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Legal, regulatory, and policy framework hypothesis testing in a proposed e-procurement implementation assessment model framework

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Abstract

Purpose: This paper investigated the essential variables that contribute to the successful implementation of an electronic procurement system in Bangladesh. Another goal was to build an efficient e-procurement implementation assessment model.

Design/methodology/approach: The hypothesized model was operationalized with survey data from 206 samples of procurement entity (PE) officers collected via primary investigation. Survey questionnaires were employed to collect data from eleven zones in Roads and Highways Division (RHD) as a population in Bangladesh.

Findings: The analysis found that the proposed conceptual framework for the e-procurement assessment model confidently asserts that the legal, regulatory, and policy framework was accepted. The results also demonstrated that the alternative hypothesis was accepted, so the proposed model was fit.

Originality/value: The study was an early attempt for the first time to get the theoretical design of a unique e-procurement implementation assessment model that had been developed and proposed. The study's findings would be helpful to e-procurement practitioners. The suggested assessment model would further help review, implement, and modify subsequent e-GP policy/guidelines.

Keywords: e-GP policy; e-GP guideline; e-Procurement assessment model; Hypothesis test; e-Procurement; Legal Regulatory and Policy Framework

1. Introduction

1.1. Overview and Problem setting

State-owned enterprises (SOEs) should have a well-defined legal and regulatory framework (World Bank 2014) that separates the managerial autonomy needed for commercial decision-making and proper government control and oversight for SOE accountability. Along with clearly defining the general policy directions, it also aims to demarcate the government's role as a shareholder from that of SOE boards and management. The *regulatory framework for public procurement* in Nigeria has been developed in the implementation of e-procurement (Udeh, K., & Ahmadu, M. 2013). E-procurement implementation regulatory frameworks should be built around the procurement governance framework, which gives a clear blueprint of procurement guidance for its design and implementation (Naomi, J., & Karanja, K. 2016). Many countries around the world are gradually focused on enhancing their public procurement processes, both legally

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and practically (Schooner et al. 2008). That is, the legal framework is perceived as the major critical success factor that influences other critical success factors in the adoption of e-procurement in the public sector.

To establish a suitable legislative framework, the Public Procurement Act 2006 (IPPA 2010) and the Public Procurement Rules 2008 were released by the Central Procurement Technical Unit (CPTU) in Bangladesh. Bangladesh then employed the traditional manual public 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 entities (PE). Because of its vastness, the manual tendering system is vulnerable to exploitation by vested interest organizations. Bangladesh adopted the e-procurement implementation (CPTU 2011) in the public procurement domain 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.

The final goal of this study was 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 in Bangladesh.

E-procurement implementation at RHD has grown significantly. In a World Bank policy research working paper (Jürgen et al. 2023) evaluated e-procurement adoption and discovered 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. The fundamental difficulty is that no RHD studies on the e-procurement assessment model have ever been conducted. As a result, no recommended e-procurement assessment model and no hypothesis testing were available on RHD. Instead, this article (Rashid and Uddin 2019) focuses on the effect of one dependent variable, the *legal, regulatory, and policy framework*, and its five associated independent variables.

1.2. Research Question and Hypothesis

The study's research question relating to this paper was:

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

Statement of Hypothesis

H. Effective e-procurement implementation assessment significantly depends on legal, regulatory and policy frameworks.

1.3. Specific Objective

Following the study question, the objective was to develop a hypothesis and corresponding 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 was to fill the gap of getting an e-procurement implementation assessment model. The study's novel contribution was threefold. First, to determine the factors for making a conceptual framework. *legal, regulatory and policy framework* is one of the assessment framework's dependent variable for the hypothesis test. Second, to get the proposed e-procurement assessment model to help overcome flaws and develop a viable e-procurement system. The study's novelty is in the theoretical design of a new e-procurement implementation assessment conceptual framework and model, which has been developed in Bangladesh's RHD. Finally, a hypothesis test was performed to evaluate the model's fitness.

2. Literature Review

The researcher established a conceptual framework after thoroughly reviewing the literature (Rashid and Uddin 2019). **Table 1** and **Figure 1** show how the variables were classified as independent or dependent. By establishing Critical Success Factors (CSFs), an organization can build a recognized point of reference to analyze its business performance properly and achieve its objectives (Kevin 2016). The researcher searched the literature study to find several lists of CSFs that could potentially be employed as variables in order to construct a conceptual framework (Rashid and Uddin 2019) for this research.

Table 1 Proposed Conceptual e-Procurement Assessment Framework

Dependent Variable	Independent Variable	Source
Y= legal, regulatory and policy framework (Overall CPTU performance)	X ₁ = overall cptu performance ; X ₂ = ppa 2006 (and subsequent amendments); X ₃ = ppr 2008 (and subsequent amendments) ; X ₄ = e-gp guideline 2011 ; X ₅ = implementation of digital signature;	World Bank 2002); (Mapsinitiative 2018); (ADB et al. 2004); (Gardenal 2013); (Stephens and Valverde 2013); (Kevin 2016); (CPTU 2011)

Data Source: Literature Review Survey, 2020

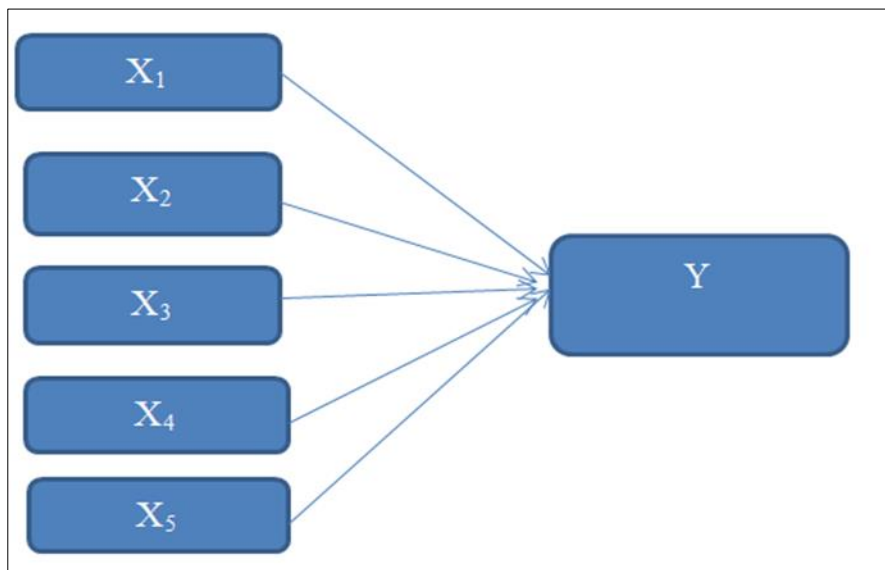


Figure 1 Proposed Conceptual e-Procurement Assessment Framework

3. Methodology

All Procurement Entity (PE) officers of the Roads and Highways Department (RHD) in Bangladesh were representing the population. Questionnaires were employed in the investigation. The study had on four wings, eleven zones, 31 circles, and 70 divisions in RHD in Bangladesh. PE officers made up 206 of the survey's sample size. A stratified sample strategy was used to choose E-Procurement tied PE officials in RHD for the survey. All surveys were designed with the study's objective in mind. A 5-point Likert scale was used to collect data from PE officers [Scale: 1= Not Satisfied, 2= Slightly Satisfied, 3= Moderately Satisfied, 4=Very Satisfied, 5= Extremely Satisfied]. For analysis, the researcher used SPSS software version 23. Multiple linear regression (MLR) model analysis was used to show the relationship between one dependent and 5 independent variables.

4. Results

Hypothesis- Effective e-Procurement implementation assessment significantly depends on legal, regulatory and policy framework.

To assess the e-tender effectiveness on legal, regulatory and policy framework had total six proposed variables.

4.1. Inferential test

From the conceptual framework Table 1 and Figure 1, variables were-

Dependent variable $Y = \text{legal, regulatory and policy framework}$

Five independent variables were-

- $X_1 = \text{overall cptu performance ;}$
- $X_2 = \text{ppa 2006 (and subsequent amendments);}$
- $X_3 = \text{ppr 2008 (and subsequent amendments);}$
- $X_4 = \text{e-gp guideline 201 ;}$
- $X_5 = \text{implementation of digital signature}$

The proposed MLR Model of the analysis is-

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon_i$$

Here, X influence Y, hence $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ would exist. Value of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ cannot be zero.

- Null hypothesis $H_0 : \beta_1 = 0, \beta_2 = 0, \beta_3 = 0, \beta_4 = 0, \beta_5 = 0$
- Alternative hypothesis $H_a : \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0$

Table 2 PE Officers Respondents' Statistics of Legal, Regulatory and Policy Framework

	Mean	Std. Deviation	N
Legal, regulatory and policy framework	4.23	0.649	206
Overall CPTU Performance	3.85	0.678	206
PPA 2006 and amendments	3.79	0.739	206
PPR 2008 and amendments	3.79	0.786	206
e-gp guideline 2011	4.16	0.666	206
Digital signature implementation	2.49	1.586	206

Data Source: Field Survey, 2020

Table 2 shows that the total number of PE officers who responded was 206. The mean value and standard deviations of the 6 variables are also seen in **Table 2**.

Table 3 Model Summary of Correlation on Legal, Regulatory and Policy Framework

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.913 ^a	0.834	0.830	0.268	0.834	200.489	5	200	0.000

Data Source: Field Survey, 2020

The R-value for the simple correlation in **Table 3** was 0.913, indicating some association. As a result, the calculated correlation value was 91.3%, a positive, strong correlation coefficient. The R^2 value of the model summary **Table 3** revealed that the dependent variable '*legal, regulatory and policy framework*' has 83.4% depending upon its five independent variables.

Table 4 Regression Fit Test (ANOVA) on Legal, Regulatory and Policy Framework

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.927	5	14.385	200.489	0.000 ^b
	Residual	14.350	200	0.072		
	Total	86.277	205			

Data Source: Field Survey, 2020

From the ANOVA **Table 4**, the regression model predicts the dependent variable *legal, regulatory, and policy framework to fit significantly well*. Because sig=0.000; So, the sig. value is less than the p-value. Therefore, the regression model is significant and statistically fit.

Again, considering the above ANOVA **Table 4** for the F test and sig value- F= 200.489 and sig=0.000. Hence, H₀ was rejected. So, overall regression significantly influences the legal, regulatory and policy framework by five independent variables that can be used to reliably predict *legal, regulatory and policy framework* (the dependent variable).

Table 5 Dependency Test (Coefficients) on Legal, Regulatory and Policy Framework

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.390	0.154		2.539	0.012
	Overall CPTU Performance	0.013	0.030	0.014	0.427	0.670
	PPA 2006 and amendments	0.022	0.049	0.025	0.441	0.660
	PPR 2008 and amendments	0.047	0.046	0.057	1.022	0.308
	e-gp guideline 2011	0.846	0.034	0.869	24.718	0.000
	Digital signature implementation	0.006	0.013	0.015	0.469	0.640

Data Source: Field Survey, 2020

From the above coefficients **Table 5**,

$$\text{legal, regulatory and policy framework (Y)} = 0.390 + 0.013 * \text{overall CPTU performance (X1)} + 0.022 * \text{PPA 2006 and amendments (X2)} + 0.047 * \text{PPR 2008 and amendments (X3)} + 0.846 * \text{e-gp guideline 2011 (X4)} + 0.006 * \text{digital signature implementation (X5)}$$

Here from the data analysis, $\beta_0 = .390$, $\beta_1 = .013$, $\beta_2 = .022$, $\beta_3 = .047$, $\beta_4 = .846$, $\beta_5 = .006$

$$\text{So, } \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0$$

So, null hypothesis H₀ was rejected, and alternative hypothesis H_a was accepted. So, it was tested that 5 independent variables (*overall CPTU performance, PPA 2006 and amendments, PPR 2008 and amendments, e-GP guideline 2011, digital signature implementation*) influenced dependent variables *legal, regulatory and policy framework (Y)*.

5. Discussion

The Analysed correlation value R was 91.3%, indicating a high correlation (Evans 1996) coefficient (positive strong). The R² value of the above model summary concluded that the dependent variable '*legal, regulatory and policy framework*' has 83.4% depending upon five independent variables. Whether the regression model is fit or not? The sig value 0.00 is less than the p-value. So, H_a was accepted. So, overall, the regression model is significant and statistically fit.

Do independent variables influence the dependent variable? From the coefficient test $\beta_0 = 0.390$, $\beta_1 = 0.013$, $\beta_2 = 0.022$, $\beta_3 = 0.047$, $\beta_4 = 0.846$, $\beta_5 = 0.006$. So, it was tested that five independent variables influenced the dependent variable *legal, regulatory, and policy framework (Y)*.

The test's findings showed that the *legal, regulatory, and policy framework* substantially impact how well e-procurement is implemented. According to the findings, the proposed conceptual framework for the e-procurement assessment model confidently asserts that the *legal, regulatory, and policy framework* was accepted.

6. Conclusion

RHD in Bangladesh had chosen all PE officers as the population. Survey questionnaires and hypotheses were developed in accordance with the research methodology, with the study objectives in mind. Based on the critical literature review and research gap analysis, the researcher proposed a conceptual framework. This conceptual framework contained 5 independent variables, including the dependent variable *legal, regulatory, and policy framework*. The main conclusion of the hypothesis test was that H_0 (null hypothesis) was rejected, and H_a (alternative hypothesis) was accepted. As a result, it was determined that the *legal, regulatory, and policy framework* is the significant factor for establishing an effective e-procurement assessment model framework.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest.

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