

# E-Procurement and Supply Chain Performance in the Construction Industry of Pakistan

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**Abstract** - Technology-based service is no longer an afterthought for public and commercial businesses in today's dynamic, competitive, global economic climate; rather, it is a need. It has become essential for businesses to offer their clients a comprehensive, cost-effective solution that also improves customer happiness. E-procurement has played a significant role globally. It has so far entirely dominated Pakistan in terms of displaying a stepped-wise technique for its adoption at each stage of projects. After achieving success across the board in different projects, e-procurement began to attract the interest of numerous researchers in its application to construction projects. The literature study, however, reveals that many of the studies conducted in this field are limited to particular regions. Thus, there aren't many observational studies on the role of IT in the supply chain cycle. The aim of this study is to identify the e-procurement factors that effect the performance of supply chain management in Pakistan's construction industry. The study adopted the use of questionnaires and interview schedules to collect primary data. The research also adopted a descriptive design to collect quantitative and qualitative data that describes the effects of e-procurement factors on supply chain performance. For this, a questionnaire was designed and collected data from experienced workers. Data were analyzed in SPSS 25. The data of the questionnaire survey showed the importance of factors that affect the supply chain performance and ranked them according to mean and standard values. From the analysis results, the top e-procurement factors have been identified for construction industry of Pakistan.

**Keywords:** E-Procurement, Supply Chain Management, Construction Industry, Pakistan and Productivity.

## I. INTRODUCTION

E-Procurement is a huge business road for bringing down purchasing cost and further developing cycle capability. The electronic procurement esteem chain contains indent of the executives, electronic advising, electronic invoicing, electronic offering, electronic installment, electronic unloading, contract the board, order status, ship notice,

electronic installment, and list the executives. Powerful inventory chains are significant for a firm to remain savage in the present serious financial environment. This adequacy is driven by having a go at legitimate synchronization and coordination of movements of every kind across the whole stock organization association, going from end clients to supplier. Subsequently, once relegated functions like acquisition, a fundamental determinant for the association's connection with providers set off huge. Tremendous exchanges are rights now occurring inside buying elements of assembling firms [1].

Today's procurement work isn't just a support office capability to assist other divisions; it is a field as a whole that needs constant advancement and digitization to remain competitive. Digitalization, specifically electronic procurement frameworks, allows for the establishment and maintenance of at least one association between buyers, providers, clients, and other parties in the acquisition process. These days as an organization go worldwide there is an expanded requirement for electronic procurement frameworks to keep up with command over tasks, keep up with connection among purchasers and providers and diminish costs. According to a few studies, electronic acquisition innovation in procurement enables businesses to buy goods for 8–12% less than they would normally pay [2].

Global Public Procurement initially looked into e-procurement with a goal of initial sourcing and during current advancement for redesigning the framework to proficient productivity. The development of business-to-business flea markets, production network organization through the web, procurement dependent on the web, and procurement through networks and centers on the internet are all largely influenced by the internet. The distribution of the e-procurement framework in the late 1990s transformed the entire supply chain and procurement framework. The traditional supply chain and procurement procedures are gradually being replaced by the new system. This framework has improved procurement efficiency and viability while concurrently lowering the cost of the procurement/production network and maintaining the association's standards for quality. When compared to a manual procurement method, the tendering

system that uses the internet saves effort, time, and money. Similar to this, small and medium-sized businesses in developing countries are currently fast transitioning from old procurement systems to advanced e-procurement systems [3].

Procurement work has been one of the basic divisions in most fields. It comes up with huge authoritative capability and suitability. The issues of electronic acquisition and viable supply chain cycle are extended in this climate because of various elements such as costs and accessible assets, expertise levels and specialized abilities, and the idea of innovation. Organizations keep on confronting business-related issues like recovery for dynamic and control of the association, collection of timely reliable and exact data, processing and storing. When contrasted with current-based electronic procurement, old procurement was paper-based and conversation based. As per this investigation helpless record of the executives, documentation and recording system, absence of appropriate acquisition organizing and powerful post honor contract the board, irregularity in making obligatory announcing to general obtainment fail management and nonappearance of usage of high-level requests were obvious warnings of a unsuccessful activity [4].

This study the basic aim is to explore the effect of E-Procurement factors on supply chain management for companies in Pakistan. The study play's a significant role in the procurement sector of companies in Pakistan and through this study found out the E-Procurement related factors which effect the performance of the supply chain management.

## II. LITERATURE REVIEW

The influence of computerized procurement on successful supply chains in the energy region of Kenya. All of the components, that is, electronic information trade, electronic offering, and production network mix were found to affect feasible supply network management in the energy region[5]. There is a decent affinity among providers and East African Portland Cement Company (EAPCC) since one of the components that cause contrast between an association and providers is dispensed with. The utilization of electronic acquirement frameworks likewise is named to lessen ordering costs [6]. The advantages of the reception of electronic acquisition are portrayed. Cost-effective: the utilization of electronic acquirement can bring down costs by up to 65% so this can extend deal volume b/c it will achieve better expenses from suppliers and more fun when exchanging with suppliers. The movement of information among suppliers and customer associations can be better: b/c the computer framework and network of the internet will work with suppliers to share information about various items/benefits directly.

Smooth out Process: electronic acquirement grants relationships to streamline the cycle b/c the internet media permits organizations to interface with their providers in this manner wiping out intermediaries, therefore making huge income for the two dealers. Better Inventory Level: the electronic acquirement cycle can check for demand position or request mistakes like double information. Better administration to customers: suppliers and customers the equivalent can connect with each other's affiliations, so the help turns with a trip to be better. Further created speed of administration to customers: with the web, information trade among providers and customers can be speedier [7]. Digital Object Identifier and Technology Organization Environment systems are the most ordinarily utilized models on International Technology reception at the firm level, and most examinations on International Technology reception at the firm level are gotten from these two hypotheses [8]. Industry and top administration support from the authoritative setting, data innovation framework, data innovation expertise, business to business skill from mechanical setting, seen circuitous advantages, seen accomplishment of contenders and exchanging partner availability from environmental setting are emphatically and fundamentally connected with the electronic procurement adoption[9] and [10].

Electronic procurement coordinates the in-house and outside acquirement parts to address elements in the manner associations accomplish functional greatness by lessening cost and saving money on time used to get goods Also, electronic procurement is IT-based, and will quite often be fully informed regarding the most recent patterns in the market [12]. Any organization these days can't bear any sort of wastage identified with an interior as well as outside processes, according to the reality that each step requires a significant quantity of monetary worth, time, and effort. In any event, associations can save these assets by increasing economies and responsiveness in procurement and supply chain management [13] and [14]. E-Sourcing adoption has helped firms save costs from their supply chain, enhance the readability of critical business data, and shorten the time required to complete procurement procedures. There are precise and systematic deficiencies, which necessitate addressing various electronic procurement components. Because the probe was not conducted in Pakistan, there are also pertinent gaps [15]. When assessing the success of the supply chain, e-procurement platform are more critical than other types of e-business systems [16] and [17]. The importance of the current exploration can be evaluated through accessible writing on supply chain management in the construction industry of Pakistan. The sections of the construction industry of Pakistan in the supply chain management literature, with a primary focus on investigating the effect of electronic procurement factors on supply network

performance are vacant. Many studies or literature reviews fail to share information about the selected objectives of this research. Consequently, the current examination gets a unique spot in the writing and fills a vacant gap. This piece of the context improves the meaning of the current exploration. The current exploration fosters extraordinary information for its designated people like obtainment specialists and business advisors. Additionally, this exploration focuses on the construction industry of Pakistan, consequently, the review will be advantageous for the industries in Pakistan. Further, the current exploration has just centered around a couple of measurements of electronic obtainment factors and purposefully dismissed different factors that may likewise affect the supply chain management performance.

### III. RESEARCH METHODOLOGY

#### 3.1 Data Collection and Methodology

Data Following the approach by authors for e-procurement factors which effecting the supply chain performance, a multi-step methodology was adopted, as shown in Figure 1. In the initial phase, journal articles, conference proceedings, books, and reports to be attained from various scientific databases. Obtained documents were then be scanned for most influential factors of e-procurement. After the literature mapping of all these, unstructured interviews were conducted with the industry experts to verify their relativeness with Pakistan’s CI. In the next phase, factors were assembled in a questionnaire format which consisting of e-procurement factors which effect the supply chain performance. The perceptions of construction sector practitioners were acquired through the questionnaire. They were asked to rank the factors on a five-point Likert scale ranging from strongly disagrees to strongly agree. Then Data Analysis was performed using SPSS version 24 to obtain the top-most significant factors. Total 135 questionnaires were distributed among targeted respondents and 110 were considered valid for analysis. Respondents were asked to give feedback for each reason listed in the questionnaire used the scale as  $X_1 =$  Strongly Disagree;  $X_2 =$  Disagree;  $X_3 =$  Neutral;  $X_4 =$  Agree;  $X_5 =$  Strongly Agree. Assessment of level of significance were done using on AI (Average Index) method calculated based on frequency calculated with the help of statistical software SPSS. AI value was calculated based on following formula as adopted from.

$$AI = \frac{\sum(1X_1 + 2X_2 + 3X_3 + 4X_4 + 5X_5)}{\sum(X_1 + X_2 + X_3 + X_4 + X_5)} \quad (eq. 1)$$

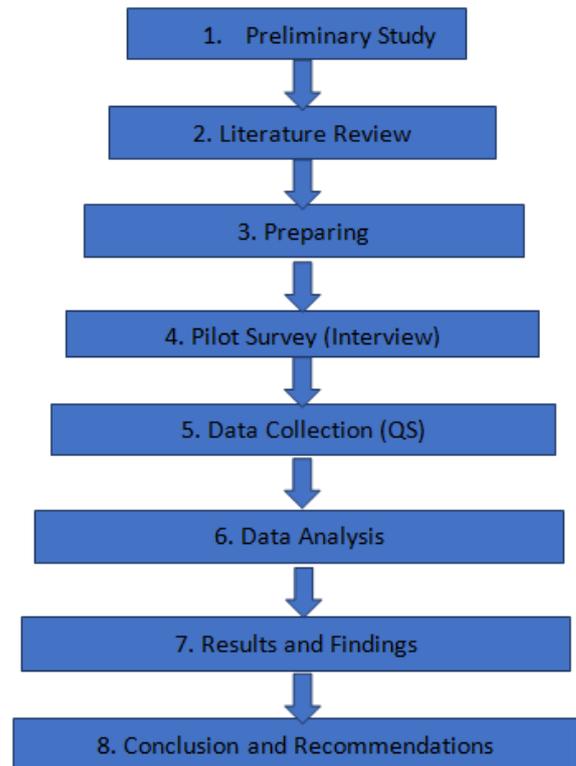


Figure 1: Research Methodology

### IV. RESULTS AND DISCUSSION

#### 4.1 Literature Review and Mapping

After a detailed literature review, 20 E-Procurement factors which effecting the supply chain performance of construction Sector of Pakistan. Then, unstructured and semi structure interviews were conducted with Construction Industry Experts, having working experience of more than 10 years. Table1 showed the result of unstructured and semi structure interview, total 20 factors of e-procurement were brought down, out of which 15 factors that effected the supply chain performance of construction Sector of Pakistan were analyzed:

Table 1: Unstructured Interview

S.No.	E-procurement practices	Yes	No
1	E-sourcing	11	02
2	E-tendering	13	00
3	E-payment	12	01
4	E-informing	10	03
5	E-biding	12	01
6	E-reverse auctioning	07	06
7	E-design	13	00
8	E-invoicing	12	01
9	E-data interchange	09	04
10	E-market sites	07	06
11	E-MRO (maintenance, repair and operations)	09	04

12	Web-based ERP (enterprise resource planning)	08	05
13	Contract management	09	04
14	Vendor Management	08	05
15	Indent Management	07	06
16	Catalog management	08	05
17	Spend analysis	09	04
18	Purchase order integration	05	08
19	Order acceptance	02	11
20	Order status	11	02

The above mentioned 10 factors were then set up in a questionnaire, which contained 2 parts. The first part of the questionnaire contained the introductory questions about the responder; however, the second part of the questionnaire contained the above mentioned 21 factors that effected the labor productivity in public sector building projects of Sindh, ranked on a Likert's scale from 1-5,

Where:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neutral
- 4 = Agree
- 5 = Strongly Agree

135 questionnaires in total were distributed among industry experts, out of which 110 were returned and were found valid for analysis. The results obtained were then analyzed in SPSS software, which yielded following results as shown in table 2:

Table 2: SPSS Results

Factors	Mean	S.D	Rank
E-tendering	2.32	.766	1 <sup>st</sup>
E-sourcing	2.23	.938	2 <sup>nd</sup>
E-informing	2.18	.808	3 <sup>rd</sup>
E-payment	2.15	.856	4 <sup>th</sup>
E-bidding	2.12	.873	5 <sup>th</sup>
E-design	2.05	.893	6 <sup>th</sup>
E-invoicing	2.04	.953	7 <sup>th</sup>
Contract management	2.00	1.125	8 <sup>th</sup>
E-data interchange	1.99	1.049	9 <sup>th</sup>
Web-based ERP (enterprise resource planning)	1.81	1.152	10 <sup>th</sup>
Catalog management	1.81	1.147	11 <sup>th</sup>
Vendor Management	1.73	1.213	12 <sup>th</sup>
Spend analysis	1.70	1.258	13 <sup>th</sup>
Order status	1.68	1.224	14 <sup>th</sup>
E-MRO (maintenance, repair and operations)	1.62	1.165	15 <sup>th</sup>

It is fairly obvious from the above table that E-Tendering was placed as the top factor because of its higher mean value.

The industry's integration suffers greatly since the factors are not easily accessible in the building sector. Due to its second higher mean value, E-Sourcing was recognized as the second most important factor in the construction industry's adoption. For better outcomes in the construction sector, another important aspect that has a significant impact on supply chain performance and collecting information about projects must be communicated through electronic sourcing. E-Informing was ranked as the third factor affecting supply chain performance in the construction industry because it had higher mean values than the first two factors. The adoption of supply chain management is significantly influenced by e-informing. Without the assistance of e-Informing, supply chain management implementation in the construction industry is not feasible. E-Payment was recognized as the top 4th factor which effects the supply chain performance because of its higher mean values after the top three factors. E-payment also plays an important role in the construction industry of Pakistan, all the important transactions between two parties or organizations through online process for security purposes, reduce time wastage, and increase supply chain performance. E-Bidding was the top 5th factor that effects supply chain performance in the construction industry because of its higher mean values after the top four factors. All the factors were identified in this manner, and they were ranked according to their mean values, with the factors with higher mean values being selected as the top factors.

## V. CONCLUSION

Previous studies tested different procurement and supply chain management strategies and their influence on firm and supply chain performance, but previous research studies did not provide empirical and theoretical insights into how E-Procurement factors are useful in effectively deploying supply chain and procurement strategies and how to increase their influence on supply chain management performance (supply chain responsiveness). The current study sought to express the effect of fifteen electronic procurement elements on supply chain performance in Pakistan's construction sector. These fifteen factors of electronic procurement were divided into three components after the exploratory factor analysis. These three components were the organization and management perspective, the system and technology perspective, and the infrastructure perspective.

These findings have the same consequences as they do in other nations where E-Procurement is used in the building industry. The perceived advantages of E-Procurement versus paper-based systems are at the top of the list of considerations that impact firms' decisions to embrace it. The study also suggests that there are different perspectives on the variables influencing the choice to use E-Procurement in the

construction sector between researchers and users. To achieve better research outcomes, construction researchers must strive to connect their ideas with those of industry practitioners. This study also has the consequence that it is crucial for companies considering adopting E-Procurement in the future to comprehend the advantages, the accessibility, and the price of E-Procurement solutions. Because of this, there is a requirement for increased E-Procurement awareness through workshops, conferences, and professional associations, as well as the availability of E-Procurement technologies and tools at reasonable prices, to ensure a critical mass uptake of E-Procurement and maximize its benefits in the construction industry.

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#### REFERENCES

- [1] R. K. Waithaka and J. G. Kimani, "EFFECT OF E-PROCUREMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE," *global general of purchasing and procurement management*, vol. 1, no. 1, pp. 32–42, 2021, [Online]. Available: [www.iprjb.org](http://www.iprjb.org)
- [2] C. R. C. G. Centobelli Piera, "E-procurement and E-supply chain: Features and Development of E-collaboration," 2014.
- [3] J. Watuleke, "E-procurement: evolution and adoption. a review of literature," *IJRDO-Journal of Educational Research*, vol. 2, no. 5, pp. 50–62, 2017.
- [4] E. Bartezzaghi and S. Ronchi, "Internet supporting the procurement process: lessons from four case studies," *Integrated Manufacturing Systems*, 2003.
- [5] K. Ngeno and J. Kinoti, "EFFECT OF E-PROCUREMENT ON EFFECTIVE SUPPLY CHAIN MANAGEMENT PROCESS IN ENERGY SECTOR IN KENYA," 2017. [Online]. Available: [www.iprjb.org](http://www.iprjb.org)
- [6] E. Nyile, "ROLE OF SUSTAINABLE PROCUREMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE OF MANUFACTURING SECTOR IN KENYA: A CASE STUDY OF EAST AFRICAN PORTLAND CEMENT COMPANY CULTURAL ASPECTS CONSTRAINING MINE WATER SUPPLY CHAIN MANAGEMENT IN ASAL AREAS OF KITUI COUNTY, KENYA View project," 2016. [Online]. Available: <https://www.researchgate.net/publication/339137337>
- [7] R. Innocent and P. B. Kalaskar, "The Adoption of e-Procurement and its impact on the Procurement Performance of Selected Telecommunication Companies in Rwanda," Online, 2016. [Online]. Available: [www.iiste.org](http://www.iiste.org)
- [8] T. Oliveira and M. F. Martins, "Information technology adoption models at Firm Level: Review of literature," *4th European Conference on Information Management and Evaluation, ECIME 2010*, vol. 14, no. 1, pp. 312–322, 2010.
- [9] L. Tornatzky and M. Fleischer, "The process of technology innovation," *Lexington, MA: Lexington Books*, vol. 165, 1990.
- [10] A. Soares-Aguiar and A. Palma-dos-Reis, "Why do firms adopt E-procurement systems? Using logistic regression to empirically test a conceptual model," *IEEE Trans Eng Manag*, vol. 55, no. 1, pp. 120–133, 2008, doi: 10.1109/TEM.2007.912806.
- [11] T. S. H. Teo, S. Lin, and K. hung Lai, "Adopters and non-adopters of e-procurement in Singapore: An empirical study," *Omega (Westport)*, vol. 37, no. 5, pp. 972–987, 2009, doi: 10.1016/j.omega.2008.11.001.
- [12] M. E. Kalau, "E-Procurement Strategies and the Performance of Kenya Owned Parastatals Mwenga Esther Kalau a Research Project Presented in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Business Administration of School of Business , Un," 2016.
- [13] S. Qrunfleh and M. Tarafdar, "Lean and agile supply chain strategies and supply chain responsiveness: the role of strategic supplier partnership and postponement," *Supply Chain Management: An International Journal*, 2013.
- [14] C. N. Rasto and J. Kenyatta, "EFFECT OF ELECTRONIC PROCUREMENT PRACTICES ON ORGANIZATIONAL PERFORMANCE IN PUBLIC HOSPITALS IN THE COUNTY GOVERNMENT OF UASIN GISHU, KENYA," *International Academic Journal of Procurement and Supply Chain Management*, vol. 2, no. 3, pp. 16–32, 2017, [Online]. Available: [http://www.iajournals.org/articles/iajpsc\\_m\\_v2\\_i3\\_16\\_3\\_2.pdf](http://www.iajournals.org/articles/iajpsc_m_v2_i3_16_3_2.pdf)
- [15] al Oteki et, "Influence of Electronic Order Processing on Supply Chain," *International general of social sciences and information technology*, pp. 2622–2634, 2018.
- [16] W. D. Presutti, "Supply management and e-procurement: Creating value added in the supply chain," *Industrial Marketing Management*, vol. 32, no. 3, pp. 219–226, Apr. 2003, doi: 10.1016/S0019-8501(02)00265-1.

- [17] F. Wiengarten, P. Humphreys, G. Cao, B. Fynes, and A. McKittrick, "Collaborative supply chain practices and performance: exploring the key role of information quality," *Supply Chain Management: An International Journal*, 2010.
- [18] Sohu, S., Abdullah, A. H., Nagapan, S., Fattah, A., Ullah, K., & Kumar, K. (2017, October). Contractors perspective for critical factors of cost overrun in highway projects of Sindh, Pakistan. In *AIP Conference Proceedings* (Vol. 1892, No. 1, p. 080002). AIP Publishing LLC.
- [19] Sohu, S., Ansari, A. A., & Jhatial, A. A. (2020). Most common factors causing cost overrun with its mitigation measure for pakistan construction industry. *International Journal of Sustainable Construction Engineering and Technology*, 11(2), 256-261.

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