Adding Value by Cost Reduction in Public Sector Tendering Process

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Dedicated
To
The Martyrs
And
Freedom Fighters
Of
Our Beloved Motherland

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PREFACE

Before you lies the final version of my master thesis, written for the master program - "Procurement and Supply Management" of the faculty Institute of Governance Studies (IGS) of BRAC University. The research has been carried out during the period August 2011 to November 2011.

I started this thesis with prior knowledge about the tendering procedures of Public Works Department (PWD) as I am an officer of the same department, serving in the capacity of an executive engineer. My background knowledge about the department also saved me substantial amount of effort and time.

I experienced both doing the research and the analyses on this particular topic as very challenging and therefore mostly enjoyable – and inevitably sometimes frustrating. Furthermore, I am quite satisfied with the results of the study, as they turned out to be of larger relevancy than I had initially expected, before starting with the thesis.

This research has made use of data originating from confidential data sources such as estimates and tender documents; the thesis blinds the references to these sources. Furthermore, this thesis contains a series of interviews which been conducted for this purpose. Due to the nature of the results of this report which are often strongly aided by statements made in the interviews, and because I do not intend to damage reputations of interviewees or their organization I have also decided to blind the identities of the interviewees.

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First of all, I thank the Almighty Allah for giving me the opportunity to complete this dissertation for the purpose of fulfilling the requirements of the Masters programme in Procurement and Supply Management.

I would like to extend my thanks specifically to my supervisor Dr. Rizwan Khair for his guidance, assistance and direction he provided me for the completion of this thesis.

This thesis was made possible by the kind assistance of a number of people in my life to whom I express my heartfelt gratitude. I owe much thanks to the resource persons, programme advisors and staffs of the Institute of Governance Studies (IGS) of BRAC University and Chartered Institute of Purchasing and Supply (CIPS) of UK for the assistance and tutoring given to me throughout the coursework during the foundation, advanced and graduate diploma programmes.

I would also like to express my gratitude to the interviewees and the staffs of various level of Public Works Department (PWD) for their kind cooperation in terms of sharing confidential information with me for the purpose of the research work.

Finally, I would like to thank my family, colleagues and friends. To all, I say thank you for the prayers, support, words of encouragement and wisdom with which this research work has been made possible.

EXECUTIVE SUMMARY

This thesis focuses on the value addition activities in public sector tendering process through cost reduction with reference to Public Works Department repair and maintenance contracts.

The premier infrastructural execution agency of Bangladesh Government, Public Works Department (PWD) has great responsibilities in utilizing the funds allocated to them for the purpose of repair and maintenance works. This requires, in addition to others, process efficiency which ensures smooth and less time consuming transition from one stage to another.

More importantly, it can be argued that these repair and maintenance works attract greater importance as there is a possibility of a much higher Value for Money (VFM) through increasing efficiency.

RESEARCH GOAL : The main research goal of this thesis was to examine whether Value for Money for repair and maintenance projects can be achieved for PWD. In this regard the following questions were tried to be answered:

"Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?"

METHOD : This thesis was made using the methodology of case study research. A common and robust way of doing research and conducting analyses in case study research is called triangulation, in which the researcher attempts to confirm facts by using different data sources from the same category (e.g. interviewing multiple persons, or comparing academic articles) in combination with data sources from other categories: in example confirming academic findings and governmental documents by means of conducting interviews with relevant people. Eventually, for this research twenty expert interviews have been conducted, complemented by investigating governmental

publications, confidential estimate and tender documents and academic research in numerous papers on efficiency in tendering process.

MAIN CONCLUSIONS : After an intensive research process, the following set of main conclusions have been drawn;

a) Process efficiency : It has been justified through the findings that there are scopes for improving the efficiency within the tendering process specially by the introduction of e-tendering.

b) Cost of tendering : The costs of financing involved in the tendering process for the repair and maintenance works are often underestimated. However, as it has been shown through findings that these financing costs are substantial in terms possible opportunities for future utilization.

c) Cost saving : The research work resulted in determining a certain percentage of cost saving that can be made during the processes leading to the signing of the contract which helps everybody to get an idea about the ensuring of VFM.

RECOMMENDATIONS : With regards to solving the issues concluded above, the following recommendations (amongst others) have been made;

a) Decrease transaction costs of tender process by standardization.

b) Take charges on inflexibility and delays into account in valuation.

c) Take financial costs of tendering into account.

d) Attach greater importance to qualitative service for the increasing of efficiency.

e) Never underestimate the value of innovation.

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Chapter One

INTRODUCTION

1.1 Introduction :

During the period of the British rule in the Indian subcontinent, the Government decided to establish the Public Works Department (PWD) in the year 1854. At that time PWD was responsible for the construction of roads, buildings, railways as well as flood control, irrigation and military works. With the partitioning of India and Pakistan in 1947, the responsibility of construction work for the Central Government of Pakistan was vested in the Central PWD. The Communication and Building Directorate (C&B), which existed at the time, was entrusted with all construction work for the Provincial Government of the then East Pakistan.

After the liberation of Bangladesh in 1971, the country inherited two separate organizations for the construction and maintenance of Government buildings: the Central PWD and the Communication and Building Directorate of the Provincial Government. These two entities were merged into one department in 1977 to form the present Public Works Department.

At present, PWD is responsible for the construction of infrastructure, mainly in the form of buildings along with providing services to 24 ministries. The construction of roads and highways is entrusted to Roads and Highways Department (RHD) with some other infrastructure development works being done by Local Government Engineering Department (LGED).

The working title for the dissertation is chosen as " Adding value by cost reduction in Public Sector Tendering Process", with special reference to PWD of Bangladesh and if time permits, possible comparison with other Government departments who does similar nature of works such as LGED.

1.2 Scope :

PWD is one of the eight executing organs in the Ministry of Housing and Public Works. It is also the Government's biggest construction agency. Apart from the public sector, it also undertakes projects for autonomous bodies. Once the work is entrusted to PWD, the client is relieved of such responsibilities as getting the plans approved, acquiring land for Government projects, evaluating bids, appointing contractors, setting material standards, resolving disputes with contractors, arbitration and going to court. In short, the whole project becomes the responsibility of PWD.

One of major areas of PWD's involvement in Government construction works is regular repair and maintenance works of Government buildings. The expenditure involved in this sector amounts to around 280 to 300 crore taka annually.

It is this particular area of expenditure which will be studied during this research work to find out ways of reducing cost to add value during the tendering process.

1.3 Problem Identification :

The Public Works Department is the premier construction agency of the Government. Being involved in the repair and maintenance works of the Government buildings amounting to around Taka 280 to 300 crore annually, it poses an enormous challenge to the procuring entity to ensure proper usage of the fund and thereby realising value for money.

Ensuring "value for money" or simply put ensuring the proper utilization of the funds for the benefit of the general public is in itself challenge for the public sector in Bangladesh.

It is therefore understood that the expenditure incurred by the PWD in the repair and maintenance sector needs to be scrutinized in line with the total process starting from the

initiation (through preparation of estimate) to the completion (handing over to the client organization or the requiring body).

Generally, any repair and maintenance work is conceived by the departmental officers on inspecting the current status of the infrastructure or by the requirement of the users and/or the client organization or as a part of routine or periodical maintenance. The process starts through the preparation of estimates, gaining approval (both fund – known as administrative approval and estimates – known as technical approval), preparation of specifications, floating of tenders, receiving and evaluating the tenders, approval of tender evaluation and contract with the successful bidder. These processes include minor sub processes along the way. Once the contract has been signed the implementation of the physical works begins which ultimately goes towards the completion of the works through the fulfillment of the obligations of all the concerned parties as stated in the contract.

Moreover, in Bangladesh the Public Procurement Rules, 2008 And Public Procurement Act 2006 are in place providing strict procedures for tendering. Hence, the implication of these rules, regulations and acts need to be analyzed specially when there are specific time limits for every action regarding tendering.

As it can be seen from the previous discussion, that it is a lengthy process from the initiation to completion. The present study intends to examine the expenditure incurred during the pre-contract period to find out whether these cost can be reduced both in terms of man hours and physical costs. The pre-contract period starts from the preparation of estimates and includes approval of estimates, invitation of tender, approval of successful bid and ends with the signing of contract. It is worth mentioning that many repair and maintenance works cannot be undertaken due to the lack of funds. Therefore, a minimum percentage of possible cost reduction opportunities are going to be examined during this research during the pre contract phase.

1.4 Research Questions :

In view of the previous discussion the following research questions are developed;

"Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?"

A study looking at the efficiency of the tendering related processes in Public Works Department in the light of the size of the contract tendered and possible introduction of e-tendering will be done to find the possible areas of cost reduction during the tendering process to examine the research questions.

1.5 Objective :

The study intends to find ways to reduce costs during the pre-contract period in terms of percentage of the total project cost; which can be further utilized in the repair and maintenance works later on. Simply put, the study intends to find out the amount of cost savings that can be re-employed for further works or in other words generating greater value for money.

1.6 Justification :

One of the major reasons for undertaking this research work is the fact that no specific study has yet been conducted in regard to possible cost reduction opportunities of Public Works Department's annual repair and maintenance expenditure with an emphasis on the pre contract period.

Many of the repair and maintenance works remain undone or cannot be undertaken at all due to lack of funds. It is therefore expected to be a very fruitful examination of the pre

contract cost reduction opportunities which will be able to shed some light in the amount of cost savings. Whatever may be the percentage of this cost saving, it will firstly, realize in a more effective utilization of allocated funds and secondly, this savings can be used for further repair and maintenance works later on.

In general, this study is expected to be helpful to the policy makers of the Public Works Department to have a better understanding and subsequent better utilization of repair and maintenance funds.

1.7 Methodology :

The study intends to use questionnaires and interviews as the methods and procedures for collecting data and information. It is quite understandable that the officers involved in the preparation of estimates, floating tender and executing contract with the contractor need to be interviewed. In this respect, the major focus will be on the office of the executive engineers at the field level. In addition, officers of other ranks from superintendent engineers to sub-assistant engineers will also be interviewed. Also, the monitoring, development and co-ordination wings of the department need to be consulted.

Prior to the collection of data, pre testing of the questionnaire will be done with few prospective interviewees, namely, executive engineers to determine the suitability and accuracy of the questionnaire for the intended purpose of finding out the possible opportunities of cost reduction in the pre contract phase.

The collection of data will emphasize on the time spent on the various stages prior to the execution of the contract and to determine whether more than necessary time is spent at these stages. These overrun of time may be in terms of man hour and/or other physical costs that may accrue as a result.

Once the data is collected, they will be compared against each other and a generalized quantitative summary will be derived to understand the amount of cost reduction that can be achieved during the pre-contract period. This will eventually help in answering the research question and find out whether the hypothesis of value addition in public sector tendering process is valid or not.

The methodology is further elaborately presented and discussed in chapter two.

1.8 Limitations :

The limitations which are likely to be faced during this study will mainly be time constraint which in turn may not make the comparison of PWD's data with those of LGED.

Some other limitation will be the fact that the study will concentrate on the repair and maintenance works undertaken by PWD, hence development projects and their consequences on cost reduction will not come into the picture. Moreover, it is to be understood that there can be a minor difference from one working division to another although it may not deviate from the main purpose of the study. Further elaboration of the limitations and associated assumptions are given in section 6.2.

1.9 Chapter Outline :

The whole research work is presented in six different chapters.

The first chapter is the introduction chapter; which gives an outline of the general background of the Public Works Department and its nature of work. This chapter also explains the scope of research work, the identification of the problem, the research

question, the objective of the work, the methodology to be followed with the probable limitations.

The second chapter is the research design chapter; where an elaboration of the design of the research work is given including the selection of interviewees, framework of the questionnaire and methods of valid interpretation through triangulation.

The third chapter is the literature review chapter; which gives a generalized concept of the value for money model basing on which this research work intends to be carried out. This chapter also sets the analytical approaches needed to determine the cost reduction in quantifiable terms.

The fourth chapter is the data presentation chapter; which expresses the collection of data using the methodology previously explained in chapter one. The data is presented in tabular form for easy understanding.

The fifth chapter is the analysis chapter; which encompasses the interpretation of the data in the appropriate format using the analytical methods in finding out the possible cost reduction during the pre contract phase. This chapter also provides the results regarding cost savings in conformance with the general concept of the value for money model as explained in the second chapter. Furthermore, this chapter gives a guideline to the policy makers of the Public Works Department in understanding the ways of cost reduction during the pre contract phase.

The sixth and final chapter is the conclusion and summary chapter; which summarizes the findings and analysis to explain the quantifiable cost reduction in the process. In addition to these this chapter also gives the limitations, assumptions and scope of further study in this field.

Chapter Two

RESEARCH DESIGN

2.1 Introduction :

2.1.1 Research Design :

Robert Yin (2006) defines three basic steps for a case study design. The first step is to clearly define the case we are studying. For this, I have earlier reviewed literature and Public Works Department's tendering procedures which led, after several revisions, to the research questions presented in section 1.4. These research questions have been revised throughout the process in order to match the findings and process of the thesis, which is not unusual for case study research (Yin, 2006).

The second step is to decide whether we investigate a single case study or multiple case studies. For this thesis I used multiple cases corresponding to data collection from various field offices of Public Works Department where possible, eventually embedded within a holistic case study. These multiple cases will then either replicate and therefore confirm each other, or to contrast in the comparison.

The third step involves the decision whether or not to use theory development to select your case(s) (Yin, 2006). For this thesis, the theoretical concept of value for money (VFM) (section 3.4) is used to define the value drivers and drawbacks for tendering processes used in PWD. These case studies have attempted to build, extend or challenge the assumptions (section 3.8 and section 6.2). However, it should be noted that this was merely a starting point, as I had to remain flexible in my research design in order to be able to explore both planned as well as emergent theory (Robson, 2002). Stake (1995) put this as follows: "Most researchers find that they do their best work by being thoroughly prepared to concentrate on a few things, yet ready for unanticipated happenings that reveal the nature of the case".

As mentioned above, the strategy was to depart from the theoretical assumptions about the added value and pitfalls of PWD contracts. An approach of practicality was chosen. Semi-structured interviews were carried out, in which respondents were asked to reflect on the value drivers and pitfalls of PWD tendering processes leading to the signing of contract, especially in terms of possible cost reductions due to time savings with increasing of efficiency and introduction of e-tendering. Contrasting with regular single-case study research, I realized that selecting interviewees having experience with multiple projects (repair and maintenance works) could express their opinions from a broader perspective. This knowledge was used to my advantage and enhanced the validity and robustness of my findings; the experiences and opinions of an assistant engineer or sub-divisional engineer working on his first project, compared to those of an experienced in-the-field veteran like an executive engineer could be refreshing, but will remain single observations – which is normal for case study research.

In line with the research questions, the interviews will not only regard the value drivers and drawbacks of PWD tendering processes leading to signing of contract, but will also be used to gain a better understanding of the decision process through the use of e-tendering.

Accordingly, the assumptions made in the decision instruments and the current flow of the decision process will serve as a starting point for further study. The aim is to analyze and discuss the consequences of the assumptions made in section 3.8 and further elaborated in section 6.2. Again, the eventual financial estimations on added value will remain the main theme here, in line with the main research question.

On a more process related note, I will critically reflect on the inferred consequences of the current decision process towards the eventual contract. Both these sections will be supported by quantitative illustrations fed by data from – real life – executive engineers from field offices of PWD. This is quite a scoop, since preparation of estimates and evaluation of tenders are confidential activities; which are normally only done by

governmental people itself, or external experts who signed a confidentiality agreement. All in all, critical reflection on the consequences of the procedures regarding efficiency in line with the PWD tendering processes up to signing of contract as they are currently in place will be the aim of chapter 4 and chapter 5.

As Yin (2006) suggested, the process in case studies is often the most challenging task, and requires more thought and consideration due to the fairly "soft" nature of the research approach. A schematic representation of the research design as described above has been depicted in the diagram below. The red boxes represent the sections in this thesis, while the blue boxes represent the activities or documents which served as input for them. Moreover, the arrows indicate that the preceding sections also served as input for another, which corresponds to the description above.

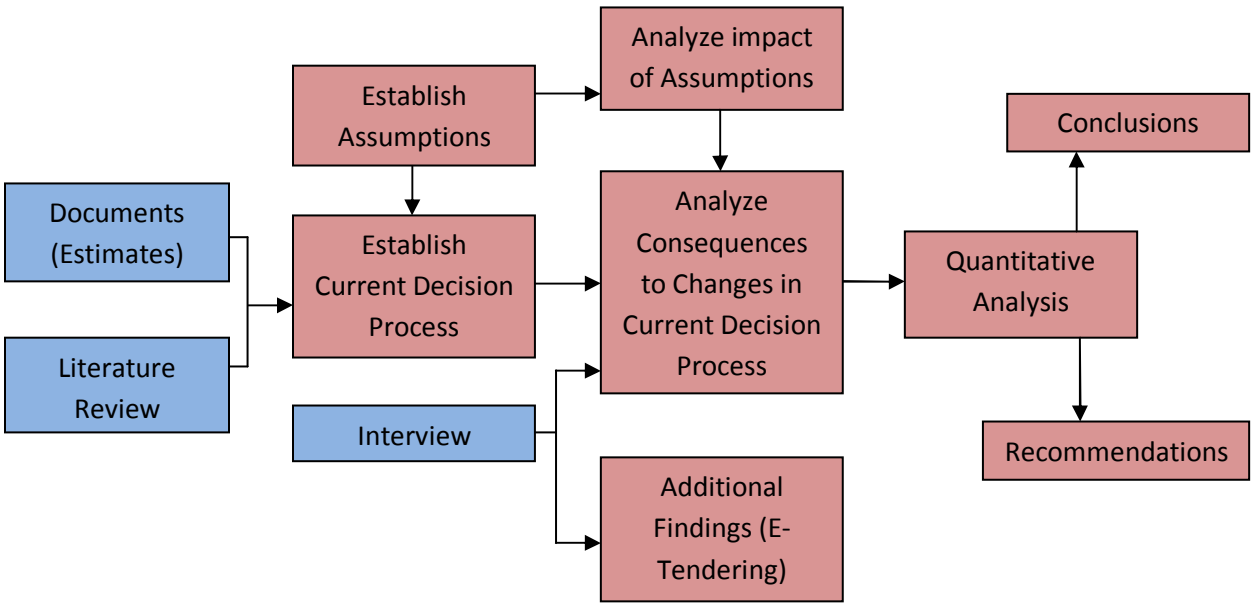


Figure : 2.1 – Research Design

2.1.2 Selection of cases and interviewees :

Selecting the cases and interviewees serves as a critical step in case study research. A common misconception is believing that case studies represent a sample from a larger base and that generalizations depend on statistical significance (statistical generalization). Instead, as Yin (2006) put it : “generalizing from case studies reflects substantive topics or issues of interest, and the making of logical inferences (analytic generalization)”. This means that it is rather the choices we make on the particular cases and people make the difference, rather than striving for a large amount of cases and people; it is about the quality rather than the quantity.

The variety of actors involved indicates the presence of many different interests, opinions and motives. These actors, namely from sub-assistant engineer to chief engineer on the Government side as well as the requiring body who may be public body or autonomous organization, are all involved in different ways in the PWD tendering process and contract execution. This means that they may relate to the effects of decision process in a different manner. Despite the fact that the designers, builders, financiers, maintainers and operational (for DBFMO) stakeholders are connected, which could bundle their interests, they still take care of different aspects of the project. Therefore, there are different risks throughout time, which could possibly influence the performance of the contracts. The right response to this knowledge is adopting a multi-actor approach. It goes without saying that this influences the nature of the interview (on which I will elaborate in the section 2.1.3): one should not ask a contractor about the governmental motivations behind the work, nor would it be useful to a ask external financiers on his experiences with PWD contracts, as external financiers do not play a role in those contracts involving repair and maintenance works. What could be interesting however, is contrasting assumptions made by actors from across the organization with statements made by authorities from either side of the post of an executive engineer and observe their reaction. Actors who are forced to re-assess the situation, and thereby possibly driven outside their comfort zone, may uncover valuable insights which transcend the surface

and could lead to new clues. However, during the case studies this only occurred on a rare basis since this is not CSI: Miami, and because experienced people are hard to drive out of their comfort zone when it concerns their topic of expertise.

Corresponding to the multi-actor approach, I want to at least interview people involved in all groups thereby avoiding a one-sided picture. Most involved actors in the process (executive engineers) have fairly straight forward roles and it is safe to assume that they have bundled interests within their organization. The parties will mainly be asked about their preferences and experiences with the tender process, the contractual arrangements and other responsibilities up to the signing of the contract.

Furthermore, the requiring body plays a substantial part in the initial stage of the project in stating their demands for repair and maintenance works. However, as their role is limited to the stating of demands, once the estimates based on the requiring body's demands are being prepared by the PWD officers, the requiring body has little role to play in the official process as it has been earlier mentioned is section 1.2. Hence, during this thesis it is thought not vital to take interviews of requiring body or the client.

In short, this comes down on the following categories of interviewees;

a) Officers above the post of executive engineers e.g. superintendent engineers
b) Officers of the post executive engineers
c) Officers below the post of executive engineers e.g. sub-divisional engineers and sub-assistant engineers

Experience with multiple projects and contracts were an additional requirement when selecting people, since they are able to draw from a larger experience.

2.1.3 Final selection of Interviewees

Of course it is easier to draw up with a list of all the people one wants to talk to, but actually arranging a (pro bono) interview is a step further, depending on goodwill and

connections. Conveniently, my colleagues of PWD were very accommodating in giving interviews. At times, it was much easier and comfortable to approach an interviewee as an executive engineer of PWD rather as a student due to potential commercial conflicts of interest which may negatively impact the amount of valuable information the interviewee was willing to convey.

The final list of interviewees is presented below, in chronological order:
1) Superintendent Engineers, 3 (three),
2) Executive Engineers, 12 (twelve)
3) Sub-divisional Engineers, 3 (three) and
4) Sub-assistant Engineers, 2 (two).

The chronological order was determined as much as possible in a manner which would allow me to first acquire a complete multi-actor picture of all the motivations, perceptions and experiences with PWD contracts forming the basis for section 3.3, and later pursue the leads for my chapter 4, regarding the impact of the decision process, and use of instruments, on the eventual contracting decision. This explains why the second group of 12 interviewees (executive engineers) all fall under one category. Even though this selection strategy helped significantly, the planning of a few interviewees from higher posts (first group of 3 superintendent engineers) were more to confirm and refine my most important findings, a process called triangulation.

2.1.4 Interviews & preparation :

In contrast to the more trivial techniques of academic data collection and quantitative data analysis which will speak for itself in chapter 4 and chapter 5, the soft methodology of interviewing demands a more witty approach. Investigators should not only be able to ask good questions and interpret the answers, but should also be a good listener and therefore open-minded, he should be adaptive and flexible to new encounters and opportunities, have a firm grasp of the issues being studied and be as unbiased as possible

by preconceived notions. From these duties, asking good questions and having a firm grasp of the case are perhaps the easiest to prepare. The first few interview rounds were primarily aimed at better understanding the various actions and time frames within which those actions are taken towards the execution of a PWD repair and maintenance work contract from their experiences. I, therefore, outlined a framework to the interviewee in which I thought my answer would be and also allowed him to take side-steps in his argumentation or description of his experiences, to which I could then anticipate in case interesting notions came along (for example, the introduction of e-tendering) which could help drawing the complete picture of this thesis. These kinds of questions are known as Level 1 questions, which have an open-ended character, contrasting with Level 2 question which are meant to follow a specific line of inquiry.

2.2 Framework of the Questionnaire :

A questionnaire was prepared for the purpose of interviewing the officers of PWD. It should be noted that as the questionnaire required filling up of several blank spaces, most of the interviewees opted in giving their answers, suggestions and decisions in a verbal form which were duly noted down by me in the corresponding spaces.

The questionnaire concentrated in three areas; firstly, the general questions, secondly, leading questions to follow a specific line of inquiry in line with the objective of the research and thirdly, open ended questions which provided a window to the interviewees to put forward their valuable opinions which may or may not be useful for the purpose of thesis directly. These can be shown in the following table;

Table : 2.1

Type of Questions		
General Questions	Leading Questions	Open Ended Questions
1. Name of the department 2. Present place of Posting 3. Date of present posting	1. Yearly expenditure in repair and maintenance works (in Taka) 2. Number of repair and maintenance estimates in a year 3. Average cost foreseen in an estimate (in Taka) 4. Average number of days required to prepare an estimate after the requisition from requiring body / higher authority 5. Average number of days required to get an estimate approved after the preparation of the estimate 6. Average number of days required to invite tender after the approval of the estimate 7. Average number of days required to approve the successful bid by the higher authority 8. Average number of days required to sign the contract with the successful bidder	1. Please suggest the average number of days that can be saved if ***e-tendering*** is used; 2. Any other suggestions regarding the possible ways of cost reduction in the tendering process

As pointed out in section 2.1.1 these research questions have been revised and necessary additions were done to the questionnaire in order to match the requirements of the thesis as presented in annexure A.

2.3 Interpretation and validation: Triangulation :

The initial task of this case study is trying to understand the case, which are both important for me, the supervisor and for the reader. After developing the framework of PWD contracts in section 3.3, it is necessary to sift through evidence in order to identify fruitful clues which could lead to more valuable and skin-deep findings. In reality, certain possible clues had already been defined prior to carrying out the first interview, based on the governmental documents and in-house discussions with my colleagues (executive engineers of PWD) about the topic.

Triangulation is a powerful technique that facilitates validation of data through cross verification from more than two sources. In particular, it refers to the application and combination of several research methodologies in the study of the same phenomenon.

- It can be employed in both quantitative (validation) and qualitative (inquiry) studies.
- It is a method-appropriate strategy of founding the credibility of qualitative analyses.
- It becomes an alternative to traditional criteria like reliability and validity.
- It is the preferred line in the social sciences.

By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single method, single-observer and single-theory studies.

The purpose of triangulation in qualitative research is to increase the credibility and validity of the results. Several scholars have aimed to define triangulation throughout the years.

- Cohen and Manion (1986) define triangulation as an "attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint."
- Altrichter et al. (2008) contend that triangulation "gives a more detailed and balanced picture of the situation."
- According to O'Donoghue and Punch (2003), triangulation is a "method of cross-checking data from multiple sources to search for regularities in the research data."

In this thesis, the approach is similar. One observation does not tell us whether something is true, whereas multiple observations provide grounds for reinterpretation or confirmation (Stake, 1995). The protocol used in this thesis is methodological triangulation, basically entailing the use of different kinds of methodologies to arrive at a valid interpretation or generalization:

- Multiple observations from theory where possible
- The interviews
- Reflection with supervisor
- Quantitative data analysis

These methods can also be used as triangulation protocols on their own, as multiple observations within the same method could also provide proper base for triangulation.

2.4 Conclusion :

Based on the design of the research as described in the previous sections of this chapter, this thesis work is carried out and the data and associated findings are analyzed to arrive at a justifiable conclusion regarding the answers to the research questions.

Chapter Three

LITERATURE REVIEW

3.1 What is Procurement? :

Procurement is a process that covers a range of activities starting from the identification of a business need for works, goods or services through to the end of any supply or contract that may result. Procurement is often confused with the term 'purchasing' that simply refers to one step in a much bigger process.

3.2 Procurement Policy :

PWD is the Government's biggest construction agency. One of major areas of PWD's involvement in Government construction works is regular repair and maintenance works of Government buildings. The expenditure, as stated earlier, involved in this sector amounts to around 280 to 300 crore taka yearly.

The general procurement policy of PWD is guided in their procurement of works, goods and services by the following principles;

- Sustainable business practice
- Best value for money over whole of life
- Open and effective market competition
- Full and fair opportunity for domestic suppliers and contractors
- Introducing electronic business capabilities, including e-tendering
- Demonstrate compliance with good practice and government guidelines

3.3 Procurement Process Overview :

The procurement process of PWD consists of five key phases;

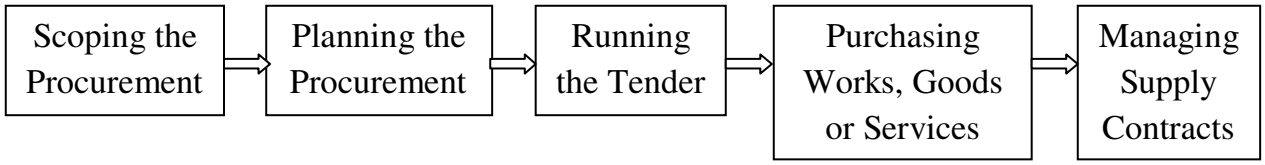


Figure 3.1 : Procurement Process

It is not necessary for all procurements to pass through all five phases. Based on the business requirements, supply, risks, costs and other considerations; which can be understood through the application of Kraljic's Matrix model; important decisions are made during the scoping and planning phases that determine the remaining phases of the process. For example, after scoping the procurement, it may be appropriate to;

- Simply procure the works, goods or services from an existing preferred supplier; or
- Purchase the works, goods or services using a selective procurement process; or
- Plan the procurement and determine that seeking quotations from several suppliers is the best approach; or
- Plan the procurement and determine that running a tender is required.

The diagram in the following page illustrates this and shows some of the key actions within each phase;

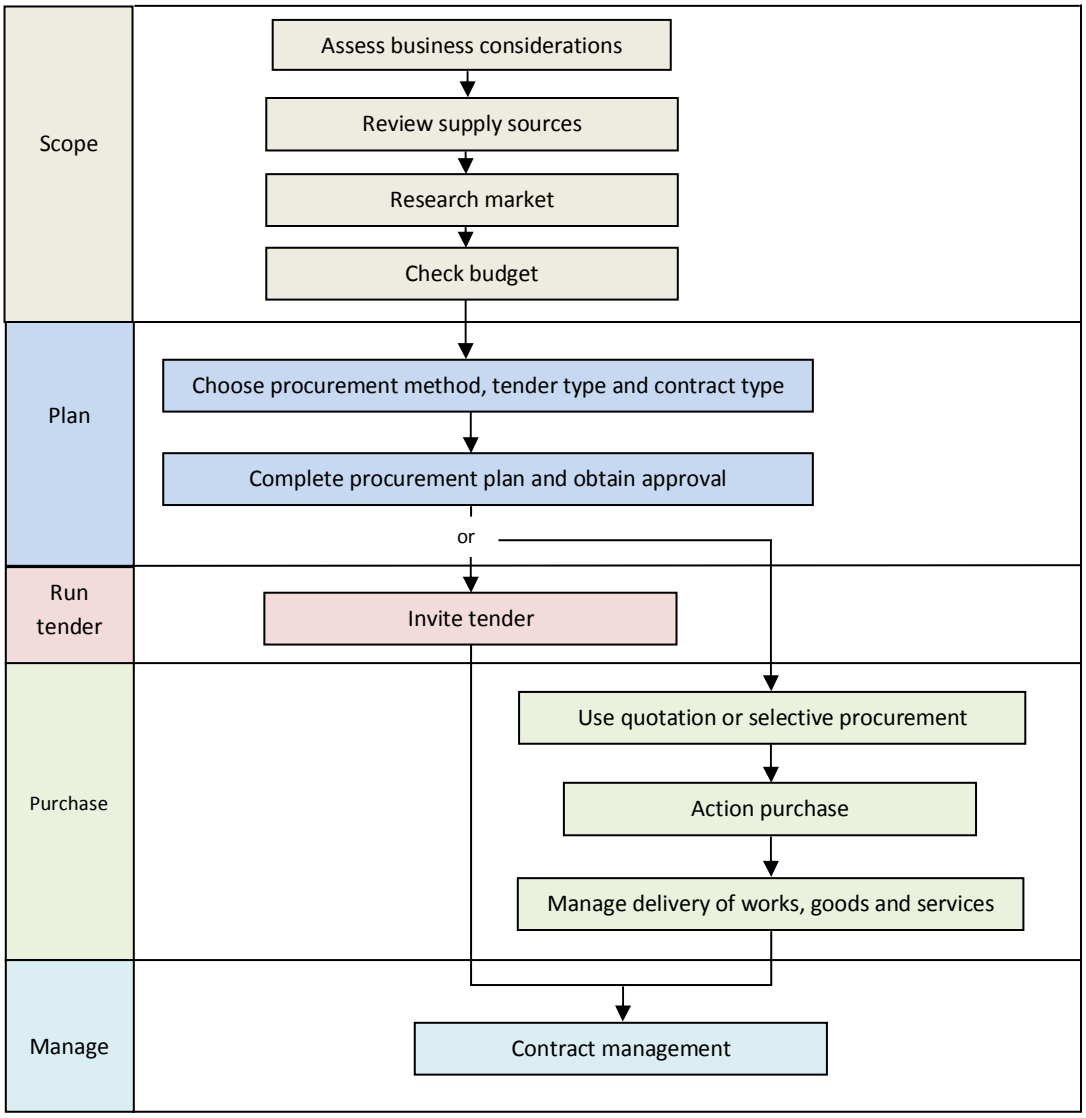


Figure 3.2 : Key Actions within Procurement Process

Based on Wellington City Council (2010)

3.4 Concept of Value for Money :

3.4.1 What is Value for Money (VFM) ?

The prime objective of the Government's and hence PWD's procurement policy is to achieve value for money (VFM) – the optimum combination of whole life cost and quality to meet the customer's requirement. Quality may relate to a number of relevant factors including functionality, durability, aesthetic appropriateness to surroundings, long-term adaptability and maintenance, environmental implications and ability of consultants and contractors to innovate, improve buildability and work as a team.

3.4.2 Why is it important and how is the process monitored ?

Every opportunity to achieve VFM should be evaluated properly and informed decisions taken. In this way, management can have confidence in answering any subsequent questions on the entire decision making process and provide full justification for the decisions taken.

When internal or external audit carry out reviews of works projects, it can be expected that consideration will be given to how resources have been used, what influenced the decisions that were taken, whether the best advice available was obtained and implemented, whether risks were managed properly and whether informed judgments were made.

3.4.3 Is lowest always best ?

VFM does not necessarily mean accepting the lowest bid as quality, as well as price, must be considered when appointing consultants and contractors. Innovation should not be stifled through rigid adherence to mechanistic procedures, although accountability for public funds remains extremely important and should not be compromised.

The Government and certain other public sector organizations including PWD must comply with the procurement rules as implemented by the Public Procurement Act 2006 and Public Procurement Regulations 2008 and the amendments. They are entirely consistent with the policy objective of achieving VFM.

3.4.4 How is VFM achieved ?

The greatest opportunity for achieving VFM occurs at project inception. Correct project definition is essential to meet the users' needs while achieving VFM. Project definition and subsequent planning should not be constrained by preconceived ideas.

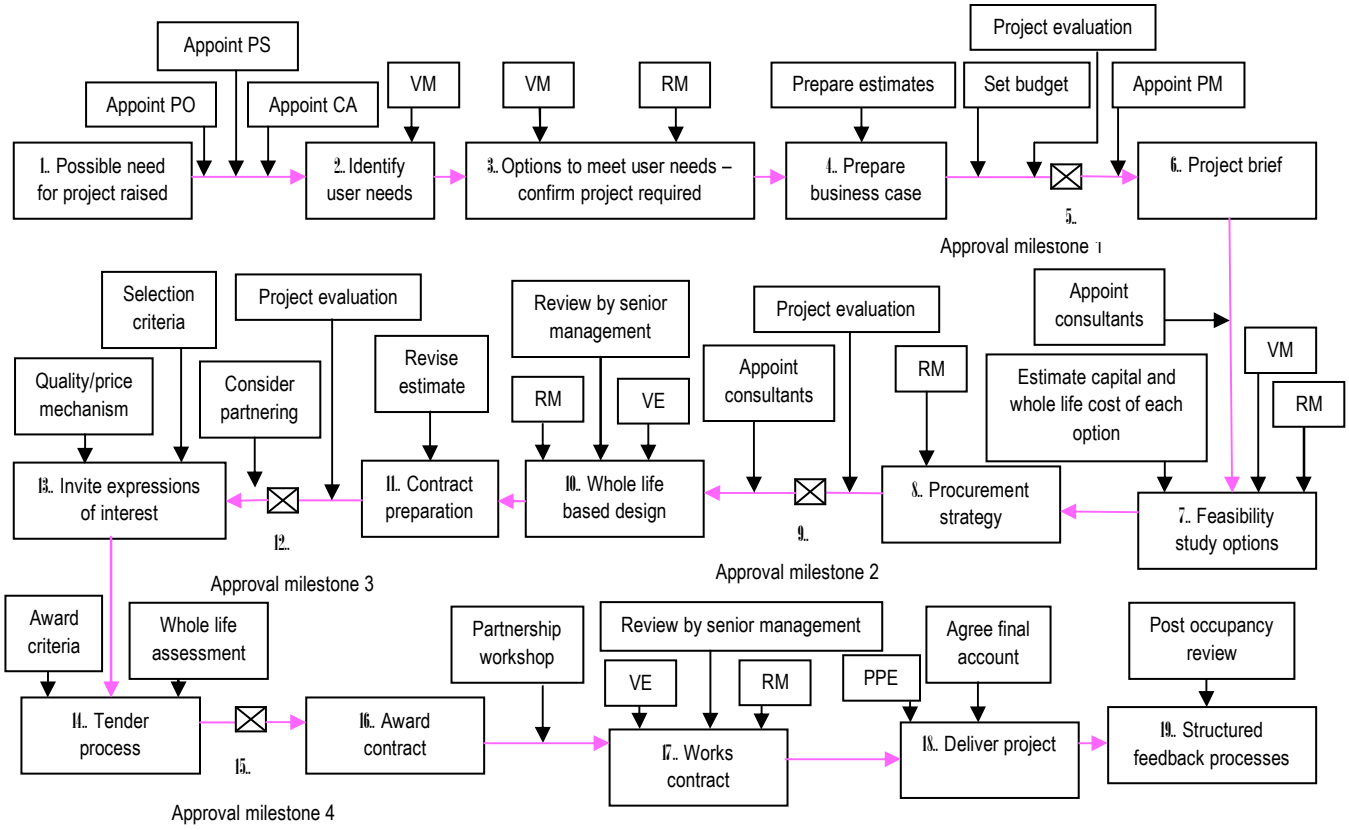
To plan and manage a project from inception to completion, the VFM process as described in Section 3.4.5 incorporates a series of management tools that provide a model structured approach. This model ensures that projects provide VFM by:

- defining the project carefully to meet the user needs and ensuring that sufficient time and resources are allowed to fully pre-plan the project execution
- fully assessing and managing the risks involved with different procurement routes and, where necessary, making recommendations to the responsible authority
- integrating value, risk and cost management techniques within project management processes
- adopting a change control procedure
- taking account of whole life costing and long term sustainability issues including the need to maintain, repair, replace and dispose responsibly of components
- avoiding waste and conflict through team working and partnering, seeking opportunities wherever possible to integrate design and construction
- appointing consultants and contractors on the basis of VFM rather than lowest initial price

3.4.5 VFM process :

The VFM process, described in the 'traditional' model here (containing consecutive design and construction stages), contains a number of approval milestones at which reviews must be undertaken. The process can be modified to suit the needs of individual users, specific projects, type of projects (development projects or repair & maintenance works) and procurement strategies, resulting in reviews being undertaken and/or appointments being made at slightly different times from those in the model. The acronyms are explained in the notes that follow the diagram.

Figure 3.3 : Value For Money Process



Based on The Scottish Government Publications (2005)

Table – 3.1 : Notes for Value For Money Process

NOTES FOR VFM PROCESS	KEY: IDM=Investment decision maker, PO=Project owner, PS=Project sponsor, CA=Client adviser, PM=Project manager, VM=Value management, RM=Risk management, VE=Value engineering, PPE=Post project evaluation, D&B=Design & build, RP=Review Panel.

NO.	ACTIVITY	DESCRIPTION	ACTION
1	Possible need for project raised	Possible need for project first brought to attention of the IDM	
	Appoint project owner	A senior officer in the business unit that requires the project, appointed by and reporting to IDM	IDM
	Appoint project sponsor	Having background in the culture and business of the client department. Terms of appointment agreed	PO
	Appoint client adviser	A construction professional, if required, to assist non-technical PS	PS
2	Identify user needs	Carry out a VM study to identify stakeholder needs, both short and long term. Set objectives and agree priority.	PS/CA
3	Options to meet user needs – confirm project required	Carry out a VM study to identify and evaluate options to meet user needs. Such options may include privately financed projects using non-profit distributing model and other, non-project, options. RM to identify risks with each option. Confirm that a project is required.	PS/ CA

4	Prepare business case	Set out user needs. Describe outline of project and alternative options to meet them (including the "do nothing" option). For each option set out base estimate, risks and total allowances for identified risks. Identify life cycle and whole life costs of each.	PS/ CA
	Set budget	Using base estimate and risk allowance for the project, with projected outturn cost.	PS/ CA
	Project evaluation	Ensure objectives reflect user needs, risks identified and reflected in estimate. Ensure project affordable.	PS/ CA
5	Approval gateway 1	Investment appraisal followed by financial, technical and delivery systems. If appropriate, give approval for project to proceed.	IDM/ PO/ PS/ CA/ RP
	Appoint project manager	Assist PS. Prepare project execution plan, including establishment of control procedures and reporting procedures.	PS
6	Project brief	PS to develop project brief. PM to deliver consultants' briefs where required. Consider options and stages for appointing consultants and specialists. Consider partnering and use of incentives.	PS/ PM
	Appoint design consultants	For feasibility study.	PS/ PM
7	Feasibility study options	Apply VM to identify and evaluate options that satisfy project brief and objectives. Identify risks for each option, cost of managing them through avoidance, design or transfer. Liaise with statutory authorities. Select best option. Revise risk allowance.	PS/ PM
8	Procurement strategy	Identify risks for each (D&B, client design, management contracting, construction management). Assess alternative risk transfer	PS

		strategies. Assess suitability for partnering. Select best option.	
	Project evaluation	Review of RM, VM and VE approaches to assess contribution to meeting objectives. If necessary, request additional studies. Review project delivery management systems.	PS
9	Approval gateway 2	Review financial, technical and delivery systems. If total estimate greater than budget, reconsider the decision to invest or revise scope of project and redesign. Set new budget. Opportunity for internal audit review. If appropriate, give approval for project to proceed. If D&B go to Activity 11.	IDM/ PO/ PS/ CA/ RP
	Appoint consultants	For detailed design (traditional client designed projects). Consider partnering and use of incentives.	PS/ PM
10	Client detailed design	Using whole life concept. Carry out VE study to optimize design. Involve contractors (appointed as consultants) to assess buildability of options. Review by senior management of the parties to address major issues. Identify residual risks and continue to manage risks and risk allowance. Ensure users understand and accept design.	PO/ PS/ PM
11	Contract preparation	For traditional client designed projects provide detailed design and specification. D&B generally requires output specifications. Revise estimate. Adopt standard form of contract to transfer risks to party best able to manage them.	PS/ PM
	Project evaluation	Review of RM. Confirm contract requirements reflect user needs. Compare revised estimate against budget.	PS/ PM

12	Approval gateway 3	Review financial, technical and delivery systems. Review acceptability of retained risks. If estimate exceeds budget, revise design or revise scope of project. Assess affordability of project. Opportunity for internal audit review. Revise budget. If appropriate, give approval for project to proceed.	IDM/ PO/ PS/ CA/ RP
13	Invite expressions of interest	Consider partnering. Set selection and award quality criteria, quality/price ratio, minimum quality thresholds, quality/price mechanisms. Consider use of incentives. Prepare long list, evaluate bidders on basis of quality, select short list and agree a tender list.	PS/ PM
14	Tender process	Invitation to tender/negotiate, evaluate bids on basis of price and quality. Where whole life criteria are set, assess price on the basis of whole life costs. Decide on suitability to partner. Decide on award. Tender report.	PS/ PM
15	Approval gateway 4	Review financial, technical and delivery systems. Consider affordability including provision for spend on specified risks. Commit funds for construction. Opportunity for internal audit review. If appropriate, give approval for project to proceed.	IDM/ PO/ PS/ CA/ RP
16	Award contract	Award contract to tender offering best VFM. Agree partnering arrangements.	PS
	Partnering workshop	Arrange and facilitate initial workshop. Agree common goals, detailed criteria for sharing of benefits, dispute resolution ladder, performance criteria, partnering champions and risk managers.	PO
17	Works contract	Manage construction. Identify possible long-term savings by VE reviews and joint risk	PO/ PS/ PM

		management approach. Review by senior management of the parties to address major issues.	
18	Deliver project	Review the acceptability of completed project. Carry out PPE – compare with original project objectives. Aim to agree final account within six months of completion. Set out lessons learnt. Seek supply side comments to improve procurement.	PO
19	Feedback	Carry out a Post Occupancy Evaluation at least 12 months after occupation in order to assess suitability of project in satisfying user needs. Assess whole life design. Provide feedback for future improvements.	PO/ PS

3.4.6 How is VFM estimated ?

The VFM assessment is based on detailed project specific information from multiple stakeholders. This information is used to develop two financial models:

Model #1 Public Sector Comparator (PSC)	Model #2 Adjusted Shadow Bid (ASB)
Total estimated costs to the public sector of delivering an infrastructure project using traditional procurement processes	Total estimated costs to the public sector of delivering the same project according to the ideal specifications

The difference between the estimated total project costs under each model is the VFM.

3.5 The E-Tendering Option :

E-Tendering solutions enable the tendering process to be conducted via the Internet. This process can include the advertisement of the requirement, document production, supplier registration, electronic delivery of documents between buyer and supplier, opening ceremony, evaluation of submissions and finally the contract award and publication.

In addition to these core functions, most e-tendering software solutions provide additional support such as archiving, document management, early warning of opportunities to suppliers, and maintenance of approved and / or potential supplier lists. A logical development of e-tendering solutions is contract management functionality. Such functionality manages the complete lifecycle of the contract to improve supplier performance, and to co-ordinate the re-tendering process.

It should be noted that e-tendering is a relatively new solution and hence is not extensively used in the sector.

E-Tendering solutions enable suppliers in different geographic regions to be notified of an opportunity, to express their interest, to download bid-related documentation and then to submit their responses. The authority can observe and manage the tendering process through a web front end. They can use the solution to resolve issues and answer questions to individual and multiple groups of suppliers.

The authority can compare all submissions by copying and pasting information given in the responses into an evaluation spreadsheet, although some solutions have an automatic scoring and evaluation capability.

Most solutions can be customized to ensure conformity with a particular authority's tendering policies and procedures. They can be bespoke or off-the-shelf and hosted by the authority, or by a third party service provider (often the software vendor).

3.6 Scope of this study in relation to the VFM concept :

3.6.1 PWD and procurement policy :

The Public Works Department and its procurement policy are governed by the Public Procurement Act 2006, Public Procurement Rules 2008 and the subsequent amendments. These act and rules require PWD to strictly adhere to the necessary regulations in their procurement activities. These rules are concerned with the Government's policy on procurement and as the premier construction agency of the Government, it is mandatory for PWD to abide by these rules.

This study gives more emphasis on the existing processes under these rules and regulations rather than investigating the policies themselves. As a result, efficient execution of the existing processes during public sector tendering is examined in some detail during this study.

3.6.2 PWD's procurement and VFM process :

As detailed out earlier in section 3.4.5, the VFM concept encompasses the whole lifecycle of a project. It has been pointed out that in a traditional model of VFM there can be as many as 19 stages while executing a project. The theme of this study being ensuring value for money in public sector tendering process, the research work concentrates up to stage 16 which involves the awarding of the contract (signing the contract) to the successful bidder.

Also, it has earlier been stated in section 3.4.5 that the VFM process can be modified to suit the needs of individual users, specific projects and procurement strategies. This research work concentrated on procurement of repair and maintenance works which is the single most major routine procurement activity of PWD through the traditional and widely used tendering method. Therefore, this study does not investigate into the areas of procurement of goods and services as well as the other options of procurement such as request for quotation (RFQ) or direct procurement method (DPM) etc.

3.6.3 E-tendering and its contribution to VFM :

The use of an e-tendering solution promotes recognized procurement good practice and hence contributes to the achievement of value for money. The contribution that e-tendering can make towards achieving better value for money involves modernization of the business processes, centralized procurement, collaboration with other authorities, collaboration between departments, aggregation of demand, supplier rationalization, transparency and fairness, contract management etc.

Achieving better value for money can lead to both tangible and intangible benefits for the whole procurement system. The tangible benefit is the process efficiency which can be achieved through time savings, advertising cost savings and overhead cost savings. On the other hand the intangible benefits include management of the tendering process, increased transparency, reduced potential for disputes, supplier benefits in the form of improved communication, instant receipt etc.

It is the process efficiency that is investigated during this study. It must be mentioned that e-tendering has not yet started in PWD. Even then, while the process efficiency in terms of cost reduction due to time savings at various stages is studied, the implication of e-tendering in achieving value for money through advertising cost savings and overhead cost savings is also given certain importance as many of the interviewees suggested this.

3.7 Quantifying Benefits :

3.7.1 Key Performance Indicators (KPI) :

The benefits component of a business case should not be diluted through complexity. In addition, tracking indicators that are not relevant can skew behavior towards the measures. For this reason, the proposed Key Performance Indicators (KPI) are:

Table – 3.2 : Key Performance Indicators

Type of Benefit	KPI
Time Savings	Reduction in time spent up to contract signing
Advertising Cost Savings	Reduction in advertising costs
Overhead Cost Savings	Reduction in total overhead costs

As described above, other intangible benefits certainly exist and are important components of a business case for the use of e-tendering. The time savings give greater emphasis on the existing process whereas the advertising cost savings and overhead cost savings give greater emphasis on the use of e-tendering.

3.7.2 Time savings :

Time savings relate to the fact of possible amount of reduction in time that is usually taken under the current tendering practice up to the signing of contract. The following stages are investigated for the purpose of finding out the possible time savings;

Table – 3.3 : Description of Stages for Time Saving

Stages	Description
Stage 1	Average number of days required to prepare an estimate after the requisition from requiring body / higher authority
Stage 2	Average number of days required to get an estimate approved after the preparation of the estimate
Stage 3	Average number of days required to invite tender after the approval of the estimate
Stage 4	Average number of days required to approve the successful bid by the higher authority
Stage 5	Average number of days required to sign the contract with the successful bidder

In addition, the use of e-tendering is also explored to find out further possibilities of time reduction.

All these possible time reductions are added up to find the total amount of time savings which is then converted in to man hours and subsequently the man hours are allocated to the officials involved in the stages 1 to 5 and finally, using the existing Government salary structure, the total amount of cost reduction due to time savings is found out. The equations developed to arrive at the final conclusion are as follows;

Table : 3.4

Calculation of cost reduction due to time savings per tender	
Step	**Equation**
Step 1	Time Savings per tender = (Time reduction in stages 1 to 5 + Time reduction due to the use of e-tendering)
Step 2	Man Hours = Time savings in number of days × 8
Step 3	Allocation of man hours to the concerned officials of stages 1 to 5
Step 4	Cost reduction per tender = Allocated man hours × Hourly salary of concerned officials

The final output by step 4 gives the possible cost reduction per tender due to time savings.

3.7.3 Advertisement cost savings :

The introduction of e-tendering will reduce the advertising cost significantly for the purpose of invitation of tender. Advertising spends have been calculated as from previous annual spend across the authority and then divided by the number of tenders in that time period. Using the % reduction in advertising spend, as suggested by the interviewees, the cost reduction in advertising spend is calculated. The equations developed to arrive at the final conclusion are as follows;

Table : 3.5

Calculation of cost reduction due to advertising cost savings per tender	
Step	**Equation**
Step 1	Advertising spend per tender = (Previous annual spend ÷ Number of tenders in that time period)
Step 2	Cost reduction per tender = % Reduction in advertising spend × Advertising spend per tender

The final output by step 2 gives the possible cost reduction per tender due to advertising cost savings.

3.7.4 Overhead cost savings :

The introduction of e-tendering will also reduce the overhead cost involved in the process. There are several components of the overhead costs. These are; paper, postage, printing/copying (excluding paper) and stationery (can include envelopes, letterheads, address labels and pre-printed return envelopes). The following equations are used to calculate the spend on traditional tendering overheads and using % reduction in spend on traditional tendering overheads, as suggested by the interviewees, the cost reduction in overhead spend is calculated. The equations are shown below;

Table : 3.6

Calculation of cost reduction due to overhead cost savings per tender	
Step	**Equation**
Step 1	Spend on traditional tendering overheads per tender = (Total cost of paper per tender + Total cost of postage per tender + Total cost of printing per tender + Total cost of stationery per tender)
Step 2	Cost reduction per tender = % reduction in spend on traditional tendering overheads × Spend on traditional tendering overheads per tender

The final output by step 2 gives the possible cost reduction per tender due to overhead cost savings.

3.7.5 Overall cost savings :

After calculating the possible cost reductions through 3.7.2, 3.7.3 and 3.7.4, the total possible cost reductions per tender is arrived at by adding all those three components. This total cost reduction per tender is converted into a percentage of the average cost of an estimate or tender. The percentage of cost savings is determined from the above findings in section 5.2.5 and a holistic view about the possible reduction from the total expenditure of PWD in the repair and maintenance sector is obtained which in turn gives the answer to the research questions as presented in section 1.4.

3.8 Assumption :

During this research work, several assumptions were made which were later on tested and validated through the interviews. These assumptions were as follows;

a) PWD's working divisions are responsible for the whole of the procurement process of repair and maintenance works, even though it may so happen (and it does!) that the architects and designers are also sometimes involved.

b) The executive engineers deal with the revenue budget only throughout the year, even though they also spent some time dealing with projects from development budget through Annual Development Programme (ADP).

c) The sub-divisional engineers and the sub-assistant engineers are assumed to be fully knowledgeable about the total procurement process generally undertaken by the office of the executive engineer.

A further elaboration of the assumptions is also given in section 6.2.

3.9 Analytical Framework :

Based on the discussion of chapter two and the analytical approach of using data for quantifying the benefits as discussed above in section 3.7 an analytical framework is developed for the purpose of the research work. Each of the elements of the framework contributes to the successful presentation of the cost savings which is the main aim of this research work. The analytical framework is presented below;

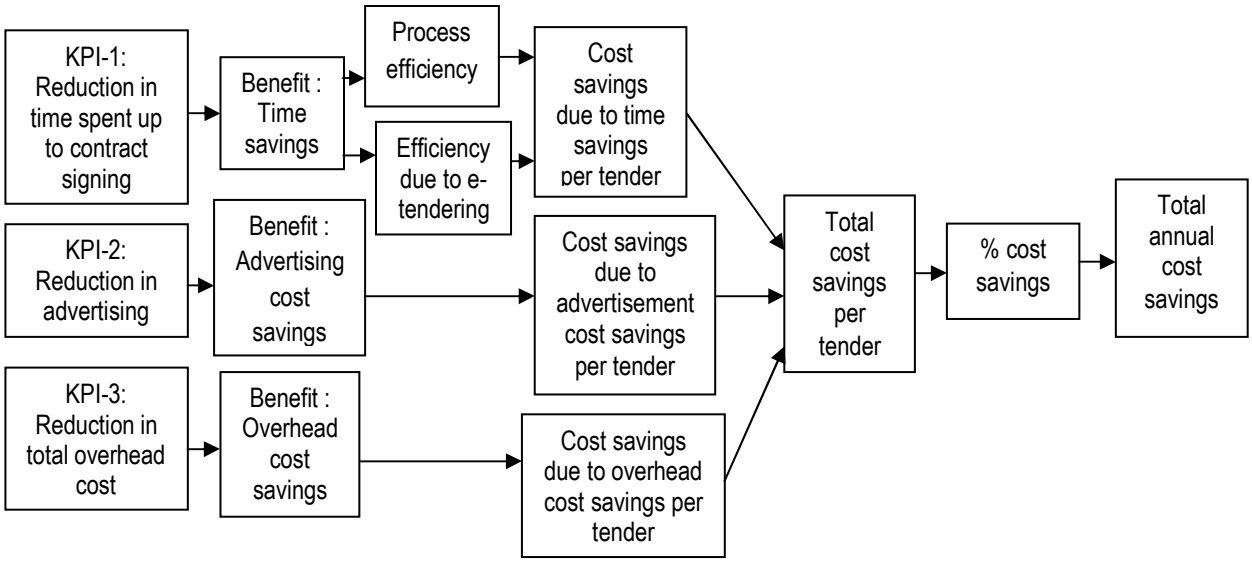


Figure 3.4 : Analytical Framework

Through the analytical framework an attempt is made to present the value for money concept by quantifying the benefits which is expected to result due to the cost savings.

3.10 Conclusion :

The analytical approach will finally give a possible guideline on the amount of cost reductions that can be made in the tendering process of PWD's repair and maintenance works.

These findings commensurate with the research question put forward in section 1.4 “Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?” Therefore, the findings are expected to fulfill the intentions of this research work.

Chapter Four

DATA PRESENTATION

4.1 Introduction :

The interviews and the documentary evidences provide the basis of the data collection related to this thesis work. The resulting data from the interviews taken are expressed in tabular forms. These tables provide a general understanding of the data sought for in those interviews. Based on these data, the final analysis is done (which is detailed in chapter 5) to find an answer to the research questions which are, "Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?"

4.2 Presentation of Data :

As described in section 2.2 and section 3.7.1, the key performance indicators (KPI) provide a basis for the preparation of the questionnaire (Annexure D), which was used to seek out the data for the purpose of this thesis.

4.2.1 Interviewees :

A total number of 20 interviewees were randomly selected for the purpose of data collection. They ranged from superintendent engineers to sub-assistant engineers as shown below;

Table : 4.1

Number of Interviewees			
Superintendent Engineers	Executive Engineers	Sub-divisional Engineers	Sub-assistant Engineers
3	12	3	2

4.2.2 General observation – E-tendering :

At the very beginning of the data collection, it was understood by me that most of the interviewees had very strong affinity towards the possible use of e-tendering as the procurement practice of PWD. In addition to increasing efficiency of the process in case of time savings, all the other savings suggested by the interviewees were greatly influenced by e-tendering. Hence, as it was earlier suggested in section 2.1.1, the research questions of section 1.4 have been further and more importantly scrutinized in view of the possible introduction of e-tendering.

4.2.3 General Information regarding estimates :

It should be noted that the basic information regarding the estimates were provided by the executive engineers as current field level officers and the superintendent engineers based on the experiences of their working days as executive engineers. The findings are as follows;

Table : 4.2

Information regarding estimates / tenders (average of 2009-2010 and 2010-2011)			
Information → Interviewee ↓	Yearly expenditure (in million Taka) in repair and maintenance works	Number of repair and maintenance estimates / tenders in a year	Average cost (in million Taka) of an estimate
S.E. 1	174.26	637	0.274
S.E. 2	108.28	253	0.428
S.E. 3	11.66	55	0.212
E.E. 1	8.65	52	0.166
E.E. 2	26.60	131	0.203
E.E. 3	11.20	61	0.184
E.E. 4	53.61	274	0.196
E.E. 5	14.30	77	0.186
E.E. 6	21.78	115	0.189

E.E. 7	36.70	164	0.224
E.E. 8	18.78	122	0.154
E.E. 9	25.81	103	0.251
E.E. 10	20.53	128	0.160
E.E. 11	26.50	127	0.209
E.E. 12	28.40	191	0.149
Average yearly expenditure	**39.1373**	**Average cost of an estimate / tender**	**0.212**

Note : S.E. = Superintendent Engineer, E.E. = Executive Engineer.

4.2.4 Information regarding time savings :

The following information are tabulated for easy understanding of the days required and the possible number of days that can be reduced during the various activities such as the preparation of the estimates, approval of estimates, invitation of tender, approval of the successful bid and signing of the contract. Engineers of all level provided their opinions in this regard; hence no segmentation is done for interviewees of different levels.

It should be noted that the days spent (DS) mentioned in the following table is the average of 20 interviewees each of who actually stated the average number of days spent for a particular stage (from 1 to 5) over 2009-2010 and 2010-2011. The possible reduction in number of days (PR) is the suggestion of the interviewees. Also, sub-divisional engineers' data are stated before the assistant engineers' as assistant engineers are posted in the office of the executive engineer.

Table: 4.3

Information regarding the process – Time Savings (average of 20 interviewees)														
Officers Involved →	SAE		SDE		AE		EE		SE		ACE		CE	
Stages ↓	DS	PR	DS	PR	DS	PR	DS	PR	DS	PR	DS	PR	DS	PR
1. Average number of days required to prepare an estimate after the requisition from requiring body / higher authority	2.88	1.00	1.23	0.50	2.54	1.00	0.69	0.2	--	--	--	--	--	--
2. Average number of days required to get an estimate approved after the preparation of the estimate	--	--	--	--	--	--	--	--	1.58	0.25	3.14	0.5	--	--
3. Average number of days required to invite tender after the approval of the estimate	--	--	--	--	--	--	1.44	0.25	--	--	--	--	--	--
4. Average number of days required to approve the successful bid by the higher authority	--	--	--	--	--	--	2.94	1.00	--	--	--	--	--	--
5. Average number of days required to sign the contract with the successful bidder	--	--	--	--	--	--	6.77	2.5	--	--	--	--	--	--

Note - 1: SAE : Sub Assistant Engineer, AE : Assistant Engineer, SDE : Sub Divisional Engineer, EE : Executive Engineer, SE : Superintendent Engineer, ACE : Additional Chief Engineer, CE : Chief Engineer.

Note - 2: DS : Days spent, PR : Possible reduction in no. of days.

4.2.5 Information regarding advertisement cost savings :

The information regarding the advertisement cost savings are provided by the executive engineers and the superintendent engineers for the same reason as mentioned in section 4.2.3 and also as the tendering process and hence the advertising expenditure is solely the activity of the office of the executive engineer. The following table presents the data collected for this purpose.

Table : 4.4

Information regarding the process – Advertisement Cost Savings (average of 2009-2010 and 2010-2011)				
Information → / Interviewee ↓	Yearly expenditure (in thousand Taka)	Number of tenders in a year	Yearly expenditure (in thousand Taka) per tender	% Reduction in advertising spend
S.E. 1	248.75	637	0.3905	50
S.E. 2	182.62	253	0.7218	75
S.E. 3	19.20	55	0.3491	60
E.E. 1	18.38	52	0.3535	70
E.E. 2	32.92	131	0.2513	80
E.E. 3	30.77	61	0.5045	75
E.E. 4	91.43	274	0.3337	70
E.E. 5	45.13	77	0.5861	60
E.E. 6	47.99	115	0.4173	80
E.E. 7	53.23	164	0.3246	70
E.E. 8	40.36	122	0.3308	75
E.E. 9	67.11	103	0.6516	75
E.E. 10	47.40	128	0.3703	70
E.E. 11	60.19	127	0.4739	80
E.E. 12	45.84	191	0.2400	75

Note : S.E. = Superintendent Engineer, E.E. = Executive Engineer.

4.2.6 Information regarding overhead cost savings :

The information regarding the overhead cost savings are provided by the officers of all levels of the interviewees as overhead expenditure is associated with all the stages. However, the information provided by the sub-divisional engineers and the sub-assistant engineers are accumulated in the information of the executive engineers for simplification. These expenditures include the cost of paper, postage, printing/copying (excluding paper) and stationery (can include envelopes, letterheads, address labels and pre-printed return envelopes) etc. The interviewees provided accumulated data regarding

expenditure on traditional tendering overheads instead of item by item such as paper, postage, printing etc. which would have been very time consuming and cumbersome. The following table provides the data;

Table : 4.5

Information regarding the process – Overhead Cost Savings (average of 2009-2010 and 2010-2011)				
Information → / Interviewee ↓	Yearly expenditure (in thousand Taka)	Number of tenders in a year	Yearly expenditure (in thousand Taka) per tender	% Reduction in overhead spend
S.E. 1	744.14	637	1.1682	70
S.E. 2	291.91	253	1.1538	80
S.E. 3	58.58	55	1.0651	80
E.E. 1	55.22	52	1.0619	75
E.E. 2	138.62	131	1.0582	80
E.E. 3	66.22	61	1.0855	80
E.E. 4	307.37	274	1.1218	75
E.E. 5	81.15	77	1.0539	75
E.E. 6	126.71	115	1.1018	75
E.E. 7	173.79	164	1.0597	80
E.E. 8	125.33	122	1.0273	75
E.E. 9	116.59	103	1.1319	80
E.E. 10	142.91	128	1.1165	80
E.E. 11	139.93	127	1.1018	75
E.E. 12	215.93	191	1.1305	80

Note : S.E. = Superintendent Engineer, E.E. = Executive Engineer.

4.3 Conclusion :

The data collected has been presented in this chapter. In the following chapter, I shall analyze the data and make an analytical presentation in line with the equations presented in section 3.7 to find answers to the research questions.

Chapter Five

ANALYSIS

5.1 Introduction :

The answers to the research questions, “Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?” are sought after in this chapter with the help of the data collected through the interviews and presented in the previous chapter.

Regarding the research question, it is quite apparent that there are three major areas which are causing unnecessary expenditure which can be avoided according to the suggestions of the interviewees.

The challenge of this thesis work is to quantify the unnecessary expenditure which can be avoided through the increasing of efficiency through less time spent in various activities of the tendering process and modernization of the tendering process through the introduction of e-tendering.

The steps presented through the analytical framework in section 3.9 are used to quantify the benefits of avoiding unnecessary expenditures.

5.2 Quantifying the Benefits :

5.2.1 General information of the interviewees :

The selection of the interviewees ranged from officers of four posts, namely, superintendent engineers, executive engineers, sub-divisional engineers and sub-assistant engineers. The major emphasis of this thesis work is concentrated on the tendering process of PWD, which is mainly the concern of the executive engineers. Hence, a major portion of the interviewees are the executive engineers. The other interviewees ranging

from superintendent engineers to sub-assistant engineers are for the purpose of triangulation as discussed in section 2.3.

The following assumptions are done in the selection of executive engineers as interviewees;

a) The executive engineers working in the field level within Dhaka as well as outside Dhaka are considered for interview.

b) A total number of 2 field level officers (one superintendent engineer and one executive engineer) within Dhaka and 13 outside Dhaka (two superintendent engineers and eleven executive engineers) have been interviewed which is an adequate representation - 15.00% - in terms of percentage of executive engineers of PWD (figure 5.1).

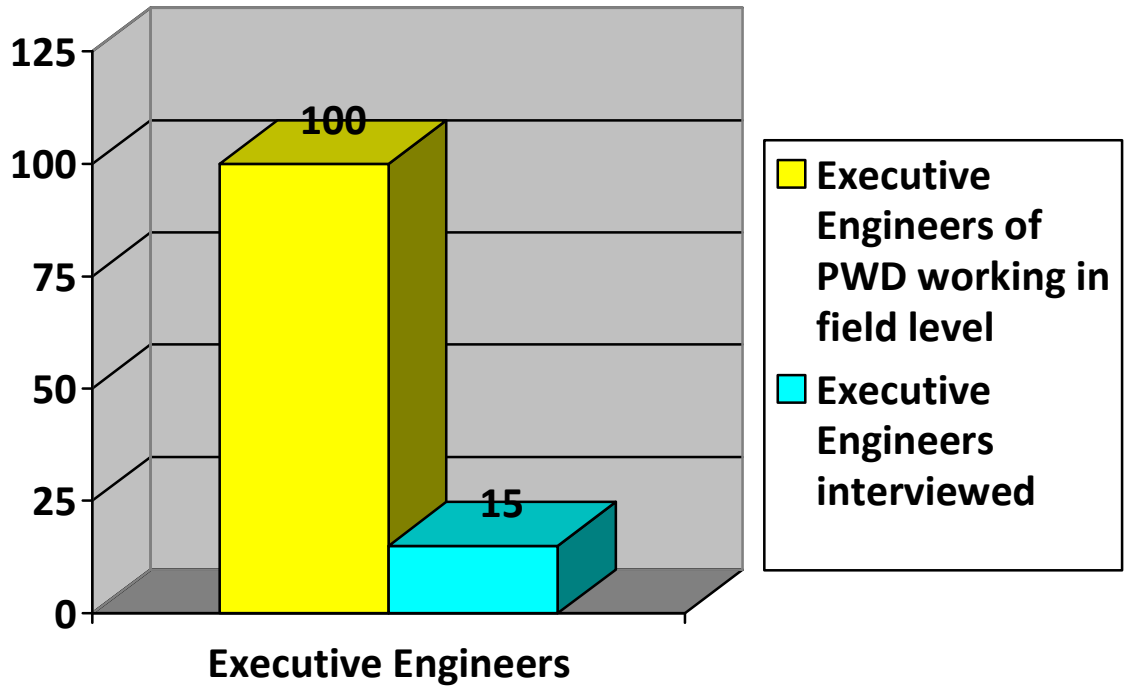


Figure 5.1 : Representation of PWD Executive Engineers

c) The total number of interviewees is 20 out of which 15 are of the post of executive engineers and above which means that 75 % of the interviewees are executive engineers and above, who are considered vital information providers for the research (figure 5.2).

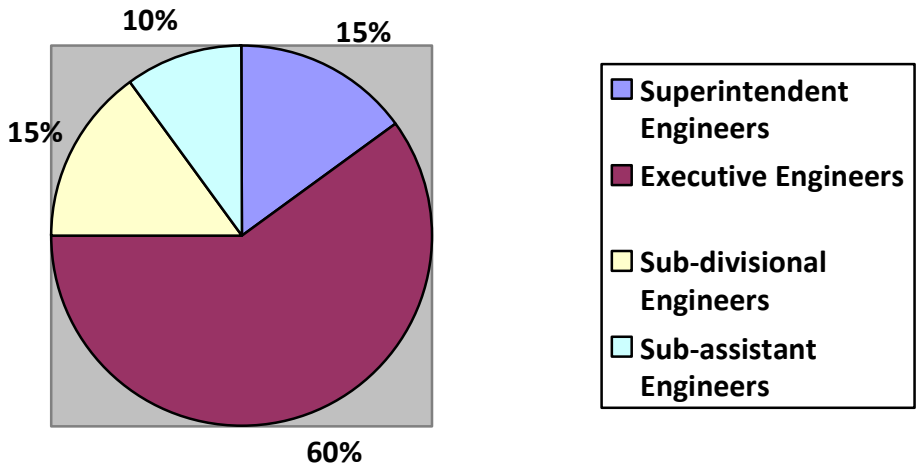


Figure 5.2 : Percentage of Executive Engineers

5.2.2 Cost savings due to time savings :

The information presented in table 4.3 has been used to analyze the cost savings that can be made due to time savings related to process efficiency including the possible use of e-tendering as suggested by the interviewees.

In table 5.1, the hourly salary of the officers involved at various stages of the tendering process is calculated on the basis of the national pay scale 2009. The monthly basic salary is used for the purpose of calculation and also, it is assumed that every officer draws salary at the initial level of the corresponding scale just to be on the conservative side. Then the monthly salary is divided by 30 to get daily salary and the quotient is divided by 8 to get the hourly salary.

Table 5.1

Hourly Salary of Officers Involved (according to national pay scale 2009)		
Officer	Monthly Salary (Taka)	Hourly Salary (Taka)
Additional Chief Engineer	29000.00	120.83
Superintendent Engineer	25750.00	107.29
Executive Engineer	22250.00	92.71
Sub-divisional Engineer	18500.00	77.08
Assistant Engineer	11000.00	45.83
Sub-assistant Engineer	6400.00	26.67

Using the hourly salary from table 5.1 and with the help of the information of table 4.3 and equation of table 3.4, the cost savings due to time savings are calculated as follows;

Table : 5.2

Cost savings per tender due to time savings				
Stages	Officer(s) involved	Time savings in hour	Hourly Salary of officer involved	Cost Savings (Taka)
1. Average number of days required to prepare an estimate after the	Executive Engineer	1.60	92.71	148.3360
	Sub-divisional Engineer	4.00	77.08	308.3200

requisition from requiring body / higher authority	Assistant Engineer	8.00	45.83	366.6400
	Sub-assistant Engineer	8.00	26.67	213.3600
2. Average number of days required to get an estimate approved after the preparation of the estimate	Additional Chief Engineer	4.00	120.83	483.3200
	Superintendent Engineer	2.00	107.29	214.5800
3. Average number of days required to invite tender after the approval of the estimate	Executive Engineer	2.00	92.71	185.4200
4. Average number of days required to approve the successful bid by the higher authority	Executive Engineer	8.00	92.71	741.6800
5. Average number of days required to execute the contract with the successful bidder	Executive Engineer	20.00	92.71	1854.2000
Total cost savings per tender due to time savings				**4515.8560**

5.2.3 Advertisement cost savings :

We now concentrate on the cost savings due to the reduction of expenditure in advertisement as suggested by the interviewees in table 4.4. With the help of the equations set up in table 3.5 and the information of table 4.4, the cost savings due to reduction in advertisement expenditure is calculated as follows;

Table : 5.3

Cost savings per tender due to reduction in advertisement expenditure		
Yearly expenditure (in thousand Taka) per tender	% Reduction in advertising spend	Cost Savings (Taka)
0.3905	50	195.2500

0.7218	75	541.3500
0.3491	60	209.4600
0.3535	70	247.4500
0.2513	80	201.0400
0.5045	75	378.3750
0.3337	70	233.5900
0.5861	60	351.6600
0.4173	80	333.8400
0.3246	70	227.2200
0.3308	75	248.1000
0.6516	75	488.7000
0.3703	70	259.2100
0.4739	80	379.1200
0.2400	75	180.0000
Average cost savings per tender due to reduction in advertisement expenditure		**298.2910**

5.2.4 Overhead cost savings :

Finally, we determine the cost savings due to possible reduction in overhead expenditure as suggested by the interviewees and presented in table 4.5. Therefore, we calculate the cost savings using the equation previously established in table 3.6 as follows;

Table : 5.4

Cost savings per tender due to reduction in overhead expenditure		
Yearly expenditure (in thousand Taka) per tender	% Reduction in overhead spend	Cost Savings (Taka)
1.1682	70	817.7400
1.1538	80	923.0400
1.0651	80	852.0800
1.0619	75	796.4250

1.0582	80	846.5600
1.0855	80	868.4000
1.1218	75	841.3500
1.0539	75	790.4250
1.1018	75	826.3500
1.0597	80	847.7600
1.0273	75	770.4750
1.1319	80	905.5200
1.1165	80	893.2000
1.1018	75	826.3500
1.1305	80	904.4000
Average cost savings per tender due to reduction in overhead expenditure		**847.3383**

5.2.5 Overall cost savings :

As previously described in section 3.7.5, the total cost savings is calculated by adding the cost savings of section 5.2.2, 5.2.3 and 5.2.4. The overall cost savings is presented in the following table.

Table : 5.5

Overall Cost Savings (in Taka) per Tender			
Cost savings due to time savings	Cost savings due to advertisement cost savings	Cost savings due to overhead cost savings	Total cost savings
4515.8560	298.2910	847.3383	**5661.4853**

In section 4.2.3 we have calculated the average cost of an estimate / tender and it came out to be of the value of Taka 0.212 million. Using this value, we calculate the percentage of cost savings and subsequently the amount of savings that can possibly be done from the repair and maintenance expenditure of PWD which is presented below;

Table : 5.6

Cost Savings (in Taka)				
Average cost of an estimate / tender	Cost savings per tender	Percentage (%) of cost savings	Average Annual expenditure of PWD in repair and maintenance works for 2009-2010 and 2010-2011	Total cost savings
212,000.00	5661.4853	2.67	2,606,494,500.00	**69,593,403.15**

5.3 General Interpretation of the Results :

By following the steps of the analytical framework of section 3.9, the final result comes out to be a 2.67 % of possible cost reduction in the tendering process up to the execution of contract. This eventually results in a possible savings of Tk. 69,593,403.15 per year from the expenditure of repair and maintenance works undertaken by PWD. We have previously found out that average yearly expenditure in a district for repair and maintenance works is Tk. 39.1373 million. Simply put, these findings in terms of savings indicate a possible budget allocation of repair and maintenance works in about 2 districts. However, this savings will increase when the whole PWD repair and maintenance budget is considered according to the following table;

Table 5.7

Average Repair and Maintenance Budget (Taka) per Working Division per year			
Total Working Divisions of PWD	Year	Repair and Maintenance Budget (Taka)	Average Repair and Maintenance Budget (Taka) per Working Division per year
100	2009-2010	2,453,510,000.00	24,535,100.00
100	2010-2011	2,759,479,000.00	27,594,790.00

Now, using the same percentage of cost savings of 2.67%, which amounts to Tk. 69,593,403.15 per year, a total of about 3 districts' repair and maintenance budget can be allocated with the savings.

From another point of view, if we consider the number of districts (2 to 3) whose repair and maintenance works can be carried out with the savings in terms of the total districts (64) of the country then we can find out that 3.125 % to 4.6875 % of the districts repair and maintenance works can be done with the savings.

Again, the number of districts whose repair and maintenance works can be done with these savings will significantly increase if we consider the districts outside Dhaka where the budget for repair and maintenance works is considerably smaller (which can be seen as presented in table 4.2) than the average value of Tk. 39.1373 million.

5.4 Benefits of the findings and their importance to Public Sector with special reference to PWD :

We have tried to find the answers to the research questions as presented in section 1.4 through our endeavors in chapter 4 and chapter 5. The research questions were, "Which areas of the tendering process are causing unnecessary expenditure? Can these expenditures be avoided so that value for money can be achieved in public sector tendering process?"

For the first part of research question, now it can be easily understood that there are areas which do make some unwanted contributions to the escalation of expenditure during the tendering process. Amongst them, the areas that have come up during this research work are mainly the preparation and approval of the estimates, the invitation and approval of the tenders and the signing of contract with the successful bidders. In other words, the thesis emphasized on the process efficiency.

Subsequently, the issue of e-tendering came up inevitably. As the process efficiency has been investigated many of the interviewees were of the opinion is that e-tendering is a must to achieve process efficiency.

In the case of the second part of the research question, the analytical findings suggest that there is a possibility of avoiding such expenditures and thereby ensuring that value for money can achieved more justifiably. To reemphasize the findings, a possible reduction by 2.67 % is achievable which amounts to a possible savings of Tk. 69,593,403.15 per year from the expenditure of repair and maintenance works undertaken by PWD. The amount in itself may not be substantial when considered in isolation but when analysed from the viewpoint that repair and maintenance works in about 2 to 3 districts within the whole of Bangladesh can be done with that amount with the number of districts likely to increase if the savings are used for smaller districts outside Dhaka and other major districts where the fund required is relatively smaller, it is quite extra ordinary. This is certainly amazing to find that such a little amount of savings can ensure such value for money.

Chapter Six

SUMMARY AND CONCLUSION

6.1 Introduction :

Bangladesh is a third world country. The economy of the country is not very strong. A major portion of the national budget is allocated for the infrastructure development. As the country is trying to establish its economy to a sustainable level, importance is also needed to be given to the repair and maintenance works of those infrastructures.

Public Works Department is the premier construction agency of the Government. Therefore, PWD is entrusted not only with major development works but also their repair and maintenance works. While the constructions of major infrastructures are of big budget, their repair and maintenance works, even though are not of the same scale in terms of financial involvement, are no less important. This is due to the fact that after the completion of the construction, regular repair and maintenance is required to ensure the full workable life and functionality of the infrastructure.

6.2 Limitations and Assumptions :

During this research work several limitations were faced which ensures that there are scopes of further study in this field especially with particular attention to PWD. The limitations and assumptions that were made during the research are mainly as follows;

a) Prior to the start of this research, it was expected that a comparison of research areas of similar departments, preferably with Local Government Engineering Department (LGED) would be undertaken but unfortunately the time barrier did not permit such an investigation as for that the time would go beyond the allowable limit.

b) For the purpose of collection of general data with regard to estimates / tenders, an average of the last two years (2009-2010 and 2010-2011) was taken. But, it could have been done separately for each different years in which case any change in the final amount of cost savings over the two years could also have been investigated (ref. section 4.2.3).

c) As previously mentioned in section 5.2.1 the data were collected from field offices of PWD. The information provided by the interviewees were later on triangulated by the official documents. One notable exemption is the omission of electrical and mechanical divisions of PWD as the researcher is a civil engineer.

d) Initially, it was assumed that the purpose of the research will be served by investigating only time savings but later on questions regarding advertisement and overhead cost savings were also added in the questionnaire as the interviewees suggested the introduction of e-tendering in PWD for the purpose of ensuring value for money. This also greatly influenced the opinions of the interviewees.

e) Many areas of unnecessary expenditure could have been investigated as there are many stages in the VFM process as can be seen in section 3.4.5 but only limited number of areas was given attention.

f) It was also assumed that one estimate results in one individual tender (ref. section 4.2.3), which in fact is the usual case in PWD.

g) Finally, it was assumed that for the purpose of confidentiality, disclosure of names of the interviewees has not been allowed by the interviewees.

6.3 Scope of Future Studies :

This type of research work has not been previously undertaken in any Government departments in Bangladesh and definitely not in PWD. Studies of this nature have been

conducted abroad but which mainly gave emphasis on the private sector. As a result, there are many scope of further future studies to fine tune the findings of this research as well as open new areas of study;

a) A comparison between different Government departments who does similar nature of works may be done.
b) Year wise study could be done to measure the differences between the findings of the different years.
c) A more holistic approach could be undertaken by incorporating all the process of a repair and maintenance work starting from preparation of estimates to handover of the project.
d) A similar study could be done on development projects.
e) Only traditional tendering method of procurement of works has been studied. Direct procurement or procurement through quotation has not been investigated.

6.4 Final Words :

Through this research work, it has been tried to establish the particular areas of unnecessary expenditure that occurs during the tendering process of repair and maintenance works of PWD. Also, by an analytical presentation it has been made easy for everyone to understand the possible amount of cost savings that can be made which eventually will go a long way in ensuring justifiable value for money for public sector tendering process.

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Annexure A

Questionnaire

Topic of Dissertation : "Adding Value by Cost Reduction in Public Sector Tendering Process"

Name : Engr. Mir Zahid Hasan MCIPS, Executive Engineer, Public Works Department

1. General:

1.1 Name of the department:

1.2 Present place of Posting:

1.3 Date of present posting:

---

2. Information regarding estimates:

2.1 Yearly expenditure in repair and maintenance works (in Taka):

2.2 Number of repair and maintenance estimates in a year:

2.3 Average cost foreseen in an estimate (in Taka):

2.4 Average number of days required to prepare an estimate after the requisition from requiring body / higher authority:

Officers involved	Days required	Possible reduction in no. of days
a) SAE	----------	----------
b) AE	----------	----------
c) SDE	----------	----------
d) XEN	----------	----------
e) SE	----------	----------
f) ACE	----------	----------
g) CE	----------	----------

2.5 Average number of days required to get an estimate approved after the preparation of the estimate:

Officers involved	Days required	Possible reduction in no. of days
a) SAE	----------	----------
b) AE	----------	----------
c) SDE	----------	----------
d) XEN	----------	----------
e) SE	----------	----------
f) ACE	----------	----------
g) CE	----------	----------

2.6 Average number of days required to invite tender after the approval of the estimate:

Officers involved	Days required	Possible reduction in no. of days
a) SAE	----------	----------
b) AE	----------	----------
c) SDE	----------	----------
d) XEN	----------	----------
e) SE	----------	----------
f) ACE	----------	----------
g) CE	----------	----------

2.7 Average number of days required to approve the successful bid by the higher authority:

Officers involved	Days required	Possible reduction in no. of days
a) SAE	----------	----------
b) AE	----------	----------
c) SDE	----------	----------
d) XEN	----------	----------
e) SE	----------	----------
f) ACE	----------	----------
g) CE	----------	----------

2.8 Average number of days required to execute the contract with the successful bidder:

Officers involved	Days required	Possible reduction in no. of days
a) SAE	----------	----------
b) AE/TE	----------	----------
c) SDE/SrAE	----------	----------
d) XEN	----------	----------
e) SE	----------	----------
f) ACE	----------	----------
g) CE	----------	----------

3. Please suggest the average number of days that can be saved in addition to the above in stages 2.6, 2.7 and 2.8 if ***e-tendering*** is used;

Stage 2.6 _____ days, Stage 2.7 _____ days and Stage 2.8 _____ days

4. Yearly expenditure in advertisement (in Taka) related to tendering;

……

5. Yearly expenditure in overhead (in Taka) related to tendering;

……

6. Any more suggestions regarding the possible ways of cost reduction in the tendering process;

Thank you for your kind cooperation.

N.B. 1. SAE : Sub Assistant Engineer, AE : Assistant Engineer, SDE : Sub Divisional Engineer, XEN : Executive Engineer, SE : Superintendent Engineer, ACE : Additional Chief Engineer, CE : Chief Engineer.

N.B. 2. In steps 2.4 to 2.8, the number of days required and the possible reduction in number of days are to be provided for individual officers involved in that stage.