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Adoption of E-Procurement and Its Effects on Firm Performance in Ghana's Construction Sector

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Abstract

Purpose: This study investigates the impact of e-procurement adoption on firm performance in Ghana's construction sector, with a focus on procurement transparency, cost reductions, and operational efficiency.

Methodology: A mixed-method approach was adopted, with data collected from 60 procurement officers and project managers in Accra.

Findings: The study reveals a significant positive correlation between e-procurement usage and firm profitability (mean = 3.59) and competitiveness (mean = 4.00). Quantitative results indicate that e-procurement led to a reduction in procurement costs by 10-15%, while qualitative insights highlight the need for capacity-building initiatives to overcome resistance to technological change. However, challenges such as unreliable energy supply (mean = 4.02) and limited technological integration hinder the full potential of e-procurement.

Unique Contribution to Theory, Policy and Practice: These findings suggest that e-procurement can play a crucial role in improving efficiency, transparency, and competitiveness in Ghana's construction sector, provided systemic challenges are addressed.

Keywords: *E-Procurement, Construction Industry, Ghana, Firm Performance, Adoption*

Introduction

The rapid evolution of technology has significantly reshaped operations across various sectors, with the construction industry in Ghana increasingly embracing these advancements. E-procurement, a key component of this technological transformation, has gained attention for its role in streamlining procurement processes, fostering transparency, and enhancing organizational performance (Azanlerigu & Akay, 2015). As nations strive to enhance their competitiveness in a globally connected world, integrating information technology (IT) into supply chain operations becomes imperative. The construction industry, which plays a crucial role in national development, is no exception to this trend (Owoo et al., 2018).

The construction industry in Ghana is a significant contributor to the nation's economy, with a growth rate of 6.5% in 2022 alone, accounting for over 9% of the country's Gross Domestic Product (GDP) (Ghana Statistical Service, 2022). With the rise in urbanization, infrastructural development, and government-driven projects such as the "One District, One Factory" initiative and various road construction projects, the sector has experienced a surge in activity. However, the traditional procurement methods characterized by manual, bureaucratic processes have long been criticized for inefficiency, corruption, and delays, creating barriers to optimal performance. To address these challenges, Ghana's Public Procurement Authority (PPA) has increasingly promoted e-procurement solutions as part of its national strategies to enhance public sector efficiency and transparency (Public Procurement Authority, 2022).

E-procurement refers to the electronic acquisition of goods and services through digital platforms, primarily using the internet, to streamline procurement processes and reduce inefficiencies (Asare & Kufuor, 2021). In the Ghanaian situation, the adoption of e-procurement aligns with the broader national goals of digital transformation under the government's "Digital Ghana Agenda," which seeks to harness digital technologies to drive sustainable development. Despite the potential benefits, the implementation of e-procurement in Ghana's construction sector faces several challenges, including resistance to change, limited technological infrastructure, and regulatory hurdles. However, the system also offers opportunities for reducing procurement costs, enhancing transparency, and improving firm performance.

Empirical studies suggest that e-procurement can lead to significant cost reductions, with savings ranging between 10-15% of total procurement costs in the construction industry (Pheng, & Hou, 2019). Additionally, the integration of e-procurement in construction has the potential to enhance accountability and competition among suppliers, which can further drive down costs while improving service delivery. However, these benefits are contingent upon the successful implementation of robust e-procurement platforms and the willingness of industry stakeholders to embrace new technologies.

The construction industry in Ghana, with its diverse range of projects spanning residential, commercial, and public infrastructure, stands to gain from the adoption of e-procurement (Chan &

Owusu, 2022). Nonetheless, the sector still grapples with issues such as corruption, delays in project execution, and high operational costs, all of which can be mitigated through more efficient procurement practices. According to the World Bank (2023), delays and cost overruns in construction projects in Ghana are often linked to opaque procurement processes, which contribute to mismanagement and corruption. It is in this interest that the study seeks to explore the adoption and practices of e-procurement within the construction sector in Ghana, assess its impact on firm performance, and identify the challenges and opportunities that arise.

Literature Review

E-Procurement in the Construction Sector

E-procurement refers to the use of digital technologies and internet-based systems to streamline procurement processes in organizations. This technology has gained prominence due to its potential to enhance transparency, reduce operational costs, and improve overall efficiency. In the construction industry, e-procurement is viewed as a critical tool that can transform traditional procurement processes, fostering integration and collaboration among stakeholders (Ofori & Fuseini, 2020). Studies have shown that e-procurement can bring strategic, tactical, and operational value to construction firms, but its adoption remains inconsistent across different contexts, particularly in developing countries like Ghana (Ujakpa et al., 2016).

Theoretical Frameworks

E-procurement adoption in construction firms is often examined through various theoretical lenses. Two of the most frequently applied frameworks are the Diffusion of Innovation (DOI) theory (Rogers, 2003) and the Technology-Organization-Environment (TOE) model (Tornatzky & Fleischer, 1990).

Diffusion of Innovation (DOI) Theory: This theory explains how new ideas and technologies spread within an organization. It posits that the rate of adoption of an innovation is influenced by five attributes: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). In the situation of e-procurement, studies have shown that construction firms are more likely to adopt such technologies if they perceive significant relative advantage and compatibility with their existing systems (Olanipekun & Saka, 2019).

Technology-Organization-Environment (TOE) Model: The TOE model provides a broader framework, focusing on the interplay between technological, organizational, and environmental factors in the adoption of innovations (Tornatzky et al., 1990). In the Ghanaian construction sector, factors such as internet infrastructure, organizational readiness, and government regulations play crucial roles in determining the success of e-procurement implementation (Frimpong, 2014).

E-Procurement Adoption in the Global Construction Industry

Globally, the adoption of e-procurement in the construction industry has been studied across various settings, offering insights into the challenges and opportunities presented by this technology. For instance, in Malaysia, a study by Hashim et al. (2013) found that construction firms perceived e-procurement as valuable for operational and tactical efficiency, though strategic benefits were less significant. In South Africa, Ibem and Laryea (2015) reported that while e-procurement systems were increasingly used, challenges such as inadequate infrastructure and lack of skilled personnel hindered widespread adoption. In the United States, Quesada et al. (2010) examined the impact of e-procurement on procurement practices and found a positive correlation between e-procurement use and firm performance. Similarly, a study by Chang et al. (2013) in the US manufacturing sector revealed that e-procurement adoption enhanced firm performance when combined with strategic sourcing practices.

E-Procurement in Ghana's Construction Sector

In Ghana, the adoption of e-procurement in the construction industry is still in its nascent stages. Ofori and Fuseini (2020) stressed that while e-procurement is recognized for its potential to improve procurement processes, its uptake has been slow due to challenges such as inadequate internet infrastructure, lack of top management support, and limited awareness of its benefits. Additionally, regulatory frameworks supporting e-procurement adoption are still underdeveloped, further stalling its widespread implementation.

A study by Adzroe and Awuzie (2018) found that e-procurement can significantly reduce costs and improve communication within Ghanaian construction firms. However, the authors also noted that firms, especially small and medium-sized enterprises (SMEs), faced significant barriers, including limited financial resources and inadequate ICT skills. These findings feature the need for capacity-building initiatives and supportive government policies to enhance the adoption of e-procurement technologies in Ghana.

Barriers to E-Procurement Adoption

Several studies have identified key barriers to e-procurement adoption in the construction sector, both globally and in Ghana. Common barriers include:

Technological Infrastructure: Inadequate ICT infrastructure remains a critical barrier, particularly in developing countries (Touray, 2013). In Ghana, unreliable internet connectivity and high costs of technology hinder the effective implementation of e-procurement systems (Azanlerigu & Akay, 2015).

Lack of Skilled Personnel: The successful adoption of e-procurement requires employees with the necessary technical skills to operate the systems. A study by Croom and Brandon-jones (2016) revealed that many Ghanaian construction firms lacked the skilled personnel required to manage e-procurement platforms effectively.

Cultural Resistance: Resistance to change, particularly among older employees, has been cited as a significant challenge in the adoption of e-procurement. Studies by Kamotho and Kamotho, (2014) and by Afolabi et al. (2019) have emphasized the reluctance of construction firms to transition from traditional procurement methods to digital systems.

Regulatory Issues: The absence of a robust legal framework supporting e-procurement is another barrier. Hamma-adama and Ahmad, (2021) noted that in Ghana, the lack of legislative backing for e-procurement limits its adoption in public sector projects.

Impact of E-Procurement on Firm Performance

Despite the challenges, e-procurement has been shown to positively impact firm performance. Studies from different countries indicate that firms that have adopted e-procurement experience improvements in efficiency, cost reduction, and transparency (Gamal, 2010). In Ghana, Tutu et al, (2019) found that construction firms using e-procurement reported enhanced project delivery times, better communication with suppliers, and improved procurement transparency. In a global setting, Kumar et al., (2020) found that the external diffusion of e-procurement technologies in business-to-business transactions significantly enhanced firm financial performance. Similarly, Tai et al., (2010) in Taiwan reported that firms using web-based e-procurement systems experienced operational efficiencies and strategic advantages in their procurement processes.

Methodology

Research Design and Sampling

A survey research design was adopted, as it enables the gathering of quantifiable data on attitudes and practices related to e-procurement. The population consisted of procurement officers, project managers, and other key personnel from construction firms in Accra, Ghana. These firms were selected based on their use of e-procurement systems and their registration under local regulations. A purposive sampling method was used to ensure that only respondents with relevant experience participated in the study.

Sample Size

The sample size for the study was 60 employees drawn from several firms, including procurement officers, project managers, and quantity surveyors. This sample was deemed sufficient for the quantitative analysis based on recommendations by Francis et al. (2010) regarding sample adequacy for descriptive and inferential analysis.

Data Collection and Instrumentation

Primary data was collected through questionnaires, which were designed based on existing measures from prior research (Ajayi, 2017). A five-point Likert scale was used to assess the frequency of e-procurement usage and its perceived impact on firm performance. Open-ended questions were included to capture additional insights into challenges and opportunities.

Validity and Reliability

To ensure validity, the questionnaire was pre-tested through a pilot study involving six employees from other construction firms, ensuring that the questions were both relevant and clear. The instrument's reliability was measured using Cronbach's alpha, with an internal consistency score exceeding 0.80, indicating high reliability (Adamson et al., 2013).

Data Processing and Analysis

Data were analyzed using descriptive statistics, mean analysis, and inferential statistics through SPSS software (version 26). These methods helped identify trends, correlations, and the strength of relationships between e-procurement adoption and firm performance.

Ethical Considerations

Ethical approval was obtained before data collection. Participants were assured of confidentiality and informed that their participation was voluntary, with the option to withdraw at any time.

Findings

Table 1: Demographic Information of Respondents

Characteristics	Frequency	Percentage (%)
Gender		
Male	47	78
Female	13	22
Age Range		
20 – 29	12	19.3
30 – 39	25	41.4
40 – 49	14	23.3
Above 50	9	16
Educational Level		
SHS/O-Level/A-level	8	12.7
Diploma/HND	3	6
Tertiary	49	81.3
Sector of Occupation		
Private	35	58
Public	17	28.7
Self-employed	8	13.3
Average Monthly Income		
GH¢ 1000-2000	16	26
GH¢ 2100-3000	10	16
GH¢ 3100- 4900	31	52
Above GH¢ 5000	3	6
Role in the Construction Industry		
Procurement and Supply Chain	29	48
Architect	5	8
Builders	8	14
Project Management	13	22
Contractors	5	8

Key demographic show that the majority of the respondents (78%) are male, with a significant portion aged between 30-39 years (41.4%) and possessing tertiary education (81.3%). This indicates that the workforce involved in the e-procurement processes is relatively young and well-educated, which is conducive to adopting new technologies such as e-procurement systems. Moreover, 58% of respondents work in the private sector, which is typically more agile and innovative compared to the public sector. This disparity could explain the varying rates of e-procurement adoption between the sectors, with private firms more likely to integrate such technologies due to fewer bureaucratic hurdles.

Table 2: Organizational Profile of Firms

		N	Percentage (%)
Organization Categories	Consulting Firm	26	43.3
	Contractor	9	15.3
	Client organization	22	37.7
	Government Ministry	3	3.7
Staff Strength	Below 10 persons	14	23.3
	10 -20 persons	33	55.7
	21 – 40 persons	10	16
	More than 41 persons	3	5
Year of Operation	Below 5 years	22	36.7
	6 – 10 years	34	56.3
	10 years +	4	7
Awareness of EP	Yes	47	78.8
	No	13	21.2
Participation	Yes	34	56.6
	No	26	43.4
Service Providers	Alibaba	12	19.3
	Amazon	22	37.3
	None	26	43.4
Number of years in Position	None	26	43.4
	Less than 1 year	0	0
	1 – 5 years	22	36.0
	6 – 10 years	11	17.6
	More than 10 years	1	3

The study shows that the majority of firms involved in e-procurement are consulting firms (43.3%), followed by client organizations (37.7%), and contractors (15.3%). The data also indicates that 55.7% of firms have between 10-20 employees, with only 5% of firms employing more than 41 people. Firms that have been in operation for 6-10 years' account for the majority (56.3%) of those engaging in e-procurement, while firms with less than 5 years of experience (36.7%) are also significant adopters. This could suggest that newer firms, which may have entered the industry during a period of increased digitization, are more likely to embrace e-procurement.

Table 3: E-Procurement Usage in Construction Firms

Categories	Never Used (%)	Used Sometimes (%)	Used Always (%)
E-Notification/ E-Announcement/ E- Informing			
E-mail Attachment	3	15	82
Voice of Internet Protocol (e.g., Skype, Zoom)	67	31	2
Websites	3.6	0	96.4
Internet supported faxing	64	28	8
E-Submission			
Project portals	43.4	44	12.6
Cloud-based systems and applications (e.g., Microsoft SharePoint)	46	36.6	17.4
Internet based systems/software application	20	17	63
E-Sourcing			
Electronic Data Interchange (EDI)	34	24	42
E-Market places	1	4	95
Company/ suppliers website	0	6.4	93.6
E-Payment			
Credit Card	16	81	3
Electronic Fund Transfer	5	7	88
Electronic systems to support traditional procurement.			
Revit Architecture			
ArchiCAD	92	7	1
AUTOCAD	11	11	78
Cost Estimation and Analysis			
CAD Quantity- Takeoff software packages	6.8	16.4	76.8
BIM-based Construction materials Quantity Takeoff Software	9.2	8.4	82.4
E-Catalogues	0	11	89
Work Scheduling			
Web-Enabled Project Management Software Applications	35	62.3	2.7
Microsoft Project	13	39.4	52.4
Tracking			
Wi-Fi Networks (e.g., cellular modems; phones)	0	0	100
Radio Frequency Identification (RFID)	42.7	23.4	33.9
Barcode Technology	23.4	10.6	66
Monitoring Systems			
BIM Technology	2.3	20.9	76.8
Web-based Project Camera	0	11.6	88.4
Internet-enabled Multimedia Technology	17	6.3	76.7

Common technologies such as email attachments (82%) and websites (96.4%) are widely used, reflecting the adoption of basic tools that enhance communication and information sharing. However, more integrated and advanced tools, such as cloud-based systems (17.4%) and project portals (12.6%), are significantly underutilized. The low usage of these tools points to a gap in the full potential of e-procurement being realized, especially in areas like collaborative project management. E-sourcing tools like Electronic Data Interchange (EDI) (42%) and e-marketplaces (95%) are also widely used, emphasizing the sector's reliance on digital platforms for sourcing and supplier management.

Table 4: Performance Impact of E-Procurement Practices

Effects	Mean	Standard Dev.
On-time Delivery	3.28	1.439
Low Procurement Cost	3.29	1.451
Wide Supplier Sourcing	3.08	1.197
High profitability	3.59	1.439
High competitiveness	4.00	1.074
Process efficiency	3.37	1.244
Reduced maverick spending	3.67	1.386
Better inventory level	2.88	1.223
Streamlined process	2.80	1.412
Better information flow between a firm and Suppliers	3.02	1.347

E-procurement has shown a significant impact on key performance metrics within the sector. Firms reported improvements in competitiveness (mean = 4.00) and profitability (mean = 3.59), demonstrating that those adopting e-procurement practices are not only more competitive but also enjoy higher financial returns. Moreover, the use of e-procurement has been instrumental in reducing maverick spending (mean = 3.67), which is crucial for cost control in an industry where budget overruns are common. Despite these gains, some areas such as inventory management (mean = 2.88) and streamlining processes (mean = 2.80) show weaker performance, indicating that while e-procurement improves some aspects of firm performance, its full potential is yet to be harnessed across all operational areas.

Organizational Value from E-Procurement Adoption

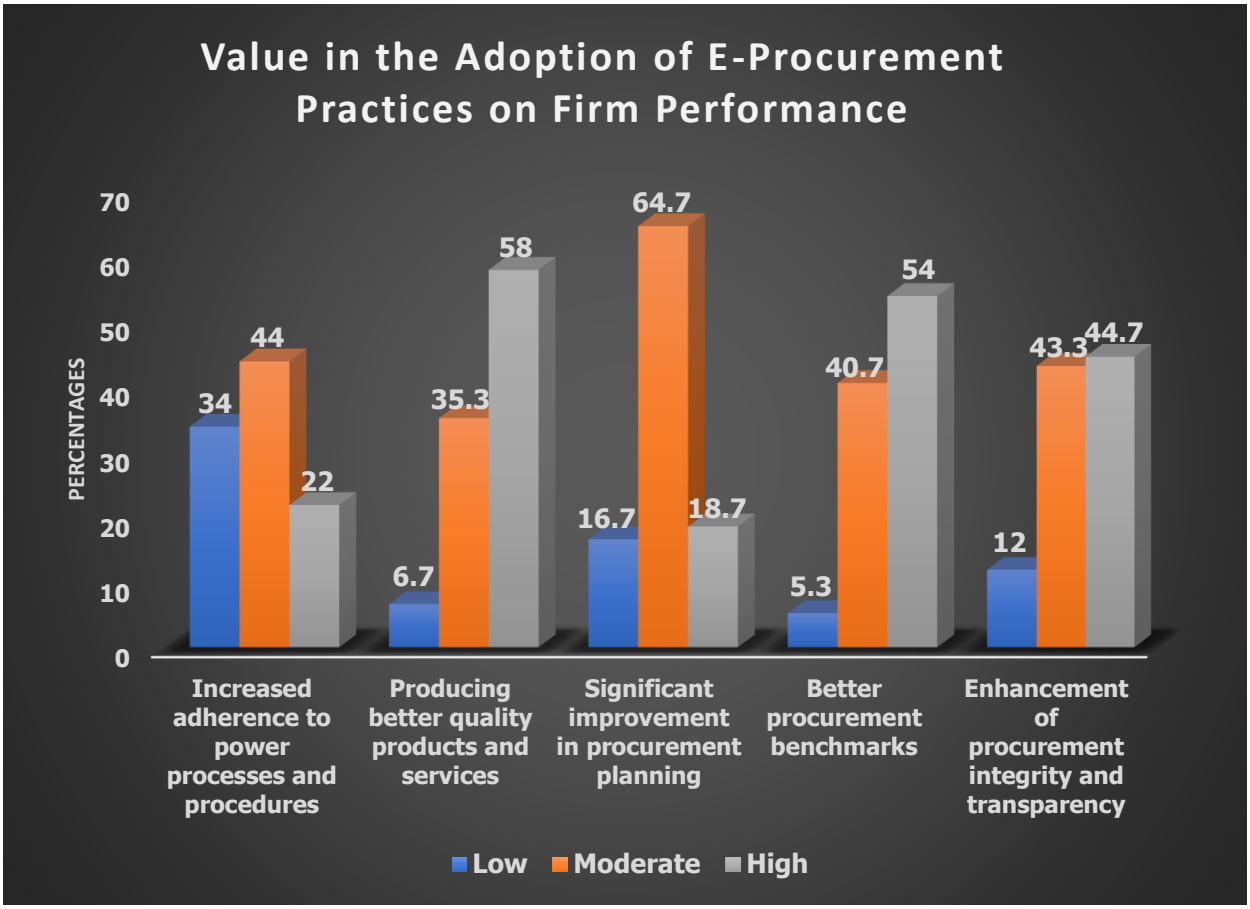

Figure 1. Organizational Value from E-Procurement Adoption

The value derived from e-procurement adoption varies among firms but remains largely positive. With 58% of firms reporting a high value in adopting these technologies, it is clear that e-procurement plays a pivotal role in improving procurement planning, enhancing benchmarking standards, and fostering procurement transparency. These are critical factors for improving the overall integrity of procurement processes, reducing fraud, and ensuring accountability in contract awards, a key issue in Ghana's construction sector.

Table 5: Key Challenges Associated with The Use of the E-Procurement Systems and Tools

Challenges	Mean	Standard Dev.
Data system hacking and cracking	1.80	.708
Unreliable energy supply	4.02	1.122
Unwillingness to re-engineer processes	3.65	1.376
Technology incompatibility/Integration to external platforms etc	3.76	1.247
Constraining legal and regulatory control	2.50	1.308
Availability of e-procurement experts	3.38	1.668

Unreliable energy supply (mean = 4.02) stands out as the most significant challenge, reflecting Ghana's broader infrastructural issues. Firms are also hindered by technology incompatibility (mean = 3.76) and an unwillingness to re-engineer traditional procurement processes (mean = 3.65). These challenges highlight the need for systemic improvements in infrastructure and a shift in organizational culture toward embracing digital transformation. Additionally, the availability of e-procurement experts (mean = 3.38) suggests that while skilled personnel exist, there is still a shortage of individuals capable of driving e-procurement initiatives within firms.

Discussion

E-Procurement Adoption and Firm Characteristics

The demographic profile of respondents, where the majority are male, aged 30-39 years, and possess tertiary education, aligns with the theory of innovation diffusion by Rogers (2003). According to this theory, young and educated individuals are more likely to adopt innovative technologies, such as e-procurement. The findings support this, indicating that the construction workforce is well-positioned to embrace technological innovations, particularly in the private sector, which exhibits higher adoption rates than the public sector. This is consistent with previous research by Bruce et al. (2023), which highlighted that private firms are more agile and less encumbered by bureaucratic hurdles that can slow down the adoption of digital tools.

Organizational Profiles and E-Procurement Adoption

The data shows that firms with 10-20 employees and those operating between 6-10 years are the most frequent users of e-procurement systems. This reflects the organizational maturity hypothesis, which posits that firms reaching a certain level of operational stability are more likely to invest in digital technologies to enhance efficiency and competitiveness (Gampine, 2023). The significant adoption of e-procurement by newer firms (below five years) suggests that these firms may have entered the market during a period of increased digital transformation, further supporting the notion that younger firms are more adaptive to technological changes (Tamilmani et al., 2020).

E-Procurement Practices and Tools

E-procurement tools such as email attachments and websites are widely used, with more sophisticated tools like cloud-based systems and project portals seeing less adoption. This gap suggests a partial realization of the potential benefits of e-procurement, as firms are primarily using basic communication tools rather than fully integrated systems that could enhance collaboration and project management. The Technology-Organization-Environment (TOE) framework, as highlighted by Tornatzky and Fleischer (1990), suggests that organizational factors such as firm size and readiness play crucial roles in the adoption of advanced e-procurement tools. Smaller firms with limited resources may struggle to implement more integrated systems due to financial or technical constraints.

Performance Impacts of E-Procurement

The empirical data demonstrates that e-procurement positively affects firm performance, particularly in enhancing competitiveness (mean = 4.00) and profitability (mean = 3.59). These findings align with the resource-based view (RBV) of the firm, which posits that the adoption of valuable, rare, and inimitable resources, such as e-procurement systems, can lead to sustained competitive advantages (Barney, 1991). Additionally, the reduction in maverick spending and the improvement in procurement efficiency underscore the cost-saving potential of e-procurement, a finding consistent with the studies of Ilhan and Rahim (2020), who observed that firms adopting e-procurement experienced significant reductions in operational costs.

However, the relatively low impact on inventory management and process streamlining suggests that some firms are not fully leveraging the potential of e-procurement in these areas. This is reflective of the partial technology adoption theory, which argues that firms often implement new technologies in phases, starting with basic functionalities and gradually integrating more complex tools (Roberts et al., 2021).

Organizational Value from E-Procurement Adoption

The reported high value derived from e-procurement adoption, particularly in procurement transparency and integrity, reinforces the argument that e-procurement can serve as a tool for combating corruption and ensuring accountability in public procurement processes (Croom & Brandon-jones, 2016). This is particularly relevant in the context of Ghana's construction sector, where issues of transparency in contract awards have been a longstanding concern. The study's findings align with global trends, where e-procurement has been shown to enhance procurement integrity and reduce opportunities for fraud (World Bank, 2023).

Challenges to E-Procurement Adoption

The major challenges identified, such as unreliable energy supply (mean = 4.02) and technology incompatibility (mean = 3.76), point to systemic issues within Ghana's infrastructure and organizational resistance to change. These findings are consistent with the diffusion of innovation theory, which states that infrastructural constraints and cultural inertia can hinder the widespread adoption of new technologies (Nawi et al., 2016). The unwillingness to re-engineer procurement processes further highlights the need for a cultural shift within firms, especially those with entrenched traditional practices.

Moreover, the shortage of e-procurement experts (mean = 3.38) reveals a gap in human capital, revealing the importance of investing in capacity building to ensure that firms have the necessary expertise to implement and maintain e-procurement systems. As Addo, (2019) suggest, targeted training and education programs can play a pivotal role in addressing this skills gap and fostering a culture of digital transformation.

Conclusion

The study concludes that e-procurement adoption in Ghana's construction sector significantly enhances firm performance, particularly through improved profitability, competitiveness, and reduced maverick spending. However, the sector's full potential remains intact due to infrastructural barriers, such as unreliable energy supply and technology integration challenges. To fully realize the benefits of e-procurement, it is recommended that firms invest in advanced procurement tools like cloud-based systems and project portals to improve collaboration and project management. Moreover, addressing the shortage of skilled personnel through targeted training programs and improving Ghana's technological infrastructure will be crucial for driving further adoption. Policymakers should also prioritize creating a robust regulatory framework to encourage e-procurement, especially in public sector projects. In sum, while e-procurement offers significant opportunities for cost savings and operational efficiency, overcoming systemic barriers will be key to its widespread adoption and impact on firm performance in Ghana's construction sector.

References

Adamson, Katie & Prion, Susan. (2013). Reliability: Measuring Internal Consistency Using Cronbach's α. Clinical Simulation in Nursing. 9. e179-e180. 10.1016/j.ecns.2012.12.001.

Addo, S. K. (2019). Challenges of E-Procurement Adoption in the Ghana Public Sector: A Survey of in the Ministry of Finance. 1(7), 44–80. https://doi.org/10.15373/22501991

Adzroe, Eric & Awuzie, B.O. (2018). Leveraging e-business technology for construction procurement improvement: Qualitative perspectives from Ghana. International Journal of Construction Supply Chain Management. 8. 43-59. 10.14424/ijcscm801018-43-59.

Afolabi, Adedeji & Ibem, Eziyi & Aduwo, Egidario & Tunji-Olayeni, Patience & Oluwunmi, Olufunke. (2019). Critical Success Factors (CSFs) for e-Procurement Adoption in the Nigerian Construction Industry. Buildings. 9. 1-18. 10.3390

Ajayi, Victor. (2017). Primary Sources of Data and Secondary Sources of Data.

Asare, E. N., & Kufuor, K. O. (2021). E-procurement: Transforming procurement processes through digital platforms. Journal of Procurement and Supply Chain Management, 8(2), 45-58.

Azanlerigu, J. A., & Akay, E. (2015). Prospects and challenges of e-procurement in some selected public institutions in Ghana. European Journal of Business and Management, 7(29), 61-76.

Bahamid, R. A., Doh, S. I., Khoiry, M. A., Kassem, M. A., & Al-Sharafi, M. A. (2022). The current risk management practices and knowledge in the construction industry. Buildings, 12(1016).

Boateng, A., Ameyaw, C., & Mensah, S. (2022). Assessment of systematic risk management practices on building construction projects in Ghana. *International Journal of Construction Management*, *22*(16), 3128-3136.

Bruce, Emmanuel & Shurong, Zhao & Ying, Du & Yaqi, Meng & Amoah, John & Bankuoru Egala, Sulemana. (2023). The Effect of Digital Marketing Adoption on SMEs Sustainable Growth: Empirical Evidence from Ghana. Sustainability. 15. 4760. 10.3390/su15064760.

Chan, Albert & Owusu, Emmanuel. (2022). Evolution of Electronic Procurement: Contemporary Review of Adoption and Implementation Strategies. Buildings. 12. 198. 10.3390/buildings12020198.

Chang, Hsin-Hsin & Tsai, Yao-Chuan & Hsu, Che-Hao. (2013). E-procurement and supply chain performance. Supply Chain Management: An International Journal. 18. 10.1108/13598541311293168.

Croom, S., & Brandon-jones, A. (2016). Key issues in e-procurement: Procurement implementation and operation in the public sector. September. https://doi.org/10.1108/JOPP-05-03-2005-B004

Frimpong S. (2014). Ghana begins electronic procurement system, Ghana Business News, Daily Graphic; Available: https://www.ghanabusinessnews.com

Gamal Aboelmaged, M. (2010). Predicting e-procurement adoption in a developing country: An empirical integration of technology acceptance model and theory of planned behaviour. *Industrial Management & Data Systems*, *110*(3), 392-414.

GSS (Ghana Statistical Service) (2022). Ghana Living Standards Survey: Labour Force Report. Accra: GSS.

Hamma-adama, M., & Ahmad, A.-B. S. (2021). Challenges and Opportunities of E-Procurement in the Construction Industry. Journal of Construction Materials, 2(4), 4–7. https://doi.org/10.36756/jcm.v2.4.7

Hashim, Norfashiha & Said, Ilias & Hidayah, Nur. (2013). Exploring e-Procurement Value for Construction Companies in Malaysia. Procedia Technology. 9. 836-845. 10.1016/j.protcy.2013.12.093.

Ibem, Eziyi & Laryea, Samuel. (2015). EProcurement use in the South African construction Industry. Journal of Information Technology in Construction (ITcon). 20. 364-384.

Ibrahim Tanko, Gampine. (2023). Business Digital Maturity and Organizational Performance: An Empirical Analysis of Service Sector Firms in a Developing Context. 10.7176/EJBM/15-15-07.

Ilhan, Nergiz & Rahim, Md. (2020). Understanding Digital Transformation of Procurement Through E-Procurement Systems Implementation: Business Partner Relationship Perspective. 10.4018/978-1-7998-2799-3.ch010.

Kamotho, K., & Kamotho, D. K. (2014). E-Procurement and Procurement Performance among State Corporations in Kenya. In International Journal of Science and Research (Vol. 8, Issue 2). http://erepository.uonbi.ac.ke/handle/11295/76295

Kumar, Nripendra & Ganguly, Kunal. (2020). External diffusion of B2B e-procurement and firm financial performance: role of information transparency and supply chain coordination. Journal of Enterprise Information Management. 10.1108/JEIM-02-2020-0060.

Nawi, M.N.M., Roslan, S., Salleh, N.A., Zulhumadi, F., Harun, A.N. (2016) "The Benefits and Challenges of E-procurement Implementation: A Case Study of Malaysian Company". International Journal of Economics and Financial Issues Vol. 6, No. 7, pp. 329-332.

Ofori, Daniel & Fuseini, Osman. (2020). Electronic Government Procurement Adoption in Ghana: Critical Success Factors. Advances in Research. 18-34. 10.9734/air/2020/v21i330191.

Owoo, Nkechi S.; Lambon-Quayefio, Monica P. (2018): The role of the construction sector in Ghana, WIDER Working Paper, No. 2018/119, ISBN 978-92-9256-561-9, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki, https://doi.org/10.35188/UNU-WIDER/2018/561-9

Pheng, L. S., & Hou, L. S. (2019). The Economy and the Construction Industry. *Construction Quality and the Economy: A Study at the Firm Level*, 21–54. https://doi.org/10.1007/978-981-13-5847-0_2

Public Procurement Authority (PPA). (2022). Implementation of the Ghana's electronic procurement system (GHANEPS). Public Procurement Authority. https://ppa.gov.gh/implementation-of-the-ghanas-electronic-procurement-system-ghaneps/

Roberts, R., Flin, R., Millar, D., & Corradi, L. (2021). Psychological factors influencing technology adoption: A case study from the oil and gas industry. Technovation, 102, 102219. https://doi.org/10.1016/j.technovation.2020.102219

Tai, Yi-Ming & Ho, Chin-Fu & Wu, Wen-Hsiung. (2010). The performance impact of implementing Web-based e-procurement systems. International Journal of Production Research - INT J PROD RES. 48. 5397-5414. 10.1080/00207540903117915.

Tamilmani, K., Rana, N. P. and Dwivedi, Y. K. (2020). "Consumer Acceptance and Use of Information Technology: A MetaAnalytic Evaluation of UTAUT2" , Information Systems Frontiers

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington, MA: Lexington Books.

Touray, Almamy & Salminen, Airi & Mursu, Anja. (2013). ICT Barriers and Critical Success Factors in Developing Countries. Electronic Journal of Information Systems in Developing Countries. 56. 10.1002/j.1681-4835.2013.tb00401.x.

Tutu, S. O., Kissi, E., Osei-Tutu, E., & Desmond, A. (2019). Evaluating critical factors for the implementation of e-procurement in Ghana. International Journal of Procurement Management, 12(1), 1-14.

World Bank. (2023). Drivers of delays in procurement of infrastructure projects. International Bank for Reconstruction and Development / The World Bank. https://documents1.worldbank.org/curated/en/P173110138cdf70ef18cd21fb78946336