



(REVIEW ARTICLE)



## Transparency hypothesis testing in an e-procurement implementation assessment model framework: Case study of Bangladesh's roads and highways division

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International Journal of Science and Research Archive, 2023, 10(02), 766–771

Publication history: Received on 22 October 2023; revised on 08 December 2023; accepted on 11 December 2023

Article DOI: <https://doi.org/10.30574/ijrsra.2023.10.2.0991>

### Abstract

The e-Government Procurement (e-GP) guideline 2011 is adopted and launched e-GP system in public procurement in Bangladesh. However, since the e-GP system was first implemented, a great deal of investigations or analyses have not been conducted to determine how well its tender transparency is being assessed. This study aims to investigate the essential variables that contribute to the successful implementation of an electronic procurement system in Bangladesh. Another goal is to build an efficient e-procurement implementation assessment model. Survey questionnaires were employed to collect data from eleven zones in Roads and Highways Division (RHD) as a population. The study sample size was 139 RHD bidders. Hypothesis test has been done choosing MLR model using SPSS software. Transparency was one of the eight hypothesis tests in the study. The results demonstrated that the model was fit. Academicians, e-GP users, procurement professionals, and researchers will benefit from the study's findings. The study's original contribution is the creation of a theoretical design for the RHD e-procurement implementation assessment model.

**Keywords:** E-GP guideline 2011; E-Procurement assessment model; Hypothesis test; E-Procurement; Transparency; Procurement entities

### 1. Introduction

To establish a suitable legislative framework, the Public Procurement Rules 2008 and the Public Procurement Act 2006 (IPPA 2010) were released by the Central Procurement Technical Unit (CPTU). Bangladesh then employed the traditional manual tendering process defined by the Acts and Rules. In spite of this, maintaining an effective, free, equitable, competitive, and transparent system continues to be difficult for public procurement agencies. Because of its vastness, the manual tendering system is vulnerable to exploitation by vested interest organizations.

In the public procurement domain, Bangladesh adopted the e-Procurement implementation (CPTU 2011) in 2011 based on the technological zenith of the electronic government procurement (e-GP) system created and executed by the CPTU of the Ministry of Planning. Furthermore, the creation of e-GP was a reaction to a World Bank recommendation (World Bank 2002) aimed at improving the efficiency, transparency, and openness of all public procurement in Bangladesh. Both the public sector and the bidding community have embraced the e-GP, which is advancing quickly by improving economy, efficiency, and transparency (Ahmed Hussain 2018), which lowers transaction costs and improves value for money.

Adopting e-procurement technologies for public procurement is primarily driven by the need to boost competition for contracts, cut costs, and accelerate processes. According to a report by the World Bank (World Bank 2021), the e-GP

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system's tender invites are becoming more valuable and have a rising number of registered bidders. According to a separate article (World Bank 2019) published by the world bank, the public procurement reform has boosted efficiency by 75%, competition is up to double its previous level, transparency is up to 85%, and yearly cost savings of \$150 million. An article published on the CPTU website on November 17, 2018 (CPTU Media 2020) stated that e-GP initiatives led to significant cost savings for public procurement entities and e-GP bidders. The other results included improved public service delivery, increased competition, transparency, and efficiency.

On the other hand, e-Procurement (CPTU About 2021) is a reliable web-based application platform for engaging with the bidder's community in a paperless environment free of challenges, delays, and physical insecurity (Sanewu 2016). The e-GP system is currently in use. The introduction of electronic procurement increased (Jürgen et al. 2023) Bangladesh's gross domestic product by 0.48 to 0.54 percent, or US\$1.4 billion to US\$1.6 billion in 2019. However, PEs and all bidders continue encountering complications, and assessments haven't been completed since the e-GP system's deployment (Akando 2016; Marcella 2006). The final goal is to forecast the critical effects of various factors impacting the deployment of e-Procurement in RHD that helped to design an e-procurement assessment model.

Academicians, students, researchers, procurement entities, and policymakers differentiate to gain from the study's implications. In order to support and improve future e-tendering processes, the ultimate goal (Becker 2018) is to conduct a key performance indicator based quality evaluation to identify potential problems and difficulties in future e-tendering procedures.

### 1.1. Background of the Study

The implementation of e-procurement in RHD has significantly expanded. Jürgen et al. (2023) examined the adoption of e-procurement, finding that it was 0% in FY 2011–12, 5% in FY 2012–13, 37% in FY 2013–14, and 100% in FY 2014–15 to FY 2017–18 in a policy research working paper released by the World Bank. The main issue is that there have never been any RHD studies on the e-procurement assessment model. As a result, there was no proposed e-procurement assessment model on RHD and no hypothesis testing. Instead, the outcome of one dependent variable—transparency—and its seven associated independent variables are covered in this article.

### 1.2. Research Question and Hypothesis

A contemporary e-Procurement implementation assessment model can be developed to evaluate the e-GP platform, which was deployed in 2011. As a result, the study's major research question was:

*1.2.1. Q. What are the different factors that influence the adoption of the e-procurement implementation assessment model in RHD?*

Statement of Hypothesis-

**Hypothesis-** Effective e-Procurement implementation assessment significantly depends on *transparency*.

### 1.3. Specific Objective

Following the study question, the objectives listed below were used to develop a hypothesis and survey questionnaires.

*Objective-* To predict the significant effects of different factors influencing adopting the e-Procurement implementation assessment model in RHD development project procuring.

### 1.4. Motivation and Novelty

The motivation for the study is to theoretically design an e-procurement implementation assessment model for RHD in Bangladesh. The proposed e-procurement assessment model will help Bangladesh overcome flaws and develop a viable e-procurement system. *Transparency* is one of the assessment framework's dependent variable for hypothesis test.

The study's novelty is in the theoretical design of a new e-procurement implementation assessment conceptual framework and model, which has been developed for the first time in Bangladesh's RHD. In addition, a hypothesis test was performed to evaluate the model's fitness.

## 2. Literature Review

### 2.1. Theoretical Review

The contingency theory was adopted in the study (Candela A. & Ulises F. 2022). Contextualizing the idea of enhancing organizational performance was made easier by this approach. Public procurement process improvement was facilitated by the adoption of e-procurement.

### 2.2. Empirical Review

Through a thorough examination of the literature (Rashid and Uddin 2019), the researcher developed a conceptual framework and used SPSS software to collect data suitably. The variables are separated into independent and dependent categories, as **Table 1** illustrates. By identifying Critical Success Factors (CSFs), an organization can create a recognized point of reference to more accurately analyse the performance of its business (Kevin 2016) and accomplish its objectives. To develop a conceptual framework for this research, the researcher looks through the literature study and finds several lists of CSF that used as variables.

**Table 1** Proposed Conceptual e-Procurement Assessment Framework

Dependent Variable	Independent Variable	Source
<i>transparency</i>	<i>non-discrimination</i> <i>online tender notice availability</i> <i>access to open tender documents</i> <i>discloser to upgrade policies</i> <i>secrecy of bidder's information</i> <i>elimination of undue pressure</i> <i>reduction of collision among the bidders</i>	(CPTU Media 2020; World Bank 2002); (Mapsinitiative 2018); (Civil Service College Singapore 2010); (ADB 2004); (Gardenal 2013)

Data Source: Literature Review Survey, 2020

## 3. Methodology

All bidders of Roads and Highways Department (RHD) in Bangladesh were population. The study used survey questionnaires. The RHD bidders were considered respondents. The scope of the study was 4 wings 11 zones, 31 circles, and 70 divisions. The survey's sample size bidders were 139 respondents. E-Procurement related bidders in RHD were randomly selected for the survey using a stratified sampling technique. All questionnaires were created following the study's objective. Data was collected from bidders with a 5-point Likert scale [Scale: 1= Not Satisfied, 2= Slightly Satisfied, 3= Moderately Satisfied, 4=Very Satisfied, 5= Extremely Satisfied]. The researcher used SPSS software version 23 for analysis. Multiple linear regression analysis was used to show the relationship of dependent with independent variables.

## 4. Results and Findings

### 4.1. Hypothesis–

- H<sub>a</sub> Effective e-Procurement implementation assessment significantly depends on *transparency*.
- H<sub>o</sub> Effective e-Procurement implementation assessment significantly does not depend on *transparency*.

To assess the e-tender effectiveness on *transparency*, eight proposed variables are considered. Now run the MLR model on 139 bidders' data.

**Table 2** Bidders Respondents' Statistics of Transparency

	Mean	Std. Deviation	N
Transparency	3.65	0.645	139
Nondiscrimination among bidders	3.51	0.630	139
Online tender notice availability	4.21	0.675	139
Access to tender documents	3.83	0.559	139
Disclosure to upgrade policy	3.64	0.614	139
Secrecy of bidders information	3.91	0.697	139
Elimination of undue pressure	3.44	0.902	139
Reduction of bidders collision	3.38	1.086	139

Data Source: Field Survey, 2020

Above **Table 2** shows that the total number of bidders who responded was 139. The eight variables' mean value and standard deviations are also seen in the **Table 2**.

**Table 3** Model Summary of Correlation by Transparency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. Change
1	0.755 <sup>a</sup>	0.570	0.547	0.434	0.570	24.834	7	131	0.000

Data Source: Field Survey, 2020

**Table 3** provides the value of  $R$  and  $R^2$ . The  $R$ -value represents the simple correlation of 0.755, which indicates a degree of correlation. Therefore, the Analysed correlation value is 75.5%, showing a strong (Evans 1996) correlation.

The findings of **Table 3**, 57.0% dependency can be explained. Therefore, the  $R^2$  value of the model summary concludes that the dependent variable 'transparency' has 57.0%, depending on seven independent variables.

**Table 4** Regression Fit (ANOVA) Test on Transparency

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.747	7	4.678	24.834	0.000 <sup>b</sup>
	Residual	24.677	131	0.188		
	Total	57.424	138			

b. Predictors: (Constant), Reduction of bidders collision, Nondiscrimination among bidders, Access to tender documents, Secrecy of bidders information, Disclosure to upgrade policy, Elimination of undue pressure, Online tender notice availability

Data Source: Field Survey, 2020

From the ANOVA **Table 4**, sig=.000, which reveals  $p < .05$ . Therefore, the regression model predicts the dependent variable *transparency* significantly well. Hence  $H_0$  is rejected. So, overall regression significantly influences increasing transparency by seven independent variables that can be used to predict dependent variable *transparency* reliably.

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## 5. Discussion of the Findings

Whether the variables are correlated or not? The Analysed correlation value  $r$  is 75.5%, indicating a strong (Evans 1996) correlation. The  $R^2$  value concludes that the dependent variable '*transparency*' has 57.0% depending upon seven independent variables. Whether the regression model is fit or not? The study found that the sig value is 0.00, which is less than the p-value. So, overall, the regression model is significant and statistically fit. The aforementioned test result demonstrates that *transparency* is a significant factor in determining the effectiveness of an assessment of an e-Procurement implementation, and the dependent and independent variables are positively associated. Therefore, data findings confidently state that the conceptual framework for the *transparency* of the e-procurement assessment model that was proposed was validated.

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## 6. Conclusion

RHD all bidders were chosen as population. Following the research methodology, survey questionnaires and hypotheses were established following the study objectives in mind. The researcher suggested a conceptual framework based on the critical literature assessment and research gap analysis. Dependent variable *transparency* in this conceptual framework had 7 independent variables. The hypothesis test's major conclusion was that  $H_0$  (null hypothesis) was rejected and  $H_a$  (alternative hypothesis) was accepted. As a result, it has been concluded that transparency is the factor in assessing effective e-procurement implementation.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

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