Challenges and Prospects of e-Procurement in Bangladesh: A Study on Roads and Highways Department

A Dissertation

By

Md Zaiful Islam Akando

MAGD-6, ID-14272015

MA in Governance and Development

Submitted to

BRAC Institute of Governance and Development

BRAC University, Dhaka, Bangladesh

In partial fulfillment of the requirement for the degree of Masters of Arts in Governance and Development (MAGD)

BRAC Institute of Governance and Development

BRAC University, Dhaka, Bangladesh

February, 2016

Table of Contents

List of Abbreviations

APP	Annual Procurement Plan
BPR	Business Process Reengineering
C&B	Construction and Building
GOB	Government of Bangladesh
CPTU	Central Procurement Technical Unit
DP	Development Partner
e-CMS	Electronic Contract Management System
e-GP	Electronic Government Procurement
EU	European Union
FGD	Focus Group Discussion
ICT	Information and Communication Technology
IT	Information Technology
IMED	Implementation Monitoring and Evaluation Division
KPI	Key Performance Indicators
KII	Key Informant Interview
NOA	Notification of Award
OMME	Operation Maintenance and Management Entity
PAs	Procuring Agencies
PEs	Procuring Entities
PPA	Public Procurement Act
PPR	Public Procurement Rule
POC	Proposal Opening Committee
PROMIS	Procurement Management Information System
RFP	Request for Proposal
RHD	Roads and Highways Department
SPSS	Statistical Package for the Social Sciences
SSL	Secure Sockets Layer
TEC	Tender Evaluation Committee
TOC	Tender Opening Committee
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
WB	World Bank

List of Tables

List of Figures

DECLARATION

I do hereby declare that this dissertation entitled "Challenges and Prospects of e-Procurement in Bangladesh: A Study on Roads and Highways Department." is the output of my own research, under the supervision of SM Sanaul Hoque, PhD, Joint Secretary, Government of Bangladesh. The whole dissertation is prepared for academic pursuit and solely aimed for the partial fulfillment for the degree of Masters of Arts in Governance and Development. I authorize BRAC Institute of Governance and Development (BIGD), BRAC University to reproduce this dissertation by photocopy or by other means, in total or in part, at the request of other institutions or individuals for the purposes of research. I further declare that this paper has not been submitted in part or in full previously for any degree or diploma either in this university or any other university.

Md Zaiful Islam Akando
MAGD-6, ID-14272015
MA in Governance and Development
BRAC Institute of Governance and Development
BRAC University
February, 2016

CERTIFICATE

I hereby recommend and certify that this dissertation entitled **"CHALLENGES AND PROSPECTS OF E-PROCUREMENT IN BANGLADESH: A STUDY ON ROADS AND HIGHWAYS DEPARTMENT."** is a research work conducted by **Md Zaiful Islam Akando,** MAGD-6, ID-14272015 under my supervision for partial fulfillment of the requirements for the Degree of MA in Governance and Development, in BRAC Institute of Governance and Development (BIGD), BRAC University, Dhaka, Bangladesh.

SM Sanaul Hoque, PhD
Joint Secretary, Government of Bangladesh.
E-mail: sanaulhq@yahoo.com

Acknowledgements

Abstract

Purpose –The paper seeks to pursue the understanding of challenges and prospects of e-GP in Bangladesh.

Methodology– The officers from procuring entity were asked to respond to a survey questionnaire. SPSS software was used to analyze data received from 50 respondents. Thirteen officers from Roads and Highways Department were interviewed to collect qualitative data. Focus group discussion was done with 10(Ten) bidders in order to identify prospects and challenges of e-GP.

Findings

Transparency: "Secrecy of bidder's information" and "Openness of information regarding procurement" has ensured after introducing e-Procurement.

Good governance: Tender box snatching problem has solved by e-GP. Collusion among the bidders has reduced significantly after introducing e-GP. e-Procurement system has ensured to increase competition among the bidders.

Efficiency: e-Procurement process is faster and easier than manual tender.

Process improvement: e-Procurement increases availability of tender notice and necessary tender documents through online and thus it make sure the procurement process to be improved.

Cost and time savings: Total Cost in e-GP system has reduced 77.35% as compared to manual tender. Total time in e-GP system has reduced 49.46% as compared to manual tender.

Technological challenges: Internet speed, Uninterrupted access to e-GP server and Internet connectivity are technological challenges for proper implementation of e-Procurement.

Administrative challenges: Computer knowledge of bidders and Training of contractors about e-GP are administrative challenges for proper implementation of e-Procurement. Bidders do not have adequate logistic support. It is difficult for bidders to buy computer, scanner, printer etc.

Challenges of awareness: Awareness about e-Procurement is below "satisfactory" level.

Challenges of security: Protection against computer virus and maintenance capability of e-GP system is below "satisfactory" level.

Research limitations- Due to time and budget constraint, this study has not covered all the offices of RHD. This study has completed survey randomly in some offices of RHD in different district of Bangladesh.

Practical implications– e-Procurement is a very important initiative with significant cost and time savings potential for Bangladesh. This study's findings can guide quick implementation of e-Procurement in Bangladesh.

Chapter 1
Introduction

1.1 Background:

The PPR 2008 is a complete document for public procurement that provides scope for procurement under different methods, as per the necessity and situation, with permission from the appropriate authority. The time has been speeding up. Advanced technology is the core requirement of modern world. In this age of technology, it is now globally recognized that the right use of technology can reduce time and costs, thus deliver better services to citizen, particularly by the government. Bangladesh cannot stay behind and the government has promised on easy and quick delivery of public services. For building a "Digital Bangladesh" by 2021, Government of Bangladesh has introduced e-Tendering, e-Contract management and these are part of electronic Government Procurement (e-GP). Most of the time businessman are facing problem by cadder who are showing the force to get the work from different projects though they don't have any experience. If e-Procurement systems have been introduced, fair businessman will participate in the tender. The tenderer also get original vendor to purchase the things. So, Government should take some steps to implement e-Procurement fully because of to save time and cost, enhance competition, ensure transparency and remove corruption in procuring goods, works and services.

1.2 Significance of the Research:

The objective of establishing e-government is to introduce a Digital Bangladesh. For better governance there should be electronic operation to save time, reduce hassles and ensure transparency through widening access to public information. As part of that process, the government has initiated a process to introduce electronic-tendering in its public procurement system. e-Tendering means carrying out all traditional tendering activities in an electronic form, using the internet. The basic objective for e-Tendering is to bring security, authenticity and accountability into the tendering process. Additional benefits include savings of time, efforts and money involved in the procurement cycle for both the supplier and the Procuring Entity. e-Tendering

offers comparative and qualitative comparisons amongst bidders to facilitate an accurate evaluation process. The hassles in dropping tenders have been a much talked issue here. In the e-GP system, the bidders need not be physically present to submit their tenders to the PEs. They can submit tenders online from home. This has widened the opportunity for competition. The essence of public procurement is to ensure transparency, accountability, equal opportunity and fair competition.

The biggest obstacle to achieving the goal is the lack of infrastructure like electricity, internet connectivity and capacity building. Power generation must increase and internet connectivity has to be raised at all costs. Hence study on the subject will explore achievements and hindrances of establishing e-Procurement. By the research, its findings and analysis will help to represent the latest scenario of e-Procurement. I hope that the research will provide policy guideline from the findings and it will helpful for policy formulation for the policy makers.

1.3 Problem Statement:

There are reports of extensive corruption, political influence and pressure from trade unions in the procurement process. The World Bank's (2002) assessment of Bangladesh concluded that the procurement process is far from satisfactory. They identified problems are: (i) Poor advertisement. (ii) A short bidding period. (iii) Poor specifications. (iv) Non-disclosure of selection criteria. (v) Award of contract by lottery. (vi) One-sided contract documents. (vii) Negotiation with all bidders. (viii) Rebidding without adequate grounds. (ix) Corruption and outside influence. Procurement delays increase costs, defer benefits and deter good firms from bidding. The much debated system of lottery for contract award will be re-introduced and tender will be rejected, if tenders quote less or more than five per cent of the official estimated costs. It was done to increase the economic efficiency, transparency and fair competition in the process of public procurement. But in practice, qualities of procurement seriously suffer due to rejection of tenders for quoting prices below or above five per cent. Many countries have created specialized agencies in order to develop and manage electronic procurement systems. e-Procurement systems can be used helping purchasing goods and services most reasonably. It is the use of electronic means for publishing, processing, exchanging, and storing all of the

information related to institutional purchases in public organization. Public e-Procurement is an important stage in e-government development. In order to improve efficiency, the World Bank has implemented a new electronic procurement solution that will help for increasing transparency and competition, minimizing processing time and effort.

1.4 Objective of the Study:

Main objective of this study is to analyze prospects and challenges of e-GP in Bangladesh.

Specific objectives are-

- ➢ To study present practice of e-GP in Roads and Highways Department
- ➢ To identify problems and challenges of e-GP
- ➢ To explore into the prospects of e-GP

1.5 Research Question:

In respect to the above objectives the following research questions are important considerations-

i. To what extent e-GP is being practiced?

ii. What problems being faced?

iii. What are the benefits after introducing e-Procurement in Bangladesh?

iv. What is the cost and time savings in e-Procurement process than manual tender?

v. What are the challenges for proper implementation of e-Procurement in Bangladesh?

1.6 Scope and Limitation of this Study:

This study has core intention on prospects and challenges of e-Procurement in Bangladesh. This study has tried to examine, how the e-Procurement system is better off than manual tendering. This study has focused on a selected department like RHD. Due to time and budget constraint, this study has not covered all the offices of RHD. This study has completed survey randomly in some offices of RHD in different districts of Bangladesh.

1.7 Organization of the Thesis:

The structure of the thesis is organized as follows: the first chapter consists with the introduction such as problem statement, rationale, objectives, scope and limitation etc. The second chapter is literature review. The third chapter is conceptual framework and research methodology. The fourth chapter covers the data analysis and findings. Finally the fifth chapter contains the recommendations and conclusion.

Chapter 2

Literature Review and Analytical Framework

2.1 Roads and Highways Department (RHD)

The Roads and Highways Department (RHD) was created in 1962 when the old "Construction and Building (C&B)" organization was split into 2 separate bodies and the other being Public Works Department. RHD is responsible for the construction and the maintenance of the major road and bridge network in Bangladesh. The RHD is headed by a Chief Engineer who is supported by a number of Additional Chief Engineers. RHD is under the control of Ministry of Road Transport and Bridges. The mission of RHD is "To provide a safe, cost effective and well maintained road network"

2.2 Procurement

Procurement can be defined as the process of purchasing goods, works or services at the most economical total cost, while adhering to any specific requirements. The procurement process should be optimized for benefit of the authority, supplier, or individuals and should be secured by signing a contract. Quality checks are also required as part of the procurement process and suppliers are usually screened by the procuring company. Procurement processes usually lead to a good business relationship between the procuring company and the supplier.

Procurement is the full process involved in acquiring required goods, services or works. Procurement involves identifying the requirement of the purchasing authority, building a list of minimum requirements, and then scoring any interested parties who meet the minimum requirements, usually offering the highest score based on the most economically advantageous bid, commonly known as "best value". Part of the procurement process is also to manage the contract once awarded, to ensure that the successful suppliers are providing a quality service.

2.3 Public Procurement

Public procurement refers to the function of purchasing goods, works and services from an outside body with a contractual means by public bodies with public fund. Public procurement is about spending tax payer's money to acquire the goods, works and services that public bodies need in order to carry out their activities. The performance of public procurement has paramount influence on the society that refers to a group of people involved with each other through persistent relations. The public procurement can affect the society in many ways. It obstructs or enables economic development of the country, promotes or dismisses social and environmental objectives. Sometimes, public procurement can be misused for political gain by supporting an ineffective procurement or an inefficient firm. The success or failure of public procurement of the goods, services, works, can lead to citizens having the quality of life they expected or hindering the government to fulfill its responsibilities with consequences for the citizens.

2.4 The Legislative, Regulatory and Institutional Framework

Public procurement legislative and regulatory framework of Bangladesh achieves the certain standards and complies with applicable obligations. It covers the legal and regulatory instruments from the highest level (national law, act, regulation, decree, etc.) down to detailed regulation, procedures and bidding documents formally in use. The Public Procurement Act was enacted in Bangladesh in 2006 followed by the Public Procurement Rules in 2008. These two legal documents are considered at the level of world standard in the area of procurement as almost all the phases in tender management and contract management are covered with these complying generic procurement principles.

This component looks at how the procurement system as defined by the legal and regulatory framework in a country is operating in practice through the institutions and management systems that are part of the overall public sector governance in the country. There is a procurement secretariat office called CPTU (Central Procurement Technical Unit) is responsible to provide necessary assistance to comply act and rule. Furthermore, they provide STDs (Standard Tender Documents) to all Procuring Entity offices in the country. Each government offices have institutional set up to apply the

procurement role as set in the act and rule. But still there is a room for improvement applying the procurement governance issue.

2.5 Problems of Previous Procedures and Practices

It is important to improve the procurement processes of the government. Since the public procurement is central to the management of any operation and a comprehensive process covering every aspect of purchasing goods and services (such as determining the needs, ordering, payment etc.), the effectiveness and efficiency of this process is essential to obtain goods and services of the right quality, at the right price and at the right time. The use of ICT in public services implies that many steps of the process, formerly carried out manually, will be carried out online after the electronic transformation of public services (NSW, 1998). This case is also true for e-Procurement and it is required to redesign public procurement process accordingly. In other words, e-Procurement should not be developed according to the existing processes because they are intended to work in the traditional paper-based organizational environment. Therefore, for the government to benefit from e-Procurement, it needs to change its well-established public procurement processes. However, such changes are difficult to achieve, particularly for the government because the improvement of the public procurement process requires both the way of thinking and the way of behaving to change.

In summary, automating existing public procurement process using ICT will be the incorrect objective. To maximize e-Procurement benefits, public procurement processes must first be examined and re-engineered (Hope et al, 2000).

2.6 Definitions of e-Procurement

Any system that uses information and communication technologies (ICT) in order to do business can be classified as e-Business system. In fact, e-Business is a broader definition of e-Commerce because it includes not only the buying and selling of goods and services, but also servicing customers, collaborating with business partners, conducting electronic transactions within an organization.

EU literature defines e-Commerce as follows:

"Electronic commerce is about doing business electronically. It is based on the electronic processing and transmission of data, including text, sound and video. It encompasses many diverse activities including electronic trading of goods and services, on-line delivery of digital content, electronic fund transfers, electronic share trading, electronic bills of lading, commercial auctions, collaborative design and engineering, on-line sourcing, public procurement, direct consumer marketing and after-sales service. It involves both products (e.g. consumer goods, specialized medical equipment) and services (e.g. information services, financial and legal services); traditional activities (e.g. healthcare, education) and new activities (e.g. virtual malls)" (EU, 1997). In this respect, e-Procurement is defined as a subset of e-Business concerning e-Commerce between private sector and public institutions where e-Commerce is intended as the activity of exchanging goods and services with some kind of payment by means of ICT. From this point of view, it is possible to make many definitions for e-Procurement.

In the simplest sense, e-Procurement means carrying out procurement decisions of the government online through the use of the Internet. In other words, e-Procurement is about transforming the processes associated with public procurement and refers to automating corresponding processes of public institutions (IPPR, 2003). In other words, e-Procurement is more than simply buying online and it is changing the traditional way in which public institutions do business (Coulthard, 2000). e-Procurement involves the use of ICT in each step of the public procurement process from identification of the need to payment. Implementation of e-Procurement initiates automation of both internal and external processes associated with public procurement process.

It is also possible to characterize e-Procurement as a comprehensive process in which the government establishes agreements with vendors for purchasing goods and services (Coulthard, 2000). This process is achieved by either tendering or acquiring directly through e-Marketplaces in exchange for the payment that can be made by the purchasing cards. Shortly, e-Procurement is "the electronic management of all the procurement activities. It is the use of web communications to e-Enable purchasing processes and strategy and is part of the wider e-Commerce revolution."

(BuyIT, 2002a). As a system, e-Procurement is a Web-based purchasing system that offers the functionality of electronic ordering, electronic payment and enhanced administrative utilities to the public institutions. In general, e-Procurement systems are developed by using the Internet to streamline, manage and analyze the government procurement activities. These systems range from basic ordering tools to complex systems that cover the entire tendering process (BuyIT, 2002b). In each case, setting up an e-Procurement system involves implementing a software application that is customized based on the public procurement processes and rules. The resulting system should be accessible by each public institution through a Web browser that enables a secure and open purchasing environment.

2.7 Main Components of e-Procurement

There are three main components of e-Procurement system as follows.

- ➢ e-Tendering
- ➢ e-Purchasing
- ➢ Auditing

2.7.1 e-Tendering

e-Tendering is suitable for acquisition of complex goods and services associated with the ICT such as embedded systems and obtaining of goods like construction and capital investment. These transactions are among the most challenging procurement activities because their technical content is diverse and difficult to define and they are subject to rapid technological change over the project life cycle. In addition, they involve combination of professional engineering services and supply of diverse hard and soft technologies (WB, 2003). Theoretically, all the functionality related to tendering can be performed online. The decision should be based on criteria such as culture, electronic readiness and human resources of public institutions.

2.7.2 e-Purchasing

e-Purchasing refers to combined use of information and communications technology through electronic means to enhance external and internal purchasing and supply management processes. These tools and solutions deliver a range of options that will facilitate improved purchasing and supply management. e-Purchasing enables

evaluation of end-to-end trading cycles. It also enables connectivity to internal systems and sources of information such as inventory management, maintenance management and Materials Resource Planning (MRP) systems.

2.7.2.1 e-Shopping

In this method, prices of goods and services are fixed (Talero, 2001). The authorized procurement officers buy goods and services by using e-Catalogs of vendors. In e-Catalog of each vendor, they can find required information for comparing prices and features of various goods and services.

2.7.2.2 e-Auction

The electronic auction e-Auction is an e-Business between auctioneers and bidders, which takes place on an electronic marketplace. It is an electronic commerce which occurs business to business (B2B), business to consumer (B2C), or consumer-to-consumer (C2C). The auctioneer offers his goods, commodities or services on an auction side on the internet. Interested parties can submit their bid for the product to be auctioned in certain specified periods. The auction is transparent; all interested parties are allowed to participate the auction in a timely manner.

2.7.3 Auditing

The large scope, high level of risk and software intensity of e-Procurement requires specialized oversight and auditing organization. This organization should balance the interests of the stakeholders of the e-Procurement system and promote cooperation among them to gain rapid adoption of e-Procurement system. The main functions of this organization are as follows:

- ➢ Coordinate adoption of e-Procurement system.
- ➢ Provide strategic advice on procurement and contract management.
- ➢ Establish operational standards for e-Marketplaces.
- ➢ Coordinate the re-engineering of public procurement processes.
- ➢ Advice public institutions on human resource education, training and incentive systems.
- ➢ Operate the financial and operational auditing system for both e-Tendering and e-Purchasing components.
- ➢ Monitor outcomes of the e-Procurement system.

10

2.8 Other Components of e-Procurement

2.8.1 e-Sourcing

The e-Procurement Lifecycle comprises two aspects – e-Sourcing supporting sourcing activity and e-Purchasing supporting transaction purchasing. e-Sourcing is the use of secure web-based collaborative tools by procurement professionals and suppliers to conduct the strategic activities of the procurement lifecycle online. These strategic activities, including requirements definition, tendering, negotiation, award and contract management, are designed to deliver value for money procurement solutions to the public sector. The e-Sourcing managed service is a secure, hosted service that is accessed by customers and their suppliers via the Internet.

2.8.2 e-Informing

This is a form of e-Procurement that is not directly connected with making a deal, while the others are. The process of collecting and distributing purchasing information is made with the help of e-informing from both external and internal parties with the internet technology. For instance, internal clients and suppliers can access the published purchasing management information on an extranet, so this is called the way of e-informing.

2.8.3 e-Market Places

The e-Procurement component involves an electronic equivalent of physical market place called e-Market place where goods and services are demonstrated figuratively. It is possible to make several definitions for e-Market place ranged from emphasizing the web-based characteristics to describing the functionality and value-added features (Nishimura, 2002). However, all definitions share in common the statement that e-Marketplace is a web-based application and offers opportunities for online trading. In the context of e-Procurement, e-Market place is defined as virtual trading environments that bring public institutions and vendors together for e-Procurement by enabling public institutions to reach more vendors and vice versa. Many buyers and many sellers coming together in marketplaces where they can obtain sufficient information to make decisions about whether to buy or sell a product, even though payment and delivery may not necessarily be arranged online (UNCTAD, 2000). In

other words, mechanisms implemented in e-Market place combine several business processes to save time and cost for both the public institutions and the vendors (UNCTAD, 2001). In addition, e-Marketplaces provide value-added services such as electronic payment, content management, comparison facilities, advanced techniques for finding best prices, etc. (Nishimura, 2002). These tools and services provided by the e-Market place changes depending on the type of the sector.

The benefits of e-Market places to the public institutions are:

➢ Information gaps are removed and as a result better selections can be made.

➢ Costs are reduced by improvement of the procurement related processes (Garicano and Kaplan, 2000)

➢ Competitive environment is enhanced by enabling the public institutions to access more vendors (ERI, 1998).

➢ Various goods and services can be screened and price advantage is achieved.

➢ Market search will become easier through the e-Catalogs of vendors.

The benefits of e-Market places to the vendors are:

➢ Sales related processes of vendors are simplified.

➢ Costs are reduced by modernization of the processes (Garicano and Kaplan, 2000)

➢ Geographical distance is eliminated.

➢ Trading opportunities are expanded.

It is important to realize that the solutions for e-Market place that offers the functions mentioned above are available in the IT market as commercial software. These solutions can be acquired, tailored according to the needs and can be operated by either the government or the vendors.

2.8.4. e-Catalogs

This is the supplier's virtual catalog that is available for the buyer to choose the product and or services. Abundance of suppliers and their catalogs require more effort to assess the catalog of each supplier. Suppliers have different catalog formats and integration to each is cumbersome if not impossible. This can limit the number of

suppliers. Catalog aggregation can solve the problem of working with different suppliers. If the automation of comparison of specifications and prices are wished, a centralized database needs to be kept. And this database of the multiple suppliers must be machine so there would be no need for human observation and manual entering data into the e-Procurement system. Financial justification of keeping a centralized e-catalog is the high frequency of orders (Baron et al., 2000).

2.8.5. Public Procurement Cards

An electronic payment system is defined as "a financial exchange that takes place online between buyers and sellers" (Kalakota and Whinston, 1997). In this context, public procurement cards are becoming more common online payment method because of savings in processing time and cost. By utilizing the public procurement cards, it is possible for the government to link the purchasing information and the accounting information (Robinson, 2001). In the electronic public procurement process, public procurement cards can be used for small but frequent purchases that are made directly through vendors.

The benefits of public procurement cards for the government are (NASPO, 2001):
  ➢ Administrative cost reductions
  ➢ Productivity increases
  ➢ Flexibility of authorized procurement officers
  ➢ Reporting improvement

2.9 History of e-Procurement in Public Sector

Public sector is guided by rules. Government of Bangladesh spent most of its public fund through different government agencies. Agencies follow Public Procurement Act 2006 and Public Procurement Rules 2008. A number of public sector agencies worldwide have identified e-Procurement as a priority e-Government agenda and have implemented or are in the process of implementing buy side e-Procurement systems.

The earliest literature on e-Procurement is that relating to electronic data interchange – a technology that has been in use in organizations since the 1960s (Millman, 1998). One of the earliest articles on this subject was a 1967 paper extolling the benefits of

electronic data interchange for buyers and sellers in the hospital environment (Meyer, 1967). There is little history of extensive e-Procurement use in the public sector except in certain entities in the military and public health sectors. As would therefore be expected, the academic literature covering public sector e-Procurement is very limited. Information about public procurement initiatives is most commonly elicited through relevant conferences. Various government agencies advise public sector entities on the uptake of e-Procurement. There is also evidence of networks supporting the development of electronic commerce in procurement (APCC, 2012).

Whatever the information source, there is insufficient systematic research of the adoption of e-Procurement in the public sector to answer some important questions. For instance, what is the extent of its uptake? Although there are headline initiatives in place, to what extent are these significant in the management of procurement effort within public sector entities? Also very importantly, what drives the adoption of e-Procurement in the public sector? The lack of evidence of its extensive use throughout a period when it was widely used in certain industries may indicate that the existing technologies were not appropriate to the public sector and that the adoption of e-Procurement only became feasible with the advent of the Internet and more cost effective solutions. It could also be that, notwithstanding the more readily available supporting technologies, the procurement profiles of typical public sector entities have not warranted significant investments in e-Procurement. Another proposition is that its adoption is being driven by wider policy considerations rather than the business related benefits. Whatever the case, the significant investment of public resources in e-Procurement and its consequences for public procurement outcomes deserves careful investigation.

2.10 e-GP Change Management Program

Change management is dealing with the psychological, cultural and technological obstacles that can arise. Without a carefully planned and managed change process, there can be a significant waste of time, resources and an accompanying loss of employee morale. Hence, a carefully designed change management process can produce significant benefits. Change management in an e-GP project implementation process is a vital issue and could take longer than expected. It may be argued that the

full benefits resulting from e-GP will only be realized through significant changes in the organization of public procurement operations and as such, will require effective change management.

The issue of organizational and institutional changes is hard to conceptualize for public sector organizations (UNDP, 2006). Organizational leaders with managing change tasks are engaged in "a great venture of exploration, risk, discovery, without any comprehensive maps for guidance" (Senge, 1999). Therefore, many of the change management exercises are highly unpredictable in terms of what they achieve. Pascale (1999) suggests that failure of change projects is seen in 80% of all programs. The UNDP (2006) stated that change management shifts the roles and capacities of different actors, which in turn shifts the existing bases of power. Building in risk assessments and accounting for such initial instability, while managing its boundaries through managing people's expectations and concerns, is a necessary part of organizational change strategy.

Hence, it is essential to deliver clear and consistent messages regarding the change process, have regular and open stakeholder consultations, allow for the airing of grievances and provide feedback and learning mechanisms to enable adaptation during the course of the change process, if this is to be managed effectively. It also stated that developing leadership skills, clarifying roles and getting stakeholders on board are all necessary for successful change interventions. However, paying attention to the soft aspects of organizations, such as culture, is also very much needed as these factors are often paramount determinants of the real direction and pace of change. The efficiency of e-GP implementation is positively related to the e-GP change management program.

2.11 The e-GP System Development in BD

National e-GP portal (www.eprocure.gov.bd) is developed, owned, being operated and maintained by the Central Procurement Technical Unit (CPTU), IMED of Ministry of Planning. The e-GP system provides an on-line platform to carry out the all procurement activities by the Public Agencies. The e-GP system is a single web portal from where and through which PAs and PEs will be able to perform their

procurement related activities using a dedicated secured web based dashboard. It is hosted in the e-GP Data Center at CPTU. The web portal is accessible by the PAs and PEs through Internet for their use. This complete e-GP solution introduced under the Public Procurement Reform Program is being supported by the World Bank and gradually used by all government organizations. e-Tendering and e-Contract Management System (e-CMS) is launched successfully on pilot basis and eventually being rolled out to all PEs of four sectoral agencies, namely Bangladesh Water Development Board (BWDB), Local Government Engineering Department (LGED), Rural Electrification Board (REB) and Roads and Highways Department (RHD). It is now expanding to all government procuring entity dealing with public procurement.

All the stakeholders, including Bidders/Tenderers / Applicants / Consultants (National and International), PEs, procurement related Committees, payment service providers, Development Partners (DPs), media, Operation Maintenance and Management Entity (OMME), e-GP system administrators, auditors and general public are getting access to e-GP system and information as per the Terms and Conditions of use and Disclaimer and Privacy Policy. The e-GP system shall be used by all concerned, for procurement of goods, works and services using public fund, following the 'Government Procurement (e-GP) Guidelines' prepared under the provision of Section 67 of the   PPA -2006 and Rule 128 of PPR-2008.

2.12 Working Procedure of e-GP system in BD

The e-GP system comprises of following key modules/functionalities:

2.12.1 Centralized Registration System

Every stakeholder must be registered in the e-GP system in order to have appropriate access points and to get working dashboards with authorized functions in e-GP system. Registration should be done through the online registration page of the e-GP system followed by due diligent post verification if CPTU considers it necessary. The intended user must provide all required information, digital documents and accept the terms and conditions of e-GP system use. There is an option for registration in the online system for Tenderer/ Applicant/ Consultant, Procuring Entity (PE)/Procuring

Agency (PA), Scheduled Bank, Media, Development Partners, TOC/TEC, Approval Authority, System Administrators and Auditors, Operation Maintenance and Management Entity.

2.12.2 Annual Procurement Planning (APP) Publication

Procuring agencies/entities should prepare their Annual Procurement Plan in the format prepared by the CPTU through the e-GP dashboard as required by the PPA 2006 and PPR-2008. The APP must be prepared and published in the e-GP system to carry out any procurement activities by procuring agencies/entities through e-GP system. The e-GP system will guide the agencies/entities with online support tools and forms for providing draft, update of APP and publishing facilities. The e-GP system provides facility to procuring agencies and entities to revise and update the Annual Procurement Plan through appropriate approval from the authority.

2.12.3 Electronic Tender Document Preparation

Dynamic forms for preparing electronic tender documents and for other activities of the procurement process shall be prepared and updated only by the CPTU or the entity authorized by the CPTU. Procuring Entities may change and update only the specific sections of the template and its contents. Procuring Entities get access to all the available standard procurement document templates for preparing invitation to Tender, Proposal and documents for procurement of goods, works and services.

2.12.4 e-Tendering

2.12.4.1 e-Advertisement

Procuring Entities should prepare Invitation of Tenders/ Proposals using online template available from their secured dashboard. The detailed description of the Goods/Works/Services, time schedule, Condition etc. including the tender documents/ RFPs for e-Tendering shall be made available on the procurement opportunities section of the e-GP system and shall be available to all interested users to search and read the e-Advertisement.

2.12.4.2 Online Entry/Uploading Tender Document

Tenderers/Consultants must submit their Tenders/Proposals with documentation online, to be uploaded by the time specified in the Invitation for Tenders/Proposals after signing of the same with the e-Signature or Digital Signature, whichever is applicable, by their authorized representatives.

2.12.4.3 Pre-Tender/Application/Proposal Meeting

e-Procurement system carries out online Pre-Tender/Application/Proposal meeting on the date, time and venue, if required, as stipulated in the tender notice/documents. Responses/clarification of the queries relating to the Tender or RFP document should be posted by the Tenderers/Applicants/Consultants online before or during the Pre-Tender/Application/Proposal meeting.

2.12.4.4 Tender/Application/Proposal Amendment

To the extent permissible under the procurement rules the Procurement Agencies may amend the tender documents at any time prior to the deadline for receipt of tenders. Procuring Entities shall issue an addendum and publish in the related section of the e-GP system and also send via an automated electronic means (i.e. e-mail, SMS) and make available online in the e-GP system for the information of the public and the bidders.

2.12.4.5 e-Lodgment

A tender/proposal lodged electronically is deemed for all purposes to be the true and legal version, duly authorized and duly executed by the Tenderer/Consultant and intended to have binding legal effect. e-Signature/Digital signatures are necessary due to the security system for identity and authentication purposes. The bidders must be ensured that their submitted documents/proposal files are virus free and tender will be rejected for unreadable file.

2.12.4.6 Tender/ Application/ Proposal Opening

The Procuring Entities receiving the tenders/proposals should form a Tender Opening Committee (TOC). Formation of TOC/POC is described in Business Process Reengineering (BPR) document. Access to the dashboard for the TOC/POC shall be available only after the specified Tender/ Application/ Proposal opening date/time.

Tenderer/consultant may physically be present online at the tender/proposal opening otherwise they may choose to participate online during tender/proposal live opening session.

2.12.5 e-Evaluation

2.12.5.1 Formation of Evaluation Committees

The Procuring Entities receiving the Tenders /Applications / Proposals should form a Tender Evaluation Committee (TEC)/ Proposal Evaluation Committee (PEC). Formation of TEC/PEC is described in Business Process Reengineering (BPR) document. Procuring Entities should ensure that the so formed Committees have sufficient knowledge and are conversant with the available tools offered by the e-GP system. Procuring Entities should make the e-GP system available to TEC/PEC members with the applicable features that support workflow and evaluation process.

2.12.5.2 Use of e-GP System by Evaluators

Access to the Dashboard, technical or financial proposals to TEC/PEC shall be available only at the specified date and time configured in the e-GP system by the Procuring Entities. e-GP system will automatically generate draft result of the evaluation to assist the evaluators. e-GP system shall not allow the evaluator to alter any data provided by the Tenderer/Applicants.

2.12.6 Approval, Notification of Award (NOA) and Contract Signing

Approval of the evaluation report will be routed in e-GP system through the workflow to appropriate Approving authority as stipulated in PPR-2008 along with subsequent amendments. Procuring Entity will issue NOA to successful evaluated tenderer/ applicant/consultant online (i.e. via tenderer/ applicant/consultant dashboard, email, SMS as configured in preference settings). e-GP system provides the facility to sign the contract online between Procuring Entity and the tenderer/ applicant/consultant, but may also choose to sign offline in compliance with the PPR-2008 along with the subsequent amendments. In case of offline contract signing, PE must enter the contract details, contract documents, and schedules of deliveries, contract execution plan in e-GP system. The e-GP system will publish the contract award information on e-GP portal as and when contract is signed and system is updated by the PE.

2.12.7 e-Contract Management

2.12.7.1 Contract Progress Monitoring and Control

The Procuring Entities should nominate individuals for managing contracts, shall have the required knowledge, skills and abilities to effectively carry out their responsibilities by using the dashboard provided in the e-GP system. e-GP system provides the standard forms and entry spaces to record the different activities and events of the contract execution under e-Contract Management System. Procuring Entities should keep updated contract with the project schedules, deliverables, Service Level Agreements if any, specifications, amendments and other information in the e-GP system. Procuring Entity (PE) or a person nominated by PE must measure time and cost against the budget and contract specifications. The projected time required to complete the contract will also be assessed to detect deviations from the plan through the e-GP system dashboard. The performance of the work must be checked to ensure that the targets are being met and accordingly update the data in the e-GP system to reflect the actual status of the contract.

2.12.7.2 Certification and Payment Processing

The e-GP system provides the standard forms for issuing different types of certifications such as acceptance certificates, etc. The designated officers responsible for evaluating performance of the contract must carefully review the contractor's requests submitted online for payments to verify the accuracy of all charges and work performed, as e-GP system does not have automated tools to verify the physical performance in the field.

2.12.7.3 Contract Agreement Administration

The e-GP system also provides a tracking mechanism for all contract agreements. The designated officer should check contract status, contracted parties, contract period, goods, works and services covered and contract point to make any decision during contract agreement administration. If any contract needs to be amended the e-GP system brings up the auto alerts for required actions. The designated officials must record appropriate reason before any such extensions.

2.13 Benefits of e-Procurement

The primary motivation for companies adopting e-Procurement solutions has been cost reductions and process efficiencies. Croom and Brandon-Jones (2005) found that cost reductions in goods purchased comprise from three key issues: consolidation of purchase specifications; reducing the number of suppliers and; through improved compliance with existing contracts. A research by Quesada et al. (2010) proposes that e-Procurement technologies affect positively to company's procurement practices and procurement performance. Positive impact on procurement practices facilitates the development of operational tasks in the procurement function, which leads to continuous improving. As the operational tasks are performed more effectively the procurement performance is enhanced. According to Davila et al. (2003) companies using e-Procurement solutions report savings of 42 percent in purchasing transactions costs. Another research by Croom and Johnston (2003) found that e-Procurement implementation can have up to 75 % cost reduction in procurement process costs and 16 – 18 % reduction in purchasing price for indirect purchases. According to Croom and Brandon-Jones (2005) complying with existing contracts is an important mechanism for realizing lower prices and discounts. The savings that come out from automating the process derive from eliminating paperwork and human intervention, reducing transaction costs and cycle time and also from streamlining and automating the audit trail and approval process (Neef, 2001). While the cost savings can be significant, De Boer et al. (2002) argue that the total volume of purchases needs to be high, as well as the amount of internal customers, in order to reach savings as high as mentioned above. The research by Davila et al. (2003) also identifies that companies using e-Procurement gain additional control over maverick spending. To support this Croom and Johnston (2003) found that e-Procurement can have a major impact on compliance on many different levels of the procurement process: it supports managerial budgetary control; reduces data entering failures; offers greater transparency and accessibility to corporate wide spending; improves system reliability; and improves the access to managerial information.

2.13.1 Benefits to the Government

Implementation of e-Procurement is very beneficial for a government. But before defining the gains and efficiencies that e-Procurement offers, it is essential to indicate the importance of strategic purchasing for the government. Strategic purchasing refers to "the process of determining which goods and services to procure, from which vendor and for what price." (Meta Group). Because of the relationship between strategic purchasing and public procurement, it is obvious that when strategic sourcing is performed well, public procurement becomes more effective and efficient. In addition, by taking advantage of the ICT, purchasing organizations will be able to operate more effective and efficient in the way they buy from, and work together with their vendors (Buy IT, 2002a).

The increased efficiency and effectiveness of public procurement process will provide potential to reduce the cost of public procurement. For example, in the United States it was reported that e-Procurement reduced the cost of transactions from $120 to $20 and delay from 40 days to 5 days (Gunyou and Leonard, 1998). Australian Government estimates that the ratio of the processing cost for check versus electronic payments ranges between 10:1 and 5:1 (DCITA, 2000).

2.13.1.1 Decrease in Costs associated with Publishing and getting Information

- ➢ Publishing the information related to the public sector opportunities and contract awards electronically in the Internet is both faster and cheaper than the traditional methods (Buy IT, 2002a).

- ➢ Purchasing activities can be monitored better and statistical data for reporting on public procurement data and vendor activity will be provided. (Avery, 2000; Leipold, 2003)

- ➢ Market search will become easier through the e-Catalogs of vendors (Nishimura, 2002).

- ➢ Public institutions will access various goods and services of multiple vendors in a competitive environment (OGC, 2002).

2.13.1.2 Decrease in Procurement Transaction Costs

➢ Public procurement services like market search, ordering, tendering, etc. will become more efficient and effective (Buy IT, 2002b).

➢ Public resources will be used more efficiently and effectively (Robinson, 2001).

➢ Administrative costs and time such as time and cost associated with business meetings will be reduced.

➢ Time spent in the requisition-to-payment cycle will be reduced through the use of electronic ordering, electronic invoicing etc.

➢ "Maverick buying" will be reduced (Leipold, 2003).

➢ Bureaucratic inertia will be reduced (Leipold, 2003).

2.13.1.3 Increase Competition

➢ The public sector business opportunities will be accessible by all vendors, which in turn will enhance the competitive environment (ERI, 1998).

➢ The purchasing power of the government can be better coordinated and costs of goods and services will be reduced through this aggregating purchasing volume (Avery, 2000).

2.13.1.4 Cost savings and effectiveness

When an organization has the ability to prove to its suppliers that e-Procurement is used as a tool to ensure end users honor their contract status, this will enable the company to negotiate down prices through greater enhanced capture, reliability of spending information, and increased confidence guaranteeing spending volumes from increased compliance with the system, which will allow volume price breaks and discounts to be obtained.

It is also believed that, "e-Procurement can be a driving force for reform of legal and regulatory framework, technology investments and training that developing countries face as a result of the information revolution" (Talero and Carp, 2002). The efficiency and effectiveness in public procurement process will bring significant cost savings. There is also a consensus that government's efficiency and effectiveness in doing business will benefit all stakeholders: public administrations, vendors and taxpayers (The Economists, 2000).

e-Procurement not only does enhance the overall quality of public procurement management throughout savings in terms of cost and time but also improves transparency in public administration. Comparing to the economic benefits, transparency gains are more apparent from the first stages of e-Procurement (Leipold, 2003). As disclosure of information associated with the public procurement is an obligation under the law, the Internet makes this disclosure easier and also makes procurement related information more accessible. In other words, the Internet offers the easiest way to publish this information on time. As consequence of transparency, e-Procurement improves public administration further by fighting against corruption. Through the improved accessibility of all parties to the public procurement information and electronic logging of all transactions, equal treatment in the public sector business opportunities can be achieved and the likelihood of detection of illegal transactions can be increased (Talero, 2001).

2.13.2. Benefits to the Private Sector

Improvement of public procurement process by the means of e-Procurement will also benefit and enable improvement in the private sector. At the simplest level, for vendors, e-Procurement means easier business dealings with the government. The other benefits that are gained by implementing e-Procurement are listed below:

- ➢ The procurement process will become more efficient by reducing the transaction costs associated with gathering information and supply chain.
- ➢ Vendors will reach more public institutions.
- ➢ The information associated with public sector business opportunities and contract awards will be accessed easier and faster (Leipold, 2003).
- ➢ Vendors will have a chance to present the technical and nontechnical descriptions, prices and promotions related with their goods and services (OGC, 2002).
- ➢ The public procurement related processes like managing orders, managing inventories, financing, etc. will be more efficient and effective.
- ➢ Time and cost associated with business meetings will be reduced.
- ➢ The time consumed in the bureaucratic inertia will be reduced (Leipold, 2003).
- ➢ New opportunities for SMEs will be formed such as increased participation in supply chain (ERI, 1998).

2.13.3 Benefits and Improvements to Buyers

The benefits and improvements to the buyers are as follows:

2.13.3.1 Cashable

➢ The Tender organization can use e-Tender sites to advertise tenders which can result in considerable cost saving from advertising tenders in more traditional forms, i.e. national press

➢ The dependency on, and cost of, sending proposals via post has eliminated.

➢ Document storage - no physical storage required.

➢ Document distribution - saves administration time and cost.

2.13.3.2 Process Saving

➢ Significant Process improvements

➢ Receiving documentation electronically means circulating tenders internally across multiple locations is simplified greatly

➢ Saves time handling large numbers of expressions of interest and quickly reduce them to a manageable number

➢ Secure communications with suppliers can be data encrypted and time locked to protect all sensitive information

➢ Improved continuity when staffs are absent.

➢ Automatically generates and dispatches common correspondence.

➢ Dramatic time savings allow more time to make accurate buying decisions.

2.13.3.3 Reduction in Overhead Cost

➢ The administration overhead of producing multiple bound copies of large paper-based proposal documents has eliminated.

2.13.3.4 Non-Cashable Improvements/Benefits

➢ Electronic submission can support environmental policies

➢ Total visibility of all tenders – greater management/audit control

➢ Project Management - project access for remote users

➢ Privacy, authenticity, integrity and non-repudiation

➢ Document control - Freedom of Information

➢ Improved history function of procurements, all emails between the tender administrator and the tenderers are automatically recorded by the system.

2.13.4 Benefits and Improvements to Suppliers

Although there may be overlap between the categories the benefits and improvements to the suppliers generally fall into one of these areas:

2.13.4.1 Cashable Improvements and Benefits

- ➢ Visibility of all current and future business opportunities
- ➢ No cost to view opportunities and to register an interest - free access to the secure area of the portal (there may be a charge from the contracting authority for issuing the relevant documents).

2.13.4.2 Process Savings

- ➢ Tender documents are easily accessed and downloaded from the e-GP site.
- ➢ The online submission process is simple to use, the upload is quick and a confirmation of receipt is usually issued.
- ➢ Once a tenderer has gone through the pre-qualification process with the organization issuing the tender, it is likely that the tenderer will be asked only to update their own details resulting in fewer forms for the supplier to fill in.
- ➢ History log - keeps supplier up to date with the process.
- ➢ No need to rely on third party delivery of documents.
- ➢ The minute the supplier sends their response the buyer should be able to view it - the supplier can therefore submit responses minutes before the deadline
- ➢ Project Management - all communications and documentation held on portal
- ➢ Suppliers can generally make changes to their submission, including adding or deleting documents, at any time up to the tender opening date.

2.13.4.3 Non-Cashable

- ➢ Ease of use
- ➢ Data security - secure communications with suppliers can be data encrypted and time locked to protect all sensitive information
- ➢ Supplier can update pre-qualification and insurance details held on e-GP portal.

2.14 Anti-Corruption Role of e-Procurement

Burton (2005) believes that public procurement is the central instrument to assist the efficient management of public resources. A United Nations report(UN, 1999) argued that public procurement is a government business system which is concerned about the government procurement process such as preparing project specification, requesting, receiving and evaluating bids, awarding contract and payment. Public procurement processes have different phases and each phase has a risk of corruption. Szymanski (2007) proposes the five stages of procurement process: procurement planning and needs assessment, product design and documentation, tender process, contract award and implementation, and accounting and audit. Identification of the risk of corruption came from the lack of transparency, limited access to information, and lack of accountability and control at each stage. Corruption in public procurement has been prevalent throughout the world and is more in developing countries. It has negative effects on the wide range of public level including local, regional, and national (Ampratwum, 2008). Most importantly, it influences the public competence and wealth in a country, increase government operation cost, corrodes the social structure and trust in government, distorts the composition of the government expenditure on different services includes education, health, operation and maintenance.

Public e-Procurement has been defined as the use of information and communication technology such as Internet/web based system by governments in conducting their procurement relationship with bidders for the acquisition of goods, works, services and other consulting services required by the public sectors (Davila et al., 2003; Leipold et al., 2004).

Public e-Procurement can play an important role for minimizing the risk of corruption in public procurement process (OECD, 2008). It improves the transparency and integrity in public service such as tendering, sourcing, ordering, and auctioning. e-Procurement has been recognized internationally as an important instrument for checking corruption and in misuse of power (Sohail and Cavill, 2008). Pictet and Bollinger (2008) pointed out that public e-Procurement helps to fight against corruption by reducing face-to-face interaction where most requests for bribes take

place. Electronic government is one kind of solution to the problems of corruption which removes the opportunities for arbitrary actions. It helps to reduce cartels, collusions, and riggings to the bidders where public procurement is politically influenced like Nepal, Bangladesh, Iraq, Sudan, and Myanmar. In many of the corrupt countries, public bids are awarded without fair competition.

Recently many least developed countries have focused on e-Procurement systems as a key tool to reduce the corruption by opening competition in government procurement processes to the public. There are many case studies in developing and developed countries of the use of public e-Procurement system for reducing the risk of corruption. For example, e-Procurement systems implemented in Korea (South), Singapore, New Zealand, Denmark, India (Andra Pradesh), and Mexico are some examples that demonstrate the innovative use of information technology to prevent and control corruption in public procurement.

Some of the benefits of e-Procurement in the public sector are as follows:
- e-Procurement can centralize data in order to improve audit and analysis (Gupta et al., 2009).
- e-Procurement eliminates the direct human interaction on bidding and other work and services, corruption is decreased significantly, and internal efficiency increase in government departments (Ndou, 2004).
- From an e-Procurement system, government can monitor all the works and services more easily and efficiently (Aman and Kasimin, 2011; Kaliannan and Awang, 2009).
- e-Procurement system provides better status monitoring and tracking of applications.
- It increases transparency in works and services and improves better interaction between supplier and vendors and citizens through online system (Adebiyi et al., 2010).
- Online bidding system automatically reduces the cartel, collusion and riggings among the bidders (Pathak et al., 2006).

2.15 Challenges and Risk of e-Procurement System

A research by Smart (2010) identifies that there are numerous obstacles in implementation projects to achieving in full the benefits which e-Procurement offers. In some cases the benefits of implementing an e-Procurement solution have been hard to evaluate.

According to Kalakota and Robinson (2001) before the implementation of e-Procurement, a company must first clearly define the business problems its e-Procurement solution is intended to address. Furthermore, before an e-Procurement solution can be deployed, a company must undergo thorough procurement process reengineering. Automating an existing procurement process will only make matters worse (Kalakota and Robinson, 2001). Puschamann and Alt (2005) recognize that in the successful practices the redesigning of the procurement process is focused on: reduction or elimination of authorization stages; regulation of exceptions to a limited degree in the beginning; elimination of paper; integration of suppliers in the entire process chain; and consideration of the complete process from searching for goods through to invoicing.

A study by Angeles and Nath (2007) identified three important challenges to e-Procurement implementation:

- ➢ Lack of system integration and standardization issues
- ➢ Immaturity of e-Procurement-based market services and end user resistance
- ➢ Maverick buying and difficulty in integrating e-Procurement with other systems

Companies need to be aware of the possible hidden costs related to implementation of e-Procurement solutions, such as system integration, content aggregation and rationalization, catalog and search engine maintenance, supplier enablement, end user training and procurement process reengineering. These costs can easily exceed software licensing and maintenance cost by five to ten times (Angeles and Nath, 2007).

A supplier may claim they could not access the e-Government Procurement portal because their network was down, before making a decision to accept the late tender. The immaturity of suppliers and the lack of preparation is also a challenge for many companies. After all, suppliers need to learn how to generate catalogs, process electronic purchase orders, how to use invoicing mechanisms among other tasks (Angeles and Nath, 2007).

The other challenge here relates to the resistance of end-users towards operating the e-Procurement solution. To prevent this Angeles and Nath (2007) state companies should encourage using new e-Procurement technologies through intensive training and educational sessions with end-users.

Some companies find it difficult to eliminate maverick buying even after the implementation of e-Procurement. This can be prevented by intensive end-user training and educational programs. Companies also need to be aware of the problems in integrating the e-Procurement solution with other systems (Angleles and Nath, 2007). According to Gilbert (2000) integrating e-Procurement solutions with other business applications (e.g. accounting) can be more complex than businesses think.

In a research by Davila et al. (2003) four risks associated with adopting e-Procurement technologies were identified. The authors stress that these risks need to be carefully addressed before these technologies are adopted. These risks are as follows

- ➢ Internal business risks
- ➢ External business risks
- ➢ Technology risks
- ➢ e-Procurement process risks

2.16 Analytical Framework:

The e-GP system has widened the opportunity to ensure the openness of information and scope of online vigilance and monitoring which has potential to increase the transparency of procurement system. The competition among the bidders would be increased through the e-Procurement system. Tender box snatching is the big problem for our country and e-Procurement system has the potential to solve the problem. e-Procurement may ensure the managerial control over the procurement process. IT can facilitate to submit tender from home and it is possible to reduce collusions among the bidders. So, e-Procurement has the potential to ensure good governance in procurement process. Faster and easier e-Procurement process has the potential to increase the efficiency of the procurement system. Automatic generation of necessary report in e-GP system and availability of necessary tender documents on online make the procurement process easy and simple. e-Procurement system has the capacity to manage the large number of bidders and thus procurement process has the potential to be improved. Cost for Advertisement of Tender notice, Pre-tender Meeting, Tender Evaluation Report Preparation etc. are supposed to be reduced in e-Procurement system. So, there are significant potential cost and time savings in procurement process after implementation of e-GP. Thus, the prospects/benefits of e-GP can be attributed by Transparency, Good governance, Efficiency, Process improvement, Total cost and time savings in e-Procurement.

e-Procurement has the challenges to ensure Internet speed, Internet connectivity, availability of electricity, uninterrupted access to e-GP server etc. which would be termed as technological challenges. Logistic support, Computer knowledge of officials, Training of contractors about e-GP etc. are also the challenges of implementation of e-Procurement which may be termed as administrative challenges. Acceptability of new system, awareness about e-GP and mindset change in favor of e-Procurement are also challenges of e-Procurement and these would be termed as challenges of awareness. Protection against hacker, virus etc. would be the hindrance for implementation of e-Procurement. Confidentiality of password, documents etc. may be considered as challenges of security. Thus, the challenges of e-GP can be attributed by Technological challenges, Administrative challenges, Challenges of awareness and Challenges of security.

The factors which are influencing the prospects and challenges of e-GP have been discussed in the below Figure-2.1 and Figure-2.2.

Figure-2.1: Analytical framework for prospects of e-GP

Cost savings and time savings in e-GP
- Advertisement of tender notice
- Tender Document preparation (for PE)
- Pre-tender meeting
- Collection of tenders from multiple locations
- TOC & TEC Members creation & management
- TOC & TEC Members honorarium
- Tender Evaluation Report preparation
- Sending Tender Evaluation Report to Approving authority for approval
- Issuance of Notification of Award & communicate with tenderer
- Contract agreement

Transparency in e-GP
- Openness of information regarding public procurement
- Public accessibility to the information of tender process
- Scope of online vigilance and monitoring
- Secrecy of bidders information
- Real time access information or real time bidding

Efficiency in e-GP
- Positive change of staff concentration
- Low Internet knowledge of bidders is sufficient for e-GP
- Reduction of errors
- Faster and easier e-Procurement process
- Improvement in cash flow compared to manual system
- Best quality, low price
- Improvement of total tendering process

Good governance in e-GP
- Selection process of bidders in e-GP
- Participation of qualified bidders
- Inventory management in e-GP
- Competition among the bidders
- Pre-qualifying process in e-GP
- Performance monitoring by PROMIS
- Reduction of tender box snatching
- Elimination of undue pressure
- Reduction of collusion among the bidders
- Managerial control and collaboration

Process improvement in e-Procurement
- Availability of tender notice online
- Workflow management
- Managing capacity of large number of bidders
- 'One Click' publishing to websites
- Necessary tender documents on online
- Automatic generation of necessary report
- Accuracy of purchase decisions
- Automation of procurement process
- e-Contract Management System

32

Figure-2.2: Analytical framework for challenges of e-GP

Challenges of awareness

➢ Acceptability of new system
➢ Awareness of all stakeholder
➢ Mindset and behavioral change of all
➢ Preparation of hard copy as a backup of automatic e-GP system

Challenges of awareness

Technological challenges

➢ Availability of electricity
➢ Internet speed
➢ Internet connectivity
➢ IT and computer infrastructure
➢ Uninterrupted access to e-GP server

Technological challenges

Challenges of e-GP

Administrative Challenges

Administrative Challenges

➢ Logistic support Scanner, Printer etc.
➢ Computer knowledge of bidders
➢ Computer knowledge of officials
➢ Training of contractors about e-GP
➢ Knowledge level of officials about e-GP

Challenges of security

Challenges of Security

➢ Protection against hacker, virus etc.
➢ Maintenance capability of CPTU for e-GP software problem
➢ Confidentiality of password, documents etc.

Chapter 3

Conceptual Framework and Research Methodology

3.1 Dependent and Independent variables

Table-3.1: Independent variables to assess prospects of e-GP

	Dependent variables	Independent variables
Prospects/Benefits of e-GP	**Transparency in e-GP**	Openness of information regarding public procurement
		Public accessibility to the information of tender process
		Scope of online vigilance and monitoring
		Secrecy of bidders information
		Real time access information or real time bidding
	Good governance in e-GP	Selection process of bidders in e-GP
		Participation of qualified bidders
		Inventory management in e-GP
		Competition among the bidders
		Pre-qualifying process in e-GP
		Performance monitoring by PROMIS
		Reduction of tender box snatching
		Elimination of undue pressure
		Reduction of collusion among the bidders
		Managerial control and collaboration
	Efficiency in e-GP	Positive change of staff concentration
		Low Internet knowledge of bidders is sufficient for e-GP
		Reduction of errors
		Faster and easier e-Procurement process
		Improvement in cash flow compared to manual system
		Best quality, low price
		Improvement of total tendering process
	Process improvement	Availability of tender notice online
		Workflow management
		Managing capacity of large number of bidders
		'One Click' publishing to websites
		Necessary tender documents on online
		Automatic generation of necessary report in e-GP system.
		Accuracy of purchase decisions
		Automation of procurement process
		e-Contract Management System
	Total Cost and Time savings	Advertisement of Tender notice
		Tender Document preparation (for PE)
		Pre-tender meeting
		Collection of Tenders from multiple locations
		TOC & TEC Members creation & management
		TOC & TEC Members honorarium
		Tender Evaluation Report preparation
		Sending Tender Evaluation Report to Approving authority
		Issuance of NOA & communicate with tenderer
		Contract agreement

Table-3.2: Independent variables to assess challenges of e-GP

Dependent variables		Independent variables
Challenges of e-GP	**Technological challenges**	Internet connectivity
		IT and computer infrastructure
		Availability of electricity
		Internet speed
		Uninterrupted access to e-GP server
	Administrative challenges	Logistic support Scanner , Printer etc.
		Computer knowledge of bidders
		Computer knowledge of officials
		Training of contractors about e-GP
		Knowledge level of officials about e-GP
	Challenges of awareness	Acceptability of new system
		Awareness of all stakeholder
		Mindset and behavioral change of all
		Preparation of hard copy as a backup of automatic e-GP system
	Challenges of security	Protection against hacker, virus etc.
		Maintenance capability of CPTU for e-GP software problem
		Confidentiality of password, documents etc.

3.2 Conceptual Framework:

For the purpose of assessing prospects and challenges of e-GP, the conceptual framework is made as below:

Figure-3.1: Conceptual framework for prospects of e-GP
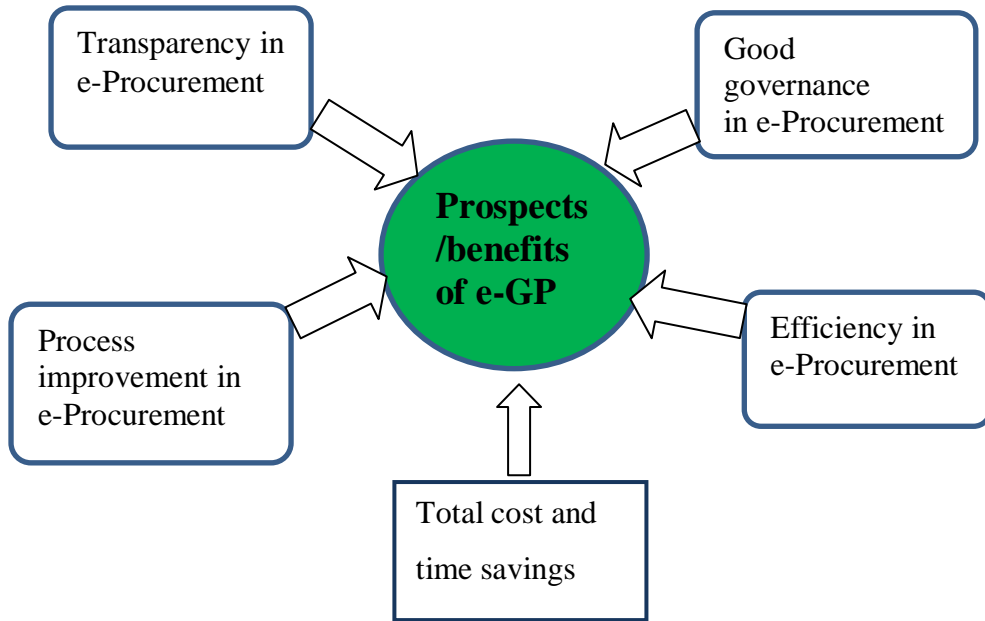
Figure-3.2: Conceptual framework for challenges of e-GP

3.3 General

The research has selected a specific organization RHD of GOB. Questionnaire survey, Focus Group Discussion (FGD), Document analysis, Key Informant Interview (KII) of RHD officials has done to fulfill the research objectives. Secondary data has collected from different sources including website. Questionnaire sent to RHD field officials through email and communicated via phone. Collected data has been analyzed by SPSS software. Different websites were visited for collection of secondary data.

3.4 Primary Survey

Respondents were selected randomly and they were requested for their response. Data were collected by email but communicated with the respondents via telephone for clarification of questionnaire. Survey questionnaire was first sent to 65 Procuring Entities of RHD from different districts of Bangladesh. Fifty of them accepted the invitation and participated in this survey. Among these 50 participants, 30 of them are Executive Engineer and 20 of them are Sub-Divisional Engineer.

Primary data were collected from the answers of questionnaires, where a set of questions were prepared to get information regarding challenges and prospects of e-Procurement system of RHD. In order to assess the prospects/benefits related to Transparency, Good governance, Efficiency and Process improvement in e-GP the respondents were asked to respond in 5 point Likert scale. The cost and time savings in different procurement steps were asked to respondents by filling the questionnaire considering a works tender valued one crore taka. The challenges related to Technological challenges, Administrative challenges, Challenges of awareness and Challenges of security were also assessed in 5 point Likert scale.

The final survey questionnaire is listed in Annexure 1

3.5 Focus Group Discussion (FGD)

The bidders are the main stakeholders of e-GP system. In order to assess challenges and prospects of e-Procurement system a focus group discussion has done with registered 10 (ten) bidders. The bidders were asked about benefits and challenges regarding e-GP. The discussion were recorded and noted. The information from Focus

Group Discussion (FGD) has analyzed, compared with the survey analysis and with information from Key Informant Interviews (KII) to find out the prospects and challenges of e-GP.

The checklist used for Focus Group Discussion (FGD) is listed in Annexure 2

3.6 Key Informant Interviews (KII)

Some higher officials of RHD and President, Bidders Association, Rangpur have been interviewed. During interview, they were asked about challenges and prospects of e-Procurement system related questions. Their answers and comments were recorded and noted. The information from KII has been analyzed and compared with the survey analysis to get findings.

The checklist used for Key Informant Interviews is listed in Annexure 3

The List of RHD officials for Key Informant Interview is listed in Annexure 4

3.7 Secondary Data

3.7.1 Collection of Secondary Data
Secondary data include printed materials, data which were collected from website of RHD and e-Procurement website of Bangladesh.

3.7.2 Document Analysis

Data connected to Key Performance Indicators (KPI) of e-Procurement in RHD, also known as PROMIS Report for last 3 financial years have been collected from System Analyst of RHD. This secondary data were analyzed and compared to survey analysis in order to seek findings. Overall procurement performance report of the financial years 2012-13, 2013-14 and 2014-2015 were collected and analyzed.

PROMIS report contains data related to the achievement of KPI's (Key Performance Indicator) in overall procurement activities of RHD for these above 3 (three) years. There are mainly 42 KPI's in the PROMIS report. This study not covered all of the 42 KPI's. Performance indicators which are directly related to challenges and prospects of e-GP system are analyzed here. Transparency, Efficiency and Competitiveness indicators were taken into account as these terms are mostly matches with the research objective.

3.8 Research Framework

Figure-3.3: Research Framework


```
                    ┌─────────────────────────┐
                    │  Selection of the study │
                    │  area and problem       │
                    │  statement              │
                    └────────────┬────────────┘
                                 ↓
                    ┌─────────────────────────┐      ┌──────────────────────┐
                    │    Literature review    │◄─────│  ➢ Books             │
                    └────────────┬────────────┘      │  ➢ Journals          │
                                 ↓                    │  ➢ Research papers   │
                    ┌─────────────────────────┐      │  ➢ Websites          │
                    │       Objectives        │      └──────────────────────┘
                    └────────────┬────────────┘
```

Primary Data
- ➢ Questionnaire survey
- ➢ Focus Group Discussion(FGD)
- ➢ Key Informant Interview (KII)

Secondary Data
- ➢ Reports/Documents
- ➢ Websites

Data collection

Data processing

- ➢ Transparency in e-GP
- ➢ Good governance in e-GP
- ➢ Efficiency in e-GP
- ➢ Process improvement
- ➢ Total cost and time savings in e-GP

Analysis of prospects/benefits of e-GP

Analysis of challenges of e-GP

- ➢ Technological challenges
- ➢ Administrative challenges
- ➢ Challenges of awareness
- ➢ Challenges of security

Findings/Recommendations

Chapter 4
Data Analysis and Findings

4.1 Demographic Analysis:

4.1.1 Respondents Designation:

Figure-4.1: Designation of the respondents
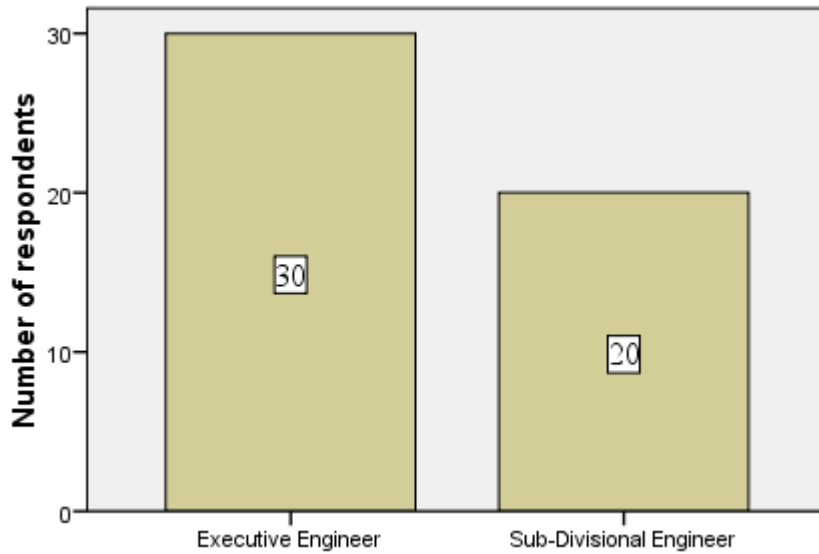
From the above Figure-4.1, we found that out of total 50 (fifty) respondents, 30 of them are Executive Engineer and 20 of them are Sub-Divisional Engineer. All of the respondents are involve in procurement activities.

4.1.2 Experience in Procurement

Figure-4.2: Experience in procurement
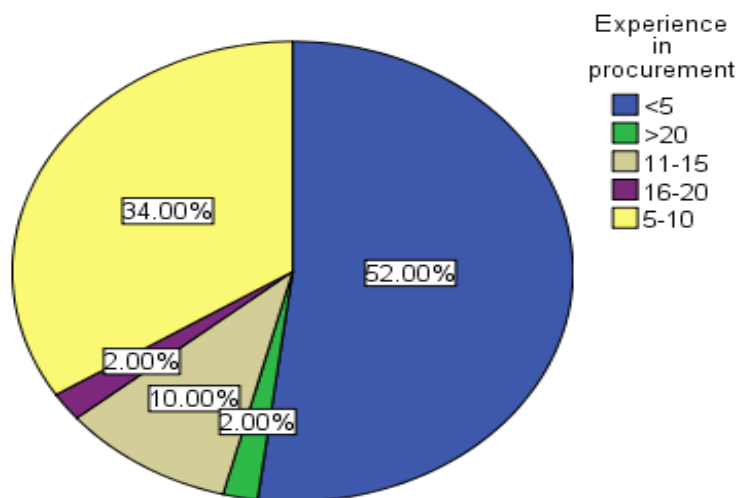
Figure-4.2 illustrates that 52% of the respondents have less than 5 years experience in procurement activities. 34% of the respondents have 5-10 years experience in procurement activities and 14% of the respondents have more than 10 years experience in procurement activities.

4.1.3 Training on IT

Figure-4.3: Training on IT
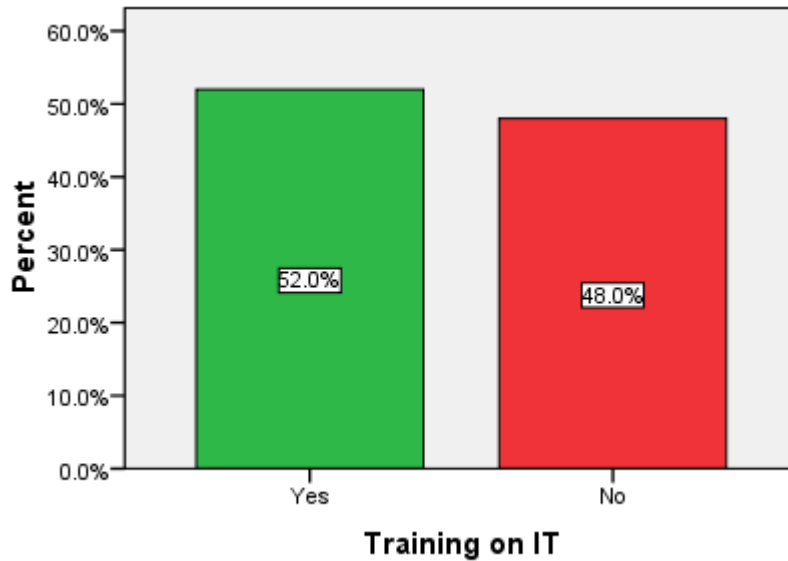
Figure-4.3 illustrates that 52% of the respondents have training on IT and 48% of the respondents did not get training on IT.

4.1.4 Training on e-GP

Figure-4.4: Training on e-GP
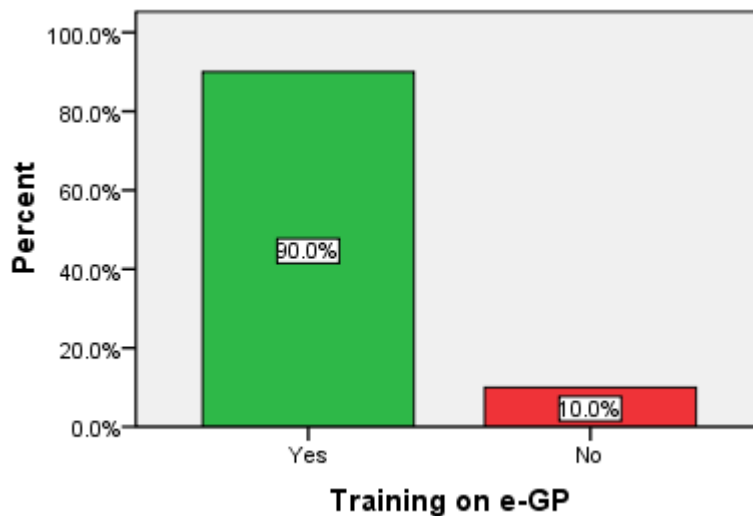
Figure-4.4 illustrates that 90% of the respondents have training on e-GP and 10% of the respondents did not get training on e-GP. So, majority of the respondents have training on e-GP.

4.1.5 Knowledge level about e-GP

Figure-4.5: Knowledge level about e-GP
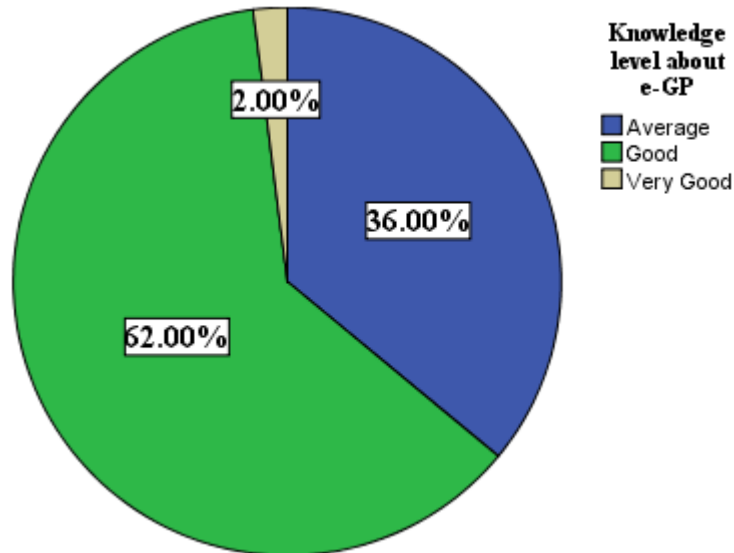
Figure-4.5 illustrates that 62% of the respondents have good knowledge level about e-GP and 36% of the respondents have average knowledge level about e-GP.

4.2 Assessments of Prospects/Benefits of e-GP

4.2.1 Transparency in e-Procurement

Table-4.1: Descriptive Statistics and Chi-square test of factors of Transparency

Factors related to Transparency in e-GP	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Secrecy of bidders information	50	4.48	0.614	18.28	2	0.000
Openness of information regarding procurement	50	4.34	0.658	12.28	2	0.002
Real time access to information	50	4.22	0.764	24.72	3	0.000
Scope of online vigilance and monitoring	50	4.12	0.746	25.68	3	0.000
Public accessibility to information of tender process	50	4.00	0.969	30.40	4	0.000
Valid N (listwise)	50					

Figure-4.6: Factors of Transparency in e-Procurement
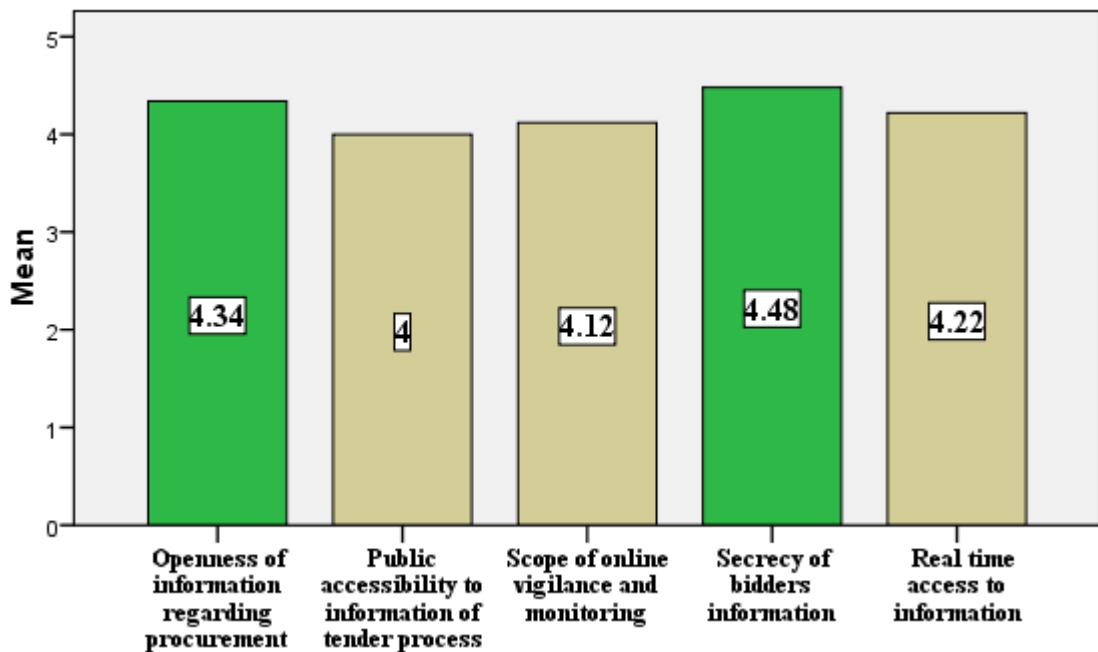
The Figure 4.6 and Table 4.1 show the result related to Transparency in e-GP. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of Transparency in e-Procurement (Table 4.1) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the Transparency in e-GP.

From the present study, we found that all the attributes of Transparency are ranked above 4 that means "good" by the respondents in a 5 point Likert scale. The factor "Secrecy of bidder's information" has got highest ranking that is 4.48 and "Openness of information regarding procurement" has got second highest ranking and ranked 4.34. So, from the study "Secrecy of bidder's information" and "Openness of information regarding procurement" are identified by the respondents as two most beneficial factors for ensuring Transparency in e-Procurement.

The combine mean of Transparency in e-Procurement is 4.23, which indicates that improvement of transparency in procurement is above "good" level after introducing e-Procurement.

e-Procurement increases transparency in works and services and improves better interaction between supplier and vendors and citizens through online system (Adebiyi et al., 2010).

4.2.2 Good Governance in e-Procurement

Table-4.2: Descriptive Statistics and Chi-square test of factors of Good Governance

Factors related to good governance in e-Procurement	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Reduction of tender box snatching	50	4.84	0.422	63.16	2	0.000
Reduction of collusion among the bidders	50	4.48	0.646	17.44	2	0.000
Competition among the bidders	50	4.38	0.697	35.60	3	0.000
Elimination of undue pressure	50	4.30	0.789	26.00	3	0.000
Selection process of bidders	50	4.24	0.870	23.44	3	0.000
Participation of qualified bidders	50	4.18	0.800	20.56	3	0.000
Managerial control and collaboration	50	4.16	0.710	6.76	2	0.034
Inventory management in e-GP	50	3.84	0.997	25.80	4	0.000
Performance monitoring by PROMIS	50	3.78	0.932	28.40	4	0.000
Pre-qualifying process in e-GP	50	3.54	1.129	20.40	4	0.000
Valid N (listwise)	50					

Figures-4.7: Factors of good governance in e-Procurement
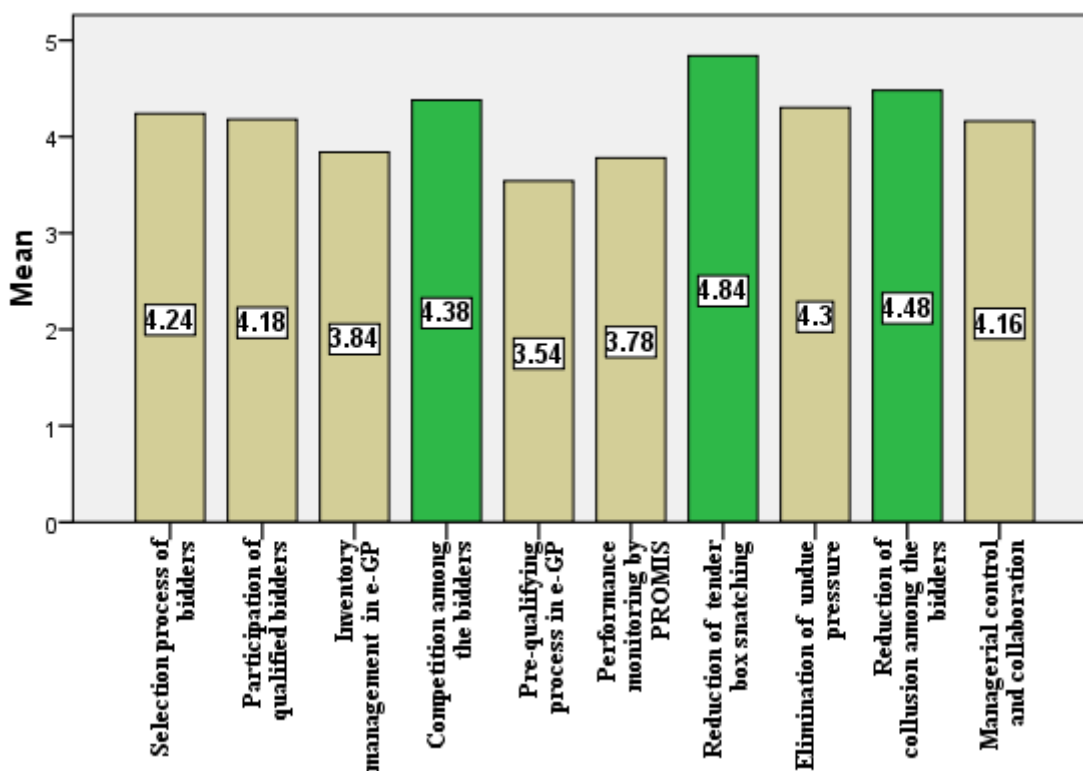
The Figure 4.7 and Table 4.2 show the result related to good governance in e-GP. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of good governance in e-Procurement (Table 4.2) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence for ensuring good governance in e-GP.

From the present study, we found that the factors of good governance such as (1) Reduction of tender box snatching (2) Reduction of collusion among the bidders (3) Competition among the bidders (4) Elimination of undue pressure (5) Selection process of bidders (6) Participation of qualified bidders and (7) Managerial control and collaboration are ranked above 4 that means "good" by the respondents in a 5 point Likert scale. The factor "Reduction of tender box snatching" has got highest ranking that is 4.84 and The factor "Reduction of collusion among the bidders" has got second highest ranking and ranked 4.48. The factor "Competition among the bidders" has got third highest ranking and ranked 4.38. So, from the study the factors such as (1) Reduction of tender box snatching (2) Reduction of collusion among the bidders and (3) Competition among the bidders are identified by the respondents as three most beneficial factors for ensuring good governance in e-Procurement.

The combine mean of good governance in e-Procurement is 4.17, which indicates that improvement of good governance in procurement is above "good" level after introducing e-Procurement.

During focus group discussion the bidders said that they are now free from undue pressure in submitting tender. They can submit tender from their home without any obstacle. The law and order situation in case of tender activity is better than before. The bidders said that the competition among the bidders has increased after introducing e-Procurement.

During Key Informant Interview, Mr. Al Mamun, Executive Engineer, RHD, Rangpur said that collusion among the bidders has reduced significantly. He also said that tender box snatching problem in manual tendering has solved after introducing e-Procurement. He also said that competition among the bidders has increased in e-Procurement system than manual tender.

Online bidding system automatically reduces the cartel, collusion and riggings among the bidders (Pathak et al., 2006).

4.2.2.1 Document Analysis:

Figure-4.8: Average number of Tenderers purchased Tender documents
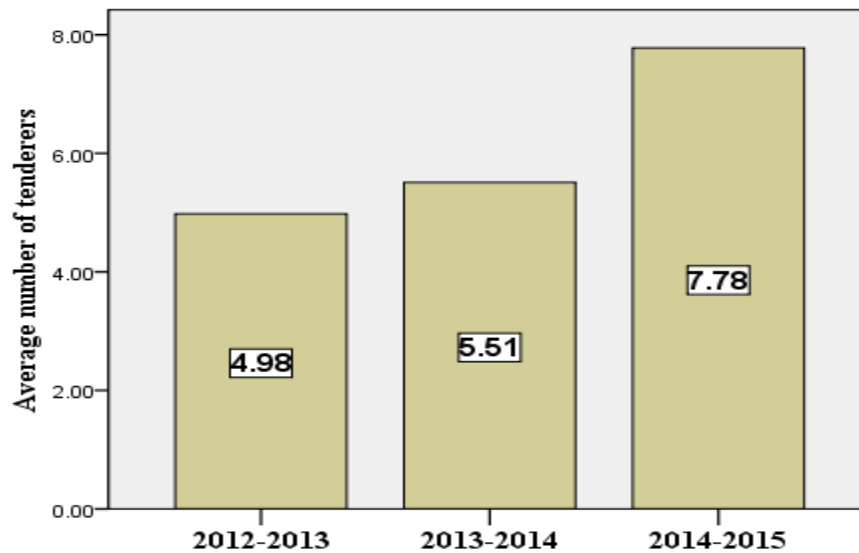
Figure-4.9: Average Number of Tenderers Submitted Tenders/Proposals
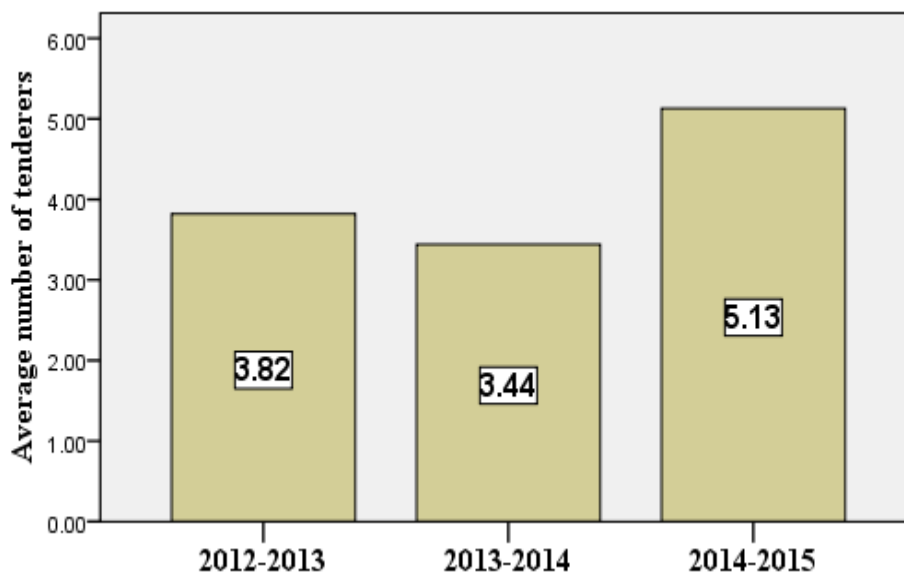
The Figures 4.8 and 4.9 are graphed from the data of PROMIS report received from system analyst of RHD, Dhaka. The figure shows that the average number of tenderers purchased tender documents is increasing in every year. The average number of tenderer purchased tender documents in 2012-2013 is 4.98. The average number of tenderers purchased tender documents is increased to 7.78 in the financial year 2014-2015. The average number of tenderers submitted tender is also increasing in every year. The average number of tenderers submitted tender has increased from 3.82 to 5.13 in last three years. This indicates that the competition among the bidders has increased after introducing e-Procurement.

4.2.3 Efficiency in e-Procurement

Table-4.3: Descriptive Statistics and Chi-square test of factors of Efficiency in e-GP

Factors related to efficiency in e-Procurement	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Improvement of total tendering process after implementation of e-GP.	50	4.28	0.640	13.72	2	0.001
Faster and easier e-Procurement process	50	4.00	0.881	35.60	4	0.000
Positive change of staff concentration	50	3.92	0.804	16.88	3	0.001
Reduction of errors	50	3.82	0.850	14.80	3	0.002
Improvement in cash flow compared to manual system	50	3.78	0.910	29.40	4	0.000
Best quality, low price	50	3.76	0.870	33.20	4	0.000
Effectiveness of low Internet knowledge of bidders	50	2.80	0.833	16.72	3	0.001
Valid N (listwise)	50					

The Figure 4.10 and Table 4.3 show the result related to Efficiency in e-Procurement. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of Efficiency in e-Procurement (Table 4.3) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the Efficiency in e-Procurement.

Figure-4.10: Factors of Efficiency in e-Procurement
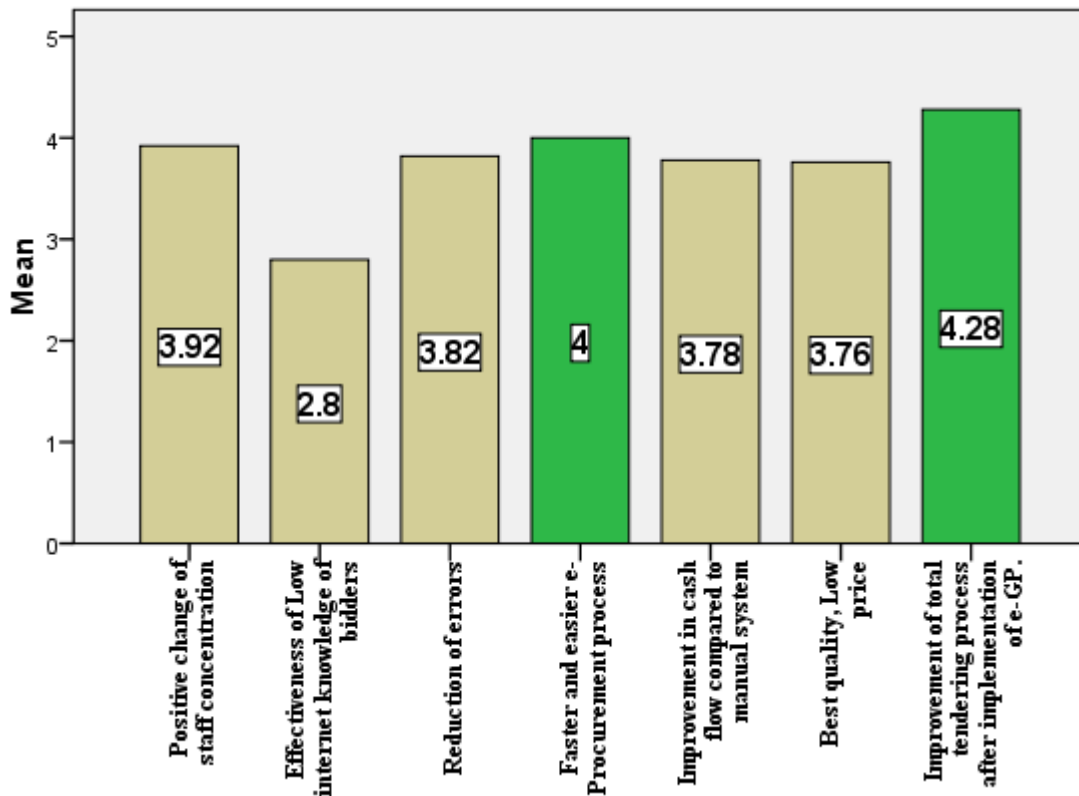
From the present study, we found that the factors of Efficiency in e-Procurement such as (1) Improvement of total tendering process after implementation of e-GP and (2) Faster and easier e-Procurement process are ranked above 4 that means "good" by the respondents in a 5 point Likert scale. The factor "Improvement of total tendering process after implementation of e-GP" has got highest ranking that is 4.28 and the factor "Faster and easier e-Procurement process" has got second highest ranking and ranked 4. So, from the study the factors (1) Improvement of total tendering process after implementation of e-GP and (2) Faster and easier e-Procurement process are identified by the respondents as two most beneficial factors for ensuring Efficiency in e-Procurement.

The combine mean of Efficiency in e-Procurement is 3.77, which indicates that improvement of Efficiency in procurement is above "Average" level after introducing e-Procurement.

During Key Informant Interview, Director CPTU, Mr. Aziz Taher Khan said that Bidders get information from automatic mobile message from e-GP system.

e-Procurement eliminates the direct human interaction on bidding and other work and services, corruption is decreased significantly, and internal efficiency increase in government departments (Ndou, 2004).

4.2.3.1 Document Analysis:

Figure-4.11: Average number of days between tender evaluation and approval contract
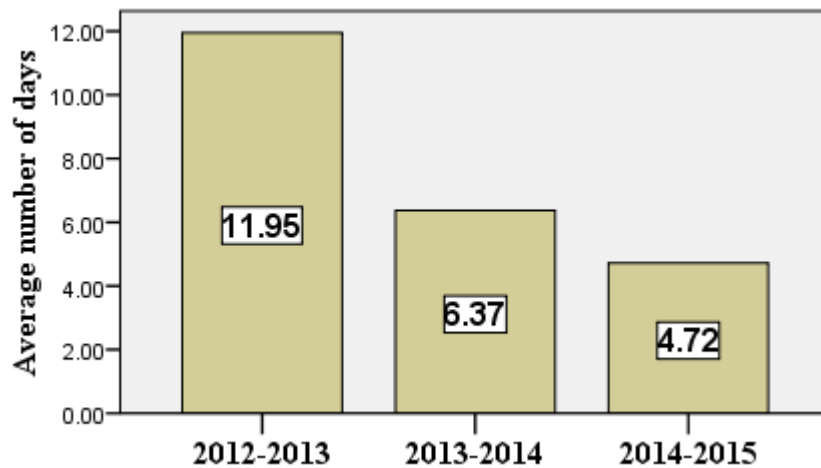
Figure-4.12: Average number of days taken between final approval and NOA
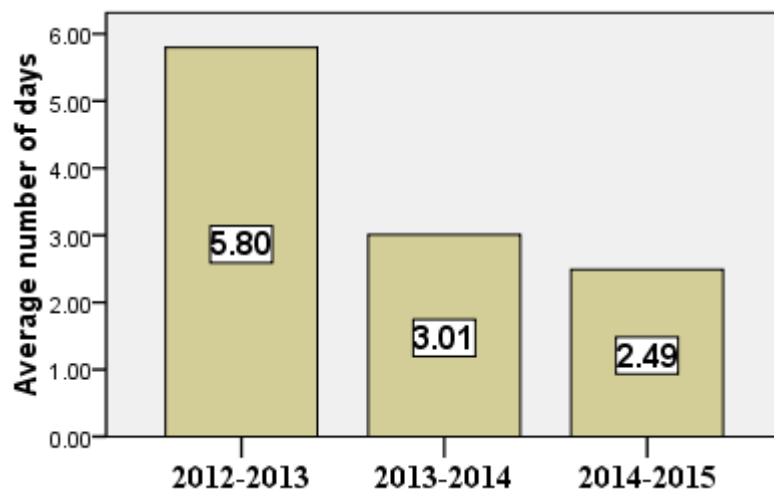
The Figures 4.11 and 4.12 are graphed from the data of PROMIS report received from system analyst of RHD, Dhaka. The figures show that the average number of days taken between tender evaluation and approval contract is decreasing in every year. The average number of days taken between tender evaluation and approval contract has decreased from 11.95 to 4.72 in last three years. The average number of days taken between final approval and Notification of Award (NOA) is also decreasing in every year. The average number of days taken between final approval and

Notification of Award (NOA) has also decreased from 5.80 to 2.49 in last three years. Thus the e-Procurement system is becoming faster than manual tendering and the efficiency has ensured in e-Procurement.

4.2.4 Process Improvement in e-Procurement

Table-4.4: Descriptive Statistics and Chi-square test of factors of Process improvement

Factors related to Process improvement in e-GP	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Availability of tender notice online	50	4.56	0.611	23.56	2	0.000
Necessary tender documents on online	50	4.30	0.678	36.88	3	0.000
Automatic generation of necessary report in e-GP	50	4.24	0.771	24.56	2	0.000
Workflow management	50	4.16	0.710	6.76	2	0.034
Automation of procurement process	50	4.14	0.857	20.72	3	0.000
'One Click' publishing to websites	50	4.12	0.961	33.40	4	0.000
Accuracy of purchase decisions	50	4.02	0.795	18.32	3	0.000
Managing capacity of large number of bidders	50	3.92	0.900	13.68	3	0.003
e-Contract Management System	50	3.78	0.910	33.00	4	0.000
Valid N (listwise)	50					

Figure-4.13: Factors of Process improvement in e-Procurement
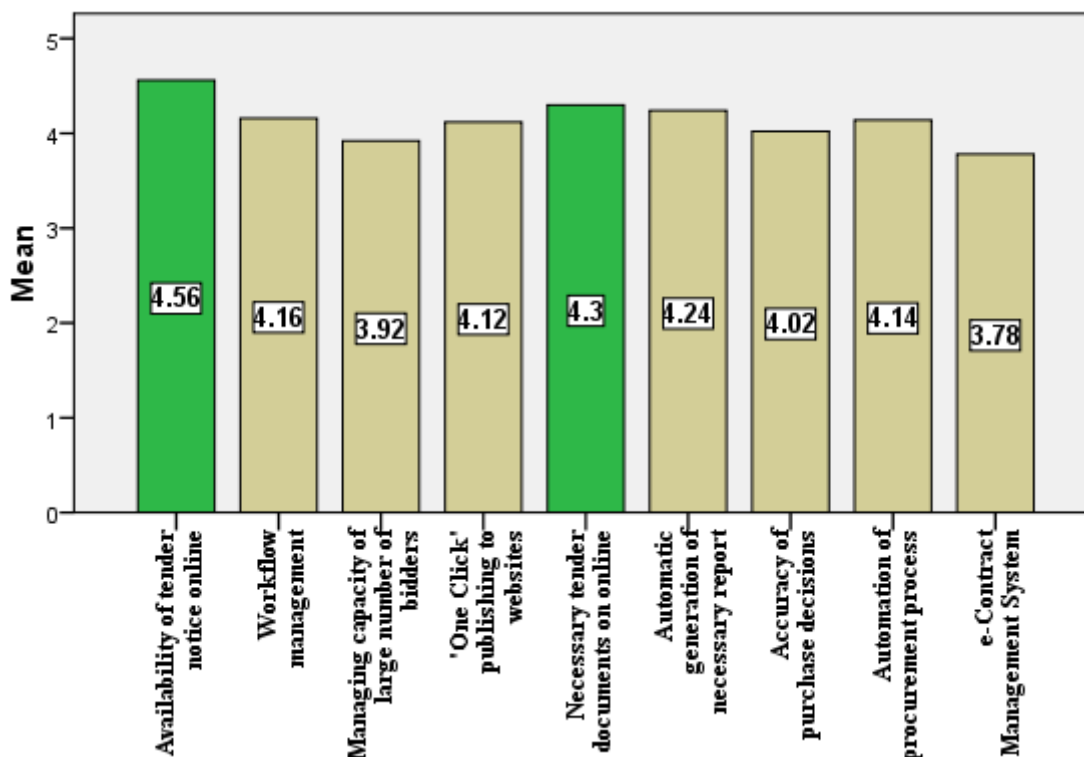
The Figure 4.13 and Table 4.4 show the result related to Process improvement in e-Procurement. To measure the significance level, the chi-square test has done for the

variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of Process improvement in e-Procurement (Table 4.4) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence for ensuring Process improvement in e-Procurement.

From the present study, the respondents identified that the factors such as (1) Availability of tender notice online (2) Necessary tender documents on online (3) Automatic generation of necessary report in e-GP system (4) Workflow management (5) Automation of procurement process (6) 'One Click' publishing to websites and (7) Accuracy of purchase decisions have ranked above 4 that means above "good" by the respondents in a 5 point Likert scale. The factor "Availability of tender notice online" has got highest ranking that is 4.56 and the factor "Necessary tender documents on online" has got second highest ranking and ranked 4.3. So, from study the factors such as (1) Availability of tender notice online and (2) Necessary tender documents on online are identified by the respondents as two most beneficial factors for Process improvement in e-Procurement.

The combine mean of Process improvement in e-Procurement is 4.14, which indicates that Process improvement in procurement is above "Good" level after introducing e-Procurement.

During focus group discussion the bidders said that they are enjoying the e-Procurement facilities and they can submit tender from their home as all the necessary documents are available on online.

During Key Informant Interview, Mr. Ahsan Habib, Executive Engineer, Procurement Division, RHD, Dhaka said that availability of necessary documents on online has ensured the procurement process simple and easy. He also said that all reports in e-GP system generated automatically. He said that introduction of e-Payment system would enhance the automation system.

During Key Informant Interview, Director CPTU, Mr. Wahiduzzaman said that at present we have no bidder's database. CPTU is working to prepare bidders database in order to be improved the procurement process.

4.2.5 Overall status of Four variables for Prospects/Benefits of e-GP:

The overall status of four beneficial factors could be presented on the basis of average perception of the surveyed engineers. Perception of the surveyed engineers may be presented through a Radar Chart, where average perception indicates the overall condition of the each individual's factor. Overall status of the four variables related to prospects/benefits of e-GP is presented in Figure 4.14.

The Figure 4.14 indicates that the factor 'Transparency in e-Procurement' is the most beneficial as respondents perceive that status of this factor is above the "Good" level. Second beneficial factor is "Good governance in e-Procurement", third beneficial factor is "Process improvement in e-Procurement", and finally comparatively less beneficial factor is "Efficiency in e-Procurement" as it ranked 3.77 that means below "Good" level but above "Average" level.

Figure-4.14: Status of four variables related to benefits of e-GP
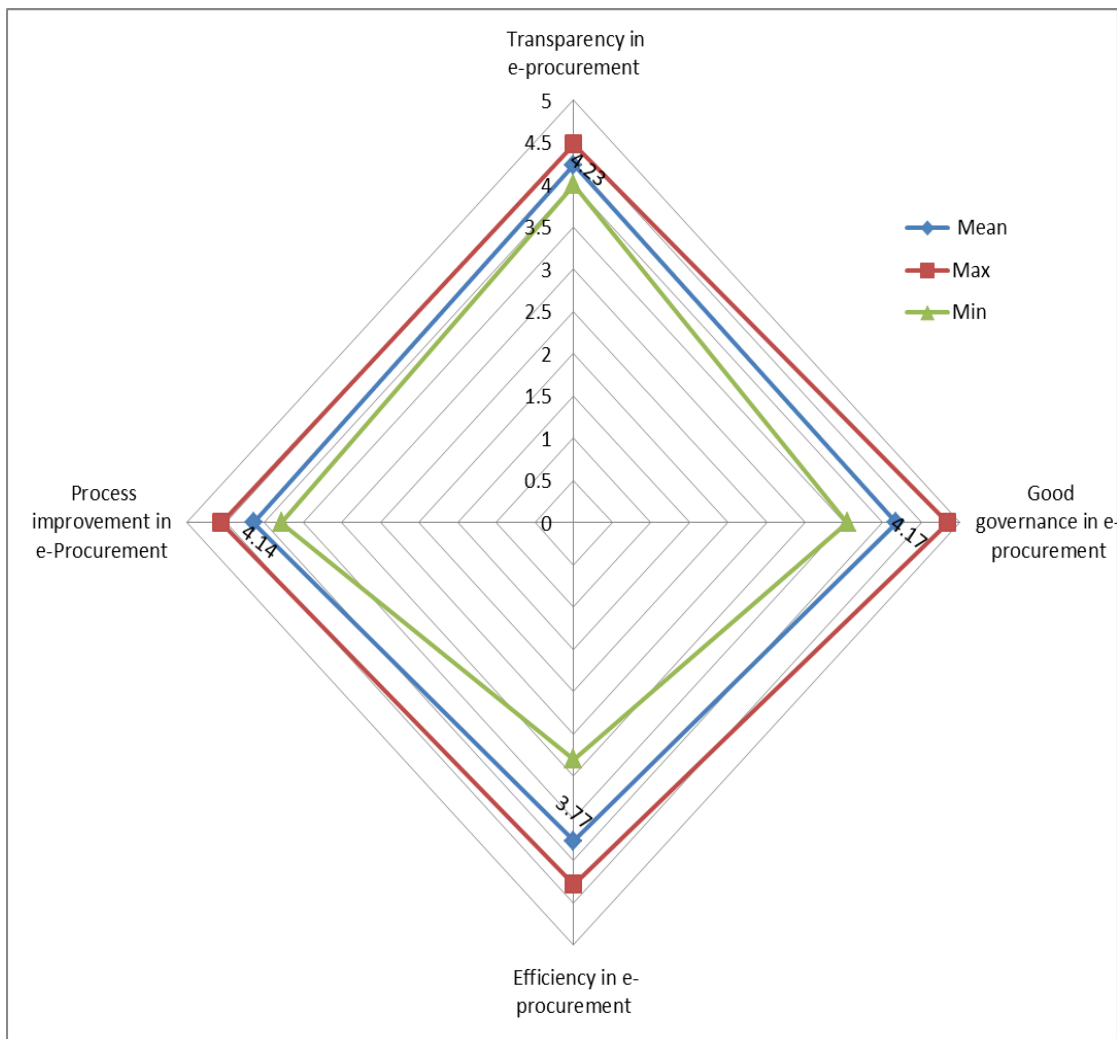
4.3 Cost and Time savings in e-GP than Manual Tender:

Table-4.5: Cost savings in e-GP than manual tender in different procurement steps

Procurement steps	e-GP		Manual tender		Savings (%)
	Mean(Taka)	Std. Deviation	Mean (Taka)	Std. Deviation	
Cost of advertisement of tender notice	9160.84	12491.957	28135.33	23864.750	67.44%
Cost of Tender Document preparation	656.08	2100.913	22820.00	28823.663	97.12%
Cost of Pre-tender meeting	534.02	1737.175	1896.00	3150.377	71.83%
Cost of collection of Tenders from multiple locations	42.04	282.902	3050.10	3571.698	98.62%
Cost of TOC & TEC Members creation & management	224.22	1297.615	1116.00	2509.196	79.91%
TOC & TEC Members honorarium	1140.02	2424.440	3230.00	3374.892	64.71%
Cost of Tender Evaluation Report preparation	996.08	2288.709	2312.00	4509.837	56.92%
Cost of Sending Tender Evaluation Report to Approving authority for approval	2.02	14.140	1162.10	1751.187	99.83%
Cost of issuance of Notification of Award & communicate with tenderer	142.02	755.949	613.00	1689.035	76.83%
Cost of contract agreement	707.02	1724.870	861.00	2087.580	17.88%

Table-4.6: Time savings in e-GP than manual tender in different procurement steps:

Procurement steps	e-GP		Manual tender		Savings (%)
	Mean (Days)	Std. Deviation	Mean (Days)	Std. Deviation	
Time for advertisement of tender notice	9.62	11.721	13.38	14.930	28.10%
Time for Tender Document preparation	2.50	2.178	7.90	6.293	68.35%
Time for Pre-tender meeting	1.28	1.773	3.60	4.899	64.44%
Time for collection of tenders from multiple locations	.30	0.463	1.06	.736	71.75%
Time for TOC & TEC Members creation & management	1.09	1.435	3.78	3.754	71.16%
TOC & TEC Members honorarium payment time	0.50	1.111	1.28	2.382	60.94%
Time for Tender Evaluation Report preparation	4.72	3.828	9.16	7.240	48.47%
Time for sending Tender Evaluation Report to Approving authority for approval	1.92	3.374	5.06	6.377	62.06%
Time for issuance of Notification of Award & communicate with tenderer	1.58	2.031	4.08	3.056	61.27%
Time for contract agreement	4.60	7.505	6.08	8.495	24.34%

4.3.1 Advertisement of Tender Notice

Figure-4.15: Cost comparison

Comparison of cost for advertisement of Tender notice between e-GP and manual tender

Mean (Taka)

28135.33

9160.84

Cost of advertisement of Tender notice in e-GP

Cost of advertisement of Tender notice in manual tender
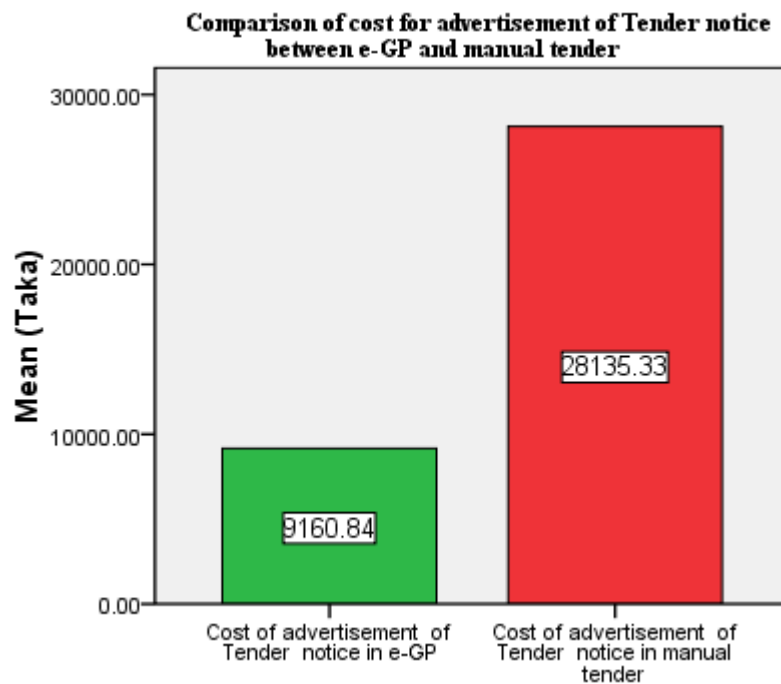
Figure-4.16: Time comparison

Comparison of Time for advertisement of Tender notice between e-GP and manual tender

Mean (Days)

13.38

9.62

Time for advertisement of Tender notice in e-GP

Time for advertisement of Tender notice in manual tender
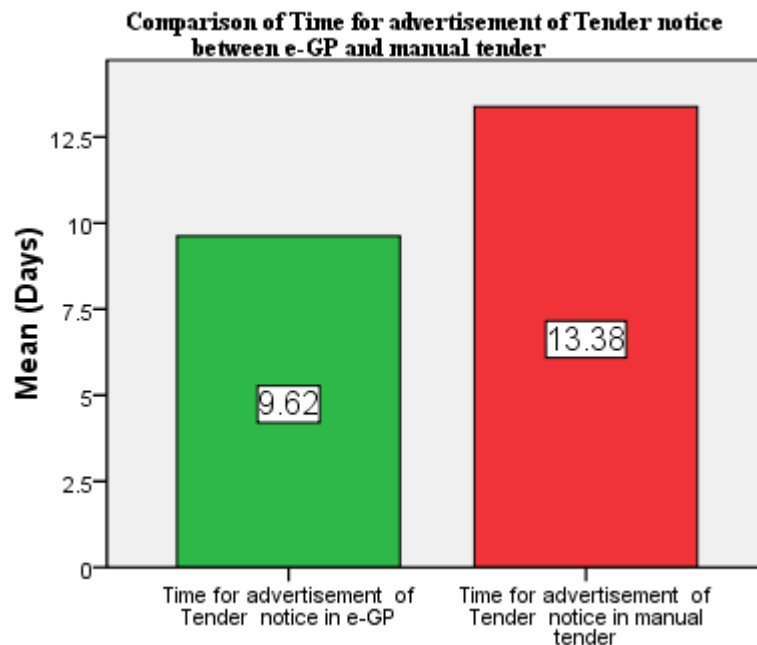
From Figures 4.15 and 4.16, the study found that there is significant savings in cost and time for advertisement of tender notice in e-GP system as compared to manual tender. The cost for advertisement of tender notice in manual tendering is 28135.33 taka. The cost of advertisement of tender notice in e-Procurement system has reduced

significantly to 9160.84 taka. The study indicates 67.44% cost savings for advertisement of tender notice in e-GP system as compared to manual tender. The time for advertisement of tender notice in manual tendering is 13.38 days. The time for advertisement of tender notice in e-GP system has reduced significantly to 9.62 days. The study indicates 28.10% time savings for advertisement of tender notice in e-GP system as compared to manual tender.

4.3.2 Tender Document Preparation

Figure-4.17: Cost comparison
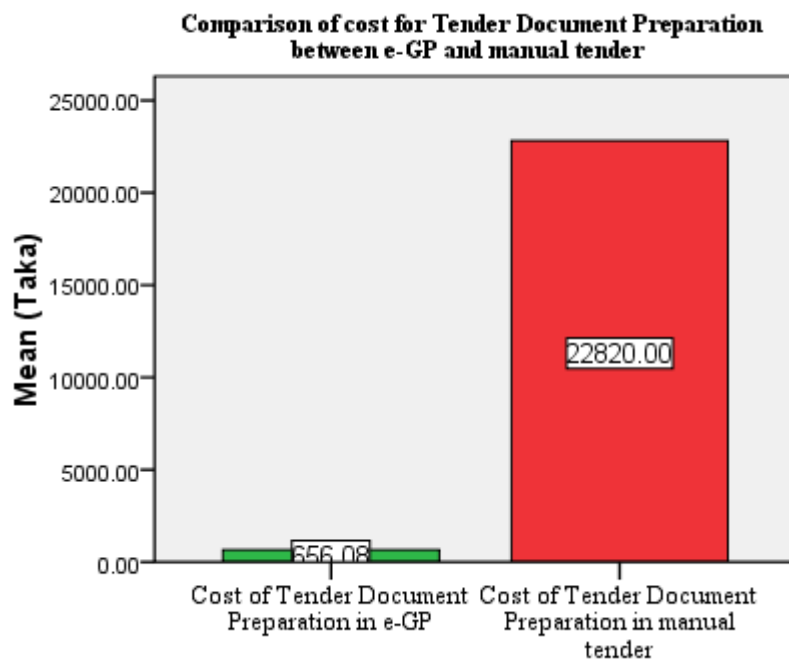
From Figures 4.17 and 4.18, the study found that, there is significant savings in cost and time for tender document preparation in e-GP system as compared to manual tendering. The cost for tender document preparation in manual tendering is 22820 taka. The cost for tender document preparation in e-GP system has reduced significantly to 656.08 taka. The study indicates 97.12% cost savings for tender document preparation in e-GP system as compared to manual tender.

Figure-4.18: Time comparison

Comparison of time for Tender Document Preparation
between e-GP and manual tender
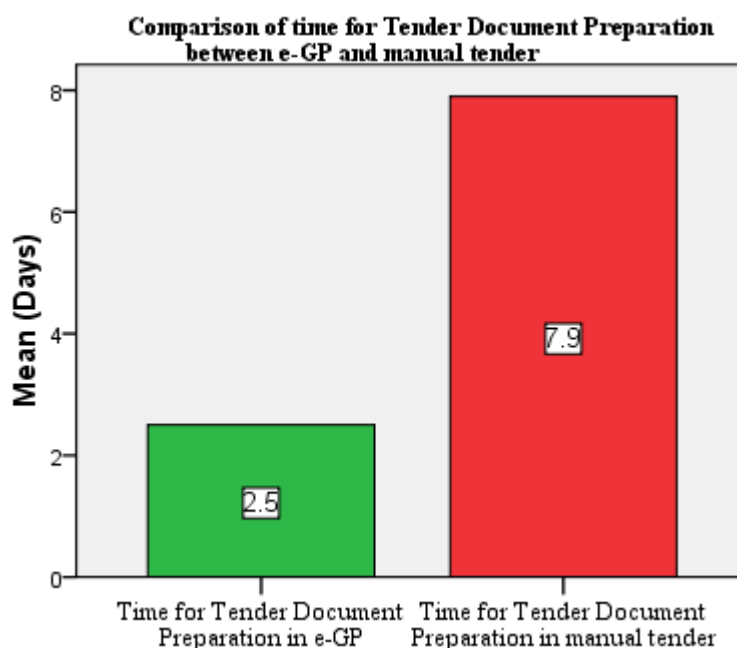
The time for tender document preparation in manual tendering is 7.9 days. The time for tender document preparation in e-GP system has reduced significantly to 2.5 days. The study indicates 68.35% time savings for tender document preparation in e-GP system as compared to manual tender.

4.3.3 Pre tender Meeting

From below Figures 4.19 and 4.20, the study found that there is significant cost and time savings for Pre-tender meeting in e-GP system as compared to manual tendering. The cost for Pre-tender meeting in manual tendering is 1896.00 taka. The cost for pre-tender meeting in e-GP system has reduced significantly to 534.02 taka. The study indicates 71.83% cost savings for Pre-tender meeting in e-GP system as compared to manual tender.

The time for Pre-tender meeting in manual tendering is 3.6 days. The time for Pre-tender meeting in e-GP system has reduced significantly to 1.28 days. The study indicates 64.44% time savings for Pre-tender meeting in e-GP system as compared to manual tender.

Figure-4.19: Cost comparison

Comparison of cost for Pre-tender Meeting in e-GP and manual tender
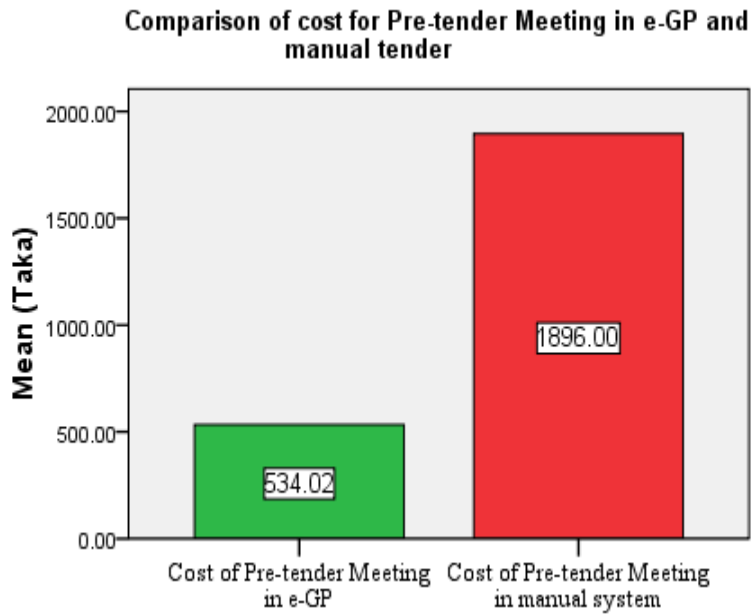
Figure-4.20: Time comparison

Comparison of time for Pre-tender Meeting between e-GP and manual tender
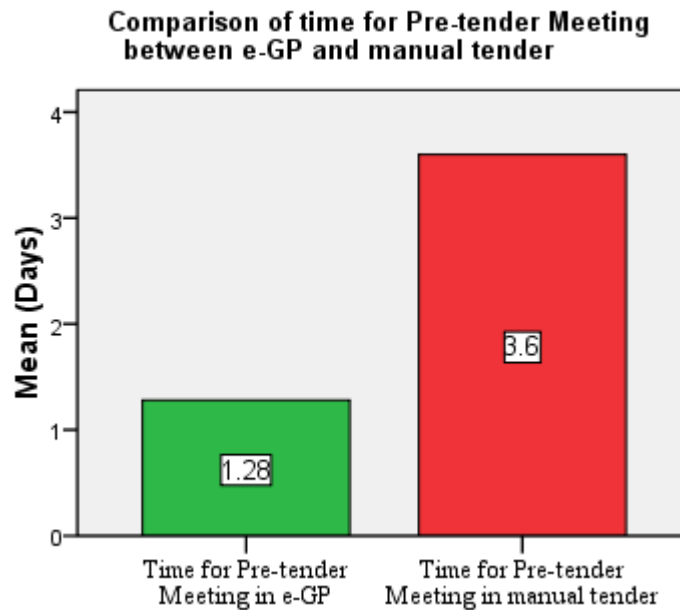
4.3.4 Collection of Tender from Multiple Locations

From Figures 4.21 and 4.22, the study found that there are significant savings in cost and time for collection of tenders from multiple locations in e-GP system as compared to manual tendering. The cost for collection of tender from multiple locations in manual tendering is 3050.10 taka. The cost for collection of tender from multiple locations in e-GP system has reduced significantly to 42.04 taka.

Figure-4.21: Cost comparison

Comparison of cost for Collection of Tenders from multiple locations in e-GP and manual tender
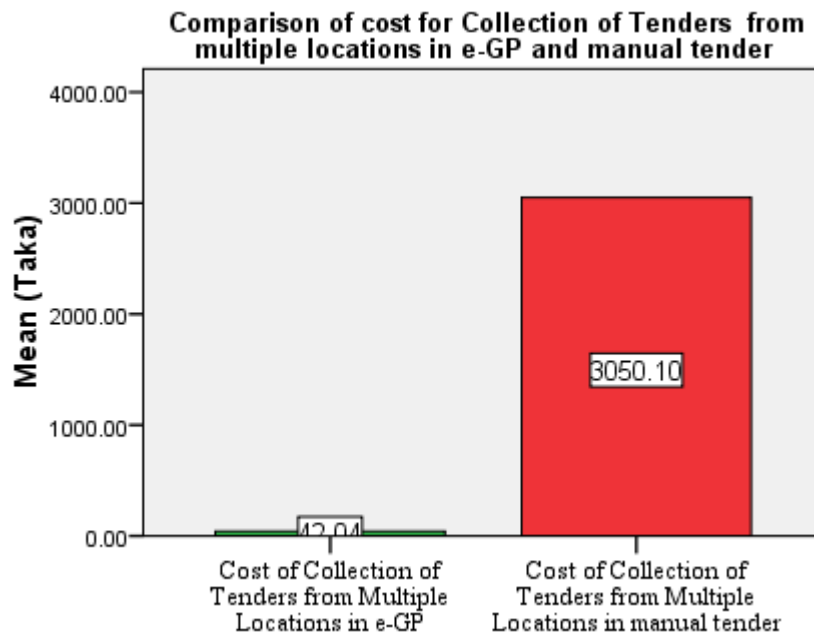
Figure-4.22: Time comparison

Comparison of time for Collection of Tenders from multiple locations in e-GP and manual tender
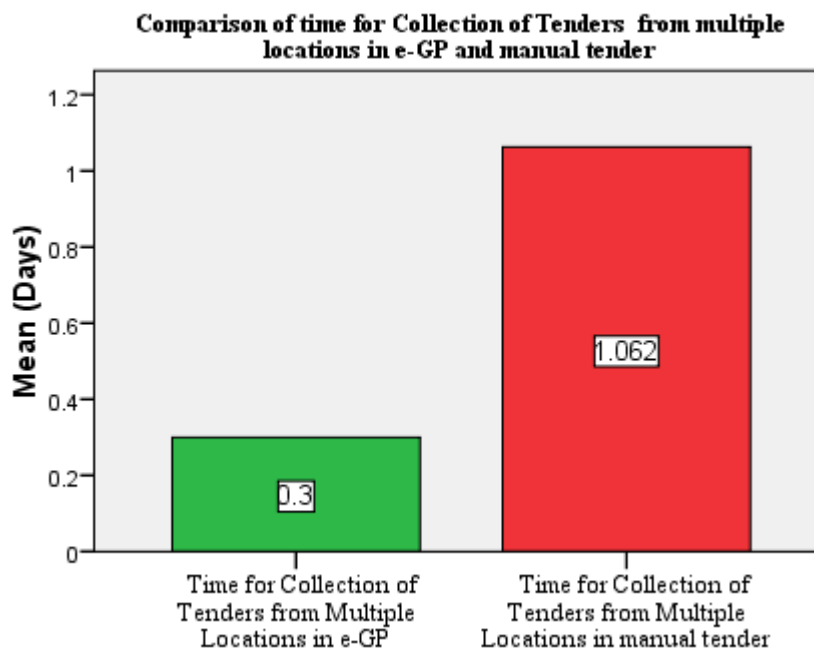
The study indicates 98.62% cost savings for collection of tenders from multiple locations in e-GP system as compared to manual tender. The time for collection of tender from multiple locations in manual tendering is 1.062 days. The time for collection of tender from multiple locations in e-GP system has reduced significantly to 0.3 days. The study indicates 71.75% time savings for collection of tender from multiple locations in e-GP system as compared to manual tender.

4.3.5 TOC and TEC member Creation and Management

From Figures 4.23 and 4.24, the study found that there are significant savings in cost and time for TOC and TEC member creation and management in e-GP system as compared to manual tendering. The cost for TOC and TEC member creation and management in manual tendering is 1116.00 taka. The cost for TOC and TEC member creation and management in e-GP system has reduced significantly to 224.22 taka.

Figure-4.23: Cost comparison
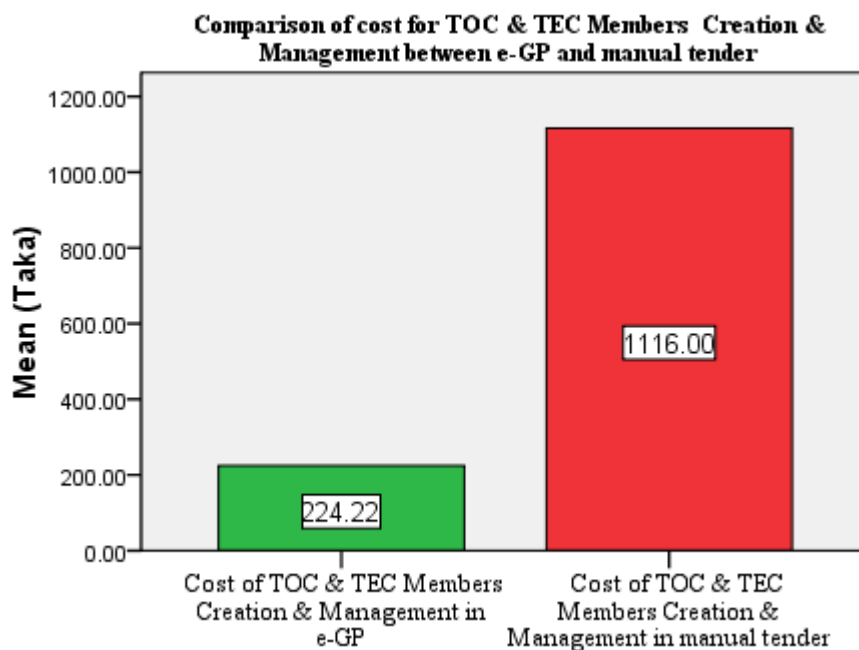
Figure-4.24: Time comparison
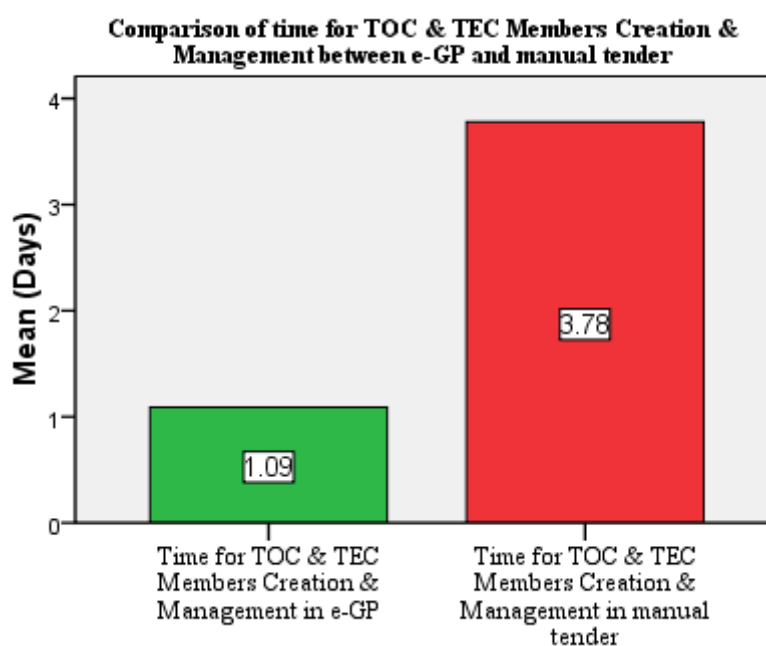
The study indicates 79.91% cost savings for TOC and TEC member creation and management in e-GP system as compared to manual tender. The time for TOC and TEC member creation and management in manual tendering is 3.78 days. The time for TOC and TEC member creation and management in e-GP system has reduced significantly to 1.09 days. The study indicates 71.16% time savings for TOC and TEC member creation and management in e-GP system as compared to manual tender.

4.3.6 TOC and TEC member Honorarium

From Figures 4.25 and 4.26, the study found that there is significant savings in cost and time for TOC and TEC member honorarium in e-GP system as compared to manual tendering. The cost for TOC and TEC member honorarium in manual tendering is 3230.00 taka. The cost for TOC and TEC member honorarium in e-GP system has reduced significantly to 1140.02 taka. The study indicates 64.71% cost savings for TOC and TEC member honorarium in e-GP system as compared to manual tender. The time for TOC and TEC member honorarium payment in manual tendering is 1.28 days. The time for TOC and TEC member honorarium payment in e-GP system has reduced significantly to 0.5 days. The study indicates 60.94% time savings for TOC and TEC member honorarium payment in e-GP system as compared to manual tender.

Figure-4.25: Cost comparison

60
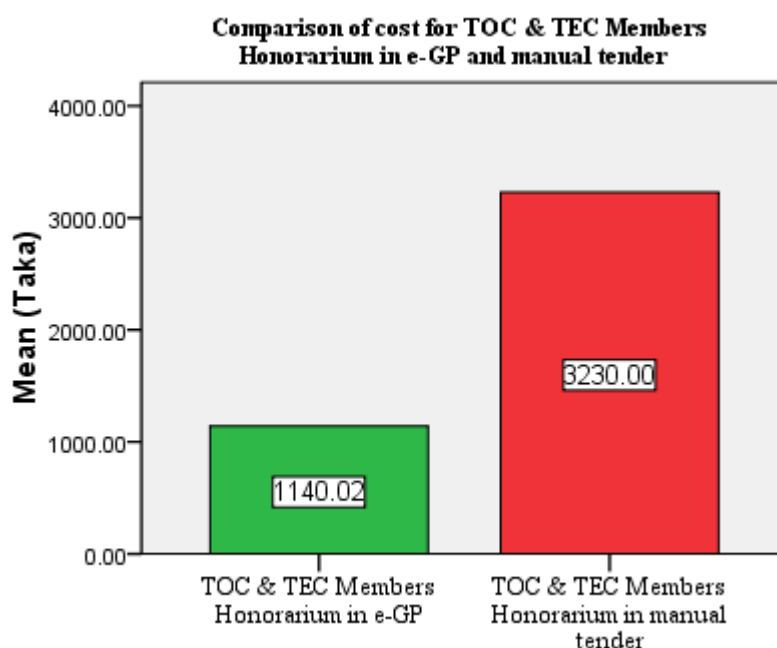
Figure-4.26: Time comparison

Comparison of time for TOC & TEC Members Honorarium between e-GP and manual tender
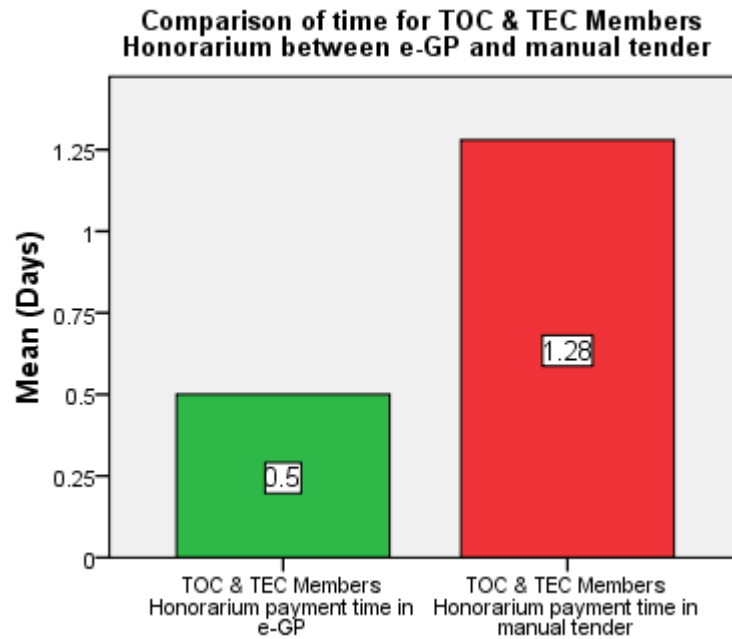
4.3.7 Tender Evaluation Report Preparation

Figure-4.27: Cost comparison

Comparison of cost for Tender Evaluation Report Preparation between e-GP and manual tender
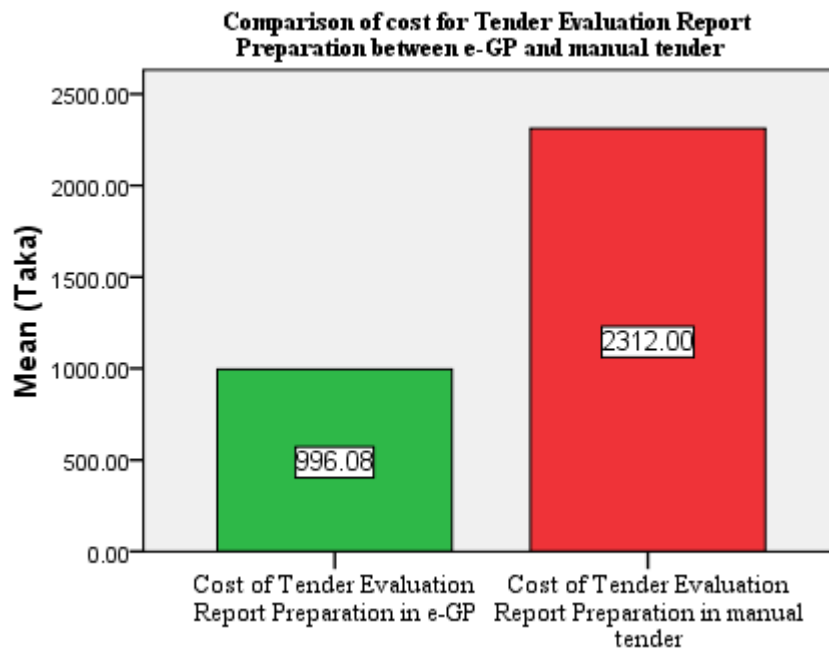
Figure-4.28: Time comparison
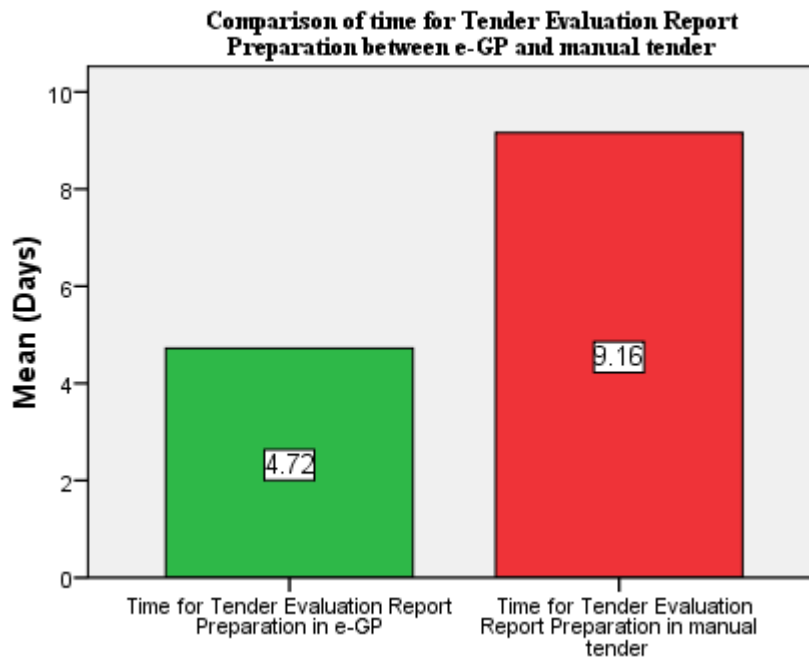
From Figures 4.27 and 4.28, the study found that there are significant savings in cost and time for tender evaluation report preparation in e-GP system as compared to manual tender. The cost for tender evaluation report preparation in manual tendering is 2312.00 taka. The cost for tender evaluation report preparation in e-GP system has reduced significantly to 996.08 taka. The study indicates 56.92% cost savings for tender evaluation report preparation in e-GP system as compared to manual tender. The time for tender evaluation report preparation in manual tendering is 9.16 days. The time for tender evaluation report preparation in e-GP system has reduced significantly to 4.72 days. The study indicates 48.47% time savings for tender evaluation report preparation in e-GP system as compared to manual tender.

4.3.8 Sending tender evaluation report to approving authority

From Figures 4.29 and 4.30, the study found that there are significant savings in cost and time for sending tender evaluation report to approving authority for approval in e-GP system as compared to manual tendering. The cost for sending tender evaluation report to approving authority for approval in manual tendering is 1162.10 taka. The cost for sending tender evaluation report to approving authority for approval in e-GP system has reduced significantly to 2.02 taka. The study indicates 99.83% cost savings for sending tender evaluation report to approving authority for approval in e-GP

Figure-4.29: Cost comparison

Comparison of Cost for Sending Tender Evaluation Report to Approving authority for approval between e-GP and manual tender
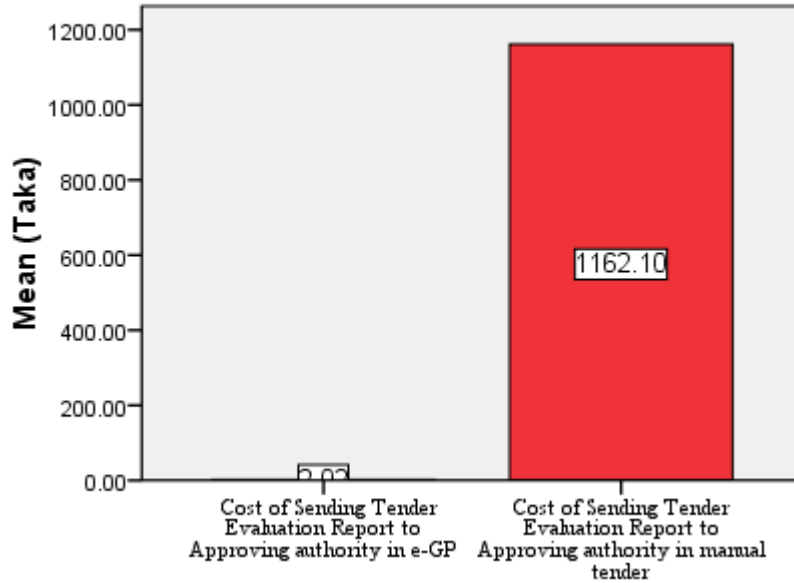
Figure-4.30: Time comparison

Comparison of time for Sending Tender Evaluation Report to Approving authority between e-GP and manual tender
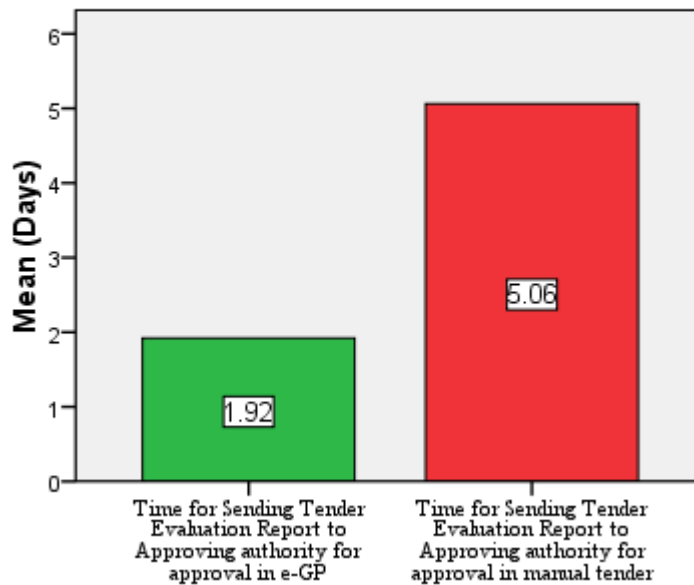
system as compared to manual tendering. The time for sending tender evaluation report to approving authority for approval in manual tendering is 5.06 days. The time for sending tender evaluation report to approving authority for approval in e-GP system has reduced significantly to 1.92 days. The study indicates 62.06% time savings for sending tender evaluation report to approving authority for approval in e-GP system as compared to manual tender.

4.3.9 Issuance of NOA and Communicate with Tenderer

Figure-4.31: Cost comparison

Comparison of cost for Issuance of Notification of award & Communicate with tenderer between e-GP and manual tender
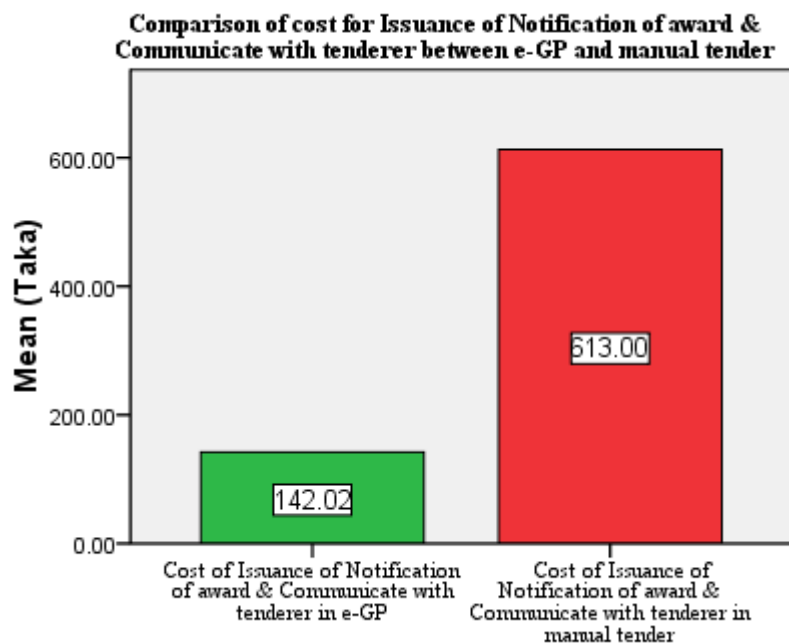
Figure-4.32: Time comparison

Comparison of time for issuance of notification of award and communicate with tenderer between e-GP and manual tender.
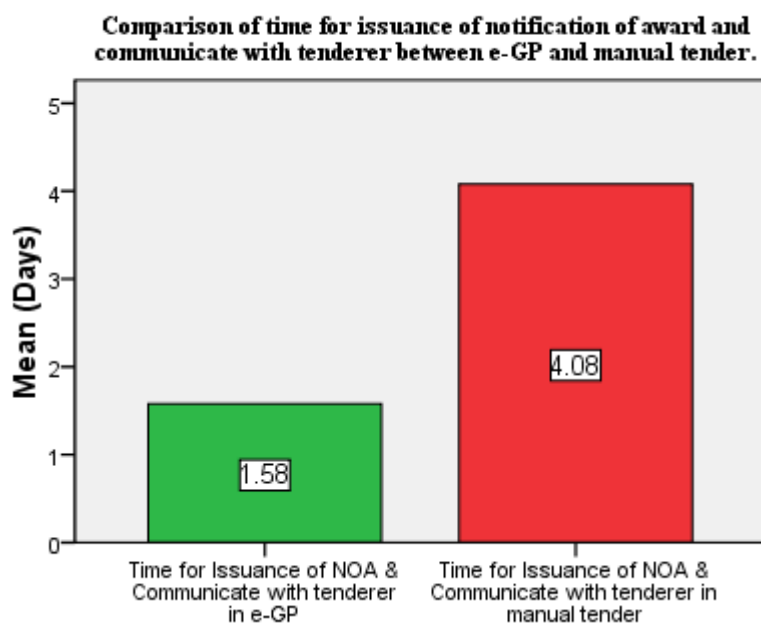
From Figures 4.31 and 4.32, the study found that there are significant savings in cost and time for issuance of notification of award and communicate with tenderer in e-GP system as compared to manual tendering. The cost for issuance of notification of award and communicate with tenderer in manual tendering is 613.00 taka. The cost for issuance of notification of award and communicate with tenderer in e-GP system

has reduced significantly to 142.02 taka. The study indicates 76.83% cost savings for issuance of notification of award and communicate with tenderer in e-GP system as compared to manual tender. The time for issuance of notification of award and communicate with tenderer in manual tendering is 4.08 days. The time for issuance of notification of award and communicate with tenderer in e-GP system has reduced significantly to 1.58 days. The study indicates 61.27% time savings for issuance of notification of award and communicates with tenderer in e-GP system as compared to manual tender.

4.3.10 Contract Agreement

From Figures 4.33 and 4.34, the study found that there are significant savings in cost and time for contract agreement in e-GP system as compared to manual tender. The cost for contract agreement in manual tendering is 861.00 taka. The cost for contract agreement in e-GP system has reduced significantly to 707.02 taka. The study indicates 17.88% cost savings for contract agreement in e-GP system as compared to manual tender. The time for contract agreement in manual tendering is 6.08 days. The time for contract agreement in e-GP system has reduced significantly to 4.6 days. The study indicates 24.34% time savings for contract agreement in e-GP system as compared to manual tender.

Figure-4.33: Cost comparison

Comparison of cost for Contract Agreement between e-GP and manual tender
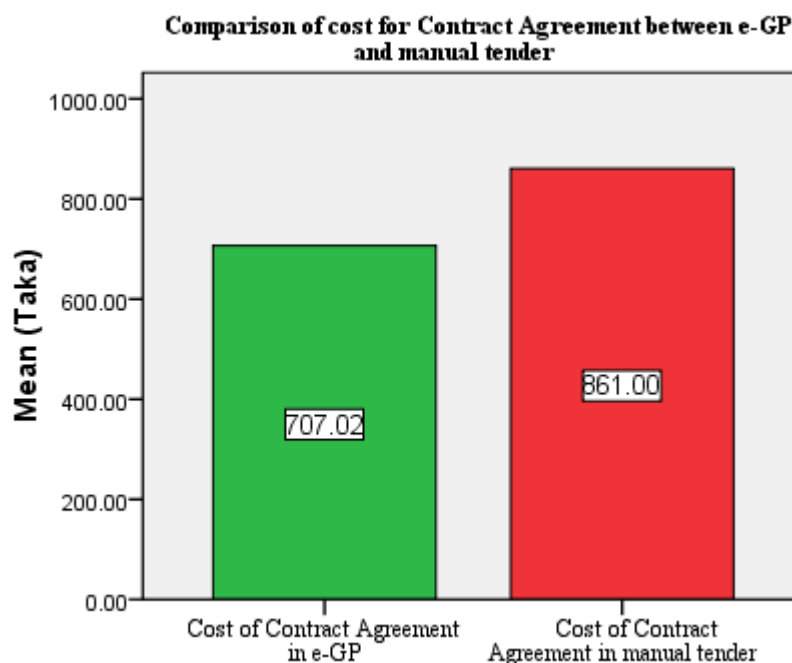
Figure-4.34: Time comparison

Comparison of time for Contract Agreement between e-GP and manual tender
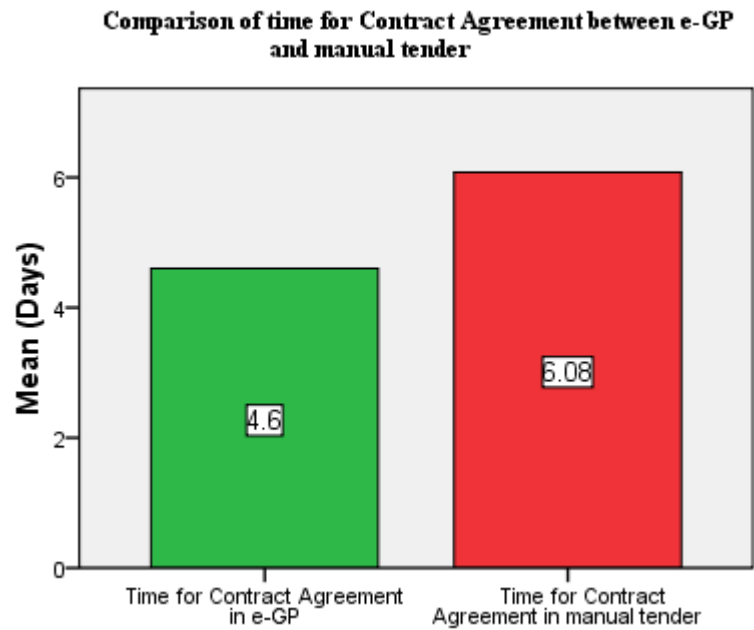
4.3.11 Total Cost and Time savings in e-GP

Figure-4.35: Total Cost comparison

Comparison between total cost in e-GP and total cost in manual tender.
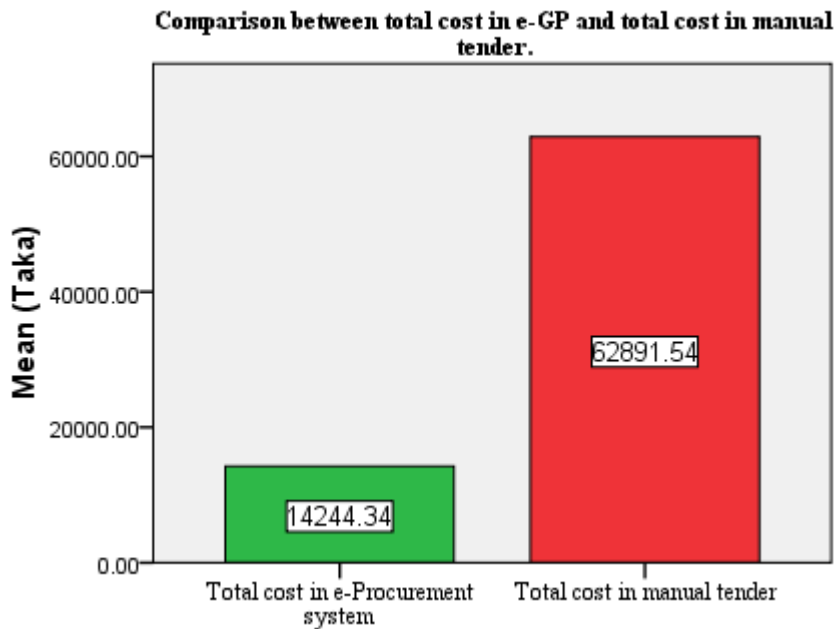
Figure-4.36: Total Time comparison

Comparison between total time in e-GP and total time in manual tender.
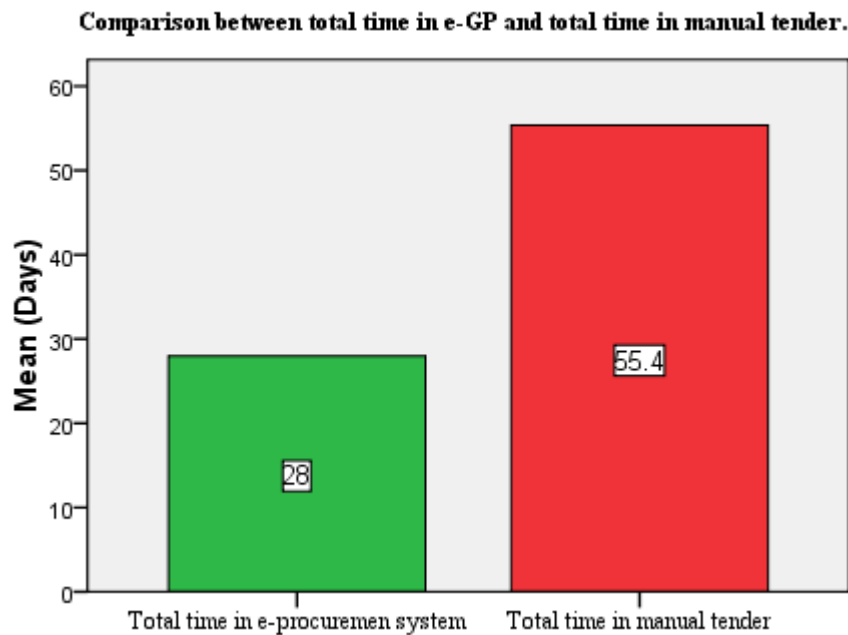
From Figures 4.35 and 4.36, the study found that there are significant savings in total cost and total time for e-GP system as compared to manual tender. The total cost for manual tendering is 62891.54 taka. The total cost for e-GP system has reduced significantly to 14244.34 taka. The study indicates 77.35% total cost savings in e-GP system as compared to manual tender. The total time for manual tendering is 55.4 days. The total time for e-GP system has reduced significantly to 28 days. The study indicates 49.46% total time savings in e-GP system as compared to manual tender.

During focus group discussion the bidders said that as they can submit tender from any places on online, their transportation cost, paper cost etc. have reduced significantly.

During Key Informant Interview (KII), Mr. Ahsan Habib, Executive engineer, RHD said that there are significant time and cost savings in the process of e-Procurement as compared to manual tender.

Another research by Croom and Johnston (2003) found that e-Procurement implementation can have up to 75 % cost reduction in procurement process costs and 16 – 18 % reduction in purchasing price for indirect purchases.

Rahghavan and Prabhu (2004) stated that the e-Procurement has such performance advantages as: (1) reduce overall procurement costs, (2) shorter-order processing and fulfillment cycles, (3) reduction in administrative costs, (4) improved strategic sourcing and (5) reduced inventory costs.

4.3.12 Crosstab Statistics of Total Cost:

Table 4.7 shows the crosstab statistics of total cost in e-Procurement and manual tender. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of the crosstab statistics (Table 4.8) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, the test rejected the null hypothesis Ho and it indicates that the total cost in e-Procurement will be always lowered than the total cost of manual tender.

Table-4.7: Total cost in e-GP system vs. Total cost in manual tender Cross tabulation

Count		Total cost in manual tender												Total
		0-10000	10000-20000	20000-30000	30000-40000	40000-50000	50000-60000	60000-70000	70000-80000	80000-90000	90000-100000	100000-110000	110000+	
Total cost in e-GP system	0-1000	5	0	1	0	0	0	0	0	0	1	0	1	8
	1000-2000	0	0	0	1	0	1	0	0	0	0	0	0	2
	2000-3000	0	0	0	0	0	0	0	0	0	0	0	1	1
	3000-4000	0	0	0	2	0	0	0	0	0	0	1	0	3
	4000-5000	0	1	0	0	0	0	0	0	0	0	0	1	2
	5000-6000	2	0	0	3	2	0	0	0	0	0	0	0	7
	6000-7000	0	2	0	0	0	1	0	0	0	0	0	0	3
	8000-9000	0	0	0	0	1	0	0	0	0	0	0	0	1
	10000-11000	0	0	0	1	0	0	0	0	0	0	0	0	1
	11000+	0	0	0	2	1	3	4	3	3	2	0	4	22
Total		7	3	1	9	4	5	4	3	3	3	1	7	50

Ho: The total cost in e-Procurement is higher than the total cost in manual tender.

Vs. H1: The total cost in e-GP is lower than the total cost in manual tender.

Table 4.8: Chi-Square test of Total Cost

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	131.0[a]	99	.017
Likelihood Ratio	98.554	99	.494
Linear-by-Linear Association	8.372	1	.004
N of Valid Cases	50		

4.3.13 Crosstab Statistics of Total Time:

Table 4.9 shows the crosstab statistics of total time in e-Procurement and manual tender. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of the crosstab statistics (Table 4.10) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, the test rejected the null hypothesis Ho and it indicates that the total time in e-Procurement will be always lowered than the total time of manual tender.

Table-4.9: Total time in e-GP system vs. Total time in manual tender Cross tabulation

Count		Total time in manual tender									Total
		0-5	5-10	10-15	20-25	25-30	30-35	35-40	40-45	45+	
Total time in e-GP system	0-5	0	0	0	0	0	0	0	0	2	2
	5-10	0	1	1	3	2	0	2	1	0	10
	10-15	1	0	1	0	1	2	1	0	0	6
	15-20	0	0	0	0	0	0	2	0	5	7
	20-25	0	0	0	0	0	1	0	3	0	4
	25-30	1	0	0	0	0	0	0	0	2	3
	30-35	0	0	0	0	0	1	0	0	3	4
	35-40	0	0	0	0	0	0	1	0	1	2
	40-45	0	0	0	0	0	0	0	0	1	1
	45+	0	0	0	0	0	0	0	0	11	11
Total		2	1	2	3	3	4	6	4	25	50

Ho: The total time in e-GP is higher than the total time in manual tender.

Vs.   H1: The total time in e-GP is lower than the total time in manual tender.

Table-4.10: Chi-Square test of Total Time

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	99.530[a]	72	.018
Likelihood Ratio	91.240	72	.063
Linear-by-Linear Association	13.036	1	.000
N of Valid Cases	50		

4.3.14 Cost savings in e-GP in different Procurement Steps:

Figure-4.37: Cost savings in e-GP than manual tender in different procurement steps
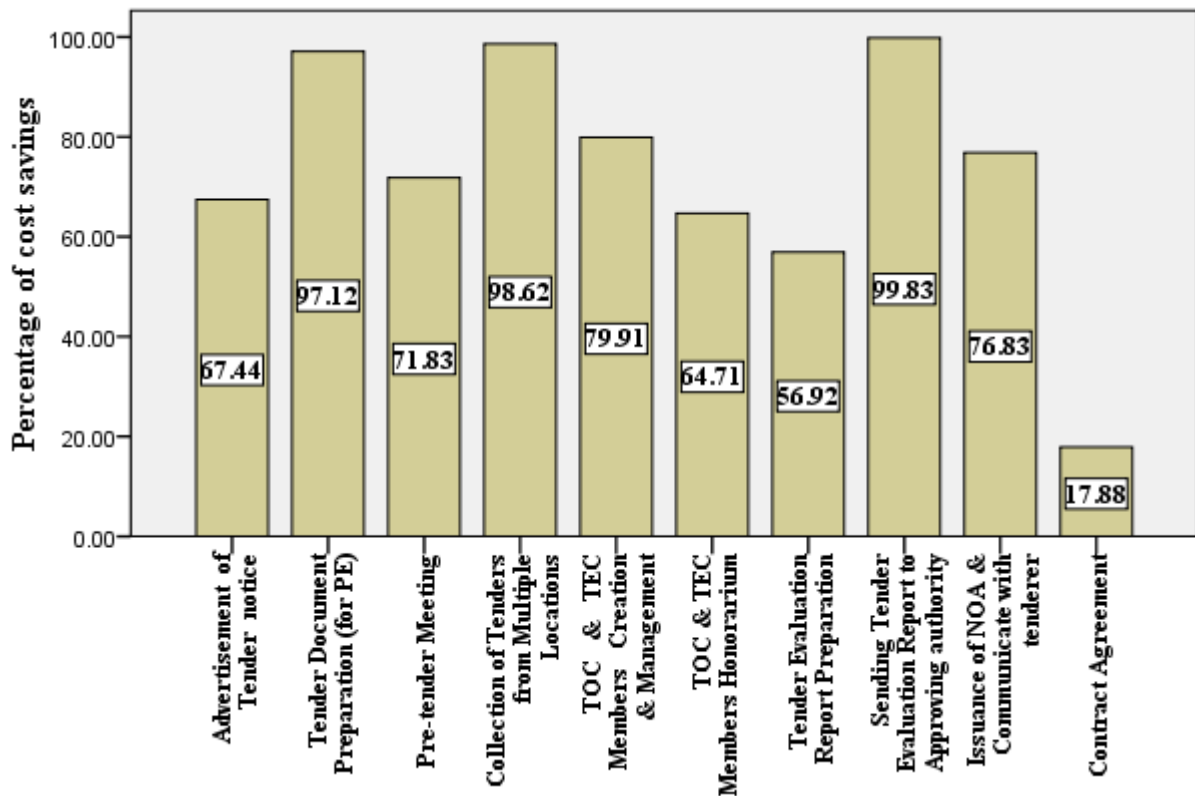
From the above Figure 4.37, we found that there are significant cost savings in different procurement steps of e-GP system than manual tender. The highest cost savings is in "Sending tender evaluation report to approving authority for approval" is 99.83% and it is possible for online communication between Procuring Entity and approving authority. The cost savings in "collection of Tenders from multiple locations" is 98.62% and it is possible for online submission of tender in one central server rather than physical collection of tender from multiple locations. The Tender document preparation in e-GP system is reusable and make 97.12% cost savings in

70

this step. TOC and TEC management cost is 79.91% less in e-GP System than manual tender. The issuance of notification of award (NOA) is through online and it reduces paper, postal and other cost. The communication with tenderer is through online and mobile messaging. This easy process of e-GP system makes 76.83% cost savings in "Issuance of Notification of Award and communicate with tenderer" in e-GP system than manual tender.

4.3.15 Time savings in e-GP in different Procurement Steps:

Figure-4.38: Time savings in e-GP than manual tender in different procurement steps
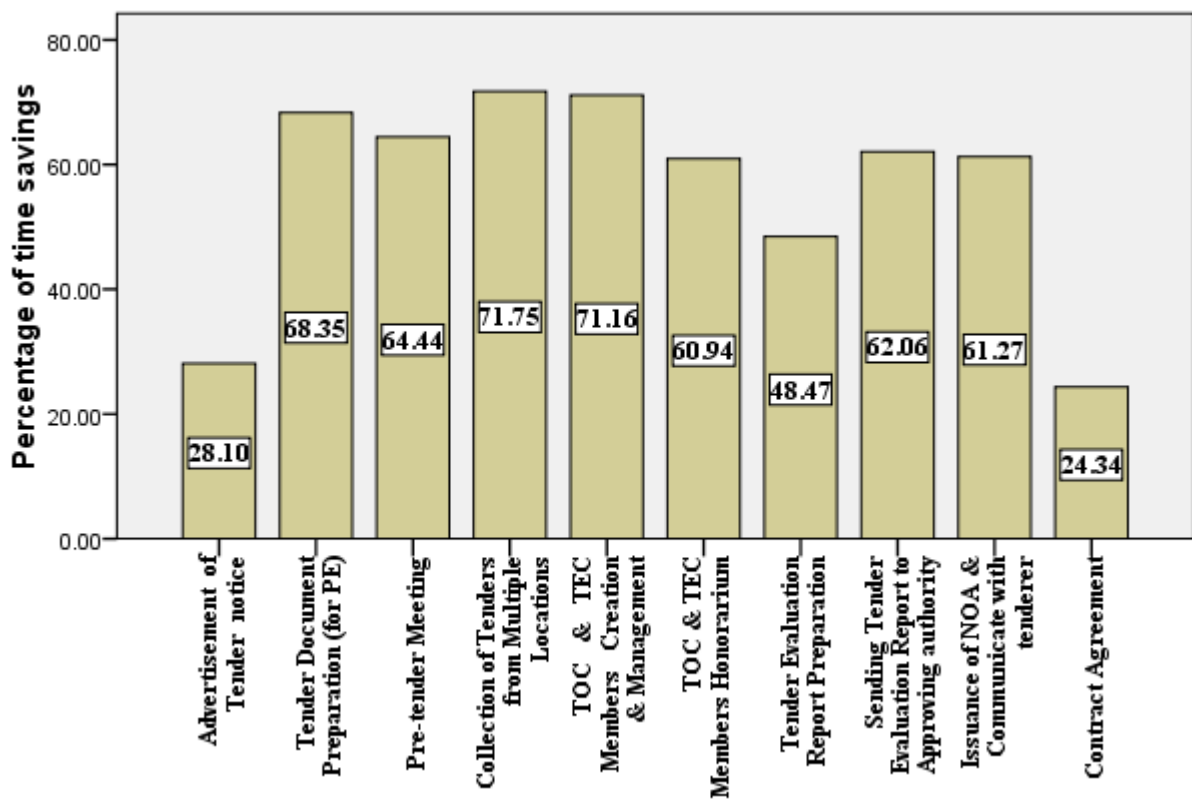
From the above Figure 4.38, we found that there are significant time savings in different procurement steps of e-GP system than manual tender. The highest time savings is in "collection of Tenders from multiple locations" is 71.75 % and it is possible for online submission of tender in one central server rather than physical collection of tender from multiple locations. TOC and TEC management time is 71.16 % less in e-GP than manual tender and it is possible for automation facilities. The "Tender Document preparation" in e-GP system is reusable and makes 68.35% time savings in this step. Pre-tender meeting facilities between Procuring Entity and

tenderer save time 64.44% in e-GP system than manual tender. Online activity and communication between Procuring Entity and approving authority helps to save time 62.06% in "sending Tender evaluation report to Approving authority for approval" step in e-GP system. The online communication between Procuring Entity and tenderer save time 61.27% in "Issuance of Notification of Award and communicate with tenderer" in e-GP system than manual tender.

4.3.16 Total Cost and Time Savings:

Figure-4.39: Total cost and time savings in e-GP than manual tender
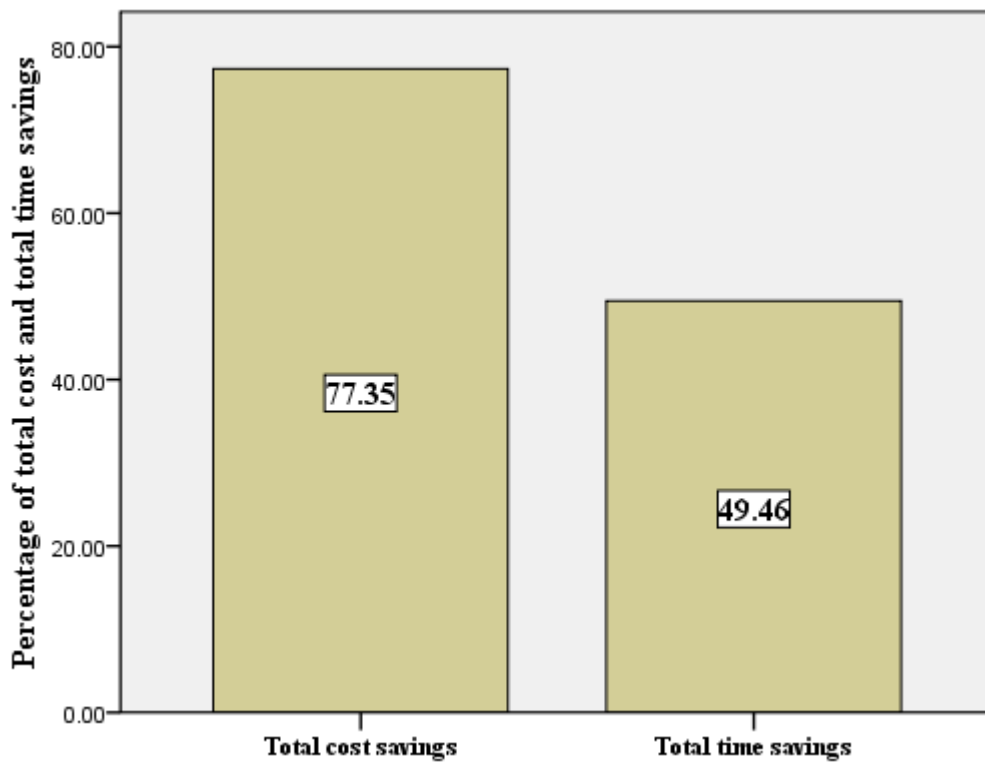
From Figure 4.39, we found that the average total cost savings is 77.35% in e-GP system than manual tender which is encouraging for any Procuring Entity. The average total time savings is 49.46%. The average total time savings may be increased by automating all procurement steps including contract management, reducing the gap between e-tender notice and tender submission deadline, upgrading the evaluation module etc.

4.4 Assessment of Challenges for Implementation of e-GP

4.4.1 Technological Challenges of e-GP

Table-4.11: Descriptive statistics and Chi-square test of factors of Technological Challenges

Factors related to Technological challenges	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Internet speed	50	2.48	0.909	10.48	3	0.015
Uninterrupted access to e-GP server	50	2.62	0.878	14.80	3	0.002
Internet connectivity	50	2.68	0.999	25.80	4	0.000
IT and computer infrastructure	50	3.34	0.772	45.80	4	0.000
Availability of electricity	50	3.34	0.745	51.40	4	0.000
Valid N (list-wise)	50					

Figure-4.40: Factors of Technological challenges in e-Procurement
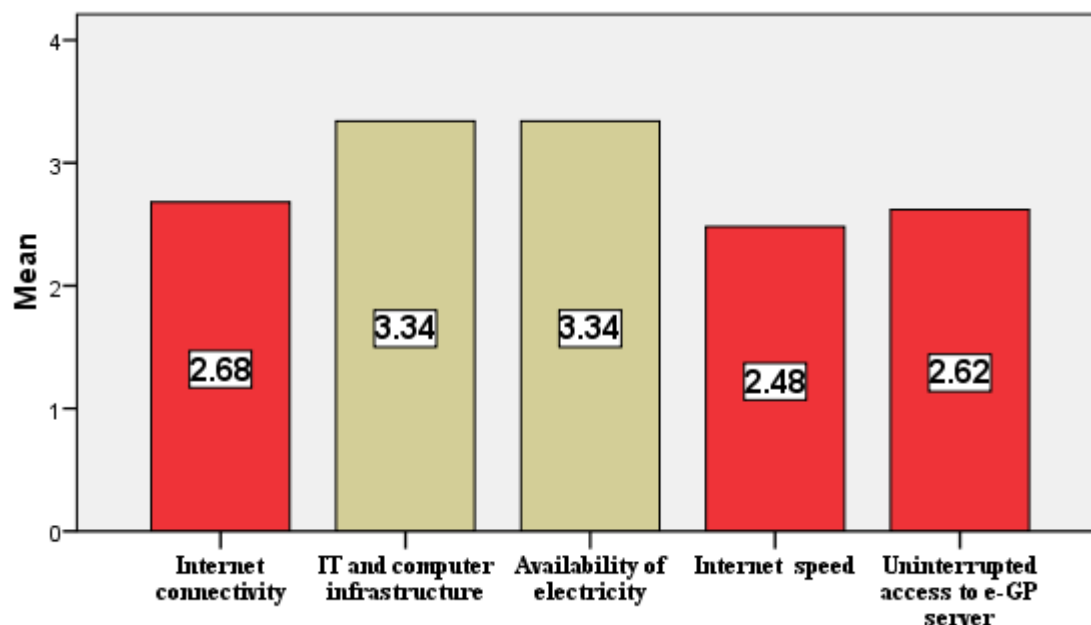
The Figure 4.40 and Table 4.11 show the result related to Technological challenges of e-GP. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of Technological challenges (Table 4.11) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the Technological challenges of e-GP.

From the present study, we found that all the attributes of Technological challenges are ranked below 4 that means below "satisfactory" level by the respondents in 5 point Likert scale. The factors such as (1) Internet speed (2) Uninterrupted access to e-GP server and (3) Internet connectivity are ranked nearly "unsatisfactory" level 2.48, 2.62 and 2.68 respectively. Therefore, the factors such as (1) Internet speed, (2) Uninterrupted access to e-GP server and (3) Internet connectivity are identified as Technological challenges for proper implementation of e-Procurement.

The combine mean of Technological challenges in e-Procurement is 2.89, which indicates that Technological facilities for proper implementation of e-Procurement are "unsatisfactory" level after introducing e-Procurement.

During focus group discussion the bidders claimed that the e-GP server is very slow. The submission of tender delayed due to slow response from the e-GP server. Internet speed is also low that causing delay of their e-Tender activity.

During Key Informant Interview (KII), Director General of CPTU, Md Farooque Hossain said that CPTU has taken initiative to increase the server capacity so that all the agencies can be incorporated for e-Procurement.

4.4.2 Administrative Challenges of e-GP

The Figure 4.41 and Table 4.12 show the result related to administrative challenges of e-Procurement. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of administrative challenges of e-Procurement (Table 4.12) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the administrative challenges of e-GP.

Table-4.12: Descriptive statistics and Chi-square test of factors of Administrative Challenges

Factors related to administrative challenges	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Training of contractors about e-GP	50	2.38	0.780	29.52	3	0.000
Computer knowledge of bidders	50	2.40	0.700	29.68	3	0.000
Computer knowledge of officials	50	3.34	0.848	48.40	4	0.000
Knowledge level of officials about e-GP	50	3.38	0.725	54.60	4	0.000
Logistic support Scanner , Printer etc.	50	3.44	0.837	37.40	4	0.000
Valid N (listwise)	50					

Figure-4.41: Factors of administrative challenges in e-Procurement
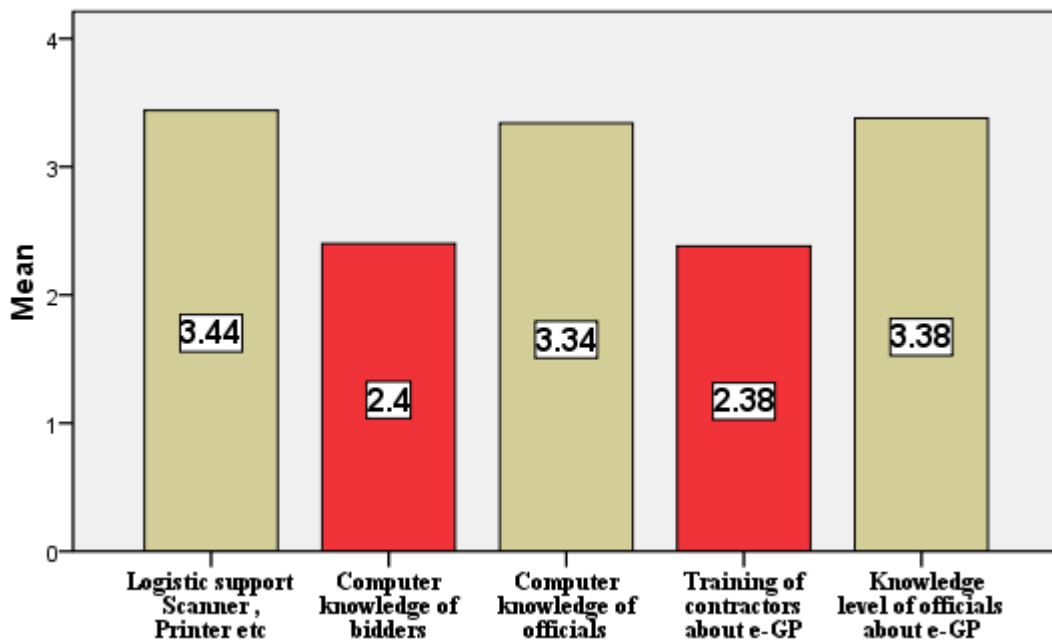
From the present study, we found that three attributes of administrative challenges of e-GP such as (1) Logistic support Scanner, Printer etc. (2) Computer knowledge of officials (3) Knowledge level of officials about e-GP are ranked above "3" that means above "Average" by the respondents in 5 point Likert scale. The factors "Computer knowledge of bidders" and "Training of contractors about e-GP" are ranked nearly unsatisfactory level 2.4 and 2.38 respectively. Therefore, the two factors such as (1) Computer knowledge of bidders and (2) Training of contractors about e-GP are identified as administrative challenges for proper implementation of e-Procurement.

The combine mean of administrative challenges in e-Procurement is 2.99, which indicates that administrative facilities for proper implementation of e-Procurement are "unsatisfactory" level after introducing e-Procurement.

During focus group discussion the bidders mentioned that they do not have adequate logistic support. It is costly for them to buy computer, scanner, printer, Internet connection and to appoint qualified computer operator. The bidders said that they did not get training from CPTU. The bidders claimed that they are paying higher fees rated by Procuring Entity.

During Key Informant Interview, Mr. Ahsan Habib, Executive Engineer, RHD informed that there is no central databank for bidders experience certificates, audit report, turnover record etc. So, Procuring Entity can't check the bidder's record in e-GP online system. Procuring Entities have to print huge document to send for post qualification. This is a time consuming and costly process. He said that it is challenges to prepare such type of database of huge number of bidders.

During Key Informant Interview, Mr. Wahidunnabi, Director of CPTU said that CPTU is planning about the training of bidders.

4.4.3 Challenges of Awareness of e-GP

Table-4.13: Descriptive statistics and Chi-square test of factors of Challenges of Awareness

Factors related to Challenges of awareness	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Preparation of hard copy as a backup of automatic e-GP system	50	3.28	0.970	28.00	4	0.000
Awareness of all stakeholder	50	3.34	0.745	48.80	4	0.000
Mindset and behavioral change of all	50	3.44	0.644	36.72	3	0.000
Acceptability of new system	50	3.56	0.760	48.80	4	0.000
Valid N (listwise)	50					

Figure-4.42: Factors of challenges of awareness in e-Procurement
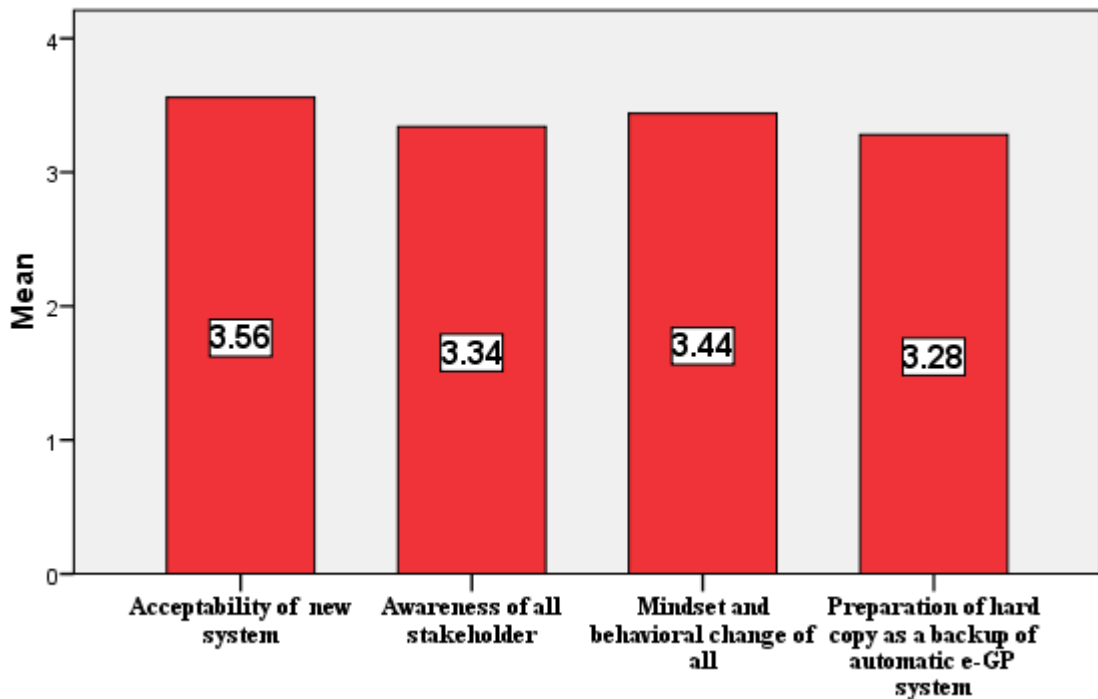
The Figure 4.42 and Table 4.13 show the result related to challenges of awareness of e-GP. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of challenges of awareness of e-Procurement (Table 4.13) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the challenges of awareness about e-GP.

From the present study, we found that all the attributes of challenges of awareness of e-Procurement such as (1) Preparation of hard copy as a backup of automatic e-GP system (2) Awareness of all stakeholder (3) Mindset and behavioral change of all and (4) Acceptability of new system are ranked above "Average" and below "Satisfactory" scale by the respondents in 5 point Likert scale. Therefore, the above four factors are identified as challenging factors for awareness about e-GP.

The combine mean of challenges of awareness in e-Procurement is 3.41, which indicates that awareness about e-Procurement is below "Satisfactory" level.

4.4.4 Challenges of Security of e-GP

Table-4.14: Descriptive statistics and Chi-square test of factors of Challenges of Security

Factors related to Challenges of security	N	Mean	Std. Deviation	Chi-Square	df	Asymp. Sig.
Maintenance capability of CPTU for e-GP software problem	50	3.12	0.940	27.40	4	0.000
Protection against hacker, virus etc.	50	3.52	0.839	37.60	4	0.000
Confidentiality of password, documents etc.	50	3.88	0.872	40.20	4	0.000
Valid N (listwise)	50					

Figure-4.43: Factors of Challenges of security in e-Procurement
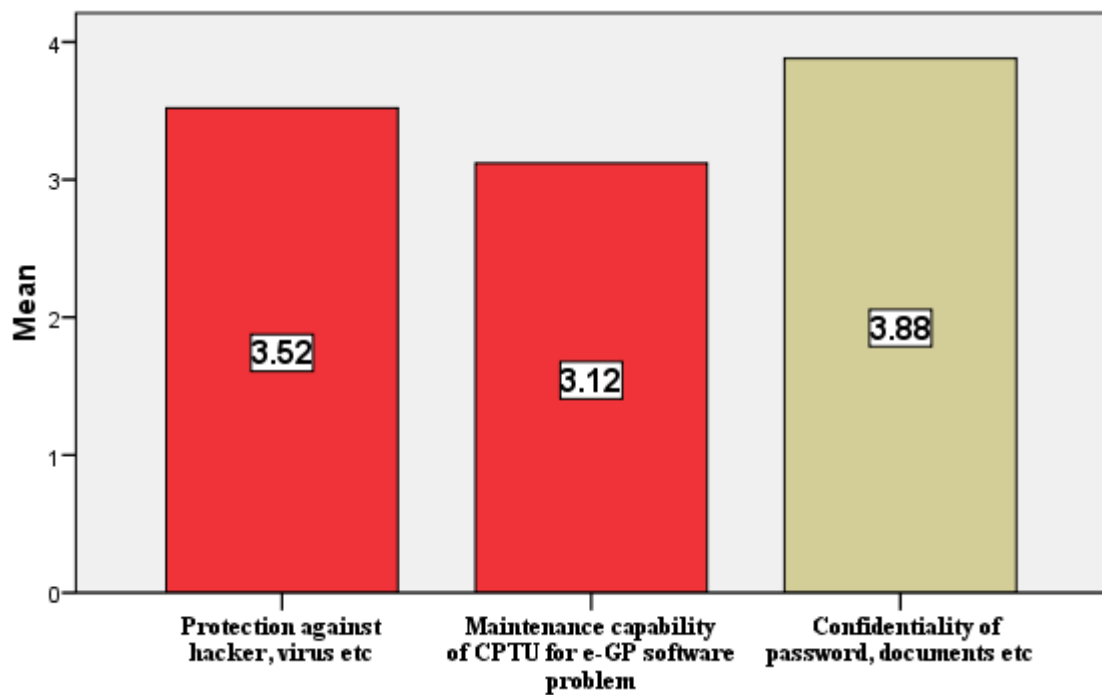
The Figure 4.43 and Table 4.14 show the result related to challenges of security of e-GP. To measure the significance level, the chi-square test has done for the variables. The chi-square distribution table has been used to determine the significance of the value. Chi-square test result of challenges of security of e-GP (Table 4.14) has showed the p-values and the values of degrees of freedom (DF). The determined p-values have been found significant in the chi-square distribution table. Therefore, it indicates that the selected variables have substantial influence on the challenges of security of e-Procurement.

From the present study, we found that all the attributes of challenges of security of e-GP such as (1) Maintenance capability of CPTU for e-GP software problem (2) Protection against hacker, virus etc. and (3) Confidentiality of password, documents etc. are ranked above "Average" but below "Satisfactory" level by the respondents in 5 point Likert scale. Therefore the two factors such as (1) Maintenance capability of CPTU for e-GP software problem and (2) Protection against hacker, virus etc. are identified as challenging factors for proper implementation of e-Procurement.

The combine mean of challenges of security in e-Procurement is 3.51, which indicates that security issues of e-Procurement are below "Satisfactory" level.

During focus group discussion the bidders said that confidentiality is a major issue for them. In manual system, office staffs prepare all documents of tender, but the proprietor or head of organization quotes prices and keep them confidential. In e-GP system, it will be tough for them to keep price secret, as most of them will depend on computer operator to submit online tender. Some bank may be corrupted if the bank managers share the tender selling related information of one tenderer with others as the bank is responsible for selling tender document in e-GP procedure. The bidders also said that they are facing virus, hacker problem.

During Key Informant Interview, Mr. Nazmul Hoque, Consultant of CPTU said that e-GP server has SSL certificate to protect hacker. In SSL certificate data transmission has done in encrypted and decrypted form. So, hacker cannot hack the data.

During Key Informant Interview, Md Farooque Hossain, Director General of CPTU said that at present DOHATEC is providing consultancy service for e-GP technical problem. CPTU is working on building new maintenance team for solving e-GP technical problem very soon. CPTU as well as Procuring Agencies believe that expert maintenance team is needed for uninterrupted e-GP system operation and system security.

4.4.5 Overall status of Four Variables for Challenges of e-GP:

The overall status of four challenging factors could be presented on the basis of average perception of the surveyed population. Perception of the surveyed engineers may be presented through a Radar Chart, where average perception indicates the overall condition of the each individual's factor. Overall status of the four factors is presented in figure 4.44.

The Figure 4.44 indicates that "Technological challenges in e-Procurement" is the most challenging factor as respondents perceive that the status of this factor is "unsatisfactory" level. Second challenging factor is "administrative challenges in e-Procurement" and ranked 2.99 or below "satisfactory" level. Third challenging factor is "Challenges of awareness in e-Procurement" and ranked 3.41 or below "satisfactory" level. Fourth challenging factor is "Challenges of security in e-Procurement" as it ranked 3.51 that means below "satisfactory" level.

Figure-4.44: Status of four variables related to challenges of e-Procurement

80
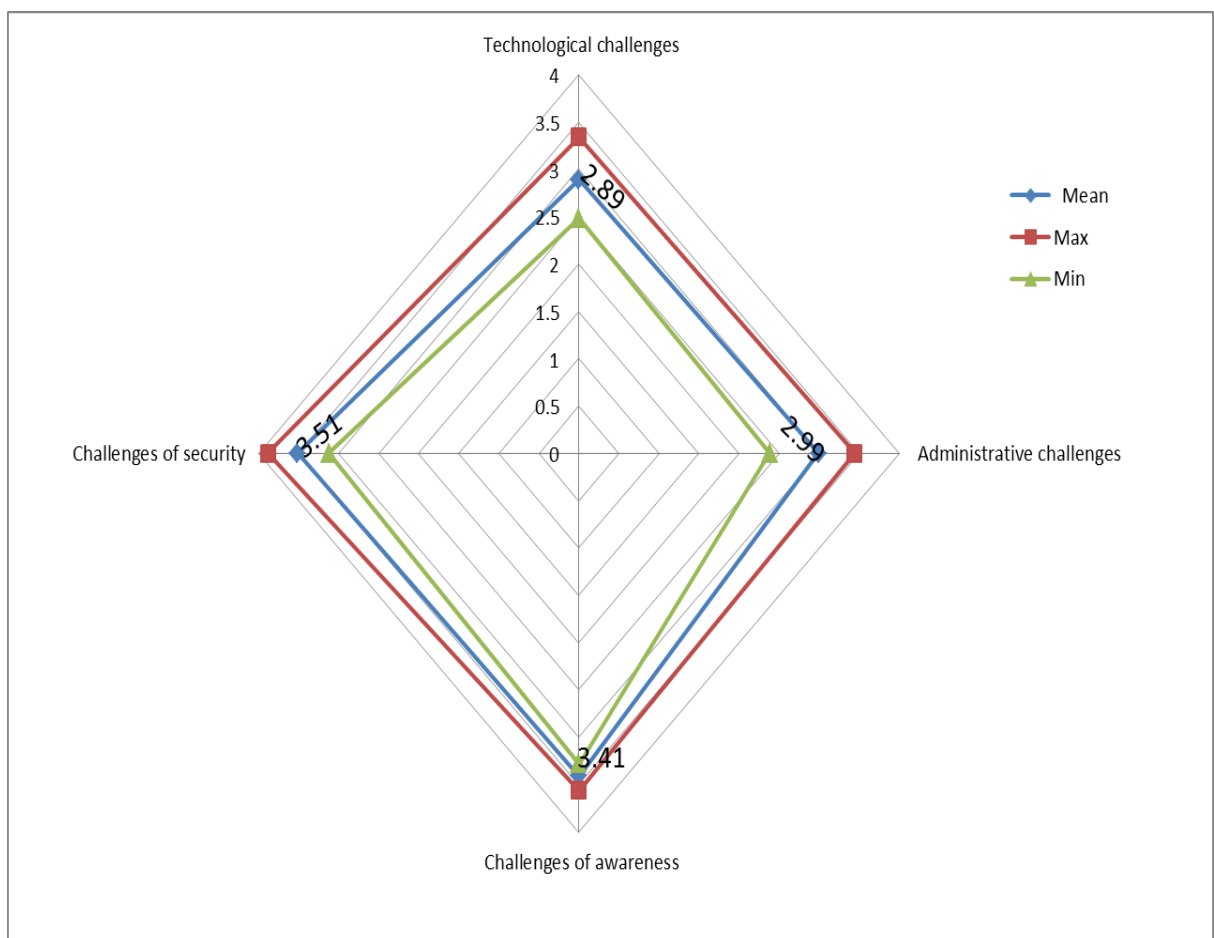
Findings

4.5 Findings

4.5.1 Findings of Benefits of e-Procurement

Transparency in e-GP: Secrecy of bidder's information and Openness of information regarding procurement have ensured after introducing e-Procurement. Thus e-Procurement is playing important role for ensuring transparency in procurement process.

Good Governance in e-GP: Tender box snatching problem in manual tendering has solved in e-GP system. Collusion among the bidders has reduced significantly after introducing e-Procurement system. Competition among the bidders has increased. Thus e-Procurement is playing important role for ensuring good governance in procurement process.

Efficiency in e-GP: Total tendering process has improved after implementation of e-Procurement. e-Procurement process is faster and easier than manual tender. Thus, e-Procurement system is efficient than manual tender.

Process Improvement: e-Procurement increases availability of tender notice and necessary tender documents through online. Thus, e-Procurement has ensured process improvement in "Good" level in procurement activities.

4.5.2 Findings of Cost and Time Savings in e-Procurement

Savings in Advertisement of Tender Notice: Cost for "Advertisement of tender notice" in e-GP system has reduced 67.44% as compared to manual tender. Time for "Advertisement of tender notice" in e-GP system has reduced 28.10% as compared to manual tender.

Savings in Tender Document Preparation: Cost for "Tender document preparation" in e-GP system has reduced 97.12% as compared to manual tender. Time for "Tender document preparation" in e-GP system has reduced 68.35% as compared to manual tender.

Savings in Pre-Tender Meeting: Cost for "Pre-tender meeting" in e-GP system has reduced 71.83% as compared to manual tender. Time for "Pre-tender meeting" in e-GP system has reduced 64.44% as compared to manual tender.

Savings in Collection of Tender from Multiple Locations: Cost for "Collection of tender from multiple locations" in e-GP system has reduced 98.62% as compared to manual tender. Time for "Collection of tender from multiple locations" in e-GP system has reduced 71.75% as compared to manual tender.

Savings in TOC and TEC member Creation and Management: Cost for "TOC and TEC member creation and management" in e-GP system has reduced 79.91% as compared to manual tender. Time for "TOC and TEC member creation and management" in e-GP system has reduced 71.16% as compared to manual tender.

Savings in TOC and TEC member Honorarium: Cost for "TOC and TEC member honorarium" in e-GP system has reduced 64.71% as compared to manual tender. Time for "TOC and TEC member honorarium payment" in e-GP system has reduced 60.94% as compared to manual tender.

Savings in Tender Evaluation Report Preparation: Cost for "Tender evaluation report preparation" in e-GP system has reduced 56.92% as compared to manual tender. Time for "Tender evaluation report preparation" in e-GP system has reduced 48.47% as compared to manual tender.

Savings in Sending Tender Evaluation Report to approving authority for Approval: Cost for "Sending tender evaluation report to approving authority for approval" in e-GP system has reduced 99.83% as compared to manual tender. Time for "Sending tender evaluation report to approving authority for approval" in e-GP system has reduced 62.06% as compared to manual tender.

Savings in Issuance of Notification of Award and Communicate with Tenderer: Cost for "Issuance of notification of award and communicate with tenderer" in e-GP system has reduced 72.32% as compared to manual tender. Time for "Issuance of notification of award and communicate with tenderer" in e-GP system has reduced 61.27% as compared to manual tender.

Savings in Contract Agreement: Cost for "Contract agreement" in e-GP system has reduced 17.88% as compared to manual tender. Time for "Contract agreement" in e-GP system has reduced 24.34% as compared to manual tender.

Savings in Total Cost and Time*:* Total cost for tender processing in e-GP system has reduced 77.35% as compared to manual tender. Total time for tender processing in e-GP system has reduced 49.46% as compared to manual tender.

4.5.3 Findings of Challenges of e-Procurement

Technological Challenges: The three factors such as (1) Internet speed, (2) Internet connectivity and (3) Uninterrupted access to e-GP server are technological challenges for proper implementation of e-Procurement.

Administrative Challenges: The two factors such as (1) Training of contractors about e-GP and (2) Computer knowledge of bidders are administrative challenges for proper implementation of e-Procurement. Most of the Procuring Entities are getting logistic support but most of the bidders do not have adequate logistic support. It is hard for bidders to buy computer, scanner, printer, Internet connection etc. and to appoint qualified computer operator.

Challenges of Awareness: Acceptability of new system and awareness of all stakeholders are the challenging factors for proper implementation of e-Procurement.

Challenges of Security: The two factors such as (1) Protection against computer virus etc. (2) Maintenance capability of CPTU for e-GP software problem are the two challenging factors for proper implementation of e-Procurement.

Chapter 5

Recommendations and Conclusion

5.1 Recommendations

5.1.1 Adequate Internet Connectivity

All over Bangladesh, Internet speed is low and somewhere connection is not reliable and not continuous. RHD offices have Internet connection in all offices now, but the service need to be improved. Internet connection facilities of bidders are limited. Usual time for submission deadline is between 12 p.m. to 3 p.m. and traditionally bidders use to submit tender at last moments. Also, tender opening will be soon after deadline of tender submission. So, when e-GP will be introduced at large scale, there will be huge traffic in Internet infrastructure of Bangladesh and CPTU should expand its capacity in order to cope with the situation. Sometimes, Procuring Entity cannot get access to e-GP server and procurement process interrupted and delayed. CPTU should increase the server capacity in order to facilitate uninterrupted access to e-GP server. Internet connectivity of the country should be improved. As it is not possible to do overnight, bidders may be encouraged to submit tender at night. Also tender opening time may be spanned for any time of the day.

5.1.2 Acceptability of New System

At present, 100% tender notices of RHD are publishing in CPTU website. Resistance to change by system users are likely to suffice and if not well managed can adversely affect the success of implementing this system in government departments. Motivational program should be taken by CPTU to increase the acceptability of new system. CPTU should take necessary steps so that all stakeholders should change their mindset in favor of e-Procurement. Political commitment also needs to ensure the acceptability of new system. RHD should ensure to print the published tender notice and other documents for evaluation and record keeping purpose. The backup hard copy may be used in case of system failure of CPTU.

5.1.3 e-GP knowledge of RHD Officials and Bidders

The RHD engineers should be given more training on IT. RHD policy should incorporate to increase the knowledge level of officials about e-GP. It is necessary to ensure training of bidders about e-GP. Also computer competencies of officials need to be ensured through proper training. CPTU should train both Procuring Entities and bidders. Bidders training would be arranged locally leaded by Procuring Entities and supported by CPTU.

5.1.4 Protection against Threats

e-GP system has SSL certificate. So, the e-GP system is supposed to be free from hacker. Protection against computer virus is below satisfactory level. Hacker, virus, spam, phishing are great threat for Internet based computerized systems. Server of the system and workstations at users end, all are under threat. Proper antivirus software and only legal purchased software should be used in all workstations and servers to protect these threats.

5.1.5 Solar Energy

Power supply system of Bangladesh is below satisfactory level. It may cause serious damage in transaction if there is discontinue of connection between server and workstation during online data entry. e-GP activity will be hampered for interrupted electric supply. As e-GP system is totally online based, continuous electric supply is needed for proper e-GP operation. Proper steps should be taken in order to ensure continuous electric supply. In order to minimize e-GP system breakdown due to interruption of electric supply, solar energy may be introduced as alternative of electric supply for proper operation of e-GP system.

5.1.6 Logistic Support

Bidders should be given support to buy computer, scanner, printer, Internet connection etc. This support will help them to submit tender from their home. Submission of tender from home will ensure bidder's confidentiality. Logistics support should be increased for the field divisions of RHD in order to proper implementation of e-GP.

5.1.7 Bidder's Database

There should be a central databank for bidder's experience certificates, audit report, turnover record etc. so that Procuring Entity can check the records of bidders in e-GP online system for post qualification. This will save time and ensure accuracy about bidder's qualification.

5.1.8 Formation of a High-Powered Steering Committee

The formation of a high-powered steering committee or board with a mandate to take decisions on all issues is important factor for successful implementation of the e-GP agenda. This board can be composed of concerned government ministries, CPTU, Procuring agencies, private sectors under the strong leadership of Prime Minister. Regular meeting once every six months should be initiated by this board to consider in detail all issues that arose during implementation and to provide solutions without loss of time.

5.1.9 Bidder's Fee

The bidders claimed during focus group discussion that they are paying higher fees rated by Procuring Entity. Different fees from bidders need to be kept on a reasonable level in order not to run the risk of reducing bidder's participation. Proper steps should be taken to return the bank draft to the bidders as soon as possible.

5.1.10 Implementation of e-Contract Management System

e-GP system has e-Contract Management facility but still now the manual contract is using by the Procuring Entity. Due to manual contract, the cost and time savings for contract management is still lower than other procurement steps. The e-Contract Management system should be introduced as soon as possible.

5.1.11 Upgradation of Evaluation module of e-GP Software

Time savings for tender evaluation report preparation is 48.47%. The time savings for tender evaluation report preparation is comparatively low than other procurement steps in e-GP system as compared to manual tender. Proper steps should be taken in order to upgrade the evaluation module of e-GP system so that the tender evaluation will be faster.

5.1.12 Time Savings for Advertisement of Tender Notice in e-GP

Time savings in e-GP for advertisement of tender notice is 28.10%. The time savings for advertisement of tender notice is comparatively low than other procurement steps in e-GP system as compared to manual tender. The time savings of this procurement step would be increased by reducing the gap between advertisement of e-tender notice and tender submission deadline. It is possible by ensuring proper Internet speed, adequate server capacity etc.

5.1.13 Incorporation of e-GP in all Sectors

As e-GP system facilitate 77.35% total cost savings and 49.46% total time savings as compared to manual tender, Government should incorporate e-GP system in all sectors as soon as possible. Private sectors should also incorporate e-GP system in order to maximize their profit and contribute to make Digital Bangladesh.

5.1.14 Maintenance Capability of e-GP System

CPTU is responsible for maintenance of e-GP system. CPTU should be taken initiative to build up skilled manpower for maintenance of e-GP system from different agencies. Maintenance capability will increase the e-GP system security. Procuring agencies should be aware of the maintenance capability of the e-GP system.

5.2 Conclusion

e-GP has the potential to strengthen the transparency, efficiency, competitiveness and compliance of the sensitive high value government procurement functions. For most jurisdictions of RHD, it represents both an opportunity for procurement reform and changing the way of procurement.

All historical information relating to the award of the tender will be held on the e-Government Procurement portal/system. This means that auditors can find all the information they need in one place, along with an auditable trail of the award decision. Anybody who has dealt with the reams of paper that can be involved in the traditional procurement process and has read this document will hopefully now see the obvious benefits of an e-Government Procurement system/portal.

Electronic tender document evaluation systems can improve the procurement process significantly. Proper implementation of e-GP can be ensured cost and time savings; hence quickening the process, reducing the strain on the resources and thus realizing economies of scale.

In spite of potential benefit, e-GP system incorporation has to face some challenges. Proper planning is needed to face the challenges and enjoy the e-GP benefit. Awareness is also needed to overcome these challenges and make the procurement process faster, efficient and transparent.

e-Government Procurement solutions can undoubtedly improve the procurement process and drastically cut-down the amount of time taken. This can result in an increase in the amount of tenders undertaken at any one time and an improvement in the overall control of the process. End users can be given access rights to involve them in the process to a large degree i.e. the specification writing etc. and work with purchasing to achieve the best overall value in terms of price and quality.

Bibliography:

Adebiyi, AA, Ayo, CK and Adebiyi Marion, O (2010), 'Development of Electronic Government Procurement (e-GP) System for Nigeria Public Sector', International Journal of Electrical and Computer Sciences IJECS-IJENS, 10 (6):74-84.

Aman, A and Kasimin, H (2011), 'E-Procurement implementation: a case of Malaysia government', Transforming Government: People, Process and Policy, 5 (4): 330-44.

Ampratwum, EF (2008), 'The fight against corruption and its implications for development in developing and transition economies', Journal of Money Laundering Control, 11, 76-87.

Angeles, R., Nath, R. (2007), Business-to-business e-Procurement: success factors and challenges to implementation. Supply Chain Management: An International Journal 12, 2, 104-115

APCC (2012), The Australasian Procurement and Construction Council. http://www.apcc.gov.au. Access date April 5, 2015.

Avery, S. (2000). e-Procurement: A Wealth of Information for Buyers Purchasing. Retrieved April 4, 2015 from https://books.google.com.bd/books? isbn=1466639156.

Baron, J.P., Shaw, M.J. and Bailey, A.D (2000), Web-Based E-Catalog Systems in B2B Procurement, Communications of the ACM, 43(5), 2000, pp.93–100.

Burton, R. (2005), 'Improving Integrity in Public Procurement: The Role of Transparency and Accountability', in Fighting Corruption and Promoting Integrity in Public Procurement, OECD Publishing, pp. 23–8.

BuyIT, (2002a), e-Procurement Guidelines. With support from the e-Envoy. Availableat:http://www.buyitnet.org/Best_Practice_Guidelines/e-Procurement/index.jsp.

BuyIT. (2002b), Building the Business Case for e-Procurement.

Coulthard, (2000), Electronic Procurement in Government: More Complicated Than Just Good Business.

Croom, S., R., Brandon-Jones, A. (2005), Key issues in e-Procurement: procurement implementation in the public sector. Journal of Public Procurement 5, 3, 367-387

Croom, S. R, Johnston, R (2003), E-service: enhancing internal customer service through e-Procurement. International Journal of Service Industry Management 14, 539-555

Davila, A, Gupta, M and Palmer, R (2003), 'Moving Procurement Systems to the Internet: the Adoption and Use of E-Procurement Technology Models', European Management Journal, 21(1): 11-23.

DCITA (2000), Department of Communications, Information Technology and the Arts, Commonwealth Electronic Procurement-Implementation Strategy. Retrieved April 5, 2015 from http://www.dcita.gov.au/text_welcome.html.

De Boer, L., Harink, J., Heijboer, G. (2002), A conceptual model for assessing the impact of electronic procurement. European Journal of Purchasing and Supply Management 8, 1, 25-33

ERI (1998), SMEs and Public Procurement: Lowering Transaction Costs to Increase Participation. UNCTAD Workshop on Procurement. The Enterprise Research Institute. November 5-6.

EU (1997), A European Initiative in Electronic Commerce. COM (97) 157.

Garicano, L. and Kaplan, S. (2000), The Effects of Business-to-Business E-Commerce on Transaction Costs. Working Paper 8017. National Bureau of Economic Research. Retrieved April 4, 2015 from www.nber.org/papers/w8017.

Gilbert, A. (2000), E-Procurement: problems behind the promise. Information Week. Nov 20, p. 48, 8 pgs

Gunyou, J., Leonard, J. (1998), Getting Ready for e-Commerce. Government Finance Review. Volume.14, No.5.

Gupta, S, Jha, B and Gupta, H (2009), 'E-Procurement: A Developing Country Perspective: A Study on New Trends Concerned with Developing Countries', AIUB Journal of Business and Economics, 122 (1): 161-75.

Hope R., D., Lett, B., Luebbers, J., Reilly, B. (2000), Real e-Procurement Savings Do Not Come From Software. Electronic Commerce and Extranet Applications Research Note. Gartner Group.

IPPR (2003). Report on Public Procurement and Electronic Service Delivery. Institute for Public Policy Research. Available at: http://www.ippr.org.uk/research/index.php.

Kalakota, R. and Whinston, A.B. (1997), Electronic Commerce: A Manager's Guide. Retrieved April 4, 2015 from https://books.google.com.bd/books.

Kalakota, R. and Robinson, M. (2001), e-business 2.0: roadmap for success. USA, Adison-Wesley.

Kaliannan, M and Awang, H (2009), 'ICT to enhance administrative performance: a case study from Malaysia', International Journal of Business and Management, 3(5): 78.

Leipold, J. (2003), e-GP World Bank Draft Strategy. International Handbook of Public Procurement.

Leipold, K, Klemow, J, Holloway, F and Vaidya, K (2004), 'The World Bank e-Procurement for the selection of consultants: Challenges and lessons learned', Journal of Public Procurement, 4(3): 319-39.

Meta Group (IT Consulting Firm), What is Strategic Purchasing. Retrieved April 5, 2015 from http://www.httprint.com/epr_what_is.html.

Meyer, E. (1967), Electronic data processing benefits both buyer and seller. Hospital Management. 103 (6), 107-08.

Millman, H. (1998), A brief history of EDI. InfoWorld. 20 (14), 83.

NASPO (2001), National Association of State Procurement Officials, State and Local Government Purchasing Principles and Practices. Retrieved April 6, 2015 from https://books.google.com.bd/books? isbn=0742532739.

Ndou, V (2004), 'E-government for developing countries: opportunities and challenges', The Electronic Journal of Information Systems in Developing Countries, 18 (1):1-24.

Neef, D (2001), e-Procurement: from strategy to implementation. USA, Prentice Hall PTR.

Nishimura, T. (2002), Foreign and Domestic Trends in the e-Marketplace. E-Commerce Journal Japan. Retrieved April 4, 2015 from http://www.ecom.jp/ ecom_e /latest/ecomjournal_no1/topic_02.html.

NSW (1998), Implementation Framework: Integrated Government Electronic Service Delivery and Electronic Commerce.

OECD, A (2008), FIGHTING BRIBERY IN PUBLIC PROCUREMENT IN ASIA-PACIFIC. [On-line]. Available at www.etransform.org/gti/sites/ etransform.org /files/Documents/bribery.pdf. [Retrieved July 21, 2011]

OGC (2002), A Guide to e-Procurement for the Public Sector. Office of Government Commerce. Retrieved April 6, 2015 from https://books.google.com.bd/books

Pascale, R. (1999), Extract from Complexity and the Unconscious. Innovation and Change Media, Milton Keynes: Open University Press, pp. 9-10.

Pathak, R, Prasad, R, Singh, G, Naz, R and Smith, R (2006), Exploring the Potential of e-Goverance Applications for Reducing Corruption: The Case of the Indian Public Sector. [On-line]. Available at http://www.napsipag.org/PDF/ Reducing_Corruption.pdf. [Retrieved December 15, 2011]

Pictet, J and Bollinger, D (2008), 'Extended use of the cards procedure as a simple elicitation technique for MAVT. Application to public procurement in Switzerland', European Journal of Operational Research, vol. 185, no. 3, pp. 1300-7.

Puschamann, T. and Alt R. (2005), Successful use of e-Procurement in supply chains. Supply Chain Management: An International Journal 10, 2, 122-133

Quesada, G., Gonzalez, M. E., Mueller J. and Mueller, R. (2010), Impact of e-Procurement on procurement practices and performance. Benchmarking: An International Journal 17, 4, 516-538

Raghavan, S.N.R., Prabhu, M., (2004), "Object-oriented design of a distributed agent based framework for e-Procurement", Production Planning and Control, Vol.15, No.7, pp. 731–741.

Robinson, B. (2001), Down Payment on e-Procurement. Federal Computer Week. A WEB-BASED PUBLIC PROCUREMENT SYSTEM. Retrieved April 4, 2015 from https://etd.lib.metu.edu.tr/upload/12605145/index.pdf.

Senge, P. (1999), The Dance of Change. Currency Doubleday. New York. Retrieved April 4, 2015 from http://www.solonline.org/resource/.../dance_of_change_study_notes.pdf.

Smart, A. (2010), Exploring the business case for e-Procurement. International Journal of Physical Distribution and Logistics Management 40, 3, 181-201

Sohail, M and Cavill, S (2008), 'Accountability to prevent corruption in construction projects', Journal of Construction Engineering and Management, 134 (9): 729-38.

Szymansk, S (2007), How to Fight Corruption Effectively in Public Procurement in SEE Countries, Paris, France.

Talero, E. (2001), Electronic Government Procurement. World Bank Discussion Papers.

Talero, E. and Carp, T. (2002), A Legal Perspective of Electronic Government Procurement: Country Practices. World Bank Discussion Papers.

The Economists. (2000), Quick Fixes. Vol: 355

UN (1999), Procurement Reforms: Resolution / Adopted by the General Assembly.

UNCTAD (2000), Building Confidence: Electronic Commerce and Development. United Nations Conference on Trade and Development, Geneva. Retrieved April 6, 2015 from http://unctad.org/en/docs/posdtem11.en.pdf.

UNCTAD (2001). e-Commerce and Development Report, Geneva. United Nations Conference on Trade and Development, Retrieved April 6, 2015 from http://www.unctad.org/ecommerce/docs/edr01_en.htm.

UNDP (2006). Institutional Reform and Change Management: Managing Changing Public Sector Organizations, United Nations Development Programme. Retrieved April 6, 2015 from www.asia-pacific.undp.org/...%20Publications/.../Insitutional Reform.

WB (2003). Supply and Installation of Information Systems: Single Stage Bidding. Standard Bidding Documents, World Bank. Retrieved April 6, 2015 from siteresources.worldbank.org/INTFIDFOR/Resources/4659186.../1Proc.

Annexure

Annexure 1

Survey Questionnaire

Questionnaire for Procuring Entity

Research Topic: Challenges and prospects of e-Procurement in Bangladesh:
A Study on Roads and Highways Department.
Researcher: Md Zaiful Islam, MAGD, BRAC University

[This is a survey questionnaire for conducting a study to find out the challenges and prospects of e-Procurement in Bangladesh. It is a part of academic necessity for the Masters in Governance and Development in the (BIGD), BRAC University. Your response is valuable for the researcher. The researcher assures you that the information given by you will be kept confidential and will be used only for the academic purpose.]

SECTION-1 (Respondent's Profile)
 [Please put bracket ( ) where appropriate]

1. Name (Optional):

   Designation and office:

   District:

2. Years of experience in procurement activities :

<5	5-10	11-15	16-20	>20

3. Do you have formal training on IT?   Yes   No

4. Do you have any training on e-GP?   Yes   No

5. Your knowledge level about Electronic Government Procurement (e-GP)

Very bad	Bad	Average	Good	Very good

SECTION-2: Assessment of Prospects /Benefits of e-GP

[Please put bracket ( ) in the respective boxes]

Transparency in e-Procurement:

[Scale: 1=Very Bad, 2=Bad, 3=Average, 4=Good, 5= Very good]

Openness of information regarding public procurement	1	2	3	4	5
Public accessibility to the information of tender process	1	2	3	4	5
Scope of online vigilance and monitoring	1	2	3	4	5
Secrecy of bidders information	1	2	3	4	5
Real time access information or real time bidding	1	2	3	4	5

Good Governance in e-Procurement:

[Scale: 1=Very Bad, 2=Bad, 3=Average, 4=Good, 5= Very good]

Selection process of bidders in e-GP	1	2	3	4	5
Participation of qualified bidders	1	2	3	4	5
Inventory management in e-GP	1	2	3	4	5
Competition among the bidders	1	2	3	4	5
Pre-qualifying process in e-GP	1	2	3	4	5
Performance monitoring by PROMIS	1	2	3	4	5
Reduction of tender box snatching	1	2	3	4	5
Elimination of undue pressure	1	2	3	4	5
Reduction of collusion among the bidders	1	2	3	4	5
Managerial control and collaboration	1	2	3	4	5

Efficiency in e-Procurement:

[Scale: 1=Very Bad, 2=Bad, 3=Average, 4=Good, 5=Very good]

Positive change of staff concentration on their prime function	1	2	3	4	5
Low Internet knowledge of bidders is sufficient for e-GP	1	2	3	4	5
Reduction of errors	1	2	3	4	5
Faster and easier e-Procurement process	1	2	3	4	5
Improvement in cash flow compared to manual system	1	2	3	4	5
Best quality, low price	1	2	3	4	5
Improvement of total tendering process after implementation of e-GP.	1	2	3	4	5

Process Improvement in e-Procurement:

[Scale: 1=Very Bad, 2=Bad, 3=Average, 4=Good, 5= Very good]

Availability of tender notice online	1	2	3	4	5
Workflow management	1	2	3	4	5
Managing capacity of large number of bidders	1	2	3	4	5
'One Click' publishing to websites	1	2	3	4	5
Necessary tender documents on online	1	2	3	4	5
Automatic generation of necessary report in e-GP system.	1	2	3	4	5
Accuracy of purchase decisions	1	2	3	4	5
Automation of procurement process	1	2	3	4	5
e-Contract Management System	1	2	3	4	5

SECTION-3: Assessment of Cost and Time savings in e-Procurement system compared to manual system

(Please fill up the format below by average approximate cost and time for a works Tender valued one Crore Taka)

Sl no	Tender Process	Cost (Taka)		Time(Days)	
		e-Tender	Manual Tender	e-Tender	Manual Tender
1	Advertisement of Tender notice				
2	Tender Document preparation (for PE)				
3	Pre-tender meeting				
4	Collection of Tenders from multiple locations				
5	TOC & TEC Members creation & management (process, communication etc.)				
6	TOC & TEC Members honorarium				
7	Tender Evaluation Report preparation				
8	Sending Tender Evaluation Report to Approving authority for approval				
9	Issuance of Notification of Award & communicate with tenderer				
10	Contract agreement				

SECTION-4: Assessment of Challenges for Proper Implementation of e-GP

[Please put bracket ( ) in the respective boxes]

Technological challenges:

(1 =Highly Unsatisfactory; 2 =Unsatisfactory; 3 = Average; 4 =Satisfactory; 5 = Highly Satisfactory).

Internet connectivity	1	2	3	4	5
IT and computer infrastructure	1	2	3	4	5
Availability of electricity	1	2	3	4	5
Internet speed	1	2	3	4	5
Uninterrupted access to e-GP server	1	2	3	4	5

Administrative Challenges:

(1 =Highly Unsatisfactory; 2 =Unsatisfactory; 3 = Average; 4 =Satisfactory; 5 = Highly Satisfactory).

Logistic support Scanner , Printer etc.	1	2	3	4	5
Computer knowledge of bidders	1	2	3	4	5
Computer knowledge of officials	1	2	3	4	5
Training of contractors about e-GP	1	2	3	4	5
Knowledge level of officials about e-GP	1	2	3	4	5

Challenges of Awareness:

(1 =Highly Unsatisfactory; 2 =Unsatisfactory; 3 = Average; 4 =Satisfactory; 5 = Highly Satisfactory).

Acceptability of new system	1	2	3	4	5
Awareness of all stakeholder	1	2	3	4	5
Mindset and behavioral change of all	1	2	3	4	5
Preparation of hard copy as a backup of automatic e-GP system	1	2	3	4	5

Challenges of Security:

(1 =Highly Unsatisfactory; 2 =Unsatisfactory; 3 = Average; 4 =Satisfactory; 5 = Highly Satisfactory).

Protection against hacker, virus etc.	1	2	3	4	5
Maintenance capability of CPTU for e-GP software problem	1	2	3	4	5
Confidentiality of password, documents etc.	1	2	3	4	5

Annexure 2

Checklist for Focus Group Discussion

1. Please tell about e-GP system?

2. Do you find any kind of awareness, knowledge or skill related gap in using e-GP system? If yes, Please explain?

3. What are the benefits for you after introducing e-GP?

4. What are the challenges for introducing e-GP?

5. What are the threats in this process?

6. How do you compare between manual tendering and e-GP?

7. What is your opinion about preparation and existing facilities of RHD regarding e-GP?

8. Is there anything else you would like to say about prospects and challenges of e-GP system?

Annexure 3

Checklist of Key Informant Interview

This is a checklists, which imply that the researcher randomly ask the interviewee according to the flow of discussion. The researcher may not need to ask all the questions.

1. **Transparency in e-Procurement**
   - ➤ Openness of information
   - ➤ Online vigilance and monitoring
   - ➤ Secrecy of bidders information, Quoted rate etc.

2. **Improvement of Good Governance after implementation of e-GP**
   - ➤ Comparison of number of bidders in e-GP and manual tender
   - ➤ Status of tender box snatching
   - ➤ Status of collusion among the bidders
   - ➤ Reduction of undue pressure

3. **Efficiency improvement in e-GP system**
   - ➤ Fastness of e-Procurement process

4. **Process Improvement**
   - ➤ Availability of tender notice
   - ➤ Simplicity of e-GP system compared to manual system
   - ➤ Automatic report generation and e-Contract management system

5. **Cost and time savings in e-GP system compared to manual Tender**
   - ➤ Cost and time savings in different steps of procurement process

6. **Technological challenges for proper implementation of e-GP**
   - ➢ Internet speed and connectivity
   - ➢ Infrastructure
   - ➢ Uninterrupted access to e-GP server
   - ➢ Future plan of server capacity

7. **Administrative Challenges for proper implementation of e-GP**
   - ➢ Training of contractors
   - ➢ Logistic support -Scanner, printer etc.

8. **Awareness about e-GP system**
   - ➢ Acceptability of new system by all stakeholders
   - ➢ Stakeholders awareness

9. **Security challenges of e-GP**
   - ➢ Protection against hacker, virus etc.
   - ➢ Confidentiality of information

Annexure 4

List of Key informant interviewee

Sl no.	Name of interviewee	Designation
1	Md Farooque Hossain	DG, CPTU
2	Md Firoz Iqbal	Chief Engineer, RHD
3	Md Wahidunnabi	Director, CPTU
4	Md Aziz Taher khan	Director, CPTU
5	Mozibul Hoque Molla	Superintendent Engineer Management Information System, RHD, Dhaka
6	Md Nazmul Haque	Consultant, CPTU
7	Md Asaduzzaman	Consultant, CPTU
8	Md Hafiz Uddin	Executive Engineer, Administration, RHD, Dhaka
9	Md Ahsan Habib	Executive Engineer, Contract Evaluation, RHD, Dhaka
10	Md Sabbir Hasan Khan	Executive Engineer, Procurement Division, RHD, Dhaka
11	Md Al Mamun	Executive Engineer, RHD, Rangpur
12	Md Rezaul Hoque Prodhan	Sub-Divisional Engineer, RHD, Rangpur
13	Md Manowar Hossain	President, Bidders Association, Rangpur