Faculty of Technology Management and Technopreneurship

ICT PROCUREMENT: PRE-AWARD AMBIGUITIES IN REQUIREMENT ANALYSIS AND POST-AWARD ICT PROJECTS EFFECTS IN GOVERNMENT SECTOR

Mohamed Maharoof bin Vaheed

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ICT PROCUREMENT: PRE-AWARD AMBIGUITIES IN REQUIREMENT ANALYSIS AND POST-AWARD ICT PROJECTS EFFECTS IN GOVERNMENT SECTOR

MOHAMED MAHAROOF BIN VAHEED

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DECLARATION

I declare that this thesis entitled "ICT Procurement: Pre-Award Ambiguities in Requirement Analysis and Post-Award ICT Projects Effects in Government Sector" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Name : MOHAMED MAHAROOF BIN VAHEED

Date : .....

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

Signature : .....

Supervisor Name : ASSOCIATE PROFESSOR DR. JUHAINI BINTI JABAR

Date : ……

DEDICATION

This thesis is dedicated to my late parents who taught me that the largest task can be accomplished with little steps and never to give up.

To my dear wife Faizanah for being my inspiration and my children Fardeen, Faris and Fareed for all their assistance and motivation.

To my supervisors for their guidance and support.

ABSTRACT

The Information Communication and Technology (ICT) industry offers major revolution in propelling the economy of a country, but statistics and literatures on ICT project implementations have been reported to be underperforming especially with regards to untimely delivery, exceeding budgets, and the lack of quality of the systems delivered, that causes major concerns and frustrating. In addressing these concerns, this thesis has performed a research study on the ICT procurement process chain that deemed to affect the performance of ICT projects in government agencies by referencing among others, the 2013 Malaysian Ministry of Finance, ICT procurement guideline. It analyzes the 3 phases of the ICT procurement chain specifically the pre-tender, post-tender and post-award phases and the corresponding resolve while adopting three theories namely the dialectical theory, resource-based theory, bureaucratic theory, and some combination of these theories were explored. These theoretical perspectives appear to establish in that they help to describe different resolutions that can arise within the ICT procurement lifecycle and collectively understand the reasons why and when ICT projects fail, so that the process can be improved. To begin with, a pilot study was conducted with a 33 questions reliability survey that resulted a Cronbach Alpha of 0.766 from 30 non-random respondents. Subsequently in the main study, respondents from three groups from the public agencies namely the business functional users, ICT technical teams, ICT procurement teams and the fourth group being the ICT vendors were surveyed quantitatively to form a sample size of 338 responses. The respondents were mainly from the levels of divisional heads and similar representing the public agencies and from the vendors were the ICT consultants and senior project leaders. A statistical analysis with SPSS analytical software was produced in order to comprehend the process of ICT procurement and the challenges it encounters within the process chain. This result was used to develop set of questions for the purpose of validating the study by a qualitative method. In the development of qualitative questions, a panel of 5 senior experienced experts from both the public organizations and ICT vendors were asked to review and comment on the clarity and the construction of the interview questions. This qualitative method is designed as a case study was tested on 5 senior management members from the public agencies and ICT vendors in order to review policies, standards, and practices that are used currently to procure ICT systems, and to determine how and why some projects were unsuccessful. The outcome found that at the pre-tender and post-tender phases, firstly, there are absence of skilled resources, which includes insufficient knowledge, and inexperience personnel at the level of functional users and ICT team. Secondly, technical requirements are ambiguous due to lack of expertise at the agencies ICT team to produce the exact requirements and thirdly, the dialectics between these different units contribute to other post-award implementation issues. Eventually this study had resulted in a development of an improved ICT procurement process that were assented by the experts. The study's novelty is its research of horizontal-based procurement processes and gaps, in addition of its analysis on issue-by-issue process phase's themes and concerns.

PEROLEHAN ICT: ANALISA KEHENDAK YANG TIDAK JELAS DI FASA PRA-PENGANUGERAHAN DAN KESANNYA TERHADAP PERLAKSANAAN PROJEK ICT DI FASA PASCA-PENGANUGERAHAN DI SEKTOR KERAJAAN

ABSTRAK

Industri Teknologi Maklumat dan Komunikasi (ICT) telah diperakui menawarkan suatu revolusi dalam menggerakkan ekonomi sesebuah negara, tetapi disebaliknya, statistik dan kajian mengenai pelaksanaan projek ICT pula telah dilaporkan kurang memuaskan terutamanya berkaitan dengan jadual perlaksanaan yang lewat, melebihi kos yang ditetapkan, dan kekangan kualiti sistem yang dilaksana, telah menyebabkan kebimbangan dan kekhuatiran. Untuk menangani masalah ini, tesis ini telah membuat suatu kajian penyelidikan mengenai rantaian proses pemerolehan ICT yang dianggap mempengaruhi prestasi perlaksanaan projek ICT di agensi kerajaan dengan dirujuk antara lain, kepada Garis Panduan Perolehan ICT Kerajaan, Kementerian Kewangan Malaysia. Ia menganalisa 3 fasa proses perolehan ICT khususnya fasa pra-tender, pasca-tender dan pasca-penganugerahan projek dengan bimbingan tiga teori iaitu teori dialektik, teori berasaskan sumber, teori birokrasi, dan beberapa gabungan teori telah diterokai dalam menjana penyelesaian masalah yang ingin ditangani. Kajian awalan dijalankan dengan 33 soalan kaji selidik bagi kepastian reliabiliti, yang telah menghasilkan Cronbach Alpha dengan nilai 0.766 daripada 30 responden bukan rawak. Seterusnya dalam kajian utama, responden daripada tiga kumpulan dari agensi awam iaitu pasukan pengguna ICT, pasukan teknikal ICT, pasukan perolehan ICT dan kumpulan sasar keempat dari syarikat pelaksana ICT ditinjau secara kuantitatif untuk membentuk saiz sampel sebanyak 338. Responden kebanyakannya dari peringkat ketua jabatan dan yang setaraf dengannya yang mewakili agensi awam dan perwakilan syarikat pelaksana ICT pula terdiri dari perunding ICT dan pimpinan utama projek. Analisa statistik dengan perisian analisa SPSS dihasilkan untuk memahami rantaian proses perolehan ICT dan cabaran yang dihadapi dalam proses ini. Dalam penjanaan soalan kualitatif, sebuah panel terdiri dari 5 pakar yang berpengalaman dari agensi awam dan syarikat pelaksana ICT diminta mengulas kejelasan dan pembinaan soalan temu bual ini. Kaedah kualitatif ini dirancang sebagai kajian kes diuji pada 5 anggota pengurusan kanan dari agensi awam dan syarikat pelaksana ICT untuk mengkaji semula dasar, piawaian, dan amalan yang diguna-pakai pada masa ini bagi perolehan sistem ICT, dan menentukan bagaimana dan mengapa beberapa projek tidak berjaya. Hasil kajiselidik keseluruhan mendapati bahawa fasa pra-tender dan pasca-tender, pertama sekali, terdapat kekurangan sumber manusia mahir, ia termasuk tahap sumber pengetahuan yang tidak meluas, dan kakitangan yang kurang berpengalaman dalam pasukan pengguna ICT dan pasukan teknikal ICT. Kedua, keperluan teknikal yang samar kerana kekurangan kepakaran di agensi-agensi ICT untuk menghasilkan keperluan yang tepat dan ketiga, dialektik di antara jabatan yang terlibat ini menyumbang kepada isu-isu pelaksanaan pasca-penganugerahan yang lain. Akhir sekali kajian ini dapat mengenalpasti jurang yang terdapat dalam proses perolehan ICT kini dan seterusnya mencadang proses penambahbaikan perolehan ICT yang lebih menyeluruh yang diakui oleh para pakar. Kebaharuan kajian ini adalah penyelidikannya mengenai proses dan jurang pemerolehan berasaskan mendatar, di samping analisisnya mengenai tema dan masalah fasa proses demi isu.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Information and Communications Technology (ICT) has been crucial for an effective business operation of corporations, financial institutions and governments, in terms of the delivery of services to businesses and citizens. The field of ICT continues to revolutionise people's everyday activities, fuelled by social media applications such as Facebook, Twitterand gaming, coupled with the increasing power and speed of the Internet. In recent years, technological advances have changed the way people interact with each other, consumemedia, work, shop and play.

Studies around the world have shown that ICT investments can positively impact jobs, productivity, GDP growth and innovation (Toader, 2018). Many countries that have evaluated the merits of investments in traditional industries, such as manufacturing, textiles and automotive, are discovering a better and longer-term ROI in the growthof the ICT sector. These benefits of ICT investments have become increasingly evident, but the challenge is identifying the wisest investments, those most likely to grow the economy, increase GDP, improve revenue and lowers costs, both in the immediate future and in theyears to come. Significantly, ICT has the potential to transform government operations and improve the quality of services it offers to the public. ICT provides opportunities for governments to increase operational efficiency by reducing costs and increasing productivity, and to provide a better quality of services by its agencies to its citizens.

While the benefits of ICT in government cannot be disputed, there are several concerns about its success as well as the strategies to be adopted in implementation of systems in various countries. Although ICT clearly sits at the centreof government business, many government ICT systems are outdated and unable to deliver the required functionality. This has ledto investment in a large number of ICT projects, a substantial number of which have had poor results. Government ICT-enabled projects are often large, complexand known in the public domain. The primary aim of many such projects is to provide services to the community at minimal cost to public spending, thus exerting significant pressure on the agencies, departments and executives responsible for developing and implementing these projects successfully.

1.2 Background of the study

Traditional ICT project approaches assume that the world works in a rational and predictable fashion as shown in Figure 1.1. Requirement specifications are drawn up in advance, 'solutions' are procured, and then delivery is managed against a pre-determined timetable. In reality, priorities change rapidly, and technological development is increasingly unpredictable and non-linear. Most government ICT, therefore, remains trapped within an outdated model that attempts to lock project needs requirements up-front and then proceeds with the execution and implementation of the project at a hostile pace. Thisoften results in repeated system-wide failure.

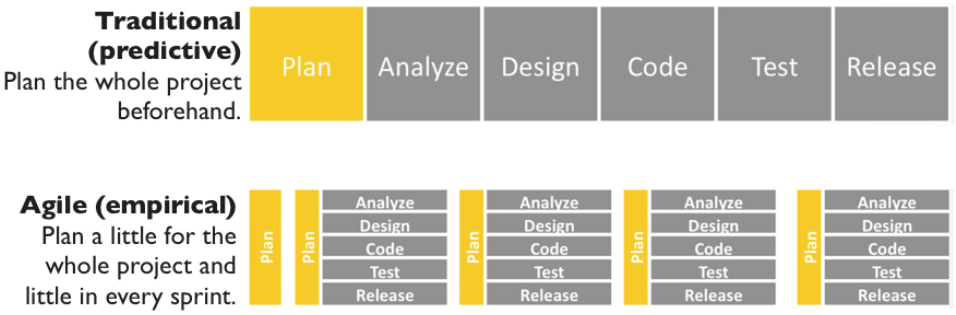

Figure 1.1: The predictive linear approach and the empirical non-linear approach

Prior to procuring, the business users, the procurement team and ICT managers in government departments must be aware of the many problems they could potentially face in an ICT intensive project. Government policies are observed to have a strong preference for fixed-price ICT contracts in their procurement contracting, but a firm fixed-price contracts are depicted as existing on the extreme left of the continuum of risk to an ICT project. The decision is even more critical in an environment of evolving requirements, especially during the implementation of the project. Again, in government procurement contracting, there are many examples of changing requirements leading to change orders with escalating cost estimates and increased risk. Cost, schedule and performance risk are just three characteristics of an acquisition approach that procuring authorities and the contracting professionals consider, in selecting vendors and the underlying contract structure, and these are deemed inadequate for completing a successful ICT project.

A firm fixed-price ICT procurement contracts are often competitively bid upon and are mostly awarded solely on price, as long as the vendor meets certain qualification criteria. The vendor's challenge is to submit a bid price that compensates the work involved and provides a reasonable profit, while still trying to bid lower than competitors. To do this, the vendor should systematically plan a bid preparation so that it is considered responsive by the customer within the required needs specifications. During tender bidpreparation, vendors

rely mostly on the tender specifications document alone and no significant requirements are overlooked. Any necessary qualifications or exceptions are documented and reasonably accurate data are collated in determining the tender pricing.

However, following a successful award, when the anticipated needs of the government agencies are not fulfilled, the vendor is blamed. Rework and error corrections on ambiguous and inadequately tendered specification needs can actually multiply the cost of the final solution. It is not surprising that the vendors are expected to anticipate such outcomes, as there are always surprises awaiting the project implementation, for example, handling vague requirements, changing needs, technical difficulties and wrong assumptions. An ICT procurement contract based upon reasonable estimates, if forced very early, in project kick-off phase when the vendor does not have complete information, is bound to fail. As such, bidding vendors find relying solely on the information ofa tender needs requirement is insufficient, as there is no access given to the agencies environment to conduct a proper study, to inspect and to re-examine the requirements against the tendered specifications (Hancox and Hackney, 2000).

The fixed-price procuring contracts are defined by a set of tendered requirements to be delivered by a defined price (Bergman and Lundberg, 2013).As the outcome is clearly set out at the beginning in the tender document needs requirement, it is relatively straightforward for the vendor to estimate and validate effort and cost. However, when the requirement changes within the project execution phase, more effort are required, and the vendor's cost escalates together with time. Additional efforts are undertaken by the vendor to address the changes, but a fixed price for the contract remains unchanged, though cost escalates due to the new changes. This has become one of the biggest challenges in delivering successful ICT projects.

The policies of procurement departments and legal advisers in almost all government agencies require issuing firm fixed-price contracts based on an assumption that the list of requirements is there to protect the customer. In fact, these lists sometimes shield the vendors because they know it is sufficient to check the compliance and can focus on minimising the effort required, instead of maximising business value created. With strict contracts, often the requirements are not met, and the value generated may be far from optimal. It is common for the procuring agencies to view the ICT vendor, rather than the agency, as having to shoulder the overall risk in terms of budget, time, effort and scope of work (Ekholm and Molnár, 2009).

1.3 Significance of the problem

There are many reasons as to why project failure arises repeatedly in every new ICT project being carried out. According to a report by Widman (2008), those who manage IT projects do not seem to learn from the mistakes of their colleagues. The government institutions, in fact, are the biggest failures in terms of not learning from project mistakes made earlier. When a bridge falls down, it is investigated, and a report is written on the cause of the failure. But in ICT projects, this is not the case, because failures are usually covered up, ignored, or rationalised (Schdmit, 2012). As a result, the customers keep making the same mistakes. However, Wilkins (2013) observed that government entities are more prone to ICT project failure because of difficulties in covering up their failures. This is unlike the private sector, where the limited number of individuals involved in the project, and the limited number of stakeholders, provides the opportunity to cover their mistakes (Widman, 2008).

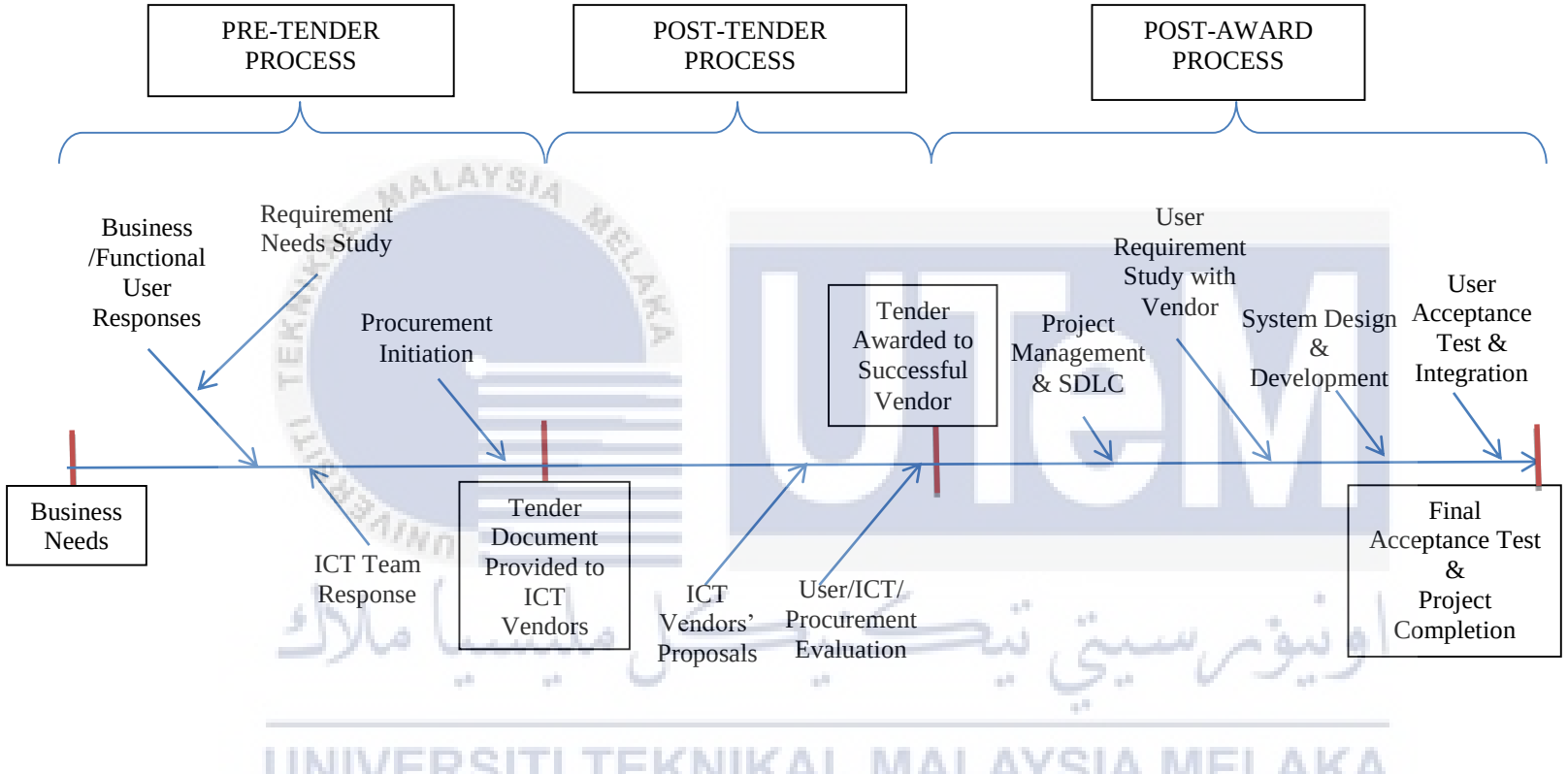

Figure 1.2: Key milestones of a typical ICT procurement process in a government agency (Source: Government ICT Procurement Guideline, Ministry of Finance, May 2013)

Systems theory allows conceptualising typical ICT procurement processes according to the model above. Figure 1.2 illustrates that these compositions are typically structured based on three essential processes: pre-tender, post-tender and post-award. During the initial pre-tender phase, the government identifies core needs for systems, processes and projects. This typically consists of tender advertisements designed to appeal to potential vendors, who are parties or persons qualified or eligible to fulfil the specified requests. Subsequent to this process, vendors submit proposals, which include their credentials, specific approach to fulfilling the business and technical request and their commercial quote fees. At the same time, vendors provide services by mapping the methodology and technology that they would employ. The government agencies then accept the proposals and move to the secondary post-tender process phase.

During the post-tender phase, the agencies acquire various proposals and, from these, they select the most optimal vendor. While this decision process may vary, public contractors tend to base their selection criteria on factors such as vendor credentials and proven track record, the time identified for project completion and the estimated cost stipulated. Though cost-oriented selections are considered the most optimal approach, they do not take into account hidden variables that can sometimes result in hidden costs or unexpected events. Regardless of the criteria the agencies employed, the post-tender process marks the phase during which the contracting agency awards the project and contract to the selected vendor.

During the post-award process, the vendor and contractor agree on the various components related to their agreement, such as cost, deadline and stipulated requirements. Ultimately, the post-award phase can be viewed as the phase where both parties come to a mutually understood framework for their agreement. The manner in which ICT need requirements are evaluated and developed into ICT project tenders, influences the quality of the ICT tendering process and the capacity of ICT suppliers to respond easily to the tenders,