

Article

# Comparing the efficiency of cost and time of the e-GP system with the manual tender: Notification of award perspective

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## Abstract

Public procurement is a vital process to procure goods, works and services, ensuring accountability that ensures cost and time-savings. However, cost and time reduction is a considerable barrier to the Roads and Highways Department's (RHD) public procurement. In RHD, however, no comparative analysis of the efficiency in the cost and time context of tender notification of award has been explored. Therefore, using a stratified sampling method, the RHD's e-procurement-related PE officers were chosen as a sample. The mean value of notification of award cost and time of the e-tender system and the manual tender system as a continuous normally distributed variable was utilized to compare two groups using the independent samples t-test model. The study's novel contribution is the comparison of efficiency in terms of cost and time context between two sets of manual and e-tender notification of award. According to the survey results, the e-procurement system showed lower costs and time involved in giving notification of award to bidder compared to manual tender. The results will also aid academicians, students and procurement entities improvements to e-GP policy standards. More public procurement entities will be influenced to procure using e-GP system.

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## Keywords

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## Introduction

The Central Procurement Technical Unit (CPTU), now CPTU transformed into Bangladesh Public Procurement Authority (BPPA) on 18 September 2023 of the Ministry of Planning in Bangladesh. BPPA has been developing and managing the e-GP system in public procurement since 2011. The World Bank [1, 2] recommended that the e-GP be used to improve efficiency, transparency, fairness, and competitiveness in all public procurement. In FY20, US\$17.5 billion of procurement contracts representing about 62 percent of public procurement expenditure [3] in Bangladesh, were processed through the e-GP system.

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According to World Bank, electronic tools [4] are used to process the entire procurement cycle, from planning to contract completion. This includes creating the bid document, invitation to bid, and procurement plan; issuing electronic bid security; submitting, opening, approving, and evaluating the bid evaluation report; and issuing and accepting the notification of award. But in Bangladesh context, PPR 2008 [5], Rule 102 (1) to 102(13) are stated on the issue of notification of award and contract sign. PPR 2008, Rule 102 revealed that prior to the expiry of the Tender validity period and within one (1) week of receipt of the approval of the award by the Approving Authority, a Procuring Entity shall issue the Notification of Award (NOA) to the successful Tenderer.

### **Background of the study**

The e-GP system has been operational in Bangladesh since 2011. However, the issue is that bidders, procurement entities, and other stakeholders are considering knowing the efficiency of the e-GP system's cost and time contexts. What is the cost and time effectiveness of the e-GP system? What benefits would the nation derive from the most recent creative technique, such as the e-GP system? Compared to a manual tendering system, are there any cost-savings [6] of e-procurement? The factors [7] to be addressed in the e-procurement system are the ideal solution in terms of cost, time, and quality. There is a lack of such literature comparing notification of award costs between manual and e-procurement tendering in RHD.

### **Motivation**

The level of interest in this study topic is the comparison of the tender notification awarding costs and time associated with manual and electronic tendering processes. Any study on notification of award (NoA) yet to seen in the literature.

### **Research question**

Following research question was developed in support of the study while keeping in mind of the research on the subject:

**Q.** *How to compare the procurement efficiency between manual and e-procurement purchases in the context of the RHD development projects.*

### **Research objective**

Following research objective were considered in support of the study question in mind:

**O.** *To compare the procurement efficiency between traditional and e-Procurement purchases of the RHD development project.*

### **Research hypothesis**

Following two hypothesis were tested to compare cost and time issue on notification of award of a tender in electronic and manual platform.

**H1** *e-tender NoA issue cost and manual tender NoA issue cost is not same*

**H2** *e-tender NoA issue time and manual tender NoA issue time is not same*

## Related literature

In according to PPR 2008, Rule 102(6), the Notification of Award [5] establishes a contract between the Procuring Entity and the successful Tenderer and the existence of a contract is confirmed through the signature of the contract document that includes all agreements between the Procuring Entity and the successful Tenderer.

## Method

The study population was RHD in Bangladesh. The sampling technique was multistage. A stratified [8] and simple random sampling technique was used to select respondents. The research was conducted in four wings and eleven RHD zones. The total sample size of this research was 402 Procurement Entity (PE) officers and bidders of RHD in Bangladesh. Among them, 83 PE officers from RHD responded to this survey questionnaire, comparing the context of tender NoA process costs and time.

## Results and Discussion

### NoA issue cost comparison

Consider, Null hypothesis  $H_0: \mu_1 = \mu_2$

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

$\mu_1$  = population means for e-tender NoA issue cost

$\mu_2$  = population means for manual NoA issue cost

Significance level  $p = \alpha = 0.05$

Confidence interval level = 95%

### T-test result

**Table 1.** Group statistics for NoA issue cost

|      | Tender Type | N  | Mean      | Std. Deviation |
|------|-------------|----|-----------|----------------|
| Taka | Etender     | 83 | 71.0843   | 365.10277      |
|      | Manual      | 83 | 1247.8916 | 1806.70417     |

*Data source:* Field Survey, 2020

The average NoA issue cost for e-tender and manual system costs was Taka 71.0843 and 1247.8916, respectively, following Table 1. This means that the current e-tender NoA issuance cost is less than the cost of a manual NoA issue.

**Table 2.** Comparing NoA issue cost between e-Tender and manual tendering

|           | 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       |            |
| Tendering | Equal variances assumed                 | 96.070 | .000                         | -5.817 | 164             | .000            | -1176.80723           | 202.32028                                 | -1576.29561 | -777.31885 |
|           | Equal variances not assumed             |        |                              | -5.817 | 88.686          | .000            | -1176.80723           | 202.32028                                 | -1578.83291 | -774.78155 |

Data Source: Field Survey, 2020

According to Table 2, the F value is 96.070, and its Sig. value is 0.000. In this case, the sig value (.000) is significant because it is lower than the p-value (0.05). This shows that the second row of output is used in this situation rather than assuming equal variances. The Sig. (2-tailed)/2 = 0.000/2 = 0.000 in the second row. In this case, the fact that the sig value is less than the p-value is significant. As a result, the null hypothesis  $H_0$  is rejected. So  $\mu_1 \neq \mu_2$ . According to this, the average cost of an NoA issue for an e-tender is not the same as an issue for a manual tender.

**NoA issue time comparison**

Consider, Null hypothesis  $H_0: \mu_1 = \mu_2$

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

$\mu_1$  = population means for e-tender NoA issue time

$\mu_2$  = population means of manual NoA issue time

Significance level  $p=\alpha = 0.05$

Confidence interval level = 95%

**T-test result**

**Table 3.** Comparing NoA issue time by mean

|      | Tender Type | N  | Mean   | Std. Deviation |
|------|-------------|----|--------|----------------|
| Days | Etender     | 83 | 4.9141 | 7.55157        |
|      | Manual      | 83 | 8.0602 | 8.21116        |

Data source: Field Survey, 2020

The group statistics Table 3 reveals that the average NoA issue time for e-tender and manual system time is 4.9144 & 8.0602 days, respectively. This indicates that the present e-tender NoA issue time is lower than the manual NoA issue time.

**Table 4.** Test for comparing NoA issue time between e-Tender and manual tender

|      |                             | 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  |
| Days | Equal variances assumed     | 2.370                                   | .126 | 2.569                        | 164     | .011            | -3.14614        | 1.22450               | 5.56395                                   | .72834 |
|      | Equal variances not assumed |   |      | 2.569                        | 162.863 | .011            | -3.14614        | 1.22450               | 5.56408                                   | .72821 |

Data source: Field Survey, 2020

It was revealed in Table 4 that the F value is 2.370, and its Sig. value is 0.126. This study's sig value (.126) is not significant because it is higher than the p-value (0.05). This shows that the first row of output was dependent upon because equal variances were anticipated here. The 2-tailed Sig. in the first row is  $2 \times 0.011/2 = 0.0055$ . In this case, the sig value is significantly lower than the p-value. So, the alternative hypothesis  $H_a$  is acceptable, as shown by this. So  $\mu_1 \neq \mu_2$ . According to this, the average time for e-tender NoA issues are not the same as the average time for manual NoA issues.

### Conclusion

The study compared the time and costs associated with manual versus e-procurement processes to examine the efficiency of public procurement in NoA issues. The researcher collected primary data from PE officers in RHD and processed using the independent sample t-test model. Based on the findings and analysis, it is proved that e-procurement requires a lower average tender NoA cost than manual tendering. Additionally, it is established that e-procurement requires less time on average for NoA process than manual bidding. As a result, RHD in Bangladesh was able to cut back on NoA process costs and time due to the use of e-procurement.

### Future Research

Future studies may expand this research by including other public sector organizations in Bangladesh to enhance the generalizability of the findings. Further research could also examine additional dimensions such as transparency, accountability, and user satisfaction in the NoA process under e-procurement. Finally, longitudinal studies may assess the long-term institutional and organizational impacts of e-procurement adoption on public procurement performance.

### Competing interests

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