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JUDUL: DEVELOPMENT OF DATABASE MANAGEMENT SYSTEM (DBMS) BASED ON ELEMENTAL COST ANALYSIS (ECA) METHODOLOGY

SESI PENGAJIAN: 2005/2006

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DEVELOPMENT OF DATABASE MANAGEMENT SYSTEM (DBMS) BASED ON ELEMENTAL COST ANALYSIS (ECA) METHODOLOGY

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Master of Science (Construction Management)

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May, 2006

I declare that this project report entitled "Development of Database Management System (DBMS) Based on Elemental Cost Analysis (ECA) Methodology" is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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ABSTRACT

For 30 years, major Quantity Surveying (QS) consultants from the developed country have started to produce the Database Management System (DBMS) for estimating process. Development and installation of the software required high expenses. These conditions encourage the development of estimating software in the market. Currently, there are few estimating software in the market. These systems are difficult to use because they are not developed by the practicing QS themselves and not comprehensive enough. Therefore, this study aims to develop a software based estimating system using Elemental Cost Analysis (ECA) method. Extensive study was performed at the initial stage of this study using various methodologies such as interviews, questionnaire survey, and case studies in order to identify the viability of the developed system. This study found that the developed systems which integrate the application of DBMS system and ECA method increases efficiency and speed of estimating system. The developed system has been tested on real project and verified by a panel of experts. The results of the validation process encourage the recommendation of the developed system for practical implementation in the industry.

ABSTRAK

Sejak 30 tahun yang lalu, kebanyakan Perunding Ukur Bahan daripada negara membangun telah mula menghasilkan Pengurusan Sistem Pengkalan Data untuk proses penganggaran. Pembangunan dan pemasangan perisian memerlukan perbelanjaan yang besar. Keadaan ini telah menggalakkan kepada pembangunan perisian penganggaran di dalam pasaran. Pada masa sekarang, terdapat beberapa sistem penganggaran di dalam pasaran. Sistem tersebut sukar untuk digunakan kerana pembinaan sistem tersebut adalah bukan oleh Juruukur Bahan dan tidak berapa lengkap. Oleh sebab itu, kajian ini telah dijalankan untuk membina perisian berdasarkan sistem penganggaran menggunakan kaedah Analisis Kos Elemen. Kajian dilaksanakan pada peringkat awal dengan menggunakan pelbagai kaedah seperti temubual, borang soal selidik, dan kajian kes untuk mengenal pasti keperluan dan keberkesanan sistem yang dibangunkan ini. Kajian ini telah membuktikan bahawa sistem yang telah dibangunkan yang berintegrasikan kepada aplikasi Pengurusan Sistem Pengkalan Data dan kaedah Analisis Kos Elemen telah meningkatkan kecekapan dan kepantasan sistem penganggaran. Sistem yang telah dibangunkan ini diuji dengan projek sebenar dan telah disahkan oleh panel-panel yang pakar. Proses pengesahan keputusan ini menggalakkan kepada cadangan untuk mengguna pakai sistem ini di dalam industri.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will present an overview of the study in respect of its background; determining its aims, specifying the problems in the problem statement, mapping the study process, selection of the correct methodology, setting the report outline and identify the limitation of the study scope.

1.2 Problem Statement

Anyone with an interest on cost advice will be aware that the subject can involve the use of a number of mathematical formulae. At the heart of nearly all building evaluation programmes of any size is a database, which is an organised pool of shareable data usually consisting of regularly updated files. These files are related and permit direct retrieval of information for a wide range of purpose.

The function of approximate or preliminary estimate is to produce forecast of the cost of any future project before it is designed in details. This preliminary estimate will inform the client about their commitments (as the project owner) before the design works is undertaken. The choice of method employed will be

influenced by the information and time available, the experience of the Surveyor and the amount and form of the cost data available to him.

The entry of Quantity Surveyor with adequate technique into the estimating field was of considerable significance in the early development of professional role. To extent this role into that, the building economics required the development of understandings and techniques of a kind that deal. Not just with the items which go into the accountancy of a particular building, but with the economic and other forces, which have determined the nature and relationship of those quantities and costs, and which determine the trends they show. Indeed, economics is the study of all the forces which determine the present functioning and probable future trends of a whole industrial or financial system.

The Quantity Surveyor performs an extremely important role in cost assessment, giving advices as to the probable cost of a particular design proposal and variation to it. However, be emphasized at the outset that no approximately estimate can be any better than the information on which it is based. Indeed, realistic approximately estimating can be achieve only when there is full co-operation and communication between all the consultants to gather the information. The information also can be taken from the supplier, contractors and also from the past project. The estimate which based on inadequate information cannot be precise, and in such a situation he would be well advised to give a range of prices, as an indication of the lack of precision that is obtainable. Here the important of the Database Management System (DBMS) for estimating process in collecting the information.

Using computer based tools to generate an estimate will only take few minutes. However, the Quantity Surveyor needs better techniques, parametric models, and tools in case of changes during the design development process. The greatest challenge for the Quantity Surveyor is deciding where to start when faced with a blank sheet of paper to start the first preliminary estimate or to up-grade the existing or previous preliminary estimate if changes are happen. For example, during a proposal Quantity Surveyor must quickly gain an understanding of the

building's requirements, the structure of the solution, and the process needed to design, build, and deliver that solution in computer base. Hence, the development of Database Management System (DBMS) in respect of Elemental Cost Analysis (ECA) form should become the best solution to make sure the information gathered are in systematic ways and easy to understand.

Therefore, the needs of computer generated in preparation of estimating process are a must to produce accurate, fast and lower overhead cost to enhance the clients need in order to achieve clients target such as total construction cost, duration of construction period, and forecast their profit or loss.

1.3 Aim and Objective

The aim of this study is to identify how to improve the efficiency in preliminary estimate through the use of computers to cope with increasing challenges of tight budgets, strict deadline and limitation of staff (resources) in preparing the approximate quantity. These will include modelling and utilizing of construction information database to support estimating operations.

To achieve the above aims, the following objectives are set:

a) To review the current practice in preparation of estimating process
b) To develop a new computer generated approach in DBMS to support the estimating process based on ECA methodology
c) To evaluate the implementation of the ECA DBMS estimating system using real life project.

1.4 Scope of Study

The scope of study will be focusing on current practice of Quantity Surveying Firms in preparation of estimating process. After the interview with

senior quantity surveyor and also through the early literature review, the current estimating process can be classified into six (6) types as follows:

a) Unit Method
b) Cube Method
c) Superficial of Floor Area Method
d) Storey-Enclosure Method
e) Approximate Estimate
f) Elemental Cost Analysis (ECA).

The study will also focus on the development of a new computer generated approach in Database Management System (DBMS) to support the estimating process base in Elemental Cost Analysis (ECA) methodology. Evaluation of this computer generated approach on the Elemental Cost Analysis (ECA) Database Management System (DBMS) estimating system will be using real project setting as follows:

- Construction and completion of three (3) and for (4) storey shop/office lot (KP87) at Parcel C2, Danga Bay, Mukim Bandaran, Daerah Johor Bahru, Johor Darul Takzim for Messrs Danga Bay Sdn. Bhd.

1.5 Brief Methodology

The study was conducted mainly through three (3) methods, namely:

i) A literature review was conducted in all the various way which are relevant such as books, articles, journals, magazines, reports, and examination paper for the Professional Practice by Institution of Surveyor Malaysia (ISM).

ii) Questionnaire was passed to the qualified Quantity Surveyor (registered with Board of Quantity Surveyor Malaysia - BQSM, Institution of Surveyor Malaysia (ISM) or both). The questionnaire are divided into three (3) section and structured as follow:

- Section A : Respondents background
- Section B : Current estimating method
- Section C : Usage of Database Management System (DBMS)

iii) Interview was conducted with the same qualified quantity surveyors (respondent in (ii)). The respondents give a very good feed back from the face-to-face interview because they can refer to the questionnaire as guidance in answering the interview.

The study can be summarized by the flow chart shown in Figure 1.1

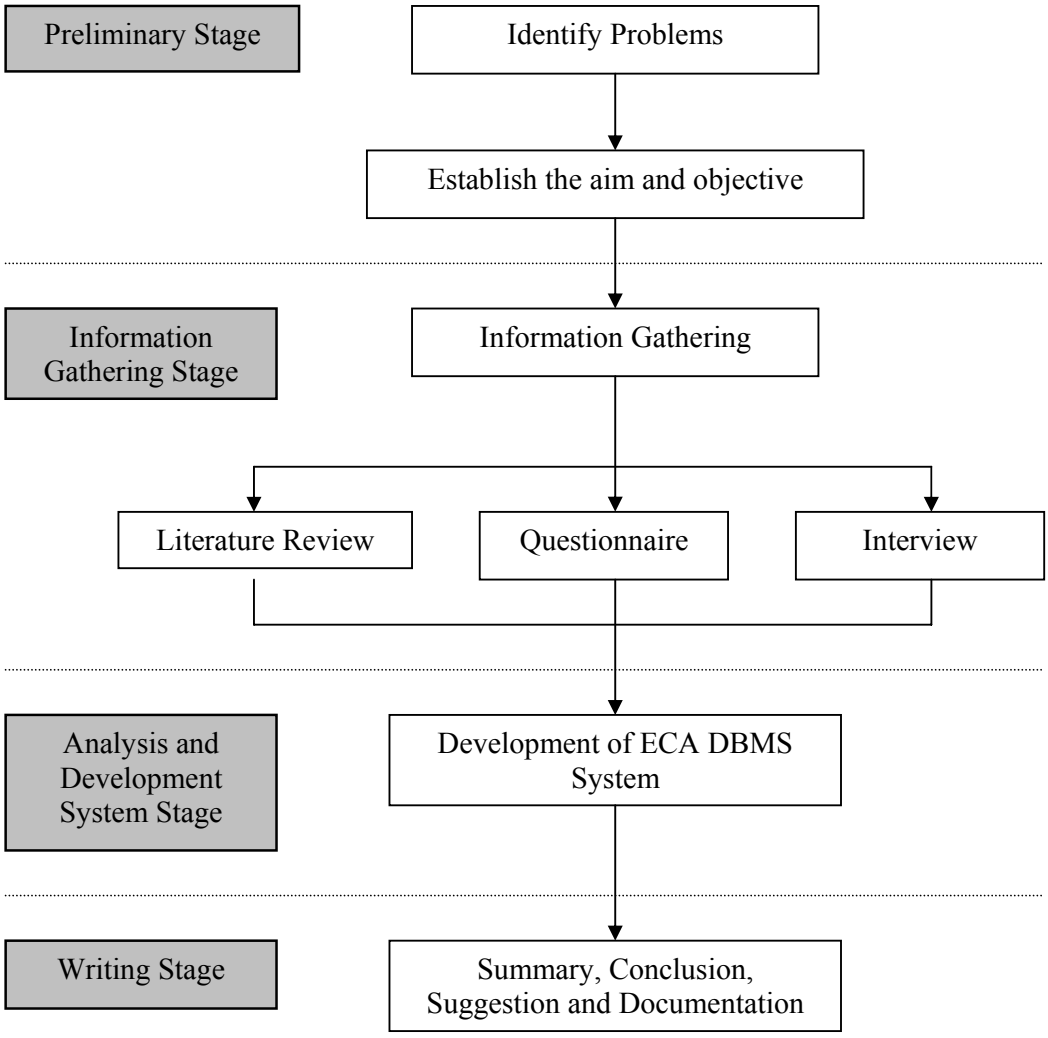

Figure 1.1 : Study of flow chart

1.6 Report Outline

The report can be divided into seven (7) main chapters. The first chapter introduced the report aims and objectives, scope of study, and selected method used in conducting the study.

The second chapter is a review on the current estimating methods (Unit Method, Cube Method, Superficial of Floor Area Method, Storey-Enclosure Method, Approximate Estimate, and Elemental Cost Analysis (ECA)). This chapter will also describe how to do the measurement/taking-off in order of Standard Method of Measurement (SMM), and rate the element by Build Up Rate (BUR).

Chapter three will discuss the development of the Database Management System (DBMS). The implementation of Active Server Pages (ASP), Structured Query Language (SQL), and ActiveX Data Objects (ADO) are shown on the connection, language and communication between these three (3) elements to develop the estimating system.

Chapter four described the selected methodology used in this study together with the structure and description on the questionnaire.

Chapter five showed the collected data from the questionnaire survey in form of tables, figures and also the analysis of these data.

Chapter six focus on the results and the findings of the studies.

The last chapter which is chapter seven will present the conclusion and recommendation for further study.