A STUDY OF FACTORS THAT CONTRIBUTE TO THE PERCEPTION OF UNDER-USAGE OF PROJECT MANAGEMENT SOFTWARE IN CONSTRUCTION INDUSTRY IN MALAYSIA

BY

LONG AHMAD BURHANUDDIN BIN LONG HASSAN

A dissertation submitted in partial fulfilment of the requirement for the degree of Master of Business Administration (Construction Business)

Kulliyah of Architecture and Environmental Design
International Islamic University Malaysia

JANUARY 2014

ABSTRACT

Earlier studies on adoption of ICT in Malaysian construction industry give the impression that Project Management (PM) software is not being utilized to the extent that it should be in the said industry. To identify possible contributing factors to this "perceived under-utilization" of PM software in Malaysian construction industry, a questionnaire survey was carried out. Out of a list of possible factors derived from literature, seven factors were investigated, namely; education level, acquisition of ICT training by employees, number of years of using PM software, experience with PM software in terms of "ease of use" and "usefulness", internet connectivity, budget allocations by companies to purchase computer hardware and software, and budget allocations by companies for ICT training for employees. The questionnaire forms were sent out to 700 construction-related companies in Kuala Lumpur and Selangor and 65 responses were received. It was found that budget allocation by employers for ICT training of employees, budget allocation by employers for purchase of computer hardware and software, access to formal and structured ICT training for construction personnel, and the number of years of having used PM software, contribute to the perceived under-utilization of PM software in Malaysian construction industry.

خلاصة البحث

تعطي الدراسات السابقة حول اعتماد تكنولوجيا الاتصالات والمعلوماتية في الصناعة البنائية الماليزية انطباعا مفاده أن برنامجيات إدراة المشاريع غير مستخدمة كما يلزم في الصناعة المذكورة. ولأجل حصر العوامل التي يمكن أن تكون ذات مساهمة في هذا النقص المتصور، فقد تم الاعتماد على استبيان. وقد عمل هذا الاستبيان من التحقق من سبعة عوامل تم اختيارها من قائمة للعوامل الممكنة المشتقة من الدراسات السابقة، وهي: مستوى التعليم واكتساب الموظفين لتدريب حول تكنولوجيا الاتصالات والمعلوماتية وعدد سنوات استعمال برنامجيات إدارة المشاريع وخبرة استعمالها من حيث "سهولة استخدامها" و"مدى الاستفادة منها" والاتصال بشبكة الإنترنت والميزانية المخصصة من قبل الشركات لاقتناء أجهزة الكمبيوتر والبرمجيات وأخيرا الميزانية المخصصة من قبل الشركات لتدريب الموظفين في تكنولوجيا الاتصالات والمعلوماتية. وقد أرسلت استمارات الاستبيان إلى 700 شركة متخصصة في البناء في كوالالمبور و سيلانجور، وتم استقبال 65 ردا. وقد وجد أن العوامل التالية تساهم فعلا في النقص المتصور في استعمال برنامجيات إدارة المشاريع في الصناعية البنائية الماليزية: الميزانية المخصصة من طرف أرباب العمل لتكنولوجيا الاتصالات والمعلوماتية والميزانية المحصصة من طرف أرباب العمل لاقتناء أجهزة الكمبيوتر والبرمجيات وتوفر فرص تدريب رسمية ومنظمة لموظفي الصناعة البنائية في مجال تكنولوجيا الاتصالات والمعلوماتية وعدد سنوات استعمال برنامجيات إدراة المشاريع.

APPROVAL PAGE

I certify that I have supervised and read this study and in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master in Business Administration.

.....

Md Asnyat Asmat
Supervisor

I certify that I have read this study and in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master in Business Administration (Construction Business).

.....

Sharifah Mazlina Syed Khuzzan
Examiner

This dissertation was submitted to the Centre of Built Environment and is accepted as partial fulfilment of the requirements for the degree of Master in Business Administration (Construction Business).

.....

Syafiee Shuid
Head
Centre for Built Environment

This dissertation was submitted to the Kulliyah of Architecture and Environmental Design and is accepted as partial fulfilment of the requirements for the degree of Master in Business Administration (Construction Business).

.....

Khairuddin Abdul Rashid
Dean
Kulliyah of Architecture and
Environmental Design

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not previously or concurrently submitted as a whole for any other degree at IIUM or other institutions.

Long Ahmad Burhanuddin Bin Long Hassan

Signature..... Date: 21 . 1 2014

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED STUDY

A STUDY OF FACTORS THAT CONTRIBUTE TO THE PERCEPTION OF UNDER-USAGE OF PROJECT MANAGEMENT SOFTWARE IN CONSTRUCTION INDUSTRY IN MALAYSIA

Affirmed by Long Ahmad Burhanuddin bin Long Hassan

..... 21 1 2014 .....

Signature Date

ACKNOWLEDGEMENTS

All Praise Be to Allah, Sustainer of the Universe.

The preparation of this paper would not have been possible without the contributions and sacrifices of people closest to me. My wife, Noor and children Aisyah, Naimah and Sofia have been very understanding with their husband/father throughout the time invested in this research project. Also, fellow students in the MBA class have been giving much needed encouragement and have been cooperative in many ways. And of course, this research project would never have been properly conducted without the wise guidance of my supervisor, Bro. Md Asnyat Asmat who among other things provided valuable directions at critical junctures in the course of the project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 RESEARCH BACKGROUND

PM software offers great assistance in tracking inter-related tasks, resources, and time in project management and in managing the integration of various processes and phases of a construction project. It enables project managers to effectively and efficiently analyze massive amounts of data to monitor, control, and integrate the progress of interrelated processes, tasks, activities and other variables that moved together to make up a construction project (Conlin & Retik, 1997). PM software is becoming an important issue because the need for effective project management is becoming increasingly indispensable in both the public and private sectors (Salaheldin, Sharif & Al Alami, 2010).

However, the rate of acceptance and adoption of PM software usage and ICT amongst the participants of construction industry generally seemed to be slow (Becerik, 2004). The construction industry gave the impression of taking on a wait-and-see attitude in adopting ICT (Mitropoulos & Tatum, 2000; Mak, 2001; Liberatore & Pollack-Johnson, 2003; Chan & Leung, 2004; Becerik, 2004; Peansupap & Walker, 2005; Ali & Money, 2005; Hewage, Ruwanpura & Jergeas, 2008; Kaplinski, 2008; Isikdag, Underwood, Korouglu, Goulding & Acikalin, 2009; Ahuja, Yang & Shankar, 2009; Kareem & Bakar, 2011; Majid, 2011).

One of the reasons for the slow up-take of ICT by construction industry is the nature of the industry itself. The nature of construction industry is more fragmented than other industries such as automobiles, banking or manufacturing as explained by

Dawood, Akinsola & Hobbs (2002) and Peansupap & Walker (2005). These researchers explained the nature of the construction industry thus; it catered to a market that demands products of varying types, sizes and complexities; and the products range from big infrastructures like highways, railways, bridges, viaducts, dams, and tunnels, to basic accommodation necessities like houses, schools, hospitals, and apartments, and almost everything in between. To fulfill these demands, the industry attracted participants of all capacities and capabilities cutting across various disciplines, trades and education levels. The fragmentation means that there exists no single platform on which ICT could be established and performed (Ahuja, Yang, Skitmore & Shankar, 2010) and resulted in the industry being slow in embracing ICT compared to other industries such as automobile, banking, or manufacturing.

Emphasizing the difference between construction industry and other industries which hindered rapid adoption of ICT, Chan & Leung (2004) stated that a characteristic of construction projects was that each construction project was unique and the construction process of a particular project itself was "one-off", making each project arguably a prototype. Chan & Leung (2004) added that project teams rarely remained the same from one project to the next resulting in constantly changing team compositions which makes the promotion of teammate-to-teammate familiarity almost impossible. Chan & Leung (2004) further stated that in construction industry, a number of teams from different organizations were organized in non-hierarchical structures; hence there was not much incentive in sharing knowledge or methodologies.

By comparing and contrasting the above-mentioned characteristics of construction industry to other industries such as automobile, manufacturing or finance industries, one would understand the difficulties in adopting new technologies such as

ICT in construction industry. In manufacturing industry, for example, once a manufacturing process and streamlined supply chains is set up and put in place, multiple products can be produced with increased efficiency. This is not the case with construction industry where every single product was different from previous ones. Even when the product is similar in shape and size as the previous ones, the location and the team members working on it were different from those that had worked on the previous product.

Under the scenario described above (wide ranging products, participants of varying capacities and capabilities, fragmented supply chains), adoption of ICT tools was bound to be slow (Peansupap & Walker, 2005). Decisions on purchasing of ICT tools including PM software very often resulted in the negative due to uncertainties in the areas of usefulness, contractual acceptability, integration and interoperability (Peansupap & Walker, 2005). The return on investments of fund and man-hours in an ICT product to be utilized in an environment that may not be conducive, or even hostile to it, was questionable and uncertain (Love & Irani, 2004). Managements began to adopt a "let others do it first" attitude or purchase the software but do not implement it to a degree that it will impact performance positively (Mui, Aziz, Ni, Yee & Lay, 2002).

The nature of construction industry as being slow and late in embracing ICT applies to the Malaysian construction industry too. For example, Kareem & Bakar (2011), and Mui et al. (2002) reported numerous weak points in ICT utilization by Malaysian construction companies as will be explained in Section 1.2.

1.2 PROBLEM STATEMENT

1.2.1 "Perceived Under-utilization"

Previous studies have shown that:

a) Construction companies were still in preliminary stage of ICT usage (Kareem and Bakar, 2011).

b) Construction companies in Malaysia did not see any increase in monetary profits due to usage of ICT tools nor did they see any increase in management flexibility due to usage of ICT tools (Kareem and Bakar, 2011).

c) There was considerable discomfort and anxiety experienced by Malaysian construction personnel towards the use of ICT (Ramayah et al., cited in Kareem and Bakar, 2011).

d) There was no explicit understanding amongst construction entrepreneurs of how to improve company performance by using ICT (Hussan et al., cited in Kareem and Bakar, 2011).

e) About half of Malaysian construction companies decided to adopt ICT tools not because of problems and needs but because of following the footsteps of more successful companies (Mui et al , 2002).

f) There were insufficient numbers of ICT knowledge-workers in Malaysian construction industry (Mui et al., 2002).

g) ICT infrastructure was not satisfactory and needed to be improved (Mui et al., 2002).

h) Malaysian construction companies had not made full use of the internet (Mui et al., 2002).

The findings in studies mentioned above give the impression or perception that the level and extent of usage of ICT tools in Malaysian construction industry was low, that is, there was an under-utilization of ICT. No study has conclusively proven that this "under-utilization of ICT" is actually a reality; hence the use of the phrase "perceived under-utilization" throughout this paper.

1.2.2 Relationship between ICT and PM software

PM software is a sub-set of ICT. Put simply, PM software is an ICT tool. There are numerous studies on the propagation and adoption of ICT in construction industry; a sampling of such studies are referenced to in Section 1.1. However, there are not many studies on the propagation and adoption of PM software (Ali & Money 2005). Most of the literature on PM software "describes the available packages and their features, surveys desired software features, and reviews and compares specific packages. However, these studies give no indication of the extent to which these packages are used in practice, how they are used, and why they are selected." (Liberatore & Pollack-Johnson, 2003, page 164).

Based on the fact that PM software is a sub-set of ICT, the "perceived under-utilization" of ICT in Malaysian construction industry as explained in Section 1.2.1 permeates PM software utilization too.

1.2.3 Statement of Problem

Section 1.2.1 has established that there is a "perceived under-utilization" of ICT in Malaysian construction industry. Section 1.2.2 postulates that this perceived under-utilization permeates the domain of PM software usage too based on the fact that PM software is a sub-set of ICT.

There has not been much study on perceived under-utilization of PM software compared to similar studies on ICT which is the super-set of PM software, as already mentioned in Section 1.2.2. There is almost no literature on perceived under-utilization of PM software in construction industry in Malaysia. There is a gap in the body of knowledge in this area. This gap in itself is a big field. The author intends to focus on a narrow strip in this field and carry out a study to identify some possible factors that contribute to perceived under-utilization of PM software in Malaysian construction industry. In addition, the author also intends to gauge the commitment of Malaysian construction companies towards provision of employee training for and purchase of PM software.

This study is thought to be important because it is only after identifying the factors that contribute or influence the perceived under-utilization of PM software, proper remedial steps can be formulated and selected to correct the perceived shortfall in the level and extent of adoption and utilization of PM software in Malaysian construction industry.

1.3 RESEARCH AIM

The aim of this paper is to study the factors that contribute to perceived under-utilization of PM software in Malaysian construction industry.

1.4 RESEARCH OBJECTIVES

The main objectives of this research are:

a) To identify factors that might contribute to perceived under-utilization of PM software in Malaysian construction industry.

b) To find out the commitment of construction companies towards provision of monetary allocation for provision of training for and purchase of PM software in Malaysian construction industry.

1.5 ORGANIZATION OF THE THESIS

This thesis is organized thus:

Chapter 1 introduces the research background, the problem statement, research aims, research objectives, and the organization of the thesis.

Chapter 2 presents the literature review. It presents the background and historical aspects of the evolution of Project Management as a discipline, an overview of the nature of construction industry and its projects and processes, an outline of PM software, previous studies conducted on PM software usage, and barriers and inhibitors to the propagation and adoption of PM software in construction industry.

Chapter 3 presents the research methodology from the first step of selection of topic to the final step of conclusion and recommendations.

Chapter 4 presents the analysis of data collected from the questionnaire survey. Descriptive statistics were used to analyze the collated data.

Chapter 5 presents the discussion on the results of analyses of data in Chapter 4 and put forth the findings of the research.

Chapter 6 presents the conclusion, limitation of research, contribution to the body of knowledge and further recommendations.

CHAPTER TWO

PROJECT MANAGEMENT AND PROJECT MANAGEMENT SOFTWARE

2.1 INTRODUCTION

This chapter gives a historical perspective and background of project management (PM), and the role of PM in project success. It gives an insight into the nature of construction industry, construction projects and construction processes. It introduces project management and PM software and traces their origins and the software's rapid development and expansion in usage in 1980's as a result of the invention and propagation of personal computers. It indicates the location of PM software in the PM Body of Knowledge (PMBOK). It highlights the fact that while there are a number of studies that evaluate technical capabilities of various PM software packages, studies on the extent of utilization of PM software in construction industry are few and limited. It goes on to highlight various barriers and inhibitors to the adoption of ICT tools including PM software in construction industry of various countries. These barriers and inhibitors are central to understanding the slow rate of adoption of PM software by construction industry. The slowness in the up-take and adoption of ICT tools including PM software has led to a perception of under-utilization of PM software in that particular industry in most countries including Malaysia. The factors that contribute to perceived under-utilization of PM software in construction industry of Malaysia are the subject matter of this study.

2.2 DEFINITIONS OF PROJECT MANAGEMENT

There have been many attempts to define project management throughout the years; among the earliest was by Gaddis (cited in W.Abdullah & Ramly, 2006) who defined it through the definition of a project which is "an organization unit dedicated to the attainment of a goal - generally the successful completion of a developmental product on time, within budget, and in conformance with pre-determined performance specifications". Altfelt (2000) stated that the term "project manager" was first introduced by Gaddis (1959).

Oisen (1971) defined project management as the utilization of a group of tools and techniques (such as the CPM and matrix organization) to focus the use of diverse resources toward the accomplishment of a unique, composite, one-time task within time, cost and quality constraints. Each activity requires a specific combination of these techniques and tools arranged to fit the environment and life cycle (from conception to completion) of the activity.

Turner (1999) defines project management as the process by which a project is successfully completed, and its objectives successfully met. Atkinson (1999) took into view the numerous definitions of project management and opined that perhaps project management was simply an evolving phenomenon, which would remain vague enough to be non-definable. He described the various definitions of project management in the 1990's; it was defined as "a combination of management and planning and the management of change" in 1993 (Reiss, cited in Atkinson, 1999); "has evolved in order to plan, co-ordinate and control the complex and diverse activities of modern industrial and commercial projects" in 1994 (Lock, cited in Atkinson, 1999); "a specialized management technique, to plan and control projects under a strong single point of responsibility" in 1993 (Burke, cited by Atkinson,

1999); and "the art and science of converting vision into reality" in 1996 (Turner, cited by Atkinson, 1999). Wirth (cited in Atkinson, 1999) highlighted that there were differences in contents of the definition between six countries' own version of PM Book of Knowledge (PMBOK).

Kerzner (2009) stated that project management may be defined as the process of achieving project objectives through the traditional organizational structure and over the specialties of the individuals concerned.

PMI (2014) defines project management as the application of knowledge, skills and techniques to execute projects effectively and efficiently; and it is a strategic competency for organizations, enabling them to tie project results to business goals — and thus, better compete in their markets.

This Section 2.2 has shown that the definition of Project Management has continuously evolved over time and based on this trend, it will continue to evolve. For the purpose of this paper, the current definition by PMI is used.

2.3 BACKGROUND OF PROJECT MANAGEMENT

Project management to a large extent involves circumventing problems, embarking upon new ground, handling a group of people and trying to achieve very clear objectives fast and resourcefully (Alshawi & Ingirige, 2003). Project management is now used in almost all industries including construction, finance and banking, health, information technology (IT), manufacturing, petrochemical, transportation, and wholesale and retail. It is recognized as an important characteristic of successful companies and is now more than ever needed to efficiently and effectively manage projects of increasing complexity and to support project managers in their decision-making (Alshawi & Ingirige, 2003).

Project management has been practiced for thousands of years since the Egyptian era but it was only in the beginning of twentieth century that organizations began to use modern project management techniques and tools (PMTT's) to implement complex projects (Kwak, 2005).

Various studies gave different moments in history as to when modern project management began to take shape and the different reasons for modern project management to take shape. For example, Kwak (2005) suggested that the origin of modern project management concept started in the first half of twentieth century (1900-1950), noting that some studies pointed to Henri Fayol's (1916) five functions of a manager i.e. to plan, organize, coordinate, control and direct, as the origin of modern project management. However, Sisk (2004) pointed out that at an earlier time which was at the end of 19th century, Frederick Taylor (1856-1915) had been quantifying labor and materials scientifically and found new ways of increasing productivity other than just "working harder". Taylor was known in the history of management as "the father of scientific management", a title which was engraved on his tombstone. Henry Gantt (1861 - 1919) was also credited with the title of father of modern project management due to his Gantt chart which was later improved upon and became a standard tool in project management practice (Soderland, cited in Wan Abdullah, 2006).

Snyder and Kline (cited in Kwak, 2005) found that modern project management era only started in 1958 with the development of Critical Path Method/ Program Evaluation and Review Technique (CPM/PERT). Morris (cited in Kwak, 2005) stated that the origin of modern project management came from the chemical industry just prior to World War II (1939-1945). Virtually all the practices, concepts and language of project management can be shown to have had their origins largely in

the US aerospace agencies in the mid-1950s, though with antecedents in pre-World War II (Morris, 2002). The critical path analyses and network scheduling and simulation techniques had their beginnings in 1950's in the form of CPM and PERT (Kidd, 1990). Sisk (2004) observed that project management, in its modern form, began to take root in the early 1960s at the time where businesses and organizations began to see the benefit of organizing work around projects and started to understand the critical need to communicate and integrate work across multiple departments and professions.

In the 1970's and 1980's, project management evolved from informal to structured forms to meet the challenges in managing projects of increasing magnitudes (Kerzner, 2009). In the construction industry during that period, Construction Project Management (CPM) was defined as the planning, control and co-ordination of a project from conception to completion (including commissioning) on behalf of a client. It is concerned with the identification of the client's objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between resources. The integration, monitoring and control of the contributors to the project and their output, and the evaluation and selection of alternatives in pursuit of the client's satisfaction with the project outcome are fundamental aspects of CPM (Walker, 1984).

By 1990's, industries has learned the lessons of 1989-1993 recession (in the USA) of the importance of schedule compression and of being the first to produce. Project management then was accepted as a requisite to handle the increasing complexity of relationships between various project activities (Kerzner, 2009). Execution of work by project teams as opposed to functional teams was becoming an accepted norm in 1990's and beyond as organizations becomes flatter and leaner,