A FRAMEWORK FOR COST ASSESSMENT OF QMS FOR BUILDING CONTRACTORS BASED ON BIOLOGICAL IMMUNE SYSTEM

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To those how teach me since I was born

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ABSTRACT

Quality as a traditional objective in construction industry that is lacking of quantitative assessment approach has been planned and evaluated in qualitative manner. Study in order to develop a feasible quantitative QMS (Quality Management System) assessment framework, has been considered Cost of Quality as a quantitative measurement to evaluate the success of quality program in a self-improvement organization. Therefore, in this study, elements of cost of quality in several approaches have been reviewed. Besides, principles of several QMS tools and techniques: Taguchi methods, process of Failure Mode and Effect Design (FMEA), Benchmarking techniques, Shainin, Demings 14 point for Plan for TQM, Six-Sigma and finally Kaizen management philosophy are reviewed. Furthermore, objectives of Biological Immune System (BIS) to capture the success factors of an intelligent system have been reviewed. Through this study, proposed intelligent based framework model and its tools and descriptions have been developed. For evaluating finding objectives, each finding has been discussed with relevant field of research experts. Finally feasible validations were made by questionnaires on 5 industrial experts.

ABSTRACT

Kuanliti adalah objektif trandisional di industri pembinaan di mana kekurangan pendekatan tentang penilaian kuantitatif dirancangkan and ditimbangkan dengan cara kualitatif. Penyelidikan ini adalah untuk mengembangkan satu rangka penilaian kuantitatif QMS yang fleksibel dengan dipertimbangkan kualiti kos sebagai penilaian kuantitatif menilaikan kejayaan bagi program kualiti di organisasi kemajuan diri. Oleh demikian, elemen-elemen bagi kualiti kos di beberapa pendekatan akan dikaji semula di penyelidikan ini. Prinsip-prinsip bagi peralatan dan teknik QMS adalah seperti berikut: Taguchi methods, process of Failure Mode and Effect Design (FMEA), Benchmarking techniques, Shainin, Demings 14 point for Plan for TQM, Six-Sigma and finally Kaizen management philosophy" akan dikaji semula. Selain itu, objektif bagi Biological Immune System (BIS) yang sebagai sistem kecerdasan untuk merangsangkan satu kecerdasan model organisasi akan dikaji semula. Daripada penyelidikan ini,cadangan kecerdasan bagi rangka model, peralatan dan deskriptif akan dikembangkan. Untuk mencapai objektif, stiap keputusan akan dibincangkan dengan medan pakar penyelidik. Akhirnya, pengesahan fleksibel akan dilaksanakan melalui penyediaan soal selidik kepada 5 pakar industri.

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CHAPTER I

INTRODUCTION

1.1 Problem Background

In construction industry, it is common to evaluate project performance by comparing only actual cost and time with scheduled cost and time. In order to assess quantitatively process performance of quality program and also even to improve quality program, the problem was having quantitative “measurement”, until recently quality has been measured by quantitative measurement and named Cost of Quality (COQ). But it has not been used in monitoring and controlling manner for assessing the current quality program of project, instead, it is used only to predict for reducing the future projects cost of quality. P.E.D. Love and J. Smith (1998) tried to bring quality to account through recording cost of quality to predict future performance with presents of different policies and various methodologies [2], [15] as shown in Figure (1). Davis (1987); Abdul-Rahman (1993); Low and Yeo (1998); Barber et al (2000).; Love and Li(2000); P.E.D. Love, Z. Irani (2003) and a few others,[1] also tried to introduce information systems to capture cost of quality.

This study tried to perform an intelligent organizational model, for quantitative assessment (based on cost of quality) and self improvement framework for quality program in building construction in contractor sector.

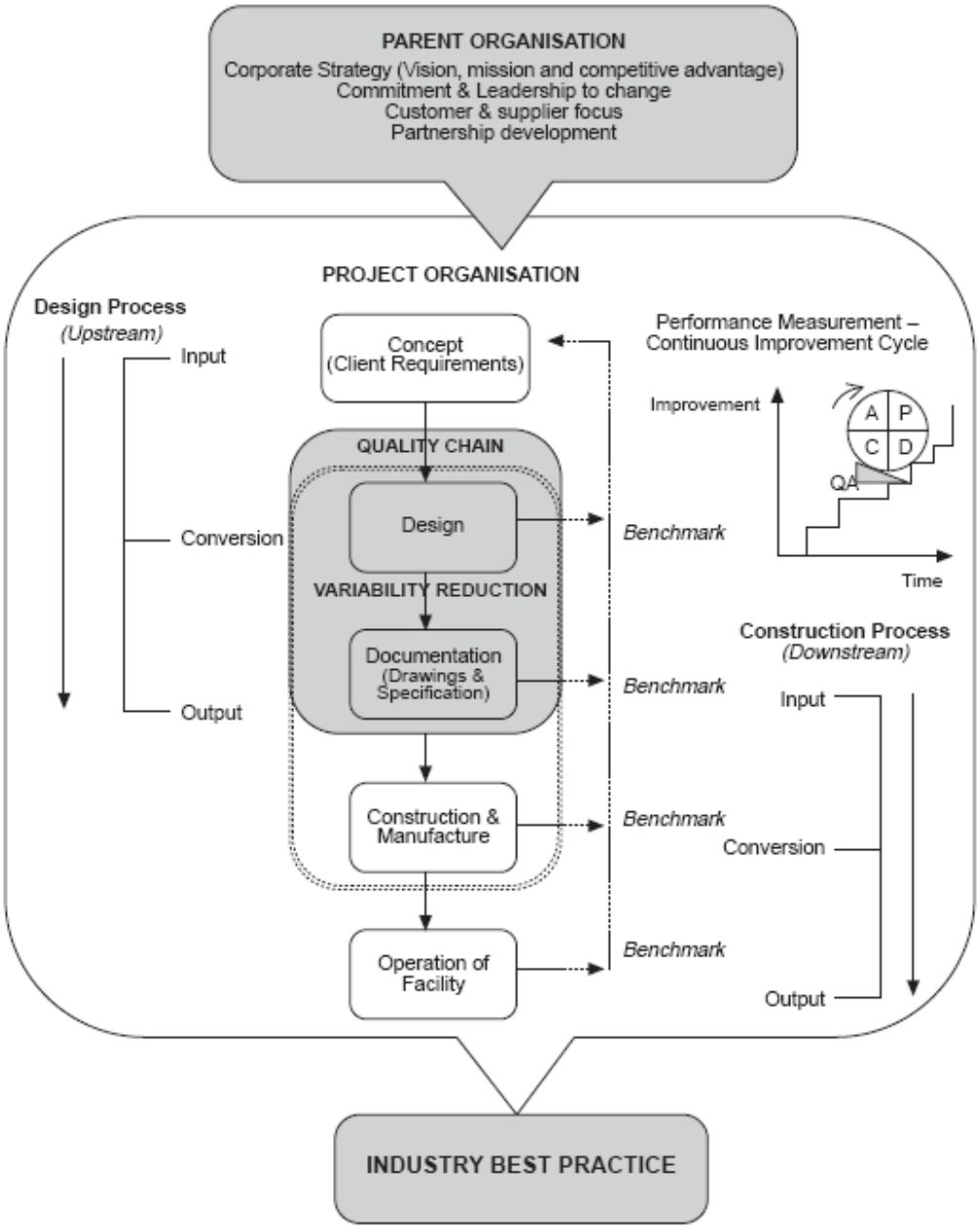

Figure 1: A conceptual model for benchmarking the interfaces of the quality chain. (P.E.D. Love and J. Smith (1998))

1.2 Problem Statement

Referring to ISO TR 15504 as a process improvement principle, beside the fast growths of construction project complexity especially in terms of quality, it is necessary to implement self quality assessment system for QMS tools as a technique to analyses the quality plan of construction projects for catching better quality performance. In this manner it can implement by defining job description, rather than job specifications which act as policies. In other words, in order to have self improvement QMS system as a key performance indicator, it is subjected to lead quality of construction, even QMS tools, by itself. It will also to use project descriptions rather than project specification and finally to use task oriented assessment system rather than skill oriented.

1.3 Aim

The study is carry out in order to solve the stated problems based on cost value of quality, by continues assessment and improvement of the quality plan, in construction project has been studied. Therefore, in order to cover the overall aim of study, this effort goes to the development of one framework (IDEF4 (Integration DEFinition) semi-structured based) model and tools. It is focusing on contractor's party for in process assessing and self-improvement framework to improve the implemented QMS tools and techniques in collaborative environment to construct building projects. It will be assumed as bases for internal benchmarking quality assessment system which referred to cost of quality for health check of quality assurance performance.

1.4 Objectives

Therefore, for archiving overall aim of study, the objectives of study are as follows:

- To identify the elements of cost of quality in construction projects as quantitative measurement for assessing principles of the QMS tools and techniques
- To identify improvement principles of QMS tools and techniques
- To identify the success factors of an intelligent assessment and improvement system as self assessment and self improvement framework system
- To develop a framework technique and it's tools, for cost assessment of implemented QMS tools for building contractors

1.5 Scope

In order to capture the objectives of this study, the scope includes reviewing previous efforts on cost quality measurement, checked out principles of Taguchi methods, process of Failure Mode and Effect Design (FMEA) and Benchmarking techniques as its Quality engineering methodologies. Furthermore, this study will review Shainin, Demings 14 point for Plan for TQM, Six-Sigma and finally Kaizen management philosophy. It will also include reviewed objectives of intelligent systems, for this part, this study only have been focused on BIS as it's based intelligent system.

In this research cause of different nature of construction projects like dam, road, air port, high rise building, office buildings project and further; researcher has selected office building construction to focus on. Besides, In order to make a feasible model as time ruled, scope for study is limited only in alike building projects. In term of cost and function from the same contractor, it is to insure that it has equality in all driven

managerial tools and systems for data mining of Quality Performance. Also for simplicity it is assumed that there is no different in cost of similar work in different project which also means that area is economically stable.

Another limitation of scope is having a procurement method of contract, which with believe of complexity of collaborative teamwork environment, this study has choose collaborative team work environments such as build and design procurement system as a scope of implementing model.