

# Comparing the Cost and Time of Tender Opening Committee Report Preparation for Manual and E-Procurement Tenders in the Roads and Highways Department of Bangladesh

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## Abstract

Bangladesh's public procurement system has been traditional, *i.e.*, a manual tendering system, under the legislative guidance of PPA-2006 and PPR-2008. Manual tendering has long been a source of concern for public procurement agencies regarding tender opening related to cost and time. To resolve this challenge and make the dream of a Digital Bangladesh a reality, the Government of Bangladesh launched the e-Procurement system in 2011 under the flagship of e-GP Guidelines. Following the successful pilot testing conducted under the umbrella of the CPTU, all public PEs are attempting to implement electronic procurement tenders. This study aims to examine the cost and time involved in preparing Tender Opening Committee (TOC) Reports for manual and e-procurement tenders in Bangladesh's Roads and Highways Department. A mixed-method was used to collect data from the population of 11 RHD zones, including KII and primarily survey questionnaires. The independent samples t-test was used to compare data and hypothesis tests from two groups using SPSS software. The results indicated that e-Procurement tendering, tender opening preparation costs and time were more efficient than manual tendering. Academicians, students, practitioners, researchers, and policymakers will benefit from the study's conclusions. Additionally, the government will be urged to improve policies such as the PPA 2006, the PPR 2008, and the 2011 e-GP Guideline.

## Keywords

e-GP Guideline 2011, e-Procurement, Tender Opening Committee Report Preparation, t-Test, TOC Meeting

## 1. Introduction

### 1.1. Introduction

Electronic Government Procurement (e-GP) was established in 2011 in response to a World Bank suggestion [1] to improve the efficacy, credibility, and transparency of all public procurement in Bangladesh. The e-GP system is now operational, however procurement entities (PE) and all bidders continue to experience challenges [2] [3], and assessments have yet to be completed following the e-GP system's deployment. The study's overall goal is to measure the efficiency of the e-GP system application on public procurement in various development projects to assess the significant impact of different elements that influence whether or not the e-GP system implementation is a success. Also, the study wanted to compare the procurement efficiency of manual purchase with the RHD development project's newly developed e-Procurement purchase. The population of this study was Bangladesh's large Roads and Highways Department (RHD). The findings of this study will aid in developing an e-Procurement assessment model and improve public procurement policies.

### 1.2. Background of the Study

The key issue is that no previous research in RHD had been conducted in the context of the newly developed e-procurement assessment model. As a result, there is a gap in this context because there is no secondary data or findings. The motivation of the study is to evaluate the efficiency of the RHD's field-level data with the manual tendering system and the e-procurement tendering system in terms of costs and time. The theory is that e-procurement helps in saving cost and time.

### 1.3. Problem Statement

The government of Bangladesh began adopting e-procurement application software, such as the e-GP system, for public procurement in 2011. The government's goal is to use e-Procurement software to purchase all public goods, works and services. Another goal is to use the e-tender system to achieve 100% public procurement [4] by 2020. As a result, it's time to assess the e-Procurement system to identify the contributing factors that influence e-Procurement implementation. Following a comprehensive review of the e-Procurement literature, it was revealed that no numerous investigations had been done on analysing the performance of the e-GP system since its inception. There is no comparison between the current e-GP system and the manual tendering system relating to issues with the Tender Opening Committee (TOC) Report preparation cost and time.

The study's rationale is that academicians, students, researchers, bidding communities, and policymakers will benefit from the study's conclusions. The ultimate goal [5] [6] is to conduct a KPI (Key Performance Indicator)-based quality evaluation to identify potential flaws and difficulties in future e-tendering procedures to support and enhance future e-tendering processes. TOC report prepara-

tion cost and time are saved by e-procurement, but another advantage is that the quality of the government tendering process [6] has increased.

## 2. Literature Review

### 2.1. Public Procurement Reform Project

The World Bank issued Bangladesh Country Procurement Assessment Report (CPAR) in 2002 [1]. According to this report, the Government of Bangladesh (GoB) approved CPAR on February 6, 2001. CPAR identified the following significant deficiencies in the GoB public procurement system:

- Absence of the standard legal framework.
- Delay in process for bureaucratic procedure.
- Lack of proper planning.
- More layers in the approval and the review process.
- Lack of competencies of professional staff.
- Poor quality tender documents.
- The inefficient tender evaluation process.
- Absence of competent authority to monitor and establish transparency and accountability.

The GoB launched [7] phase 1 and phase 2 of the Public Procurement Reform Project to address the aforementioned problems and strengthen public procurement governance.

### 2.2. PPRP Phase 1

PPRP phase 1 was approved on February 14, 2002, to improve the public procurement system. Following significant policy reforms were adopted by CPTU:

- Public Procurement Regulations (PPR) 2003 issued and remained in action until January 30, 2008.
- Public Procurement Act was passed In July 2006 in the Parliament.
- CPTU was established under the Ministry of Planning, and CPTU developed a website [8].
- CPTU developed an online Procurement Management Information System (PROMIS).
- The delegation of financial power was amended.
- The Parliament ratified PPA in 2006.
- PPR 2003 was replaced by PPR 2008, following under Public Procurement Act 2006.

### 2.3. PPRP Phase 2

In June 2007, the GoB approved the PPRP-II technical assistance initiative for improved sustainability and strengthening. The PPRP-II featured four primary components:

Component 1: Advancing Policy Reform and Strengthening Institutional Capacity.

Component 2: Strengthening Sectoral Procurement Management & CPTU/IMED.

Component 3: e-Government Procurement is Introduced (e-GP).

Component 4: Communication, Behavioral change, and social accountability.

#### **2.4. Guiding Principle in Designing PPA, PPR & e-GP Guideline**

According to history, the CPTU is supported by the revenue budget and is in charge of all public procurement activities. The Public Procurement Regulations (PPR) 2003 governed public procurement activities in Bangladesh before 2006. The Public Procurement Act (PPA) 2006 was made public on July 6, 2006. The PPR was drafted in 2008 under the PPA 2006 and became the rule in January 2008 after being published in the Gazette.

Following principles [8] are the base of-  
PPA 2006

- It is primary legislation, and it focuses on main public procurement issues.
- The PPA directly requires obligatory adoption of rules/regulations on various occasions.

The PPA 2006 objectives are:

- Establish transparency.
- Establish accountability.
- Ensure equitable treatment.
- Free and fair competition.

PPR 2008

- Secondary legislation addresses those issues that, while vital for a proper and effective public procurement process, are best spelt out in secondary legislation.
- PPR 2008 was prepared based on the PPA 2006 and other relevant implementation documents, formats, models, guidelines, and instructions.

e-GP Guideline 2011

The main guidelines for implementing the e-GP system in Bangladesh [8] are outlined in this document. Section 65 of the PPA 2006 and rule 128 of the PPR 2008 were used to create this e-GP Guideline. The recommendations also follow the current ICT Act 2009, the Right to Information (R2I) Act 2009, and international electronic procurement practices. The e-GP guidelines guaranteed that the public procurement system was transparent and accountable.

#### **2.5. e-GP Modules**

Bangladesh's e-GP system consists of a set of 9 modules. Modules are inter-linked. Modules are noted below:

- The central registration system for all stakeholders.
- Workflow Management System (WMS).
- e-Tendering (e-Publishing/e-Advertisement, e-Lodgment, e-Evaluation, e-Contract award).
- e-Contract Management System (e-CMS).
- e-Payments.

- PROMIS.
- Security and System Administration.
- Handling Exceptions and Errors.
- Usability and Help.

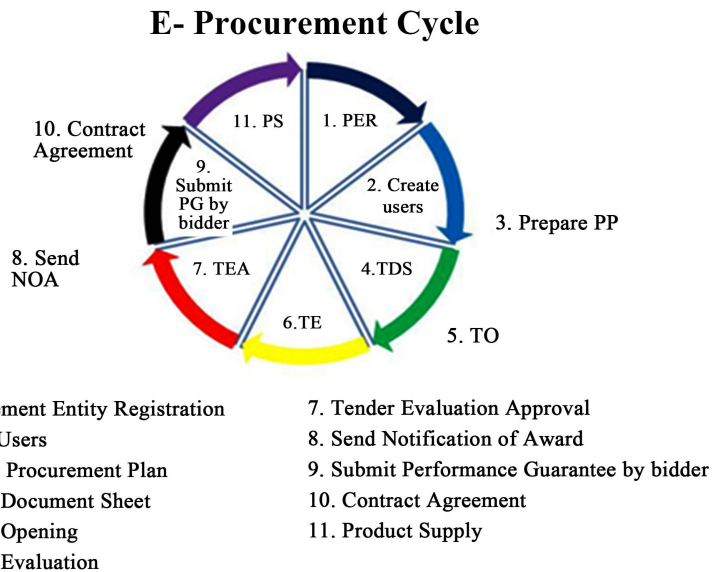
### 2.6. Turn to e-Procurement

As a buyer [9], the government uses secure web-based application platforms to engage with the bidder’s community in a paperless environment free of difficulties, delays, and physical insecurity of any kind [10].

The definition of e-procurement [11] is the procurement of goods and services through the internet or an electronic network. The goals of e-procurement are to increase transparency accountability, promote bidding competition, support process monitoring and auditing, and meet the demand for up-to-date information.

### 2.7. E-Procurement Cycle

In Bangladesh e-GP system [9], there are 11 steps to be covered in the e-Procuring cycle shown in **Figure 1**.



**Figure 1.** e-Procurement cycle.

### 2.8. E-Procurement Outcomes

e-Procurement outcomes are commonly identified in the context of Bangladesh and other [3] countries as:

**Intermediate outcomes:**

- Better services.
- Cost savings.
- Time savings.

**Outcomes:**

- Advancement of labor productivity in the public sector.
- Economic rationality (organisational efficiency).
- Process simplification, establishing transparency and accountability.
- GDP magnification.

### 3. Methodology

The purpose of research design is to translate a research problem into data that can be analysed for the least amount of money to provide accurate answers to research-based questions [12]. The study used quantitative and qualitative research approaches in a mixed-methods approach. Mixed methods research promotes data triangulation, data integrity, and credibility. The survey used questionnaires to get quantitative data on cost and time issues involved with TOC report preparation. Study sample respondents were officers from the RHD department's PE office. The RHD was chosen because, since 2011, when the e-GP system was launched in Bangladesh, it has been one of the largest departments actively using it for procurement. Visits to the RHDs of several PE offices in Bangladesh produced study data. The study covered 11 zones, 31 circles, and 70 divisions of Bangladesh's RHD. To fulfil the study's goal, this survey employs structured questionnaires. The questionnaires were administered by the researcher, and the PhD supervisor approved them. Document analysis and literature reviews were used to compile the secondary data. To choose e-Procurement-related PE officers in RHD, the survey employed a stratified sample method. For KII and survey questioners, the total sample size was 206. In a survey of 206 PE officers, 83 PE officers responded to a question about the cost and time of preparing a TOC report. Some PE officers respondents were reluctant to respond because calculations were involved in responding on TOC report preparation. The data were preprocessed using the knowledge discovery in database (KDD) process [13], which helped clean the data, handle missing data, and improve data quality for the final analysis. Using SPSS software, the independent samples t-test was used to compare data and evaluate hypotheses from two groups.

## 4. Data Analysis and Discussions

### 4.1. Descriptive Statistics of PE Officers Demographic Data

What percentage of the RHD population's responses (PE officers) are male and female? In response to this question, 93.7 percent of PE officers said they were male, while 6.3 percent said they were female. This means that the majority of RHD's PE officers are men.

Another question was what proportion of PE officers played a different e-GP role? The findings of e-GP role issues indicated that significant RHD PE officers samples who responded were Organ PE Admin (14.1%), PE User (61%), TOC member (26.7%), TEC member (4.9%), and Authorised User (18.9%). These findings revealed that data were acquired from relevant RHD PE officers actively involved in e-procurement.

## 4.2. T-Test for Comparing Manual and e-Procurement Efficiency TOC Report Preparation

The study compared manual procurement efficiency to e-Procurement efficiency. The study's purpose was to see how the e-GP system improved public procurement cost and time savings in the case of TOC report preparation. RHD PE offices were interviewed. The efficiency of the e-GP system was compared to the manual tendering system. The independent samples t-test was done to compare two groups on the mean value of a continuous normally distributed variable.

### 4.2.1. TOC Report Preparation Cost

Here, Test Variable(s) *i.e.* two independent variable(s) are:

TOC report preparation cost (e-GP system) and TOC report preparation cost (manual system) whose means have been compared between the two groups.

Let consider, Null hypothesis  $H_0: \mu_1 = \mu_2$ .

Alternative hypothesis  $H_a: \mu_1 \neq \mu_2$ .

$\mu_1$  = population means for TOC report preparation cost for e-tender.

$\mu_2$  = population means for TOC report preparation cost for manual tender.

Significance level  $p = \alpha = 0.05$ .

Confidence interval level = 95%.

#### T-Test result

**Table 1.** Group statistics for TOC report preparation cost.

Group Statistics					
	Tender Type	N	Mean	Std. Deviation	Std. Error Mean
Taka	Etender	83	331.3253	1425.54463	156.47385
	Manual	83	1536.9880	2079.57356	228.26285

Source: Researcher's Field Survey, 2020.

The average TOC report preparation cost, *i.e.* the mean value for e-tender cost and manual system cost, is taka 331.3253 and 1536.9880, respectively, according to group statistics in **Table 1**. This means that the current cost of preparing an e-tender TOC report is less than the cost of preparing a manual TOC report.

**Table 2.** Comparing TOC report preparation cost.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
Taka	Equal variances assumed	15.285	0.000	-4.357	164	0.000	-1205.66265	276.74536	-1752.10594	-659.21936
	Equal variances not assumed			-4.357	145.126	0.000	-1205.66265	276.74536	-1752.63468	-658.69062

Source: Researcher's Field Survey, 2020.

**Table 2** observed from Levene's test that the F value is 15.285 & its Sig. value is 0.000. Here, the sig value (0.000) is less than the p-value (0.05), *i.e.*, significant. This indicates that equal variances are not assumed here and rely on the second row of output. The second-row t value is  $-4.357$ , negative, left tailed & the Sig. (2-tailed)/2 =  $0.000/2 = 0.000$ . Here, the sig value is less than the p-value, which is significant. This indicates that the Null hypothesis  $H_0$  is rejected & alternative hypothesis  $H_a$  is accepted, *i.e.*  $\mu_1 \neq \mu_2$ . This states that *the average cost of e-tender TOC report preparation is not equal to manual TOC report preparation.*

#### 4.2.2. TOC Report Preparation Time

Here, Test Variable(s) *i.e.* two independent variable(s) are:

TOC meeting arrangement time (e-GP system) and manual tender TOC meeting arrangement time (manual system) whose means have been compared between the two groups.

Let consider, Null hypothesis  $H_0: \mu_1 = \mu_2$ .

Alternative hypothesis  $H_a: \mu_1 \neq \mu_2$ .

$\mu_1$  = population means for TOC report preparation time for e-tender.

$\mu_2$  = population means for TOC report preparation time for manual tender.

Significance level  $p = \alpha = 0.05$ .

Confidence interval level = 95%.

#### T-Test result

**Table 3.** Group statistics for TOC report preparation time.

Group Statistics					
	Tender Type	N	Mean	Std. Deviation	Std. Error Mean
Hour	Etender	83	0.8625	1.12467	0.12345
	Manual	83	4.2211	4.27012	0.46871

Source: Researcher's Field Survey, 2020.

**Table 3** shows the average time to prepare a TOC report, *i.e.* the mean value for e-tender time and manual system time is 0.8625 and 4.2211 days, respectively. This means the current e-tender TOC report preparation time is less than the manual TOC report creation time.

**Table 4.** Comparing TOC report preparation time between E-Tender and manual tender.

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
Hour	Equal variances assumed	52.417	0.000	-6.929	164	0.000	-3.35855	0.48469	-4.31559	-2.40152
	Equal variances not assumed			-6.929	93.322	0.000	-3.35855	0.48469	-4.32101	-2.39610

Source: Researcher's Field Survey, 2020.



**Table 4** observed from Levene's test that the F value is 52.417 & its Sig. value is 0.000. Here, the sig value (0.000) is less than the p-value (0.05), *i.e.*, significant. This indicates that equal variances are not assumed here and rely on the second row of output. The second-row t value is  $-6.929$ , negative, left tailed & the Sig. (2-tailed)/2 =  $0.000/2 = 0.000$ . Here, the sig value is less than the p-value, which is significant. This indicates that the Null hypothesis  $H_0$  is rejected & alternative hypothesis  $H_a$  is accepted, *i.e.*  $\mu_1 \neq \mu_2$ . This states that *e-tender* TOC report preparation *average time is not equal to manual*/TOC report preparation *average time*.

## 5. Conclusions

The study's findings are based on data collected from Bangladesh's RHD population. A mixed-method approach was used to collect data. Survey questionnaires were developed in accordance with research methodology and with the study's objectives in mind. Eleven RHD zones were used to collect data. The Independent Sample t-test was used to enter and analyse survey sample data using SPSS software. The researcher analyses data in order to determine the procurement efficiency of manual and electronic procurement for the RHD public procurement. In terms of perceived time and cost, the efficiency of a manual tender vs. an e-procurement tender was compared. 26.7 percent of the study sample served as Tender Opening Committee (TOC) members. The difficulties encountered by TOC members were that manual tender opening took more time and money. However, the study's finding revealed that the TOC report preparation means cost of an e-tender and a manual system is taka 331.3253 and 1536.9880, respectively. Thus, e-Procurement ensured the lowest possible cost. Again, the TOC report preparation means duration of an e-procurement tender and a manual tender is 0.8625 and 4.2211 days, respectively. As a result, time is saved in the e-procurement system. Independent sample t-test results for TOC report preparation cost and TOC report preparation time revealed that the sig value = 0.00 is smaller than the p-value, which is significant. Therefore, the null hypothesis  $H_0$  has been rejected, and the alternative hypothesis  $H_a$  has been accepted. Compared to a manual tender system, the T-test model fit and ensured less cost and time in the e-procurement system. As a result, the e-procurement system outperforms the manual tendering system in terms of efficiency. Both time and money are saved by using the e-procurement system.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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