



Credible E-tendering System Using Blockchain

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ABSTRACT—

According to the research, the current e-tendering process is not open to all participants; that is, information is not shared with all participants. For example, when the winner of the selection process is chosen, they are announced as they want. Organisations participating in the same competition will not be told why their bid was rejected or why the company was selected as the winner. Companies can request this information, but obtaining it is time-consuming because the data is analysed and the analysis takes time. Apart from the fact that these portals are opaque, the security of these portals is a major concern as it can lead to fraud and manipulation of information in the central database. Information such as a simple conversation process, detailed information, a request form, and comments, which we will use as a block exchange of this information. You don't have to think about the profile of the organisation, its history, supporting content, and more. The fire spread. Therefore, we will use blockchain and machine learning algorithms to predict the best distribution companies to compete, use Kaggle datasets, and also create our own datasets.

Keywords— Blockchain, Tenders, Bidders, Suppliers, Encryption, Portal, Machine Learning

Introduction

Today, businesses and governments are heavily reliant on information and communication technology for effective communication and establishing contacts. Electronic tendering is gaining widespread acceptance worldwide. In its simplest form, e-tendering involves electronic publishing, communication, accessing, receiving, and submitting all relevant offer information and documentation via the Internet. It replaces traditional paper-based tenders and enables a more efficient and streamlined business process for all parties involved. The basic principles of the selection process in e-tendering have been successfully applied in various business areas, such as procurement of goods, searching for service providers, seeking business advice, and selecting main contractors for construction projects [1].

However, inadequate security measures create opportunities for fraud and collusion among parties participating in the bidding process. This document aims to outline the general legal framework and security requirements for a typical electronic tendering system. Additionally, it discusses the three stages involved in the development and implementation of an electronic tendering system, along with the security issues associated with each phase.

Insufficient security measures can lead to fraudulent activities and collusion both internally and externally within the bidding process. In this contribution, we aim to establish the principles of legal and security requirements for electronic tendering, shedding light on this aspect for the first time. Furthermore, we explore the security issues related to each phase of the development and implementation of an e-procurement system.

This level of development is similar to the second level, where competition between bidders and contract management takes place electronically using collaborative software. In previous e-tendering systems, digital signatures were implemented as a means to ensure the non-repudiation of previous communications. However, in this new era of electronic tendering, electronic signatures are necessary to ensure the authenticity of electronic contracts. Verifying the accuracy of an electronically signed contract is a crucial challenge, with potential consequences for failure to do so. Risk assessment of the e-procurement system should take these aspects into account.

Legislators and organizations often rely on tenders or contracts to acquire work and goods. The lack of expertise and sensitivity among managers often leads to significant losses due to poor-quality systems. Suppliers may be held responsible for issues such as inadequate information storage, lack of transparency, data theft, information alteration, and more. To address this problem, we propose the utilization of simple and secure blockchain technology, combined with blockchain-based engineering, to bring about transformative changes. In such cases, we employ blockchain-based tools to receive and exchange information, facilitating various processes, including communication, detailed information sharing, application submissions, recommendations, organization profiles, historical data, content promotion, content rejection, and more. These measures are undeniably necessary to ensure transparency and integrity throughout the tendering process.

Motivation

The motivation behind our project is to address the security and integrity concerns in electronic tendering systems. By leveraging blockchain technology, we aim to create a credible e-tendering system that ensures transparency, trust, and fairness. Our goal is to eliminate fraud and collusion, simplify the tendering process, and align with legal requirements.

Problem Definition

The current e-tendering process is not "fair and open", meaning that information is not shared with all participants. For example, when a company is selected as the winner of a contract, the information is presented "according to its content". Organisations participating in the same competition will not be told why their bid was rejected or why the company was selected as the winner. Companies can request this information, but obtaining it is time-consuming.

Literature survey

"Improving crime prevention in the electronics industry through anti-corruption support", article by Putri Mirah Delima One article says that by preventing corruption, the costs of corruption can be reduced. This study aims to improve the e-procurement (EPS) system so that it is transparent, accountable, and effective in preventing corruption and supporting the Health Services Committee (HSC). Data management techniques and business process reengineering methodologies are used in this study. The data design developed in this study using the process development method consists of four phases: the creation of an entity relationship diagram (ERD), a relational database, a use case diagram, and a data flow diagram (DFD). This study presents a selection of three scenarios modelled and simulated by Igrafx software. The current situation is the first case of knowledge management integration between government agencies. The results of the first scenario are a 34.20% reduction in average cycle time, faster competitive analysis, and the elimination of the frontal process to avoid collisions. Scenario 3 is the best scenario to use in a long-term project. The results of the third event are an 18.34% reduction in average cycle time, faster analysis, elimination of the frontal process to avoid accidents, improvement of electronic display control through self-monitoring, analysis, reporting technology (intelligent), and transparent extension of information."

The Electronic Bidding Process in Construction: A UK Perspective" is an article by Geoff Tindsley and Paul Stephenson. This article states that e-procurement can be defined as the electronic publication and receipt of procurement documents that facilitate the procurement and award of construction contracts. Strong paper has been on the market for many years, but with the latest technological advances, traditional methods no longer apply. Many key projects in the UK are now awarded via e-tendering, including the multi-million-pound development of the London 2012 Olympic Games. Although e-procurement technology has been approved for these major projects, it is not clear where e-procurement is used in the construction industry in general. This study focuses on the current status, performance, and potential benefits of competitive electricity in the UK construction industry. The results come from market research that includes quantitative and qualitative data. Case studies evaluating the practical use of software for electronic procurement are also included. The results of the study show that electronic competition can save a lot of materials for the main part of the equipment, and the main effect is to improve communication, save time, and reduce costs. However, much of the business is still unsure about using new technologies, with reluctance to change being the biggest problem. The findings show that many construction professionals in the UK agree that the use of e-procurement needs to be strengthened, but think that education, training, and support from top management.

"Improving the fight against corruption in electronic procurement information systems using the design of smart anti-corruption tools" is an article by M. Dachyar that discusses the inclusion of quantity adjusters in the tendering process to combat corruption. The article acknowledges that transitioning to electronic systems may initially take longer compared to traditional mail-based methods but highlights the satisfaction and improved position achieved through the use of software. The author emphasises the importance of overcoming initial hurdles and the potential for continuous improvement in subsequent uses. Resistance to change is identified as a significant challenge in the widespread adoption of electronic tendering, with some auctioneers showing limited interest. The lack of training and understanding among contractors has resulted in costly mistakes. The future use of e-procurement is seen as dependent on the expectations and openness of the participating companies.

"A New Electric Power Model for Better Performance" is an article by Abdallah Qusef that explores the benefits of implementing electronic solutions in the supply chain process, particularly in the context of electronic public procurement. The article presents a new e-tendering model that enables companies to conduct the tendering process online. This strategic model offers high-performance, digital, and web-based bidding solutions, covering all stages of the bidding process and involving relevant stakeholders and audit institutions. The article emphasises the significance of digitising the entire tender cycle and addresses the challenges faced by bidders in adopting e-tendering solutions. The model provides new avenues for participation in e-tendering, leveraging advancements in the digital space and encouraging increased participation in available competitions.

Modules

1. **Registration and login:** Here we allow users to register in our system first; this will be the security process we use.
2. **Dataset design and training:** This model is based on machine learning; we generate data for the system and train the process and design to analyse customer needs. yes.

3. **Tender application:** We apply for open tenders here and send them to the system.
4. **Processing:** Here we will perform the subtraction test and fit it with the training dataset.
5. **Display:** The system will automatically select the most competitive firm; the others will give reasons for not being selected.

MODEL IMPLEMENTATION

- **E-procurement: Portal system** The portal for e-tendering should be transparent for end users. They should be able to use a GUI that supports all levels of e-procurement. All necessary data must be transferred between the system modules. Thanks to this model, authentication using a unified signature scheme will be ensured, which will be efficient and justify the entire system integration. In addition, the e-competition site should provide a main language, such as English, and provide multiple languages as needed so that multiple languages can be used and supported in the system.
- **E-registration:** The E-registration module should be based on user management, which includes functions such as registration, verification, and approval. In order for candidates to use the e-tendering portal, a registration link must be provided. Sellers must be able to register to bid. All users registered on the e-Tender Portal must be members of the EAC Officer or Agency in each organisation or institution, and different user roles must be supported. After a user registers, the information needs to be stored in a database for later use.
- **e-Tender: System** The electronic tendering system is the most effective electronic tendering service. The e-Tender system is used for the preparation of electronic procurement plans, electronic advertising (publication of offers), procurement documentation search, electronic delivery (submission of procurement documentation), electronic evaluation, display of public procurement results, and selection of successful bidders. Iron. Bidders can notify bidders, receive bids from e-vendors, open bids, and select a winning bidder.
- **Electronic contract:** Organisations and suppliers requiring the system can use standard electronic files to sign contracts without access or stamping. The e-Contract system provides contract templates and user-friendly contract information online. Organisations and vendors can reduce costs and increase business productivity by using e-contracting. Electronic signature tools, such as digital certificates, are important.
- **Contract management:** Contract management is one of the important phases of economic competition. Electronic bidding systems will allow bidders and contract managers to communicate with management online and easily identify communication conflicts and delays. Reporting methods and statistics Most electronic systems benefit from providing important information to stakeholders and decision-makers. The system must provide this information in a timely manner.
- **Interconnection systems (interconnection or integration):** The new e-procurement system will need to exchange information with other existing systems, such as various asset and facility management products.

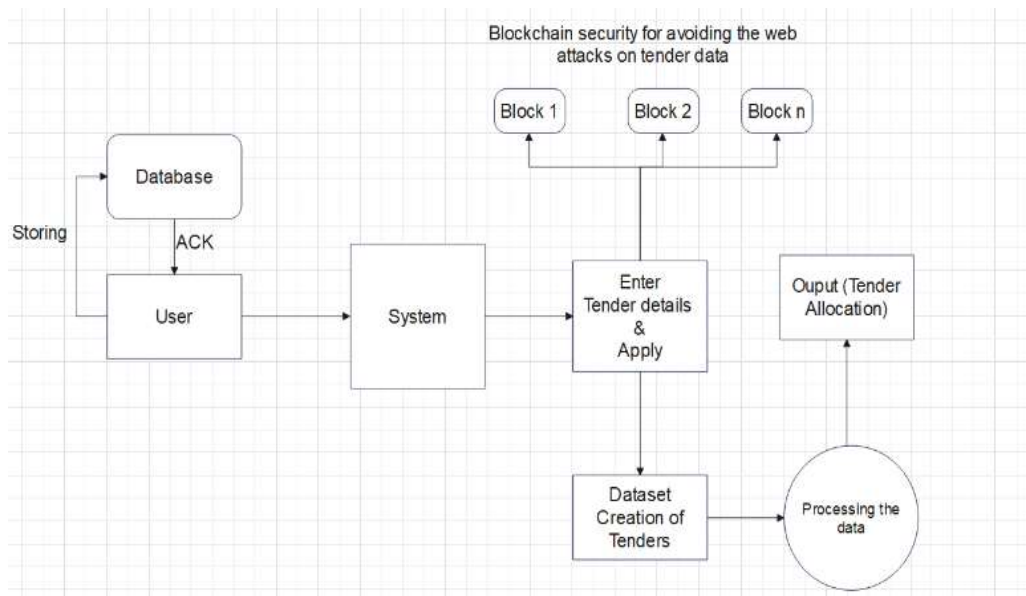


Fig -1: System Architecture Diagram

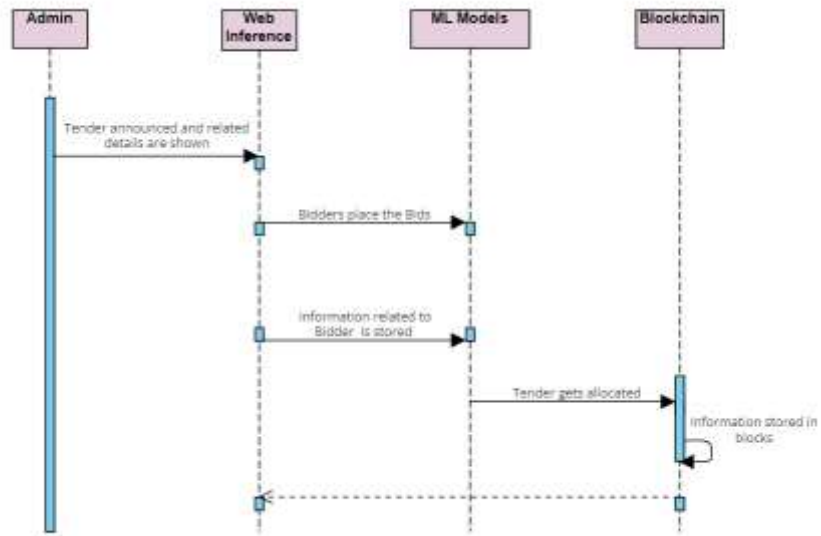


Fig -2: Sequence Diagram

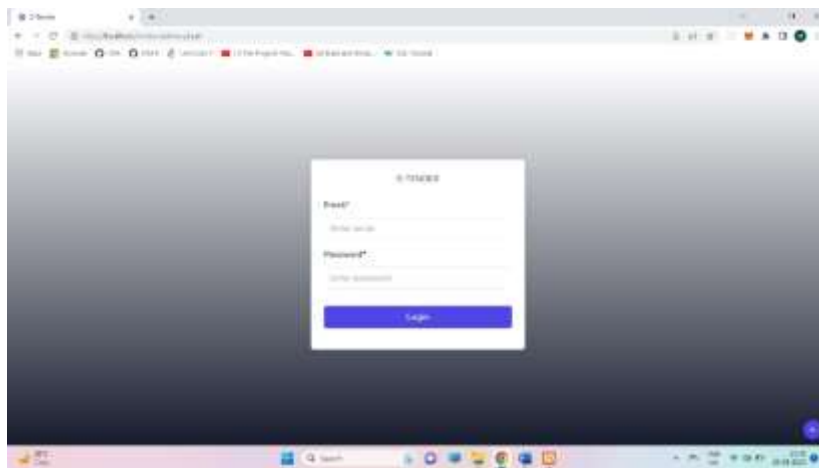


Fig -3: Login Page (Admin)

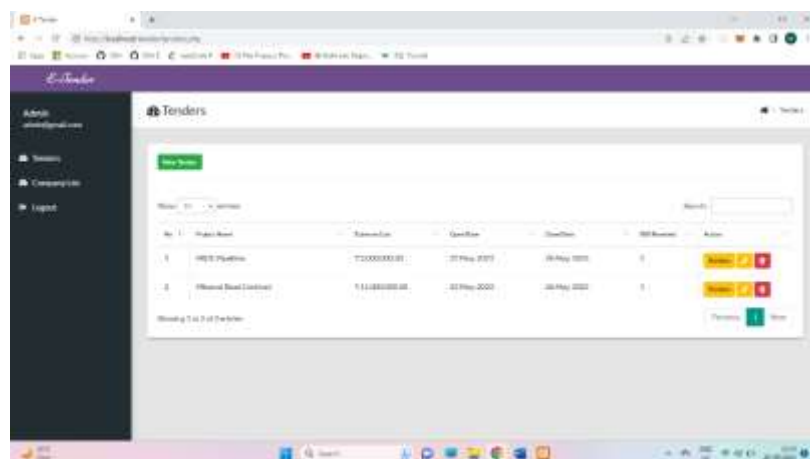


Fig -4: Active Tenders Display (Admin)

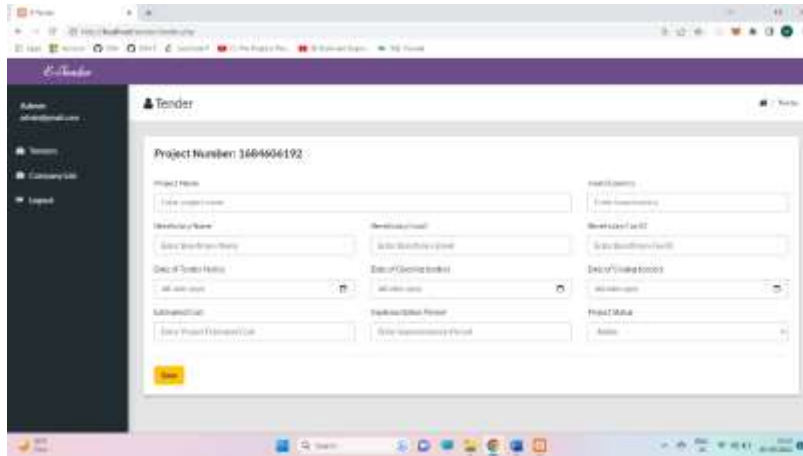


Fig -5: Tender Project Creation (Admin)

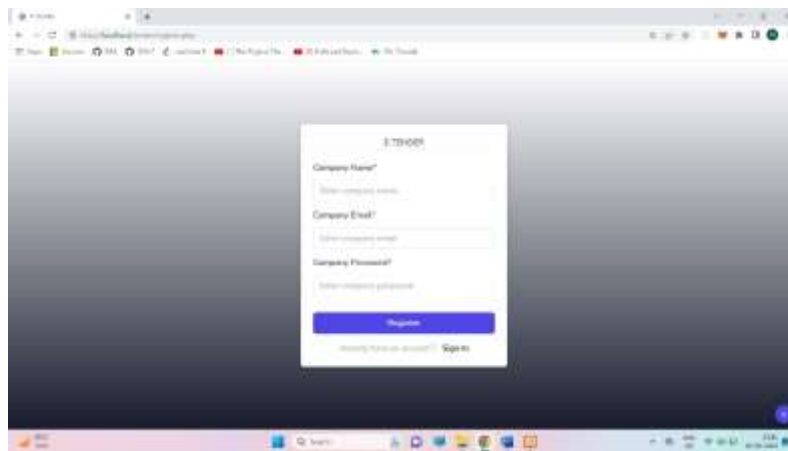


Fig -6: Login Page (Client)

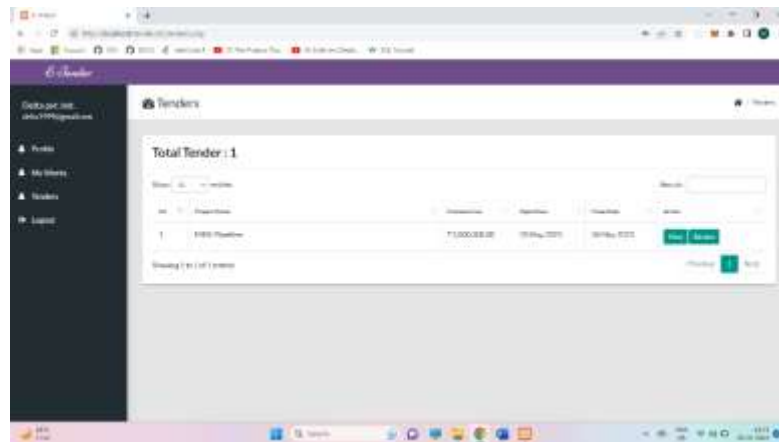


Fig -7: Active Tenders Display (Client)

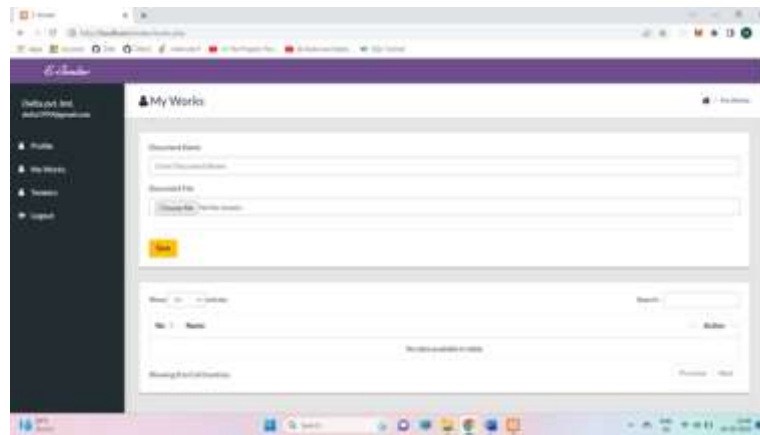


Fig -8: Submitting Documents (Client)

Conclusion

Competition is increasing, and its effects are expected by both buyers and sellers. In the last decade, many e-procurement tools and web platforms have installed payment systems. However, they are less restrictive when it comes to the entire bottle, reducing overall management and operational work for buyers and sellers throughout the lifecycle process.

These platforms often have digitised paper and blue processes without increasing efficiency. Machine learning (ML) is a new technology that uses algorithms to detect hidden problems that humans cannot recognise in order to make decisions using the available data. It can improve the efficiency of the standard system and the level of automation. Machine learning and the bidding process offer the promise and hope of improving the seller's bidding process while helping buyers get the most money in the process.

This project successfully used a combination of machine learning methods by designing SMART to improve the e-procurement system to make it more transparent, accountable, and effective in preventing corruption. Thus, our system overcomes the disadvantages of the existing system and provides a better solution at a low cost compared to the existing system. So we overcome the disadvantage of the outgoing system and provide a better solution at a low cost.

References

1. Transparency International Indonesia, Indeks persepsi korupsi Indonesia 2017: Survei antara pelaku usaha di 12 kota di Indonesia. 2017.
2. KPK, "Statistik TPK Berdasarkan Jenis Perkara," 2019. [Online]. Available: <https://www.kpk.go.id/statistik/penindakan/tpk-berdasarkan-jenis-perkara>.
3. H. Xinli, "Effectiveness of information technology in reducing corruption in China A validation of the DeLone and McLean information systems success model," *Electron. Libr.*, vol. 33, no. 1, pp. 52–64, 2015, doi: 10.1108/el-11-2012-0148.
4. M. Dachyar and G. Novita, "Business process re-engineering of logistics system in pharmaceutical company," *ARNP J. Eng. Appl. Sci.*, vol. 11, no. 7, pp. 4539–4546, 2016.
5. G. Singh, "Role of Relational Database Management System in Management Information System," *Int. J. Curr. Eng. Technol.*, vol. 7, no. 6, pp. 2109–2111, 2017.
6. F. Zhang, Z. M. Ma, and J. Cheng, "Enhanced entity-relationship modeling with description logic," *Knowledge-Based Syst.*, vol. 93, pp. 12–32, 2016, doi: 10.1016/j.knosys.2015.10.029.
7. Yourdon, "Dataflow diagrams," in *Just Enough Structured Analysis*, no. March 1896, Ed Yourdon, 2006, pp. 112–114.
8. Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah, "Peraturan Pemerintah Republik Indonesia Nomor 9 Tahun 2018. Jakarta : LKPP," p. Hal. 35-37, 2018.
9. LKPP, "User Guide SPSE 2019," 2019, doi: 10.1017/CBO9781107415324.004.
10. W. Wensink and J. M. de Vet, "Identifying and Reducing Corruption in Public Procurement in the EU," no. June, 2013.