

Research Trends on the E-Procurement Smart Systems



N. Madhusudan, L. Manjunatha Rao

Abstract: By the development of the real-time technologies, the association and commerce applications has been observed among the enhancing movement to implement cutting edge skills to control their commerce method. But, this movement was not observed much the electronic-procurement technique, where the obtainable consumers still order things using a predictable web-based method, which may not present a different continuing challenge in the e-procurement technique. This manuscript effort to study the existing movements and disputes of the web-based e-procurement technique and demonstrates that the acceptance of the cloud computing as a recent trend, like continuing problems of the e-procurement, may be shown. This manuscript also introduces the efficiency of the accessible methods by explanation of the research-gap.

Keywords: E-procurement, E-auction, Cloud computing, Supply chain organization

I. INTRODUCTION

Electronic-procurement is a technique for buying purchases online. An accurately executed technology may connect the organizations and their business methods with the dealers while controlling the entire interaction between them. It contains organization of the communications, questions and answers, previous costing, and multiple emails to various applicants.

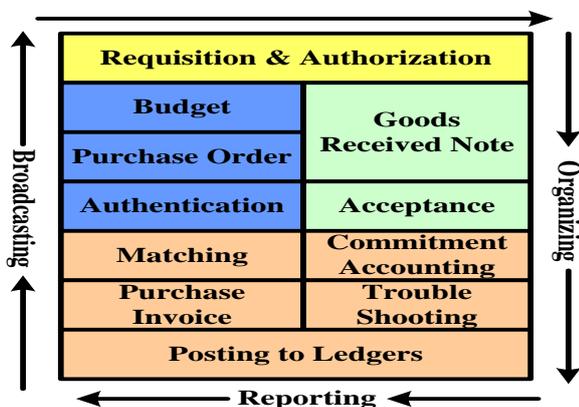


Fig.1 Method of Electronic-Procurement

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The suitable "e-procurement" method assists a firm categorizes its communications with its very significant dealers. It gives a classification method to maintain the open line of broadcasting techniques with potential dealers during a business technique [1]. This technique illustrates the managers to confirm the costing and leverage earlier agreement to make sure every unique quote is more competitive than order one. The fig.1 presents the blueprint of the "e-procurement" technique. The prime objective of this paper is to investigate the accessible electronic-procurement technique, also discloses the problems, and highlight how the "cloud-computing" helps in resolving the problems of the predictable "electronic-procurement" technique. The manuscript also presents an important research gap in the accessible technique demonstrates the future study. The section "A" presents background and describes the research issues in the section "B". The primary theory about "e-procurement" has been addressed in section-II, section-III talks about the important research gap for the prior study. The Section-IV talks about the research analysis and Section-V, discusses the conclusion based on the presented study.

A. The Background

This part demonstrates about the background study, presenting the previous research efforts to intending the electronic-procurement technique till presently. The work of Haizi et al. [1] focuses on the study of the dealer evaluation technique in the e-government procurement based on the various amended weight factors. By Yang and Zhang [2], the study of electronic-procurement introduces steel enterprises, and iron is presented. The combination with real position and the procurement model in the Bao steel organization, they have done the study based on its electronic-procurement model architecture. They discover several types of developments after utilizing the unique procurement technique. The work is done by Nanang et al. [3] that explore the believe, error as well as public key infrastructure model based on the electronic-procurement acceptance. By Sundarraj and Mok [4] have proposed suggestions from the literature review over human cooperation and client on 1, 80,000 models to calculates the performance of their models with respect in order to these negotiation features. The models and reproductions have suggestions for the e-procurement. Guo and Chen [5] to study the application of electronic-procurement in the activities. As per the position of the electronic-procurement in the events, the manuscript divides the advantages of the electronic-procurement on the traditional modes and discovers the methods of the electronic-procurement.



Aguiar et al. [6] have presented an integrative design in order to illustrate the procurement implementation. They have posited which EPS execution success has been established by the EPS-project organization method, the soft's absorptive ability, and its IT capability. They have conceived which methods integration between the focal soft's and its primarily buyer's reasonable the connection between the obtaining procurement performance and successful EPS execution by the soft's. By Sundarraj and Shi [7] introduces the application of non-linear optimal for studying the parameters of the general cooperation decision purpose. After that, it demonstrates the value of studying in procurement negotiation communication; they have also delineated the reaction design, which looks to enhance the result. The Kamei and Tanaka [8] have illustrated the logistics method and reproduce the employ of the actual "e-commerce" organization's information. The simulation shows that the technique is effective enough in order to decrease the entire losses by 40%. Futo [9] introduces the idea of the planned "E-procurement" technique of the Hungarian governments, which is discussed in this research study. Hidayanto et al. [10] have studied the execution of the e-procurement into the PT. The PLN offers a significant collision on the entire price of the attainments, company features, governance arrangement, pre-sourcing business methods, and the procurement reference. By Wang and Wang [11] introduced the multi-item procurement issue with variable amount is examined, and the association method of the corresponding reverse e-sale has been introduced. Wang and Zhong [12] producing the enterprise buyer performance growth that indicates the assortment under electronic-procurement. Hazra and Mahadevan [13] introduce the procurement design in the e-market with the coordination prices. The Akbar [14] has calculated the impact of DDoS attacks on the obtainable network framework of the government-procurement check and also calculates the available network defense device. Saso et al. [15] introduce the evaluation of the modify ePP answer for the republic of Macedonia with a proper evaluation structure that follows the client through the stages of the e-procurement methods. Luo et al. [16] demonstrate the structure of the design of the e-procurement method. It is based on supply-chain; after that, it provides a literature study of the electronic-procurement technique based on the supply-chain. The Solanke [17] studied of "e-commerce" overproduction material procurement for the sustainable manufacture. The Cabral et al. [18] presents that the eRA that taken place in the 0.7% of the methods, consistent and in line with the outcomes which indicates advantages by the European abilities. The MA et al. [19] this study focuses on government e-procurement design and the development of counter calculations. Naseebullah [20] introduces the role of factors in the B-2-B electronic-procurement execution. The Dai and Paracha [21] it's transporting the efficiency and transparency in the project organization throughout robust electronic-procurement techniques in the Afghanistan nation.

B. The Problem

The problem identifies the utilization of conventional electronic-procurement method are as follows:-

- o Recently, the buyer is not presented with any access to the electronic-procurement devices approved by the dense.
- o An achieving synchronization the complete electronic-procurement method with the obtainable

techniques, which is time taking for the workers who all working in the method organization with fewer technical abilities.

- o The obtainable "e-procurement" application does not offer more user-friendly knowledge to its buyers, also other stakeholders.
- o The conventional method of "e-procurement" calls for the consumer-based design-related the obtainable need of the association without focus over the elasticity of the software model.
- o An available web-based electronic-procurement method also does not focus on the typical cryptographic method, and it is not flexible against different sorts of internet-based attacks.

II. RESEARCH METHODOLOGY

Based on the typical condition, the value of "e-procurement" prototype must introduce the following stages e.g., a) Application stage, b) Data stage, and c) Infrastructure stages also d) the development stage. Based on the universal economical policies (UEP) of the IT Act-2005 [22], it's extremely significant which is "e-procurement" technique must execute only in four stages for running its vital process as the typical pictorial explanation of the typical structure of the "e-procurement" that demonstrates in the fig.2.

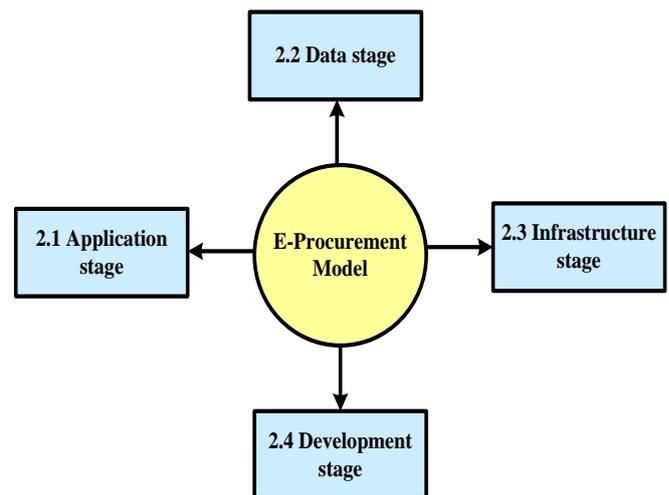


Fig.2 Demonstrates the e-procurement model design

A. Application Stage

This stage focuses on maximum and minimum stage design of the "e-procurement" structure stage like Rule destruction, Memory leakage, application call diagram, and expired codes so and so. The verification of the application stage has been done by using function testing for data support.

B. Data Stage

This stage introduces to make sure the storage of the information which is transacted or produced by using the "e-procurement" technique. This stage also illustrated by the inclusion of the safety audits for every conducted data and validation of the cryptographic methods to be utilized for the encryption.



C. Infrastructure Stage

This stage demonstrates the "e-procurement" is provided with various components like server, load-balancing, security techniques (Firewalls). The design of this stage has been done by using the infrastructure stage, performed penetration testing, as well as performance testing.

D. Development Stage

The verification of the process stage has been done by using ISO-27001, which is primarily designed to established safe SLA faithfulness. The entire technique that has been created in this stage is subjected to the optimal security and set-up by hierarchical access strategy.

Apart from the inclusion of the above-presented stage, it is extremely significant that there must be a specific certification strategy of the adopt "e-procurement" application to make sure superior conformance of the international standard and good flexible for any further modifications has been producing to map with the business perspective. There are some researcher has been done the study in order to explore the best structures in the "e-procurement" from many years. The study is done by Bof et al. [23] introduces multiple national structures for the acceptance of the "e-procurement" model in order to improve the method of the methodology. Sharma et al. [24] have proposed a model of "e-governance" structure presenting the case study of Uttarakhand city in India. Similarly, the works of Parida [25] have introduced the structure in order to examine its probable impact over the performance of a firm. They have also implemented the qualitative method to produce the structure, which was studied by using descriptive statistics. The work of Singh et al. [26] demonstrated the case study of the Australian "e-procurement" structure. They have presented a technique that is created by using a dealer module, installation of the connection module, and a marketplace module.

III. RESEARCH GAP

This section introduces the important research gap which demonstrates after studying the current literature study to the "e-procurement" technique. The major trade-off established on the obtainable research efforts till dates are:-

A. Inadequate Technical Research

There are around 39 manuscripts related to the technical execution of the "e-procurement" technique and 10 manuscripts on the cloud-based "e-procurement" technique. Furthermore, the popularity of available work has been accepted by qualitative methodologies where the data was gathered by using questionnaires. The technical execution of the cloud structure has quite minimum focused on the "e-procurement" method till today. Although, there are numerous whitepapers are available on the internet based supplies; however, the very minimum paper has been found to platform the issues relating to the cloud-based structure. Hence, it may be said that there is a necessity to continue investigating the issues connected with the cloud-based "e-procurement" technique with the development of various models.

B. Minimum focus over genuine issues

Very recently, it was seen that the combination of the sophisticated technique, dynamicity of the method, and user-friendly are present several important issues. The primarily work has been introduced to maintain the standard manuscript; it's not highlighting the problems.

C. Minimum focus over confirmation models

Numerous standards manuscripts are presented for the design and improvement of the "e-procurement" technique; however, till now, there is no previous work has been initiated to hold on the standard agreement requirements.

IV. RESULT STUDY

This section focuses about the results obtain from the presented study. The complete mathematical model has been used and the execution is done by using MATLAB application. The all process of the outcome study, highlight were provided evaluate the calculation period of time also accuracy related with bidding method in the "E-Procurement" technique. The improvement form of the outcome studies, the results have been evaluated with several of the existing method of "E-procurement" technique [21] [28-29]. The result of comparative study has been demonstrated below:- The Table 1 talks about the statics of comparative study of calculation time and the graphical representation is shown in figure 4.

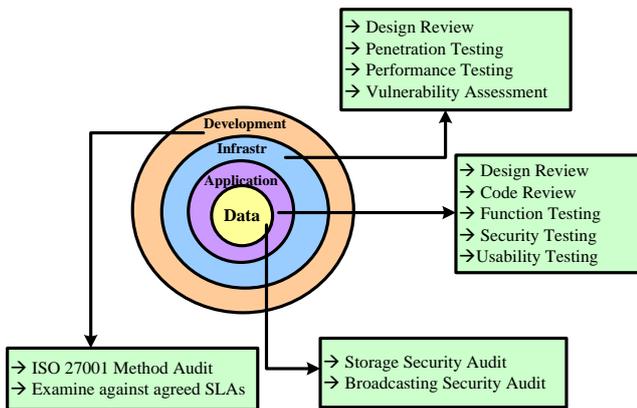


Fig.3 Typical structure of e-procurement

The Eadie et al. [27] have presented a prototype dependable for designing the compatibility maturity prototype of the "e-procurement" considering the case study the UK manufacture divisions. The study also recognized around 32 issues that have obstacles to the utilization of the "e-procurement" technique in the construction area in the UK. Though the limitations of the demonstrated structure are a) No benchmarking of the structure producing it tough to understand the efficiency, b) Lack of inclusion of safety ordinary, and c) No discussion based on the accordance of this model with the typical structure of the "e-procurement."

Table 1 Statics of comparative study of calculation time

Approaches	Calculation Time(s)
Proposed	0.3
Dai-Approach	0.9
Fu-Approach	0.7
Idrees-Approach	0.5



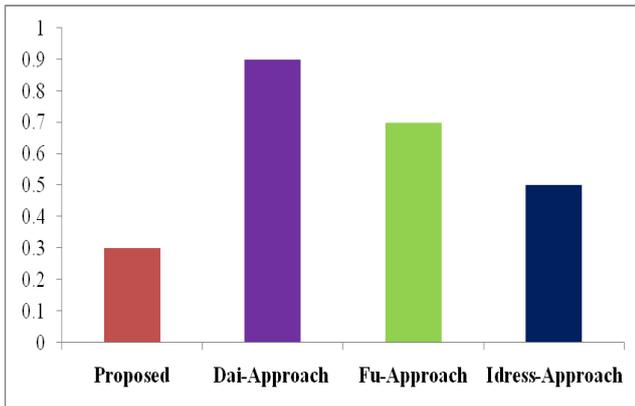


Fig.4 Comparative study of calculation time

Figure 4 represents that the presented method provides enhancement of calculation time by 91.02, 74.89%, 46.82%, and 34.28% evaluated to [21], [28-29]. The major reason behind this is none of this existing method was found to approve the time-based optimization method for which reason there is an association of the important calculation time. Furthermore, existing method is more application definite which has its dependencies over outer agents; while there is no such thing has been measured in the presented method. Hence, the presented method provides quick response time for catering up quicker bidding commands over “e-procurement” technique. In the table 2 the statistic value for comparative study of bidding accuracy.

Table 2 Statics of comparative study of bidding accuracy

Approaches	Accuracy in (%)
Proposed	91.02
Dai-Approach	74.89
Fu-Approach	46.82
Idrees-Approach	34.28

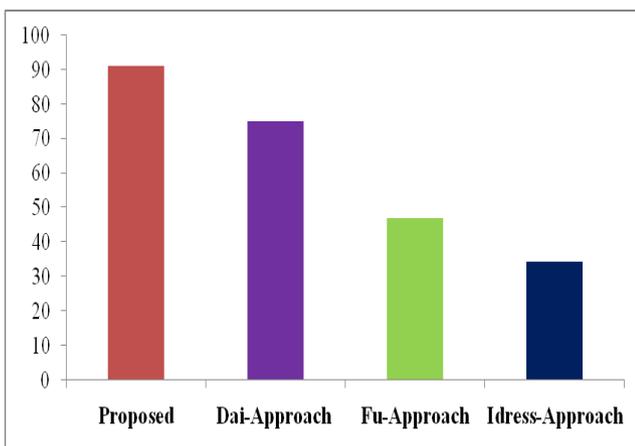


Fig.5 Correctness of calculating the bidding quality

The figure 5 demonstrates that the correctness of calculating the bidding quality for presented method is superior by 15.55%, 19.52%, and 8.08% in the evaluation to [21], [28-29]. The main purpose behind this is presented method calculates well-defined uncertainties by using non-linear optimization method by using regression. This system consistently calculates the less square faults and performing minimization as per the objective of defined objective role. Therefore, the presented method also demonstrates the study of current bidding method which provides competitive

advantages for the bidders and merchant in the “e-Procurement” technique.

V. CONCLUSION

By enhancing acceptance of the cloud-computing over different activity appliances in the present age, the “e-procurement” method is not missing. This manuscript has afforded to presents the "e-procurement" is not just a function to produce online buyers; however, it is another causal characteristic. While accepting the "e-procurement" technique helps on the online-placement of the buyer order, this also improves the partner to observe control their purchasing behavior in terms of the payments. This paper classified into the background section of the procurement technique, which demonstrates the essential components dependable to operate over the "e-procurement" technique, and the conversation was disposed to profits the issues in this field. The further study has been introduced in order to understand the critical needs of the "e-procurement" technique with emphasizes over the sets of the "e-procurement" technique. This conversation indicates that the if the researchers have been afforded to make blueprint of "e-procurement" technique, it must stand by the acclaimed values. The result present that there are critical requirement to develop with an adaptive model which may capably hold the continuing issues found unnoticed in the prior work.

REFERENCES

- Haizi, Wang, Zhao Li, Liu Juan, and Zhang Tongtao. "Research of the Supplier Evaluation System in Electronic Government Procurement Based on Multiple Amended Weight Coefficient." In 2009 International Forum on Computer Science-Technology and Applications, vol. 2, pp. 90-92. IEEE, 2009.
- Yang, Jie, and Ruoyun Zhang. "The research and analysis of e-procurement for iron and steel enterprises." In 2009 International Conference on Information Management, Innovation Management and Industrial Engineering, vol. 2, pp. 3-6. IEEE, 2009.
- Nanang, Herlino, Ahmad F. Misman, and Zahidah Zulkifli. "Trust, risk and public key infrastructure model on e-procurement adoption." In 2017 5th International Conference on Cyber and IT Service Management (CITSM), pp. 1-6. IEEE, 2017.
- Sundarraj, R. P., and Wilson Wai Ho Mok. "Models for human negotiation elements: Validation and implications for electronic procurement." IEEE Transactions on Engineering Management 58, no. 3 (2011): 412-430.
- Guo, Ping, and Ziwen Chen. "Application of e-commerce in procurement management of enterprise." In 2010 International Conference on Future Information Technology and Management Engineering, vol. 2, pp. 519-522. IEEE, 2010.
- Aguiar, A. M., K. Ramamurthy, and A. P. Reis. "Electronic procurement systems: an integrative model to explain procurement performance." In 2008 IEEE International Conference on Industrial Engineering and Engineering Management, pp. 1490-1494. IEEE, 2008.
- Sundarraj, R. P., and Xianjie Shi. "Optimization-based methods for improving the accuracy and outcome of learning in electronic procurement negotiations." IEEE Transactions on Engineering Management 59, no. 4 (2011): 666-678.
- Kamei, Keita, and Kenji Tanaka. "An optimization system for procurement logistics including both the cost of ground rent and the cost of procurement logistics." In 2011 21st International Conference on Systems Engineering, pp. 334-336. IEEE, 2011.



9. Futo, Ivan. "The electronic procurement system of the Hungarian government." In Proceedings of the 23rd International Conference on Information Technology Interfaces, 2001. ITI 2001., pp. 173-180. IEEE, 2001.
10. Hidayanto, Achmad Nizar, Yuanisa Ditari, and Dina Chahyati. "Study of e-procurement implementation impacts: A case study in PT. PLN." In 2012 IEEE International Conference on Management of Innovation & Technology (ICMIT), pp. 152-157. IEEE, 2012.
11. Wang, Na, and Dingwei Wang. "Model and algorithm of winner determination problem in multi-item E-procurement with variable quantities." In The 26th Chinese Control and Decision Conference (2014 CCDC), pp. 5364-5367. IEEE, 2014.
12. Wang, Mingyan, and Wu Zhong. "The Manufacturing Enterprise Supplier Performance Evaluation Indicator Selection under E-procurement." In 2009 International Conference on Electronic Commerce and Business Intelligence, pp. 7-11. IEEE, 2009.
13. Hazra, Jishnu, and B. Mahadevan. "A procurement model in an electronic market with coordination costs." In 2011 IEEE International Conference on Industrial Engineering and Engineering Management, pp. 1364-1368. IEEE, 2011.
14. Akbar, Salman, and Adhi Dharma Wibawa. "The impact analysis and mitigation of DDoS attack on local government electronic procurement service (LPSE)." In 2016 International Seminar on Intelligent Technology and Its Applications (ISITIA), pp. 405-410. IEEE, 2016.
15. Saso, Josimovski, Trenevska-Blagoeva Kalina, and Mihajlov Martin. "Evaluation of electronic public procurement solution for the Republic of Macedonia." In 2009 9th International Symposium on Communications and Information Technology, pp. 124-127. IEEE, 2009.
16. Luo, Dong, Zhi-guang Qin, Rong Gao, and Ji Geng. "Literature review of e-procurement system based on supply chain." In 2010 International Conference on Future Information Technology and Management Engineering, vol. 3, pp. 431-434. IEEE, 2010.
17. Solanke, B. H., and Julius Ayodeji Fapohunda. "Impacts of E-commerce on construction materials procurement for sustainable construction." In 2015 World Congress on Sustainable Technologies (WCST), pp. 65-70. IEEE, 2015.
18. Cabral, Óscar, Luis Ferreira, and Gonçalo Paiva Dias. "Adoption of reverse auctions in public e-procurement: the case of Portugal." In 2016 11th Iberian Conference on Information Systems and Technologies (CISTI), pp. 1-5. IEEE, 2016.
19. Ma, Xin. "Analysis on government E-procurement model and the development countermeasures." In 2010 2nd International Conference on Education Technology and Computer, vol. 1, pp. V1-578. IEEE, 2010.
20. Naseebullah, M., Dominic PDD, and M. F. Hassan. "The role of factors in business-to-business e-procurement implementation." (2010).
21. Dai, Abdul Sami, and Samiullah Paracha. "Bringing effectiveness, efficiency and transparency in project management through a robust e-procurement system in Afghanistan." In 2016 International Conference on Applied System Innovation (ICASI), pp. 1-4. IEEE, 2016.
22. Panda, Dr, G. P. Sahu, and Pramod Gupta. "Promoting transparency and efficiency in public procurement: E-procurement initiatives by government of India." In 7th International Conference on E-government (ICEG), 2010.
23. Bof, Francesco, and Prieto Previtali. "Organisational pre-conditions for e-procurement in governments: The Italian experience in the public health care sector." The Electronic Journal of e-Government 5, no. 1 (2007): 1-10.
24. Sharma, Soumitra. "Exploring best practices in public-private partnership (PPP) in e-Government through select Asian case studies." The International Information & Library Review 39, no. 3-4 (2007): 203-210.
25. Parida, Vinit, Kittipong Sophonthummapharn, and Upasana Parida. "Understanding E-procurement: Qualitative case studies." In ICEB+ eBRF 2006: 28/11/2006-02/12/2006. Institute of Business Information Management at the Tampere University of Technology, 2006.
26. Singh, Mohini, and John Byrne. "Performance evaluation of e-business in Australia." Electronic Journal of Information Systems Evaluation 8, no. 1 (2005): 71-80.
27. Eadie, Robert, Srinath Perera, George Heaney, and Jim Carlisle. "Drivers and barriers to public sector e-procurement within Northern Ireland's construction industry." Journal of Information Technology in Construction 12 (2007): 103-120.
28. H-P. Fu, T-H. Chang & W-H. Wu, "An implementation model of an e-Procurement system for auto parts: a case study", Production Planning & Control: The Management of Operations, Vol. 15, No. 7, PP. 662-670, 2004
29. A. M. Idrees, "Towards an automated evaluation approach for e-procurement," 2015 13th International Conference on ICT and Knowledge Engineering (ICT & Knowledge Engineering 2015), Bangkok, 2015, pp. 67-71.

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