



**FACTORIAL ANALYSIS OF BENEFITS OF E-PROCUREMENT PROCESS IN GOVERNMENT SECTOR**

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**ABSTRACT**

Procurement in any organisation involves around 30% of the total Budget in a year. Transparent, efficient and timely procurement is indispensable for successful achievement of the objectives and reputation of any organisation. The paper highlights the benefits of e-procurement systems as Central Government and state governments of India as well as Public Sector undertakings of India have now shifted from conventional procurement practices to e-procurement through the use of modern enterprise resource planning (ERP) systems and network exchanges.

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**INTRODUCTION**

**Backdrop**

It is estimated that about 25-30% of the GDP is used towards public procurement<sup>1</sup>. Since a large part of taxpayers' money goes towards purchase of goods and services, it is important that the procurement procedures ensure economy, efficiency and transparency. One of the key areas of debate currently is to find how technology can be harnessed to improve the efficiency and transparency of procurements in the government organisations. E procurement is one such technological intervention in the public procurement system. This paper aims to analyse the impact of e procurement in the administrative efficiency of government departments.

**E-Procurement Defined**

Electronic procurement, commonly referred to as e-procurement, means procurement of goods and service not through the conventional face to face or through paper based correspondence but electronically through the internet. It covers the entire life cycle of purchase starting from placing the indent to the final receipt of the good or service and the payment thereof. E procurement can also be understood as the automation of procurement and supply chain processes using internet based applications and technology.

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This expands the idea of Enterprise Resource Planning (ERP) systems, and takes them beyond automation of internal business processes to integrate suppliers to electronically interact with internal systems. This not only cuts down the costs, time delays but brings rich dividends in the shape of better control of supply chain, better inventory management, etc. It allows procurement professionals across the world to communicate information simply and efficiently, streamlining the global procurement process; reducing time and costs without compromising on standards and quality.

**E-Procurement in Government of India**

The Government of India has initiated e-procurement in all the Ministries and departments. For this purpose the National Informatics Centre (NIC) has developed an e procurement portal called the Central Procurement Portal (CPP). The Ministries/Departments can use the e-procurement solution developed by the NIC accessible through the Central Public Procurement Portal (CPP) or can develop their own solutions. The Government of India made it mandatory for all the government ministries, Central Public Sector Enterprises and the autonomous bodies to publish the tender enquiries, corrigenda thereon and details of bid awards on the Central Procurement Portal (CPP) set up by the National Informatics Centre (NIC)<sup>2</sup>. Later the e procurement has been expanded to include processing of tenders through the central portal. The Prime Ministers Committee on National e Governance Plan during its second meeting held on 1<sup>st</sup> July 2013 endorsed that e-procurement should be adopted both for publication and

<sup>1</sup> Government Procurement in India, Domestic Regulations & Trade Prospects, CUTS International

<sup>2</sup> OM no 10/1/2011-PPC dtd 30<sup>th</sup> November 2011 issued by the Deptt of Expenditure, Ministry of Finance

processing of tenders and that all ministries/departments should adopt end to end e-procurement. <sup>3</sup> Presently e procurement has also been adopted by many states of the country.

**Scope of the Study**

Large amount of public funds is being spent on public procurement. There are laid down rules and procedures for doing public procurement. Most of the Ministries in the Central Government follow the rules and procedures as laid down in the General Financial Rules (GFR) while some Ministries like the Railways and the Defence have their own prescribed procedures. It is imperative that officers engaged in public procurement possess thorough knowledge of all rules, regulations and procedures of public procurement. In order to ensure that the personnel engaged in procurement remain updated with the rules of procurement, capsuled trainings are conducted from time to time either in-house by the departments or outside. The Ministry of Finance, Government of India has identified National Institute of Financial Management (NIFM), Faridabad<sup>4</sup> for conducting training programmes on procurement with a view to upgrade the capacities of concerned officers with all relevant rules and procedures of public procurement. The NIFM has been conducting a six day Management Development Course since February 2014.

**Objective of the Study**

To know and understand the benefits of E Procurement in the government.

**METHODOLOGY**

The research is based on a questionnaire wherein the responses of the officials who attended the training at the NIFM was studied. Respondents who took six day training on ‘E-Procurement’ during the year 2015-16 and are engaged in Procurement in the Central and State Governments and having work experience of 2 years to 15 years were randomly selected and asked to respond to a questionnaire aimed to assess the impact following the adoption of e procurement in their departments.

**Sample Size: 100**

13 Questions were asked consisting of various attributes from 100 participants who took a 6 days training on ‘E-Procurement’ during the year 2015-16. Each respondent was asked to indicate on 5 point scalerank the question asked on the likert scale of 5.

**Tool of Analysis:** Factor Analysis

**Input Data:** See Annex -2

**Output of Factor Analysis**

Following output were generated with the help of SPSS by using Factor Analysis:

<sup>3</sup>Letter no 10/2/2012-PPC dtd 9<sup>th</sup> January 2014 issued by the Deptt of Expenditure, Ministry of Finance

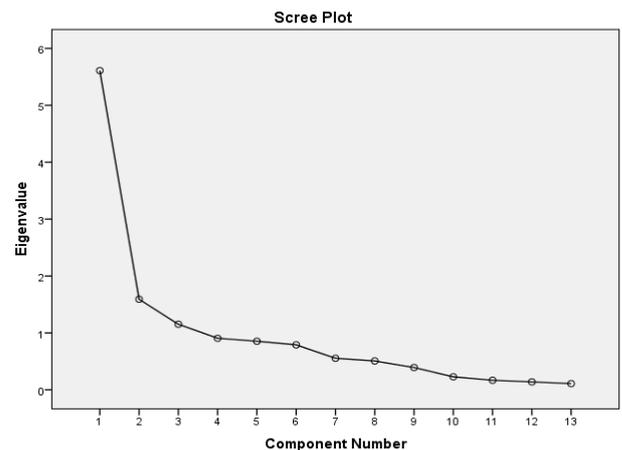
<sup>4</sup>The NIFM is a Centre of Excellence specializing in capacity building of professionals in the fields of Public Policy, Financial Management and other governance issues for promoting highest standards of professional competence and practice. It is a premier resource center for the capacity building of senior, middle and entry level officials on Government of India

**Table 1** Descriptive Statistics

|                                    | Mean   | Std. Deviation | Analysis N |
|------------------------------------|--------|----------------|------------|
| Tendering Time                     | 2.0500 | .86894         | 100        |
| Evaluating Period                  | 2.2400 | .87755         | 100        |
| Accuracy                           | 2.1000 | .73168         | 100        |
| Competition                        | 2.0800 | .90654         | 100        |
| Accessibility of Law & Regulation  | 1.9200 | .66180         | 100        |
| Equal Opportunities                | 2.0200 | .66636         | 100        |
| Bid Opening in Presence of Bidders | 1.9600 | .70953         | 100        |
| Record Keeping                     | 2.1900 | .70632         | 100        |
| Administrative Review              | 1.9800 | .68135         | 100        |
| Reduced Procurement Cycle          | 2.2600 | .71943         | 100        |
| Improved work Flow                 | 2.1600 | .83750         | 100        |
| Enhanced Accountability            | 2.0700 | .70000         | 100        |
| Professionalism                    | 1.7900 | .60794         | 100        |

**Scree plot**

The scree plot is a graph of the eigenvalues against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten. It can be seen that the curve begins to flatten between factors 4 and 5. Note also that factor 4 onwards have an eigenvalue of less than 1, so only three factors have been retained.



**Figure 1** Scree Plot

**Communalities**

The next item from the output is a table of communalities which shows how much of the variance (i.e. the communality value which should be more than 0.5 to be considered for further analysis. Else these variables are to be removed from further steps factor analysis) in the variables has been accounted for by the extracted factors.

**Table 3** Communalities

|                                    | Extraction |
|------------------------------------|------------|
| Tendering Time                     | .833       |
| Evaluating Period                  | .646       |
| Accuracy                           | .600       |
| Competition                        | .603       |
| Accessibility of Law & Regulation  | .417       |
| Equal Opportunities                | .722       |
| Bid Opening in Presence of Bidders | .648       |
| Record Keeping                     | .619       |
| Administrative Review              | .734       |
| Reduced Procurement Cycle          | .426       |
| Improved work Flow                 | .715       |
| Enhanced Accountability            | .812       |
| Professionalism                    | .579       |

Extraction Method: Principal Component Analysis.

The table no 3 given below shows us the communalities of the respective attributes based on the Principal Component Analysis.

procurement at NIFM Faridabad. FACTOR ANALYSIS with the help of SPSS was done.

**Table 4** Total Variance Explained

| Component | Extraction Sums of Squared Loadings |               |              | Rotation Sums of Squared Loadings |               |              |
|-----------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
|           | Total                               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| 1         | 5.610                               | 43.157        | 43.157       | 3.614                             | 27.801        | 27.801       |
| 2         | 1.592                               | 12.243        | 55.400       | 2.409                             | 18.531        | 46.332       |
| 3         | 1.152                               | 8.864         | 64.264       | 2.331                             | 17.932        | 64.264       |

**Extraction Method: Principal Component Analysis.**

The table no. 4 shows us the actual factors that were extracted. If we look at the section labelled “Rotation Sums of Squared Loadings,” it shows us only those factors that met our cut-off criterion (extraction method). In this case, there were three factors with eigenvalues greater than 1. SPSS always extracts as many factors initially as there are variables in the dataset, but the rest of these didn’t make the grade. The “% of variance” column tells us how much of the total variability (in all of the variables together) can be accounted for by each of these summary scales or factors. Factor 1 accounts for 27.801% of the variability in all 13 variables, and so on.

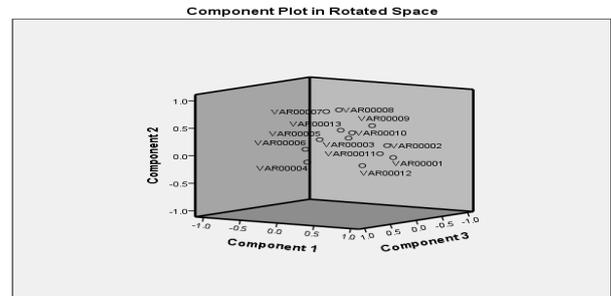
A summary of the exploratory factorial analysis of benefits of e procurement is given below in table no. 5

**Table No 5** Summary of the Exploratory Factorial Analysis of Benefits of E-Procurement

| Items /Attributes  | Rotated Factor Loading             |                       |                          |
|--|------------------------------------|-----------------------|--------------------------|
|  | Enhanced Administrative Efficiency | Enhanced Transparency | Enhanced Competitiveness |
| Reduced Tendering Time                                       | .901                               | .032                  | .143                     |
| Reduced Evaluating period of Bids                            | .768                               | .225                  | .070                     |
| Ensure accuracy of data entry                                | .504                               | .388                  | .442                     |
| E-Procurement increases competition                          | .163                               | -.037                 | .758                     |
| Accessibility of Law & Regulation to various stakeholders    | .168                               | .338                  | .524                     |
| Bids and procurement opportunities are adequately publicized | .173                               | .204                  | .806                     |
| Bids /tenders are opened in front of public /bidders         | .018                               | .783                  | .183                     |
| Ensure the proper record keeping of procurement documents    | .039                               | .785                  | -.032                    |
| Adequate access to administrative review regarding tenders   | .613                               | .581                  | .142                     |
| Reduced Procurement Cycle                                    | .411                               | .446                  | .242                     |
| Reduced procurement time through improved work flow          | .799                               | .108                  | .255                     |
| Enhanced level of accountability in procurement              | .739                               | -.079                 | .510                     |
| Enhanced level of professionalism in procurement staff       | .377                               | .515                  | .414                     |
| Eigen Value  | 5.610                              | 1.592                 | 1.152                    |
| % of Variation   | 43.157                             | 12.243                | 8.864                    |
| Cumulative % of Variation                                    | 43.157                             | 55.400                | 64.264                   |

**Interpretation of the Output**

13 questions were asked to 100 participants to assess the impact of the implementation of e- procurement. The participants were those who had some background of procurement and had taken the six day training on



**Figure 2** Component Plot in Rotated Space

Scree Plot helped to identify 3 important Factors which has EIGEN Value Greater than 1 and the table of “Total Variance Explained” suggests us that this 3 Factors EXPLAINS 64.26 % of the total variance in the Analysis.

The “Rotated Matrix table” helps us to identify the Name of the these three factor which are detailed below:

**Factor 1**

It is clear that attributes like Tendering Time has loading of .901, Evaluating Period has loading of .768, Improved work Flow has loading of .79, Enhanced Accountability has loading of .73 Administrative Review has loading of .61. If we club these attributes, we can define this factor as

“Enhanced Administrative Efficiency”.

**Factor 2**

As we see the attribute Bid Opening in Presence of Bidders has loading of .783 and Record Keeping has loading of .785, so we may define this factor as

“TRANSPARENCY”

**Factor 3**

As we can see that only the attribute “Competition” has loading of .758. This third factor can be named as

“Enhanced Competitiveness”

**Summary**

The study showed that adoption of e procurement system in government organisations has had a positive impact in terms of improving the overall administrative efficiency and transparency of an organisation. Adoption of e procurement has reduced the time taken in the entire tendering life cycle. The reduction in time has been particularly felt in the time taken to evaluate the bids. Further e procurement has enhanced transparency in public procurement as tenders are now opened publicly through the procurement portal. The study also pointed to increase in competitiveness with the adoption of e procurement.

**Scope for further research**

The study however only took into consideration the views of the officers in the government dealing with procurement and not with the bidders who are an important stake holder in the procurement process. More studies therefore need to be done to find out whether the intended benefits of e procurement as viewed by the purchasers are also shared by the bidders. Further the study was not aimed to find out the impact on the costs of procurement of goods and services in the government. An important consideration of bringing in e procurement was also to increase competition by bringing in more bidders in to the government system with a view to reduce the costs of purchases. More research would be needed to analyse this aspect.

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