

**SUPPLIER SELECTION FRAMEWORK FOR
STRATEGIC GOVERNMENT PROCUREMENT**

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To my dearest wife Sie Fung and daughters Ming Ing and Ming Jiat

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ABSTRACT

This research project is a study on supplier selection decision-making framework on strategic government procurement. Current practices do not allow balanced tradeoffs to reach optimal procurement decisions consistently. The main drawback of the current system can be traced to the practice of the lowest acceptable offer principle which is not capable of establishing any scientific relationship between the price and quality criteria and therefore, unsure of identifying the best bid and maintain decision consistency. Due to absence of scientific structured supplier selection method in the present system, supplier selection decision-making process is heavily skewed to decision-makers' intuition and ad hocism; no clear audit trail exists and, therefore lacks system transparency. The main objective of this study is to propose a framework that is capable of overcoming the major systemic weaknesses, namely, lacking of proper guidelines and clear framework that can be used to make balanced and consistent supplier selection decisions for complex system procurement. The study uses Royal Malaysia Police as an example and the procurement of a complex telecommunications system as a case study. Focus interview was used to identify buyers' strategic orientation, main and sub supplier selection decision criteria. Via focus interview, RMP procurement practitioners also suggested that closer working relation between the financial and technical evaluation committees could be more effective in identifying the best bid. Literature review suggested the total cost of ownership procurement principle is widely used among the more progressive companies globally and Analytic Hierarchy Process (AHP) emerged as the most suitable decision-making technique for supplier selection. Based on the above findings, a generic framework was established. The proposed framework was tested successfully in an actual tender evaluation of complex telecommunications system procurement. Being scientific, explicit, transparent and objective, it was capable of addressing the current systemic weaknesses satisfactorily. The framework was able to bridge the policy/implementation gap of the Treasury Instruction and is capable of realising the desire of practicing total cost of ownership (TCO) principle in the Malaysian government procurement function. Testimonies on the relevancy and applicability the AHP based supplier selection decision-making framework by the Chairman of the technical evaluation committee and the Chairman of the Home Ministry Tender Board, confirmed the success of the framework under test and also this project as a whole. The proposed framework when modified is suitable for any kind of purchase in other government departments or agencies.

ABSTRAK

Kajian ini berfokus pada pengwujudan sebuah rangka kerja membuat keputusan bagi pemilihan pembekal dalam perolehan kerajaan. Sistem perolehan kerajaan semasa adalah berasaskan kepada prinsip **tawaran terendah yang boleh diterima** (*lowest acceptable offer*) yang tidak berupaya menghubungkan kriteria kualiti dan harga secara saintifik, justeru prinsip ini tidak dapat menjamin pencapaian keputusan yang terbaik dan konsisten. Punca kelemahan-kelemahan ini adalah dari ketiadaan penggunaan metod atau teknik membuat keputusan yang saintifik dan utama kajian ini ialah untuk mencadangkan sebuah rangka kerja yang berkeupayaan untuk menangani masalah-masalah semasa, iaitu, kekurangan garis panduan dan rangka kerja yang jelas bagi menghasilkan keputusan perolehan yang seimbang dan konsisten. Kajian ini menggunakan Polis DiRaja Malaysia (PDRM) sebagai contoh dan perolehan satu sistem telekomunikasi yang kompleks sebagai kajian kes. “*Focus interview*” diadakan untuk mengenalpasti orientasi strategik pegawai-pegawai perolehan PDRM, serta kriteria utama dan kecil membuat keputusan mengikut pendapat mereka. Melalui proses ini, pegawai perolehan PDRM juga mencadangkan bahawa adalah lebih mudah untuk mengenalpasti pembekal yang terbaik jika jawatankuasa teknikal dan kewangan dapat berkerja dengan lebih rapat dalam proses penilaian. Kajian *literature* melaporkan prinsip perolehan kos pemilikan menyeluruh (*Total cost of ownership*) adalah paling popular di kalangan syarikat-syarikat maju sedunia dan juga mendapati teknik yang paling sesuai bagi membuat keputusan perolehan ialah *Analytic Hierarchy Process* (AHP). Berdasarkan kepada penemuan-penemuan yang tersebut di atas, satu rangka kerja *generic* telah dibangunkan. Rangka kerja tersebut telah diuji dengan jayanya dalam satu penilaian tender perolehan sebuah sistem telekomunikasi yang kompleks. Oleh sebab unsur-unsur saintifik, nyata, telus dan objektif, ia berupaya mengatasi kelemahan-kelemahan yang wujud dalam sistem perolehan semasa dengan baik. Cadangan rangka kerja tersebut dapat mengurangkan jurang dasar/implementasi dalam Arahan Perbendaharaan dan berkeupayaan untuk merealisasikan aspirasi pelaksanaan prinsip kos pemilikan menyeluruh dalam fungsi perolehan kerajaan. Surat penghargaan dari pengerusi Jawatan Kuasa penilaian teknikal projek tersebut dan pengerusi Lembaga Tender Kementerian Keselamatan Dalam Negeri mengesahkan kejayaan dalam ujian rangka kerja dan kajian projek keseluruhan. Jika cadangan rangka kerja ini diubahsuai, ia boleh digunapakai bagi apa jua jenis perolehan dalam jabatan atau agensi kerajaan lain.

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ABBREVIATION

AHP	Analytic Hierarchy Process
AVLS	Automatic Vehicle Location System
BITE	Built In Test Equipment
C4I	Command and Control, Communication and Computer Integration System
CCC	Contingent Control Centre
CDP	Criterion Decision Plus
CI	Consistency Index
CR	Consistency Ratio
DCC	District Control Centre
DMU	Decision-Making Unit
DSS	Decision Support System
EC	Expert Choice®
FOB	Free On Board
GDP	Gross Domestic Product
GP	Goal Programming
GSM	Global Services for Mobile
ICT	Information Communications Technology
IGDS	Integrated Graduate Development Scheme
ISDN	Integrated Services Digital Network
ISR	Initial Spare Requirement
KOMPOL	Komputer Polis OnLine (a RMP intranet)
MAUT	Multiple Attribute Utility Theory
MCC	Malaysian Control Centre
MCDM	Multi Criteria Decision-Making
MDCS	Mobile Data Communications System
MDT	Mobile Data Terminal

MOP	Multiple Objectives Programming
MPV	Mobile Patrol Vehicle
MTTR	Mean Time To Repair
MWPM	Modified Weighted Point Method
OCPD	Officer Commanding of Police District
PDRM	Polis DiRaja Malaysia (Royal Malaysia Police)
PDT	Portable Data Terminal
PERS-999	Public Emergency Response System-999
RDLAP	Radio Data Link Access Protocol
RMP	Royal Malaysia Police
SOP	Standard Operating Procedure
SOS	System of System
TCL	Treasury Circular Letter
TCO	Total Cost of Ownership
Telco	Telecommunications Company
ToT	Transfer of Technology
VPA	Vendor Profile Analysis

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CHAPTER 1

INTRODUCTION

1.1 Background

Malaysia's public procurement has its humble start when the Treasury Department took over the public procurement function from the Crown Agent in 1966. Much of the current public procurement doctrines and procedures are rooted in the British public procurement system practiced at that point of time. Since then, the Treasury Instruction has been the authority for all government procurement; however, it underwent few structural changes (Treasury Instruction, 1997).

Operating under the Treasury Instruction (1997), the current RMP procurement system in used focuses primarily on price and quality criteria and therefore results in supplier selection decisions that are not optimal, especially in complex systems procurement.

The research findings by Benchmarking specialist PIMS Associates (Thompson, 1996) stated that by applying a strategic approach in firms that conduct their purchasing of goods or service poorly, the firms will generate savings of between 20 percent and 40 percent in expenditure and there is clear correlation between purchasing effectiveness and relative market price paid. Transactional purchasing leads to 102 percent of market price while advanced techniques achieve 98.5 percent – a saving of 3.5 percent. In order to gain similar benefits, it is therefore justified and timely to conduct this research.

1.2 Problem Statement

The current Malaysian government procurement system in used is incapable of making balanced supplier selection decisions consistently for complex systems procurement.

The current procurement system has systemic shortcomings and thus, the system is incapable of reaching balanced and optimal supplier selection decisions. This study is to explore the need to employ advanced procurement principle (Ellram, 1996), scientific decision-making technique (Min, 1994; Ying, 2000; Sashi and Kudpi, 2001) and enhancing procurement professional (Herbert, 1997) towards better supplier selection decision-making. In this study, the Royal Malaysia Police (RMP) procurement system for complex systems in used is an example of such system for government agencies.

1.3 Purpose Of This Study

This study intends to establish the theoretical basis for government procurement decision-making process to: -

- (i) enable different decision-makers to understand and evaluate past purchasing decisions,
- (ii) monitor changes in decision variables, and,
- (iii) determine new courses of action.

The study shall provide a structured, well-defined decision-making framework based on proven and up-to-date procurement principles and comprehensive decision-making techniques operating in multi-criteria supplier selection environment. The framework should address potential problems from the onset of procurement by providing a mechanism of supplier selection that provides a scientific and quantitative measure of the ability of suppliers to perform.

1.4 Objectives Of This Study

The specific objectives are to provide a framework that will enable RMP to make balanced decisions in procuring complex systems consistently. The said framework shall incorporate best practices in procurement principles and decision-making techniques. At the same time, it will also review the current evaluation and decision-making related processes and proposes a comprehensive and pragmatic solution. In a nutshell, the proposed solution has the ability to overcome the main weaknesses and dilemma faced by the government procurement function today. This is to be achieved by addressing the following issues.

- (i) To identify the theoretical basis of the current decision-making in supplier selection.
- (ii) To determine the adequacy of the current decision-making process as an appropriate methodology for the type of issues/problems being addressed.
- (iii) To determine if the current decision-making process can be modified, or a new process needs to be developed and adopted to facilitate better decision-making.
- (iv) To bridge the policy/implementation or the desire/practice gap in current government procurement practices.

The proposed solution shall have wide applicability and at the same time, be theoretically sound. Therefore the theoretical principles applied shall commensurate with the degree of academic proficiency by various user groups involved. Over sophistication relative to the competency of decision analysts and decision-makers will make the proposed solution to have little practical value. A too complex or time consuming solution will make its implementation not technically and economically viable, while an over simplistic solution will not be able to achieve the quality objectives aspired. For this purpose, the major target user groups are those officers with high school qualifications and some with college level qualifications. All of them have a fair degree of computer competency.

1.5 Scope Of Study

While this study intends to propose a supplier selection decision-making framework for complex systems procurement in the public sector, RMP will be used as an example for the study. Case study for testing and validation of the framework will be done in an actual tender evaluation of complex telecommunications system procurement in RMP. The proposed framework will deal with decision-making in strategic purchases and this framework shall handle the analysis, evaluation, and selection of suppliers under the competitive bidding or the open tender process. In this study, strategic purchases mean those purchases valued at RM 15 million or more for capital items, while purchases below that value are considered as non-strategic. These classifications are based on Clause 4 of Treasury Circular Letter No. 3/2001 (2001), whereby RM 15 million is the cut-off-point empowered to the Home Ministry's Tender Board "A" to make supplier selection decisions.

The scope of this study is as follows: -

- (i) Although the study is to propose a framework that is to be utilised by all government departments and agencies, this study is confined to RMP as the example for this case study;
- (ii) One complex system procurement exercise will be used as the case study for demonstration and validation;
- (iii) Although there are many approaches to conduct complex systems procurement, this study will focus on competitive bidding or open tendering process only because it is the most frequently used method;
- (iv) The procurement principle and decision-making technique of choice for this study should be within the technical and academic capability of the majority of the Malaysian government procurement decision analysts and decision-makers.
- (v) Testing and validating of the proposed procurement framework are subject to some constraints and limitations, i.e. the inability to share bidding data between the financial and technical evaluation committees, incomplete data collection under the current procurement system and a majority of the evaluation team members lack

theoretical knowledge in the procurement principle and decision-making technique used in the test system. All these may affect the speed and quality of the decisions made.

1.6 Research Methodology

The research methodology is summarised in Figure 1.1. Details of the research methodology are discussed in Chapter 4.

The research methodology involves the application of different research methods in different phases of the study. The major phases of research and the associated research methods used are as stated below.

Phase I: to identify the need for change in the procurement process and the major decision-making criteria and sub-criteria through focus interview of government procurement officers.

Phase II: to identify the most suitable procurement principle through literature review.

Phase III: to identify the most suitable decision-making technique for better decision-making through literature review.

Phase IV: to identify the relative significance of the major decision-making criteria and sub-criteria through the Delphi method.

Phase V: based on the result of Phase I to Phase IV, to develop a procurement framework for better decision-making in government procurement.

Phase VI: testing and validating of the proposed framework through the case study.

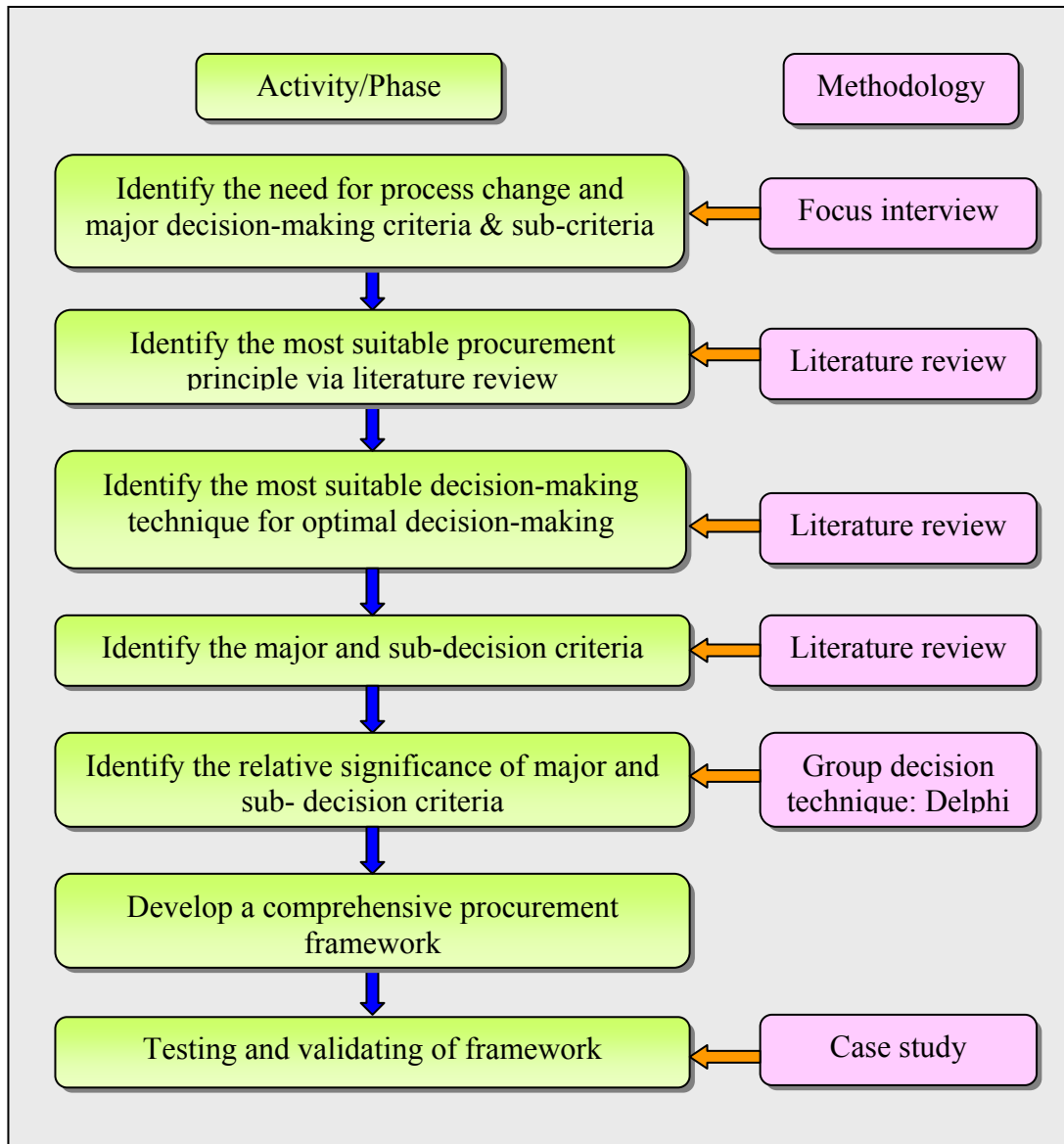


Figure 1.1. Summary Of Research Phases And Methodologies

1.7 Significance Of Study

The purpose of this study is to provide a generic framework that, with some modifications and adaptation, will be suitable for application by all government departments and agencies for any product type and buy-class. The pragmatic framework is capable of solving many embedded systemic issues that give rise to the

problem statement, and in the process of overcoming those issues; they can be turned into opportunities instead. The proposed solution is agile, able to accommodate large number of hierarchical layers and alternatives. In strategic purchases, the decision criteria are many and trade-offs are inevitable and at times, even conflicting. In addition, due to the diversity of opinion of decision analysts and the decision-makers, the best alternative is normally not obvious. Decision analysts will have overcome all those challenges and produce a priority list of choice quantitatively for the decision-makers to act. Towards this end, the proposal structured, which is theoretically based and being pragmatic will be of great help in making better supplier selection decisions in strategic purchases.

Improving government supplier selection decisions is an important effort in improving governance and accountability to all stakeholders, and this in turn will improve the country's image on international creditability and global competitive standings, where governments' management of their finance and fiscal policies are featured prominently. Globally, Malaysia ranks sixteen in this category in 2004 (IMD Report, 2004). With improved international creditability and competitive standings and improved domestic business atmosphere, more foreign direct investments (FDI) are expected to flow into the country and that will assist in creating more jobs and wealth for the country and subsequently improve the national revenue collection. More revenue means more money for government expenditure and the circular-flow of chain reactions will repeat itself. When the citizens have stable jobs and their incomes improved, social unrest caused by poverty would diminish and internal security spending could be reduced.

In short, though this study appears economic centric, it has a far-reaching effect on the national social, economic and security fronts. Indirectly, it does contribute significantly towards shaping the nation's future in the right direction.

1.8 Organisation Of Study

This thesis consists of nine chapters. Chapter 1 is an introduction chapter, which consists of the problem statement, purpose, objective and scope of study, significance of study and study outline. Chapter 2 provides some insights into RMP's current procurement practices and its systemic weaknesses. Chapter 3 is the literature review that focuses on the different decision-making techniques, decision criteria and group decision techniques.

Chapter 4 explains the research methodology and research framework development. It explains how the research is carried out and research methods used in different stages of the research. Chapter 5 reports the results of surveys, which covers focused-interview and literature review. This chapter also reports on the aspiration of procurement practitioners to make systemic change for better supplier selection outcome. Chapter 6 illustrates step-by-step on how the generic procurement system is developed. It also shows the rational and steps taken for procurement principle and decision-making technique selection for framework development.

The system application and validation is carried out in Chapter 7. This chapter shares the test results of two evaluation techniques, namely the Modified Weighted Point Method and the Analytic Hierarchy Process (AHP) and identifies the better technique for supplier selection decision-making in the complex systems procurement. Chapter 8 discusses the test model and its results. It identifies both the model's strengths and limitations. The benefits of this study for RMP and the procurement profession are recorded. Chapter 9 completes the thesis by documenting the study summary, conclusion, application of the generic system and recommendations for further research.

1.9 Conclusion

This chapter highlights the current procurement system's inability to produce best value for money procurement decisions and this weakness is reflected in the problem statement. The objective of this study is to develop a generic procurement framework that can be used for making balanced and better supplier selection decisions consistently for complex systems procurement in the public sector. A suitable research methodology that comprises multiple research methods involving literature review, focus interview, model system development, testing and validation at different research phases was proposed. The contents of each chapter are outlined. Lastly, the research's significance and benefits are identified.

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