to effectively track and report the quality cost data. Indeed, this will alert all those involved with building industry to the extent to which quality costs can reduce the costs of construction. On the other hand, knowing the barriers that halted the adoption of the quality system will assist the contractors to overcome their struggle against these barriers.

2. Review of cost of quality models

Several models have been developed in previous literature. Schiffauerova and Thomson (2006b) classified COQ models into four groups of generic models, namely, prevention-appraisal-failure (PAF) or Crosby's model; opportunity cost models; process cost models (PCM); and activity-based cost (ABC) models.

A most noticeable categorization model for quality costs is PAF, which was first simplified by Feigenbaum (1956). Prevention costs are incurred to prevent nonconforming units from being produced (Morse and Roth, 1987). The purpose of those costs is to keep defects from occurring in the first place by assuring that standards of organizational quality and customer satisfaction are met.

With appraisal costs come the costs of necessary activities to determine the actual level of quality achieved relative to the desired levels of customer satisfaction and organizational quality standards (Gilmore, 1990). Appraisal costs are incurred to identify nonconforming units before these are shipped to the customer (Morse and Roth, 1987).

Failure costs are incurred resulting from the existence of poor quality. These costs are typically classified as either internal or external. Internal failure costs occur when defective goods are identified before shipment to customers (Morse, 1993). Conversely external failure costs incur when nonconforming products are shipped to the customers (Morse and Roth, 1987).

Crosby (1979) divided quality costs into price of conformance (POC) and price of non-conformance (PONC). POC pertains to the price paid for doing things right, and examples include inspection and quality appraisal. PONC is the cost of poor quality caused by product and service failure, and examples are rework and returns. The opportunity and intangible cost model includes the cost of a missed opportunity, such as profits not earned because of lost customers and reduction in revenue owing to non-conformance (Schiffauerova and Thomson, 2006b). With the PCM, the focus is on the quality costs of a particular process rather than the total quality costs of an entire project (Tang et al., 2004). The last generic model is ABC, which provides data on how costs are actually consumed. The main idea behind ABC is that not all activities (and thus resource consumption rates) are proportional to the number of units produced (Raz and Elnathan, 1999).

To sum it up, COQ is the total of all resources spent by an organization to ensure that the established quality plan consistently achieves or exceeds standards (Bamford and Land, 2006). These resources are spent either for achieving quality or incurred due to lack of quality.

3. The significance of cost of quality

The quality costs are important because these costs can be extensive and could be 20% of the total sales turnover (Dale and Plunkett, 1999). Previous studies in North America have indicated that the costs of quality are typically at 20–30% of the total sales (Campenella, 1999; Hansen and Mowen, 1997; Krisham et al., 2000).

In construction, Lam (1994) has claimed that quality costs can make up from 8 to 15% of the total construction costs. In 1978, these costs were estimated by the UK Government to be 10% of the UK's gross national product (Low and Yeo, 1998). Low and Yeo further stated that in the USA, direct costs incurred for rework alone have been estimated to be greater than 12% of any project costs. Hagan (1986) has warned that the lack of knowledge regarding quality costs will likely lead to unbalancing the inter-relationship of quality, schedule, and cost. This imbalance will continue to exist as long as the real cost of quality remains hidden among total costs.