



FIG Working Week 2024

19-24 May

Accra, Ghana

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*Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana*

Smart Contracts for Decentralized Construction Project Bidding in Ghana: Challenges and Feasibility

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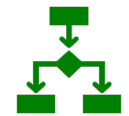
OUTLINE



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INTRODUCTION

The traditional bidding procedure opens the door to

- fraud (Jones, 2021).
- collusion
- illegal financial incentives
- manipulating the bidding process
- wrong analysis of the proposals
- lack of bid confidentiality (Anderson et al., 2018).

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INTRODUCTION

To guarantee impartiality from the start to the end of the contract awarding procedure e-tendering was introduced.

The **e-tendering primary drawback** is their need for a centralized **third-party database** and an approved entity to oversee and manage the operation.

Due to the system's total dependence on the third party, it is susceptible to fraud, collusion, corruption, and manipulative strategies ([Hassija et al. 2020](#)).

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MOTIVATION

The emergence of blockchain technology and smart contracts bidding presents an opportunity to revolutionize this process,

- providing a **decentralized and**
- **secure platform for centralized construction project bidding** (Sigalov et al 2021).

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TENDERING PROCESS

- Smart contracts are digital contracts stored on a blockchain that are automatically executed when predetermined terms and conditions are met. (Sigalov et al 2021).
- The blockchain is a technology that accesses, verifies, and transmits network data through distributed nodes. It uses a peer-to-peer network to achieve a decentralized data operation and preservation platform.
- In the blockchain, the tender process is immutable, meaning that data cannot be manipulated or altered. Blockchain works like a public distributed ledger based on hashing encryption.

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AIM and OBJECTIVES

Aim:

To explore smart contract feasibility to solve central project bidding challenges.

Objectives

To identify the existing challenges with the centralized construction project bidding procedure.

To identify potential benefits offered by smart contracts in addressing these challenges.

To evaluate the proposed smart contract solution's feasibility, effectiveness, and usability.

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RESEARCH METHODOLOGY

Mixed method

- Allows researchers to use multiple sources of data to validate and corroborate their findings.
- The descriptive research strategy was chosen to align with the study's objective.
- Survey research methodology was utilized, as it involved collecting data from a sample of the study population

Population

- Consultants and Contractors: Architects, Construction Managers, Quantity Surveyors, Civil Engineers
- both open and closed-ended questionnaires
- 81 respondents

Sampling method

- Two non-probability sampling techniques were used: purposive and snowball
- quantitative data were organized and prepared for coding using the IBM SPSS software
- qualitative data was analyzed using manually (thematic analysis).



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Overall efficiency of the current centralized bidding process in Ghana

	Frequency	Percent
Efficient	24	29.6
Inefficient	36	44.4
Neutral	18	22.2
Very Inefficient	3	3.7
Total	81	100.0



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Challenges in the centralized construction project bidding process

Theme	Specific Challenges Mentioned
Trust and Transparency	Lack of trust
	Distance and transparency is a challenge
	Power holders influence the bidding process
Document and Information Management	Bidders ignoring to provide key attached document
	Limited bidders' availability during the opening process
	Delay in receiving information
Time-Consuming Process	I think it is time-consuming
	Time constraints, laborious process
	Time-consuming
Accessibility and Availability	Distance and transparency are a challenge
	Limited bidders' availability during the opening process
	Time and cost of traveling to the employer to buy and submit bid documents
Political and Bureaucratic Influence	Power holders influence the bidding process
	Political influence affecting competition
	Bureaucracy



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Challenges in the centralized construction project bidding process

Competition and Fairness	Is very competitive
	Discrimination
	Delay in the progress of work
	Fairness
	Lack of proper competitive bidding
Financial and Resource Challenges	Source of finance to secure contract
	With the correction of contractor work
Interference and Coordination	Interference of politicians
	Poor coordination in the bidding by different stakeholders
Positive Responses	I do not face any challenge
	Hardly, do I have ever faced any challenges
	N/A
Specific Processes Mentioned	National Competitive Tendering process
	Tenders



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Potential benefits offered by smart contracts in addressing these challenges

Theme	Frequency
Increased Transparency	31
Reduced Disputes	13
Faster Contract Execution	29
Cost Savings	33
Improved Trust among Stakeholders	39
It makes all key players (stakeholders) take things seriously	5



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Can smart contracts address the challenges you identified

	Frequency	Percent
No	6	7.4
Not sure	15	18.5
Yes	60	74.1
Total	81	100.0



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Evaluate the proposed smart contract solution's feasibility, effectiveness, and usability

	Frequency	Percent
Feasible	33	40.7
Neutral	27	33.3
Very Feasible	21	25.9
	81	100.0

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CONCLUSION

- The study identified: lack of trust, Issues related to document submission, Accessibility issues, Political influence and bureaucracy, etc. as the challenges associated with the central construction bidding process.
- A substantial portion of respondents believe that smart contracts are feasible for construction project bidding.
- The potential benefits offered by smart contracts in addressing these challenges include increased Transparency, Faster Contract Execution, Cost Savings, Improved Trust among Stakeholders, and Reduced

■ Dispute

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RECOMMENDATION

- To increase the usage of smart contracts in building projects, more outreach initiatives and awareness-raising campaigns are required.
- The industry's willingness to embrace smart contracts could be contingent upon further training, pilot programs, and practical examples of their possible advantages.

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YOUR QUESTIONS/COMMENTS

E-procurement is here,
but Is the smart contracts bidding the future?



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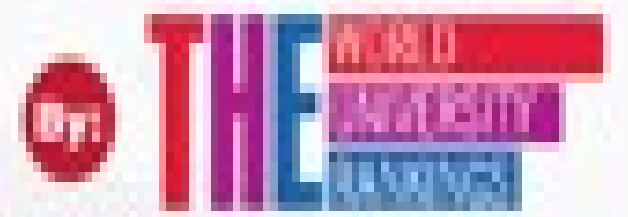
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THANK YOU

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SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Commission 10 SDG 9,

Construction Economics and Management

Serving Society for the Benefit of People and Planet



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REFERENCES

- Hassija, V., Chamola, V., Krishna, D.N.G., Kumar, N. and Guizani, M., 2020. A blockchain and edge-computing-based secure framework for government tender allocation. IEEE Internet of Things Journal, 8(4), pp.2409-2418
- Jones, A., 2021. Combatting Corruption and Collusion in UK Public Procurement: Proposals for Post-Brexit Reform. The Modern Law Review, 84(4), pp.667-707.
- Anderson, R.D., Jones, A. and Kovacic, W.E., 2018. Preventing Corruption, Supplier Collusion, and the Corrosion of Civic Trust: A Procompetitive Program to Improve the Effectiveness and Legitimacy of Public Procurement. Geo. Mason L. Rev., 26, p.1233.





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REFERENCES

- Sigalov, K., Ye, X., König, M., Hagedorn, P., Blum, F., Severin, B., Hettmer, M., Hückinghaus, P., Sithole, R.A., 2017. Implementation of e-procurement by the Gauteng Department of Infrastructure Development and its impact on the development of small and medium construction firms (Doctoral dissertation, University of the Witwatersrand, Faculty of Engineering and the Built Environment, School of Construction Economics and Management).

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