TIME COST MODEL FOR WATER RELATED PROJECTS

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DEDICATION

This thesis is dedicated to all individuals that have provided their continuous supports in completing my thesis report.

ABSTRACT

Planning is one of the elements of management, next to organizing, motivating and control. It draws attention to the determinants and characteristics of the planning part and its particular importance in the project management process. Assessing the accuracy of the project timeline should be considered an essential part during planning stage. Neglecting to estimate timeline accuracy may lead to wrong decisions on acquisition of cost assessment and exposed to unforeseen events, risks, and deviations. Thus, the study was conducted to develop and evaluate new time cost relationship model based on previous 5 years projects under Department of Irrigation and Drainage Malaysia (JPS). To attempt this study, 47 projects under JPS Johor had been selected for evaluation and comparison. The data gathered through objective were measured and translated into table and scatter graph. The model was developed in line with the time cost model developed by Bromilow in 1980 where the predictive efficacy of a model measured in its coefficient determination of R^2. The R^2 value indicated quite relevant as the study registered R^2 value more than 0.7. The study further revealed that construction size measured by the cost has a far reaching effect on the time of completion indicated by the R^2 value. Respondents with vast experiences have been interviewed to gather all data and information on disparity, similarity and effectiveness of current model practiced by their organizations. The data was tabulated into graph to acquire relevant information pertaining model of current practice in determining various project timeline and the effectiveness of model used in different organization. However, the others industry players are not practicing this model in their organizations as the other variables that they believed are important were keeping constants. The prediction efficacy of the model could be improved by incorporating other significant variables influencing construction durations. The results will be benefited as another comparison or assessment mechanism in getting comprehensive timeline during feasibility study. Findings of the study are expected to aid inputs to JPS in the direction to revise current theories which take place in 2020.

ABSTRAK

Perancangan adalah salah satu elemen pengurusan, di samping menganjurkan, memotivasi dan mengawal. Ia menarik perhatian kepada penentu dan ciri-ciri bahagian perancangan dan kepentingannya dalam proses pengurusan projek. Menilai ketepatan garis masa projek harus dianggap sebagai bahagian penting semasa tahap perancangan. Mengabaikan untuk menganggarkan ketepatan masa boleh menyebabkan keputusan yang salah mengenai pengambilalihan penilaian kos dan terdedah kepada peristiwa, risiko, dan penyimpangan yang tidak diduga. Oleh itu, kajian ini dijalankan untuk membangun dan menilai model perhubungan kos masa baru berdasarkan projek 5 tahun sebelumnya di bawah Jabatan Pengairan dan Saliran Malaysia (JPS). Untuk mencuba kajian ini, 47 projek di bawah JPS Johor telah dipilih untuk penilaian dan perbandingan. Data yang dikumpul melalui matlamat diukur dan diterjemahkan ke dalam jadual dan graf berselerak. Model ini dibangunkan sejajar dengan model kos masa yang dibangunkan oleh Bromilow pada tahun 1980 di mana keberkesanan ramalan model yang diukur dalam nilai pekali R^2. Prediktif nilai R^2 menunjukkan agak relevan kerana kajian itu mencatatkan nilai R^2 lebih daripada 0.7. Kajian ini juga menunjukkan bahawa saiz pembinaan yang diukur dengan kos itu mempunyai kesan yang jauh pada masa siap yang ditunjukkan oleh nilai R^2. Responden dengan pengalaman yang luas telah diwawancarai untuk mengumpulkan semua data dan maklumat tentang kesenjangan, kesamaan dan keberkesanan model semasa yang diamalkan oleh organisasi mereka. Data tersebut diagihkan kepada graf untuk memperoleh maklumat berkaitan model amalan semasa dalam menentukan garis masa projek dan keberkesanan model yang digunakan dalam organisasi yang berbeza. Walau bagaimanapun, pemain industri lain tidak mempraktikkan model ini dalam organisasi mereka kerana pembolehubah lain yang mereka percaya adalah penting memelihara pemalar. Keberkesanan ramalan model boleh diperbaiki dengan memasukkan pembolehubah penting lain yang mempengaruhi tempoh pembinaan. Hasilnya akan diuntungkan sebagai mekanisme perbandingan atau penilaian lain dalam mendapatkan garis masa yang komprehensif semasa kajian kemungkinan. Penemuan kajian dijangka membantu input kepada JPS ke arah untuk mengkaji semula teori semasa yang berlaku pada Mac 2020.

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CHAPTER 1

INTRODUCTION

1.1   Overview

Construction plays major roles and contributes significantly to the economic growth. The scope of construction industry is too broad and it is leading to develop more dynamic risk. Infrastructure development is avital component in encouraging a country's economic growth. Developing infrastructure enhances a country's productivity, consequently making firms more competitive and boosting a region's economy. A well-developed infrastructure and utilities are often viewed as a key component to augment the competitiveness and attractiveness of well developed countries.

Thus, the infrastructure planning has to be in line with the planning of the overall development. The World Economic Forum 2014 report has ranked Malaysia 25th among 144 countries for quality of overall infrastructure in The Global Competitiveness Index 2014–2015. This has proven by the inclusion of the

clause in The Eleventh Malaysia Plan focused on "*strengthening infrastructure to support economic expansion*" which the plan has also stated that the government will provide support to construct essential infrastructure such as roads, drainage and utilities for development.

The errors in estimating comprehensive project timeline will propagate through the project management and financial systems of the organization implementing a project and may lead to significant inaccuracies of the overall plans, and ultimately destroy the project. That infrastructure matters to growth is now relatively well recognized and widely understood among practioners and policy makers.

A fully integrated infrastructure is well defined as a driven factor in boosting the economic growth. Nonetheless it is also increasing confidence level among investors to the plug and play development landscape. Department of Irrigation and Drainage Malaysia (DID) is chosen as the projects focus area as the organization is play vital roles in strengthening infrastructure to support economic expansion which is outlined under Eleventh Malaysia Plan.

To attempt this study there is a need to identify the suitable projects and any prevailing factors contributed to the successful of the identified projects. For this study, the approach suggested is a hybrid of questionnaires feedback and face to face interviews with selected project personnel. Interestingly, DID had outlined the workable model for estimating project duration using Bromilow Model (Department of Irrigation and Drainage Malaysia (DID) , 2015).

This model has been widely used for projects under DID across Malaysia since 2015. However in ensuring the practicality and accuracy of the model, DID is committed to revisit and explore the current model reflected actual changes on ground due to various factors. (Nilson & Marc Antoni, 2005) strongly suggested continuous improvement has become an important strategy in improving organizational performance.

1.2   Problem Statement

Malaysia has been significantly increasing their total development expenditure for the last decades and prominently investing in infrastructure projects. With the current economic boost, Malaysia is experiencing rapid growth in terms of developing more projects and Government are putting enormous effort in providing good governance in terms of policy and standard operation procedures (SOP). The Government strongly believed that it will benefit more to the people by creating new employments and pushing to the economic growth by investing in infrastructure sectors.

The proposed developments either by Governments or industry player have generated a lot of interests from numerous parties. A large number of development proposals have been received to support and complement the development. At the same time there were changes in the actual development on the ground due to various factors, including social, political, and commercial and readiness of the area for development. These two considerations have led to the need to review the formula that has been used since 2015 and to capture the validity of the current formulas. Therefore it is appropriate that a comprehensive study to be carried out in order to ensure the particular formula to determine project timeline are valid, precise and reliable. All parties involved during the study must be subject matter experts both from Government and industry players that involved and more receptive to the latest industry trends. Thus it will gear the expected result become more viable.

1.3   Aim and Objectives

The study's objectives are threefold to:

i.   To compare project estimation time cost model between contractual time and actual time

ii.   To produce project duration equation model

iii.   To evaluate Bromilow Time Cost Model used in projects

1.4   Scope of Study

The scope of this study has had been limited to the projects within Johor vicinity from 2014 to 2019 through previous or on-going JPS projects. 42 projects had been analysed and generalized using MS Excel to get the *trendline*, comparison and new equation based on table and scatter graph.

Focus had been given to10 respondents with vast experiences in construction industry to acquire relevant information pertaining model of current practice in determining various project timeline and the effectiveness of model used in different organization as they are usually more sensitive towards changing practise in determining project duration. The interview carried out with other industry players from various agencies revealed factors and details to set up necessary framework at the earlier stage.

Literature reviews from other researchers were scrutinized to ensure comprehensive data gathered will be used for this study such as JPS instruction no 11 year 2015, previous projects, standard operation procedures (SOP), journals and article previous researches related to time cost model. To maintain accuracy of information collected, data had only been collected from middle and upper level management staff related directly or to construction projects at their organizations.

1.5   Significance of Study

Since infrastructure development plays vital roles and drive economic performance, it draws attention of all stakeholders to determine the effectiveness of current model in estimating project duration. The study is expected to aid effort in enhancing the current model by reflecting actual changes on ground due to numerous factors. Besides there is a need for DID to revisit the existing model every 5 years. The collaboration approached from expert is expected to outline comprehensive model that will aid greater impacts to the construction industry in Malaysia.

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