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Procurement Efficiency and Firm Competitive Advantage: Moderated Mediation Analysis of Unified Theory of Acceptance and Use of Technology: A Study in Ghana, Ashanti Region.

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Abstract: This study explored how procurement practices relate to competitive advantage within organizations, using the Unified Theory of Acceptance and Use of Technology (UTAUT) to understand the role of technology in supply chain management. Researchers employed a quantitative approach, analyzing 245 responses from 100 regional universities using descriptive statistics and structural equation modeling (SEM) with SmartPLS software. The findings revealed a strong positive correlation between effective procurement methods and competitive advantage, leading to improved financial performance, return on investment, and profit margins. Regression analysis confirmed that efficient procurement strategically enhances economic performance. The UTAUT model highlighted that performance expectancy, effort expectancy, social influence, and facilitating factors influence the adoption and use of procurement technology. The study demonstrates how aligning procurement digitalization with the UTAUT framework can optimize sourcing, foster innovation, and boost

overall profitability in supply chain management. Ultimately, this research contributes to a deeper understanding of the link between procurement practices and achieving a competitive edge in organizational supply chain management.

Keywords: Strategic Procurement, Supply Chain Management, Competitive Advantage, UTAUT, Procurement Efficiency.

1. INTRODUCTION

Procurement is essential in supply chain management, allowing organisations to obtain resources and use market opportunities. Synchronising procurement components with corporate strategy enables enterprises to enhance market presence, decrease expenses, and elevate quality. Efficient logistics management is crucial for sustaining a flexible and responsive supply chain (Sweeney et al., 2018). Performance-oriented solutions, such as strategic procurement management, emphasise enduring supplier relationships to enhance operational efficiency and save expenses. As supply chains evolve, managing these complexities becomes a competitive factor (Foerstl et al., 2021). Advanced procurement capabilities enhance supply chain performance by improving responsiveness to market changes, allowing firms to remain adaptable in dynamic environments (Herold et al., 2023). Technological advancements such as e-procurement and AI-driven supplier management systems have transformed supply chain management, enhancing efficiency and cost savings through improved purchasing processes and demand forecasting (Pattanayak & Punyatoya, 2019). The Unified Theory of Acceptance and Use of Technology (UTAUT) delineates critical determinants of technology adoption, comprising performance expectancy, effort expectancy, social impact, and facilitating conditions (Raden Edi, 2022). Performance expectancy denotes the conviction that technology enhances job performance, whereas effort expectancy emphasises the simplicity of usage. Social impact, encompassing industrial standards and managerial backing, is crucial in adoption (Rana & Arya, 2024). Enabling factors, including technical infrastructure and organisational support, guarantee the effective execution of technology (Khatri et al., 2023). These technologies allow firms to monitor market trends, manage logistics, and fortify supplier relationships, hence improving supply chain efficiency and competitiveness (Abideen et al., 2023).

Notwithstanding its benefits, the deployment of procurement technology encounters obstacles, particularly in regions like Ghana, where conceptual barriers, cultural disparities, and literacy gaps hinder implementation (Filipova, 2023Shabalov et al., 2021). Addressing these challenges requires investment in employee training, change management, and digital infrastructure. Understanding procurement efficiency through UTAUT is vital for market positioning, yet research gaps remain, especially regarding its moderated mediation effects in Ghana's public procurement (Addy et al., 2024). Overcoming these barriers requires longitudinal studies to evaluate technology's impact on competitive advantage over time (Oduro et al., 2023). By applying moderated mediation analysis, procurement managers can effectively integrate UTAUT constructs, optimizing procurement processes to align with strategic supply chain objectives (Asare et al., 2024). Investing strategically in technology and human capital is essential for developing resilient and competitive supply networks. Effective procurement improves agility, cost control, and delivery efficiency, hence bolstering organisations' competitiveness in the global market (Arun & Yildirim Ozmutlu, 2024).

This study examines the effects of procurement efficiency and social influence on a firm's competitive edge. This study investigates the mediation of user acceptance and UTAUT constructs (performance expectancy, effort expectancy, and facilitating conditions) in this relationship and analyses the moderating effect of user acceptance on the strength of the connection between procurement efficiency and competitive advantage. This study aims to address the question arising from the prior debate and the identified research gaps.

How do procurement efficiency, social influence and user acceptance collectively impact firm competitive advantage?

This research question is examined through the lens of both the Resource-Based View (RBV) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Thus, the study presents and empirically tests a model that examines how procurement efficiency and social influence impact a firm's competitive advantage, while investigating the mediating role of UTAUT dimensions

and the moderating effect of user acceptability. This study elucidates the impact of procurement efficiency and user acceptance, as informed by the UTAUT model, on company performance in Ghana's Ashanti Region. It emphasises pragmatic measures for improving competitiveness, directing governments and corporate leaders in fostering effective procurement and technology implementation. The research provides context-specific insights to assist local enterprises in overcoming procurement issues and facilitates data-driven decision-making for sustainable competitive advantage. The subsequent sections of the paper are structured as follows: The literature evaluation initially examines the utilised theories and the formulated hypotheses. The study context and measures are subsequently delineated, followed by the exposition of empirical findings. Ultimately, the study culminates in a discourse on the findings and their ramifications.

2. Literature review, theoretical constructs, and hypotheses

2.1 The Resource-Based View (RBV)

The Resource-Based View (RBV) hypothesis posits that strategic procurement diminishes costs and enhances quality, hence bolstering supply chain competitiveness (Acquah et al., 2023). Relationship-Integrated Procurement (RIP) emphasises the significance of robust supplier relationships for stability and responsiveness (Gaudenzi et al., 2023). The amalgamation of sophisticated procurement methods and sustainability initiatives improves supply chain efficiency, enabling organisations to maintain competitiveness in a swiftly changing global market (Y. K. Dwivedi et al., 2021a; Khedr & S, 2024). The resource-based view (RBV) posits that an organisation maintains a competitive edge through the effective management of its distinctive and valuable resources (Amaya et al., 2024). According to Evangelista et al., 2023, efficient procurement strengthens supply chains, reduces operational costs, and enhances product quality by responding faster to market demands, thus maintaining competitiveness. Effective procurement processes and resource management bolster a company's competitive edge through efficiencies that support competitiveness (Susitha et al., 2024).

2.2 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT). Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and User Acceptance (UA) are pivotal in procurement phases, affecting technology acceptance and user behaviour (Bajunaied et al. 2023a). PE is crucial in the Needs Identification phase, improving operational efficiency (Sivarajah et al., 2017), while EE improves the Purchase Requisition phase by ensuring user-friendly systems (Neves et al., 2025). FC supports the Review of Requisition process by providing organizational resources (V. Kumar, Sharma, et al., 2024), and SI impacts Budget Approval through stakeholder influence (Ding et al., 2024).

UA is essential in the Quotation Request phase, enhancing supplier communication via digital platforms (Vincenzo Varriale, 2023), while SI affects the Negotiation and Contract Award stage by shaping stakeholder interactions (Marc Hockings, 2021). FC facilitates compliance monitoring in Contract Management (Zhou et al., 2024), and EE improves the Receiving of Goods/Services phase by streamlining inspection procedures (Moshtari et al., 2021). The study highlights UTAUT's relevance in procurement, demonstrating its effectiveness in analyzing procurement efficiency and competitive advantage through non-linear relationships (Rozemeijer, 2000). SMART PLS was used to identify complex interactions affecting procurement and firm competitiveness, making it a valuable tool in business management research (Hiran & Dadhich, 2024; Hoang & Le Tan, 2023). The study is organised as follows: Section 2 offers a literature review encompassing theoretical constructs and hypotheses; Section 3 delineates the research methodology, comprising data collection and analysis; Section 4 presents empirical findings, including hypothesis testing and structural modelling utilising SMART PLS; and the concluding section examines theoretical implications, limitations, future research directions, and critical insights regarding procurement technology adoption for sustaining competitive advantage.

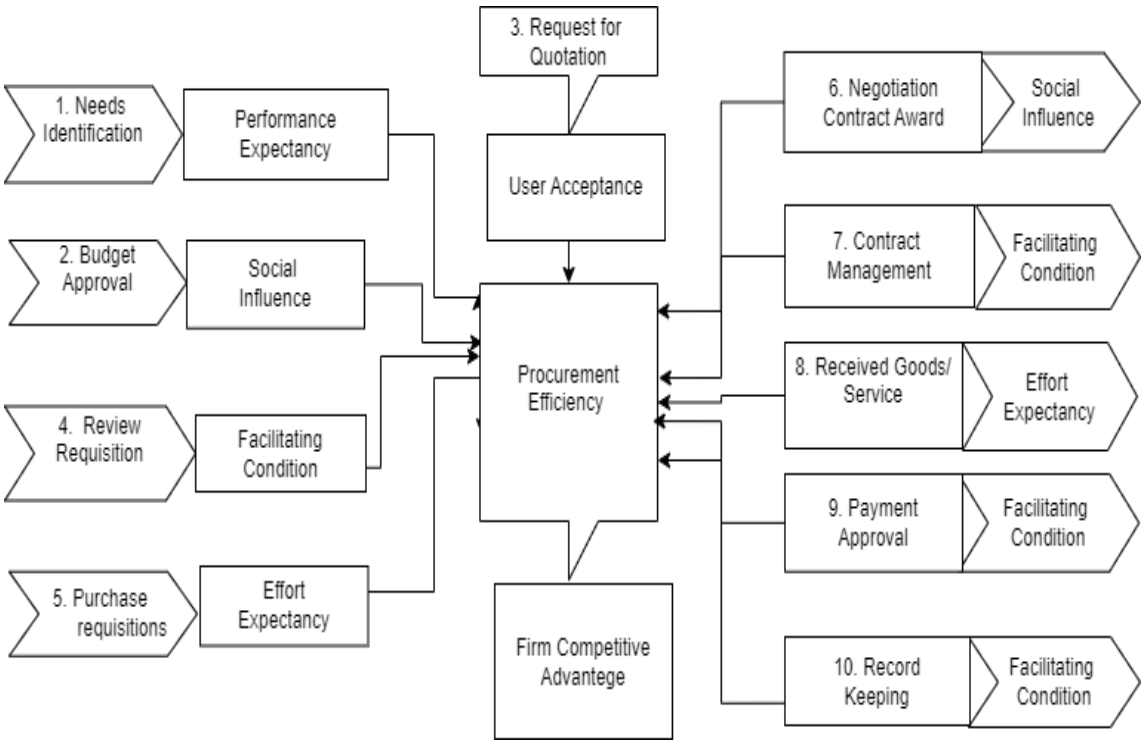

Figure I: Procurement Process and UTAUT Adoption.

Source: Authors' own elaboration

2.3. Technology and Procurement Efficiency

The incorporation of new technologies like Artificial Intelligence (AI), Blockchain, and the Internet of Things (IoT) into procurement procedures has revolutionised supply chain management by improving efficiency, transparency, and strategic results. Rashid et al. (2024) assert that these technologies establish resilient, transparent procurement frameworks that fit with supply chain goals. AI automates data analysis, decision-making, and communication with suppliers and customers, increasing responsiveness and reducing manual effort (Mohsen, 2023). Blockchain ensures compliance, reduces fraud, and secures transactions by tracking goods from origin to delivery, fostering trust within the supply chain (Agrawal et al., 2021). Procurement 4.0 focuses on performance-driven strategies, leveraging these technologies to reduce lead times, optimize inventory, improve customer service, and achieve organizational goals (Althabatah et al., 2023). This shift necessitates a realignment of procurement processes and increased accountability, as highlighted by Rejeb et al. (2022). Adopting these technologies in procurement streamlines operations and significantly enhances supply chain efficiency, security, and market responsiveness.

Procurement Efficiency and Firm Competitive Advantage

Procurement efficiency is paramount for competitive advantage, driving improvements in cost control, quality, process agility, and supplier relationships. Cost control directly boosts profitability (Henri et al., 2016), while quality enhancement fosters customer loyalty (Yum & Yoo, 2023). Accelerated processes increase agility (Alnasser et al., 2024), and strong supplier management reduces costs and improves quality (Balkhi et al., 2022). Effective procurement enhances market efficiency (Kähkönen et al., 2023). Technology is vital in minimizing errors and optimizing operations (Soori et al., 2023). The UTAUT framework explains technology adoption in procurement, concentrating on performance, exertion, social impact, and enabling circumstances (Duarte & Pinho, 2019). Implementing technology-driven procurement strategies streamlines operations and secures long-term competitive advantage. Therefore, it is hypothesized that:

H1: Procurement efficiency positively influences a firm's competitive advantage.

Social influence significantly enhances a firm's competitive advantage.

Organisations in competitive markets monitor competitors and strategic partners, such as key customers and suppliers, to enhance as crucial for technology adoption, improving market standing. Competitive pressure compels managers to adopt similar technologies, eliminating differentiation to remain economically viable enhancing departmental operations, and aligning strategies with market demands. Social influence is significant in interdependent environments, particularly procurement. (V. Kumar, Ashraf, et al., 2024) argue that projects attuned to market factors or supplier needs are more successful in terms of industry integration and profitability, enhancing internal efficacies and competitive advantage. It is therefore hypothesized that:

H2: *Social influence affects how competitive pressure drives technology adoption in procurement, helping organizations improve efficiency and gain a competitive advantage.*

Performance Expectancy exerts an interaction influence on the correlation between Procurement Efficiency and Firm Competitive Advantage.

Performance expectancy drives procurement technology adoption, reducing costs and enhancing efficiency (S. Kumar, Goel, et al., 2024). Technological advancements improve decision-making and competitiveness (Radicic & Petković, 2023). Effective inventory management strengthens resilience (Ikpe & Shamsuddoha, 2024). Strong supplier relationships (Yeh et al., 2020) and sustainable procurement (De Oliveira et al., 2018) enhance stability. It is therefore hypothesized that:

H3: Higher performance expectancy in adopting procurement technology boosts cost reduction, efficiency, decision-making, competitiveness, inventory resilience, supplier relationships, and sustainable practices.

Effort Expectancy interacts with the relationship between Procurement Efficiency and the Firm's Competitive Advantage.

Effort expectancy, or the perceived usability of a system, is important in adopting procurement technologies in supply chain management and their utilization (Brandon-Jones & Kauppi, 2018). It has been noted that user-friendly systems experience greater adoption, the efficiency of use, improved organizational performance, and resultant competitive edge (Bhatnagr et al., 2024). High effort expectancy enhances the acceptance of the technology, reducing the time and costs incurred in procurement and enabling a higher market share and profitability (Al Halbusi et al., 2024). Thus, it can be concluded that effort expectancy is critical to the understanding of reasons behind procurement efficiency and competitive advantage in any given organization. Therefore, it is hypothesized that:

H4: Effort expectancy positively influences the adoption of procurement technologies, enhancing procurement efficiency and contributing to a firm's competitive advantage.

Facilitating Conditions provide an interaction influence on the correlation between Procurement Efficiency and a Firm's Competitive Advantage.

Social influence, defined as the belief that important individuals expect others to utilise a particular system, profoundly affects employees' choices to embrace procurement technologies, thus affecting firms' competitive advantage (Asif Kamran, 2024). Research has shown that social influence positively affects procurement system adoption and enhances efficiency (Hussam Al Halbusi, 2022). When key stakeholders advocate procurement systems, employees tend to follow them, resulting in improved processes and market positioning (Liu et al., 2024). Thus, social influence interacts with procurement efficiency and competitive advantage by encouraging technology adoption, which enhances operational efficiency. It is consequently posited that:

H5: Social influence positively impacts the adoption of procurement technologies, thereby enhancing procurement efficiency and contributing to a firm's competitive advantage.

3. RESEARCH METHODOLOGY

A quantitative study methodology was employed to examine the correlation between procurement efficiency and competitive advantage, utilising UTAUT components as moderating variables. The research utilised stratified random sampling for selecting 100 companies from the manufacturing, service, and agriculture sectors in the Ashanti Region, Ghana. Procurement managers, IT managers, and procurement personnel were targeted to ensure

diverse organizational insights. A total of 300 surveys were distributed, with 245 valid responses analyzed after excluding incomplete or inconsistent responses. The final response rate (81%) met the minimum required sample size of 240 for statistical robustness (Puyana-Romero et al., 2024). Data collection followed ethical research principles, ensuring voluntary participation, confidentiality, and informed consent (Nwali et al., 2021). Ethical approval was obtained to uphold research integrity (Mulvihill et al., 2023). To measure procurement efficiency, validated scales from Fragkiskaki (2024) assessed process acceleration, quality improvement, and cost reduction. Porter's competitive advantage framework was applied using a regression model. Data screening procedures removed responses with low variance (standard deviation < 0.25) to mitigate bias and improve reliability. For data analysis, SMART-PLS software was utilized. Pearson's correlation coefficient assessed the relationship between procurement efficiency and competitive advantage, while Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to model complex relationships between procurement efficiency, technology adoption, and competitive advantage. PLS-SEM was chosen for its effectiveness with small to medium sample sizes and non-normally distributed data (Sharma & Sharma, 2023).

4. Conceptual framework

This study's conceptual framework seeks to clarify the interconnections among Procurement Efficiency (PRE), Competitive Advantage (CA), and User Acceptance (UA). It asserts that physical education affects cognitive ability, with user agency serving as a mediator. The approach utilises the UTAUT model to analyse the determinants of UA, focussing on Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). This study aims to elucidate how strategic procurement and technology integration, guided by UTAUT, improve business performance through the analysis of these elements (Akinnuwesi et al., 2022).

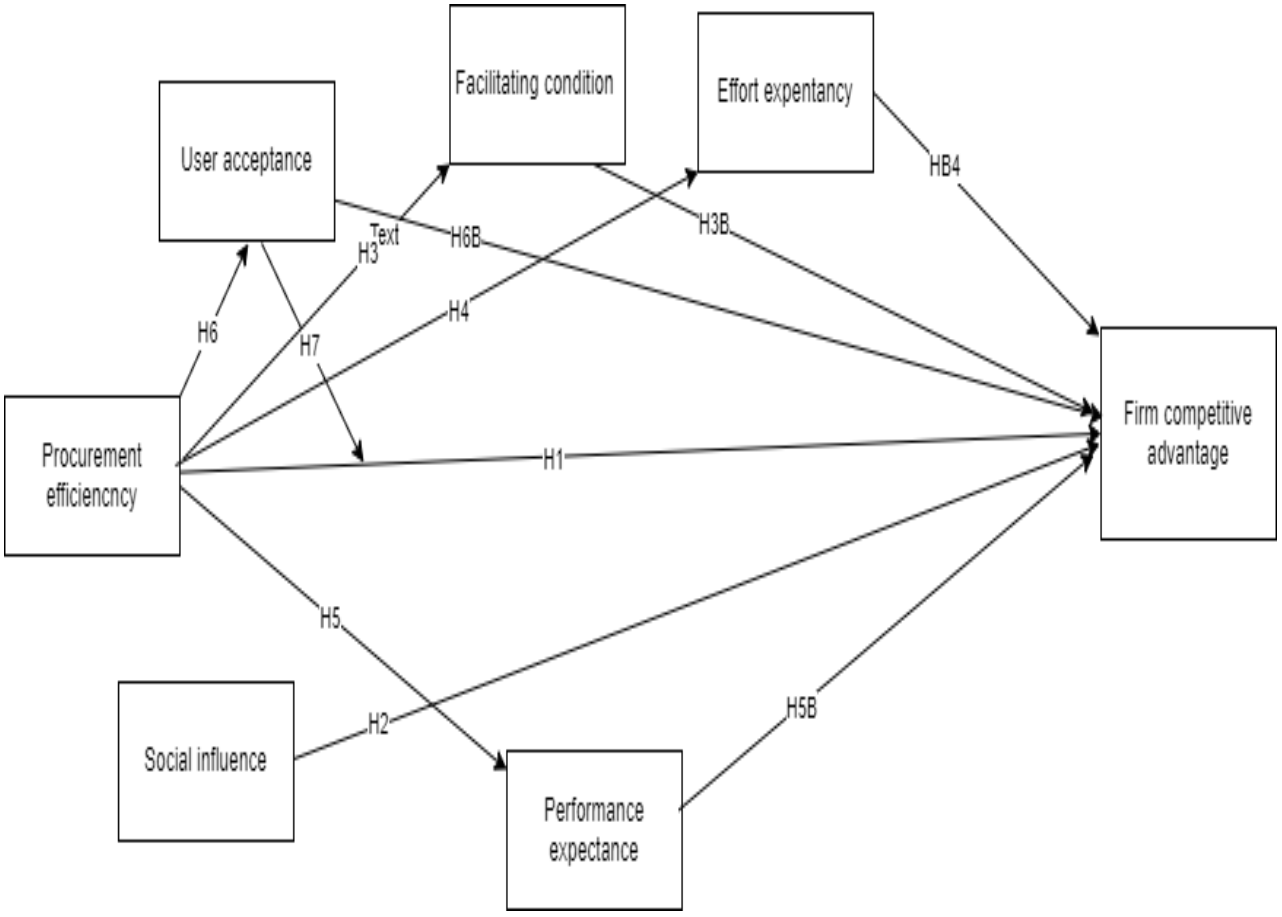

Figure II: Conceptual framework

Source: Authors' own elaboration

4.1 Regression model

The regression model used in the analysis was formulated as follows:

$$CA=\beta0+\beta1(PE)+\beta2(SI)+\beta3(UA)+\beta4(PRE\times PE)+\beta5(PE\times EE)+\beta6(PE\times SI)+\beta7(PE\times FC)+\beta8(UA\times PE)+\epsilon.$$

This study investigates the effects of procurement efficiency (PE) and social influence (SI) on competitive advantage (CA), with user acceptance (UA) serving as both a mediating and moderating variable. The model examines the connections of performance expectancy (PE) and UTAUT components, encompassing performance expectancy (PE × PE), effort expectancy (PE × EE), procurement expectancy (PRE × PE), social influence (PE × SI), and enabling conditions (PE × FC). It additionally examines the moderating influence of user approval on procurement efficiency (UA × PE). The equation comprises an intercept (β_0), coefficients (β_1 to β_8) that denote the magnitude and direction of effect, and an error component (ϵ) that addresses unexplained deviations.

5. RESULTS AND DISCUSSION

5.1 Measurement model

During the measurement model analysis, items with factor loadings greater than 0.7 were kept to enhance construct reliability and validity. If the items were cross-correlated such that one internal self-correlating item showed a correlation with another internal self-correlating item, it was dropped to ensure that the HTMT ratio was less than 0.9. The elements considered in the structural route analysis were PE1-PE3, EE1-EE3, FC1-FC4, FCA2-FCA4, PRE2-PRE4, SI1, SI3-SI4, UA1-UA3, and UA1 × PRE1. The values of Composite Reliability and Cronbach's Alpha above 0.7, indicating internal consistency. Convergent validity was confirmed with an Average Variance Extracted (AVE) exceeding 0.5 for each construct. Discriminant validity was assessed using the Fornell-Larcker criterion (Fornell & Larcker, 1981), HTMT ratios not above 0.9 (Henseler et al., 2015), and factor loadings surpassing those of cross-loading factors. The research demonstrated strong validity and reliability of components for subsequent structural route analysis.

5.2 Structural model

The model demonstrated reasonable predictive power for Firm Competitive Advantage (FCA) with an R^2 of 0.295 (above the 0.1 thresholds, explaining 29.5% of variance) and a good fit (SRMR = 0.096, below 0.1) (Zhang & Takahashi, 2024). Bootstrapping with 5,000 primary splitting samples in SMARTPLS 3.3 further strengthened model testing and hypothesis approval, enhancing the accuracy and credibility of the conclusions due to reliable standard errors and confidence intervals (Richter & Tudoran, 2024). Together, the R^2, SRMR, and bootstrapping results support the model's reliability and validity in predicting FCA based on procurement efficiency and technology adoption, aligning with past research (Wang et al., 2024).

5.3 Reliability and Validity

The internal consistency assessment among 245 respondents confirmed the reliability of measuring procurement efficiency and competitive advantage, with Cronbach's Alpha ranging from 0.825 to 0.840 (Wang et al., 2022). Determinants like cost containment, quality, speed, and supplier performance were significantly interconnected. Competitive advantage factors, including ROI, cost advantage, and sustainability, recorded Alpha coefficients between 0.845 and 0.875 (Trizano-Hermosilla & Alvarado, 2016). Technology adoption showed high reliability (α = 0.860–0.900) (Davit Marikyan, 2023), enhancing procurement performance (Charpin et al., 2021) and boosting competitiveness through IT-mediated efficiency (Slam et al., 2023).

Table I: Measurement model Reliability and Validity Test

Variables	Cronbach's alpha	Composite reliability(rho_a)	Composite reliability(rho_c)	Average variance extracted (AVE)
EE1	0.942	0.969	0.958	0.851
FC1	0.935	0.989	0.950	0.825

FCA1	0.890	0.899	0.932	0.820
PE1	0.965	1.028	0.974	0.903
PRE1	0.913	0.966	0.944	0.850
SI1	0.865	0.981	0.909	0.770
UA1	0.901	1.067	0.935	0.828

Source: Author's own construct

Table II: Correlation between variables

	EE1	FC1	FCA1	PE1	PRE1	SI1	UA1	UA1×PRE1
EEI	**1.000**	-0.126	-0.064	0.039	-0.215	0.152	0.494	-0.003
FC1	-0.126	**1.000**	-0.095	0.148	0.329	-0.127	-0.288	0.040
FCA1	-0.064	-0095	**1.000**	-0.279	0.209	-0.344	-0.083	0.283
PE1	0.039	0.148	-0.279	**1.000**	-0.099	0.111	-0.012	-0.098
PRE1	-0.215	0.329	0.209	-0.099	**1.000**	-0.107	-0.382	0.609
SI1	0.152	-0.127	-0.344	0.111	-0.107	**1.000**	0.322	0.153
UA1	0.494	-0.288	-0.083	-0.012	-0.382	0.322	**1.000**	0.128
UA1×PRE1	-0.003	0.040	0.283	-0.098	0.609	0.153	0.124	**1.000**

Source: Author's own construct

5.4 Heterotrait–monotrait ratio (HTMT)

The HTMT analysis in Table 3 assessed discriminant validity by measuring construct correlations, ensuring all values remained below the 0.90 threshold. Effort Expectancy (EE1) and Facilitating Conditions (FC1) had an HTMT value of 0.164, indicating they are distinct constructs. Facilitating Conditions (FC1) and Procurement Efficiency (PRE1) had a value of 0.293, confirming their separation. User Acceptance (UA1) and Procurement Efficiency (PRE1) had an HTMT value of 0.352, suggesting a reasonable but distinct relationship. The highest value (0.656) was between Procurement Efficiency and its interaction with User Acceptance (UA1xPRE1), showing a connection but maintaining discriminant validity. Overall, the HTMT results support the validity of the constructs, ensuring that technology adoption and procurement efficiency remain distinct.

Table III: Heterotrait –Monotrait ratio (HTMT)

	EE1	FC1	FCA1	PE1	PRE1	UA1	UA1×PRE1
EE1							
FC1	0.164						
FCA1	0.082	0.130					
PE1	0.064	0.145	0.281				
PRE1	0.225	0.293	0.227	0.100			
SI1	0.167	0.178	0.340	0.117	0.144		

UA1	0.530	0.269	0.100	0.077	0.352	0.354	
UAI×PRE1	0.016	0.303	0.303	0.105	0.656	0.142	0.17

Source: Author's own construct

5.5 Cross- Loading

Cross-loading analysis was conducted to evaluate discriminant validity. The results demonstrate strong discriminant validity, as indicators loaded significantly on their respective constructs and exhibited lower loadings on other constructs. Specifically: Effort Expectancy indicators (EE1-EE4) showed high loadings (0.910–0.936) on the Effort Expectancy construct, with lower cross-loadings on Facilitating Conditions and Procurement Efficiency, aligning with established research (Ab Hamid et al., 2017). Facilitating Conditions indicators (FC1-FC4) loaded strongly (up to 0.966) on the Facilitating Conditions construct and had lower correlations with Social Influence and User Acceptance, supporting model validity (Li et al., 2018). Procurement Efficiency indicators (PRE2-PRE4) displayed high loadings (0.872–0.947) on the Procurement Efficiency construct, with lower cross-loadings on Facilitating Conditions and User Acceptance (Ayaz & Yanartaş, 2020). User Acceptance indicators (UA1-UA3) also demonstrated strong discriminant validity (0.869–0.949) and lower correlations with Procurement Efficiency and Social Influence, reinforcing its distinct role in technology adoption (Beldad & Hegner, 2018).

Overall, the analysis confirms that indicators load more strongly on their intended constructs than on others, thus supporting the model's reliability and validity, consistent with structural equation modeling literature

Table IV: Cross Loading

	EE1	**FC1**	**F CA1**	**PE1**	**PRE1**	**SI1**	**UA1**	**UA1×PRE1**
EE1	**0.936**	-0.032	-0.018	-0.013	-0.188	-0.002	0.424	-0.031
EE2	**0.910**	-0.182	-0.027	0.040	-0.219	0.147	0.360	0.018
EE3	**0.918**	-0.156	-0.141	0.081	-0.217	0.255	0.594	-0.004
EE4	**0.925**	-0.055	-0.021	0.017	-0.146	0.116	0.399	0.004
FC1	-0.069	**0.958**	-0.130	0.164	.0352	-0.126	-0.195	0.095
FC2	-0.219	**0.907**	-0.030	0.055	0.336	-0.154	00.437	0.0921
FC3	-0.119	**0.966**	-0.096	0.210	0.268	-0.112	-0.226	-0.000
FC4	0.182	**0.192**	-0.124	0.096	0.017	0.113	0.025	-0.068
FCA2	-0.016	-0.240	**0.915**	-0.245	0.189	-0.263	-0.119	0.313
FCA3	-0.073	-0.032	**0.961**	-0.243	0.153	-0.285	0.015	0.273
FCA4	-0.087	-0.015	**0.939**	-0.270	0.220	-0.380	-0.110	0.191
PE1	-0.022	0.181	-0.306	**0.979**	-0.106	0.163	-0.024	-0.077
PE2	0.044	0.011	-0.172	**0.913**	-0.135	0.084	-0.103	-0.133
PE3	-0.004	0.171	-0.183	**0.942**	-0.020	-0.027	-0/054	-0.103
PE4	0.111	0.167	-0.330	**0.966**	-0.098	0.137	0.079	-0.080
PRE2	-0.135	0.340	0.153	-0.049	**0.947**	-0.038	-0.367	0.580
PRE3	-0.234	0.353	0.228	-0.119	**0.944**	-0.144	-0.433	0.495

PRE4	-0.227	0.178	0.191	-0.104	**0.872**	-0.108	-0.207	0.660
SI1	0.0.141	-0.205	0.271	0.042	-0.146	**0.883**	0.196	0.045
SI3	0.128	-0.011	-0.386	0.180	-0.029	**0.897**	0.332	0.214
SI4	0.140	-0.212	-0.142	-0.015	-0.176	**0.852**	0.326	0.092
UA1	0.380	-0.291	-0.134	-0.059	-0.443	0.273	**0.949**	0.033
UA2	0.406	-0.239	0.045	0.006	-0.180	0.231	**0.910**	0.293
UA3	0.587	-0.236	-0.055	0.054	-0.301	0.364	**0.869**	0.139
UAI×PRE1	-0.003	0.040	0.283	-0.098	0.609	0.153	0.124	**1.000**

Source: Author's own construct

The bold text in the table indicates the corresponding factor loadings of the items to their respective latent constructs. were examined utilising SMART-PLS 4.5 Direct and indirect influences of factors.

The study examines the relationships between various factors and a firm's competitive advantage using SMART-PLS4.5. The findings reveal that Effort Expectancy (EE1) does not significantly contribute to competitive advantage (p = 0.919), supporting Dwivedi et al. (2021a), who argued that ease of use is not always essential for gaining a competitive edge. Likewise, Facilitating Conditions (FC1) exert no substantial impact on competitive advantage (p = 0.222) despite their recognized importance in technology adoption (Rodríguez-Espíndola et al., 2022). In contrast, Performance Expectancy (PE1) exerts a favourable and significant influence on competitive advantage (p = 0.013), reinforcing Camilleri (2024), who found that when firms expect better performance from technology, they tend to achieve greater success. Meanwhile, Procurement Efficiency (PRE1) plays a complex role. It reduces perceived system complexity (p = 0.002), meaning that more efficient procurement processes make technology appear more straightforward. Additionally, PRE1 enhances Facilitating Conditions (FC1) (p = 0.001), as better procurement improves organizational support for technology (Dwivedi et al., 2022). However, despite these advantages, PRE1 does not directly influence competitive advantage (p = 0.574), suggesting that other factors mediate this relationship. The study also finds that PRE1 does not significantly alter Performance Expectancy (PE1) (p = 0.216), indicating that procurement improvements do not necessarily change how firms perceive the potential benefits of technology (Mikalef et al., 2020). Moreover, PRE1 negatively affects User Acceptance (UA1) (p < 0.001), as more efficient procurement processes may lead to resistance toward new technology adoption (Dwivedi et al., 2021d). Another significant finding is the role of Social Influence (SI1), which positively impacts competitive advantage (p < 0.001), suggesting that external pressures and industry norms provide a vital function in shaping firms' success (Kelly et al., 2023). However, User Acceptance (UA1) alone does not significantly impact competitive advantage (p = 0.549), implying that other variables may be more influential (Aparicio et al., 2021). Nonetheless, UA1 moderates the relationship between Procurement Efficiency (PRE1) and competitive advantage (p = 0.004), indicating that when users are more accepting of technology, the benefits of efficient procurement are amplified (Uyen Nguyen et al., 2024). These findings highlight the intricate interplay between procurement efficiency, technology adoption, and competitive advantage. They demonstrate that while some factors directly contribute to firm performance, others exert their influence through moderating and mediating effects.

Table V: Direct and Indirect effect of PRE on FCA (mediation, moderation)

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (IO/STDEVI)**	**P values**	**Outcome**

EE1->FCAI	0.009	0.008	0.094	0.101	0.919	Not supported
FC1->FCA1	-0.130	-0.126	0.107	1.218	0.222	Not Supported
PE1->FCA1	-0.188	-0.199	0.076	2.475	0.013	Supported
PRE1->EE1	-0.215	-0.223	0.071	3.036	0.002	Supported
PRE1->FC1	0.329	0.342	0.097	3.380	0.001	Supported
PREI->FCA1	-0.065	-0.056	0.115	0.563	0.574	Not Supported
PRE1->PE1	-0.099	-0.099	0.080	1.238	0.216	Not Supported
PRE1->UA1	-0.382	-0.386	0.056	6.783	0.000	Supported
SI1->FCA1	-0.076	-0.388	0.072	5.267	0.000	Supported
UA11->FCA1	-0.392	-0.064	0.127	0.599	0.549	Not Supported
UA1× PRE1->FCA1	0.392	0.382	0.136	2.877	0.004	Supported

Source: Author's own construct

6. **Theoretical contribution**

This research expands literature on procurement efficiency, technology adoption, and competitive advantage by integrating the UTAUT model into supply chain management (Hm et al., 2024).. The findings emphasize procurement efficiency's role in cost optimization, quality improvement, and vendor management. The study validates the significance of UTAUT in both emerging and developed markets by examining the moderating and mediating impacts of user acceptability, performance expectancy, effort expectancy, social influence, and facilitating factors (Kelly et al., 2023). It underscores the relationship between organisational culture and technology adoption, illustrating how technology improves procurement efficiency and fortifies a firm's competitive advantage (Davit Marikyan, 2023).

7. Practical and Managerial implications

This study emphasises the significance of procurement efficiency and technological adoption in generating value and establishing competitive advantage. Optimising procurement processes results in cost savings, the quality of products and services, and fortified supplier relationships, thereby improving overall operational performance. Advanced procurement technologies, including e-procurement, artificial intelligence, and data analytics, facilitate automation, enhance accuracy, and promote data-driven decision-making, leading to improved efficiency and optimised resource allocation. Effective technology adoption necessitates cultivating user acceptance via training, innovation, and a conducive work atmosphere. Mitigating elements such as effort expectancy and facilitating environments might diminish resistance to new procurement processes, resulting in more seamless transitions and enhanced performance outcomes. Stakeholders, such as suppliers, customers, and governments, are essential in advancing digital transformation and enhancing supply chain resilience. Investing in procurement infrastructure and incorporating sustainability and corporate social responsibility (CSR) concepts boosts regulatory compliance, mitigates environmental effect, and elevates corporate reputation. Sustainable procurement methods enable organisations to fulfil

ethical and legal obligations while attaining a competitive advantage for enduring success and growth.

8. Limitation, Future Research Gaps and Conclusion

This study recognises specific limitations that must be taken into account when evaluating its results. The emphasis on 245 Ghanaian firms may limit the applicability of the findings to other geographical areas, sectors, or economic conditions. Various nations and industries may present specific procurement issues, regulatory structures, and market dynamics that could affect the correlation between procurement efficiency and competitive advantage in diverse manners. Subsequent research ought to augment the sample size to encompass a wider array of organisations across other industries and geographic regions, hence improving the study's application and significance. The study primarily utilises quantitative metrics to evaluate procurement efficiency and competitive advantage. This method yields quantifiable and comparable data but neglects qualitative elements like leadership styles, organisational culture, workforce engagement, and supplier relationships, which can profoundly influence procurement results. Utilising qualitative approaches, including in-depth interviews, focus groups, and case studies, would provide deeper insights into the intricate dynamics that influence procurement success and competitive positioning. An additional crucial factor is the changing significance of sustainability in buying plans.

The study did not thoroughly investigate the impact of sustainable procurement methods, including ethical sourcing, environmental considerations, and social responsibilities, on long-term competitive advantage. As sustainability increasingly influences business strategy, future study should investigate its relationship with procurement efficiency, assessing its capacity to improve brand reputation, regulatory compliance, and stakeholder confidence. Notwithstanding these constraints, the study highlights the essential function of procurement efficiency in facilitating cost reduction, enhancing product and service quality, and bolstering supply chain resilience. These elements are crucial for businesses aiming to sustain long-term competitiveness, particularly amid swiftly evolving market demands and regulatory environments. Addressing the identified shortcomings in future studies will facilitate a more thorough knowledge of procurement's strategic significance, aiding organisations in establishing more resilient, adaptive, and sustainable procurement frameworks.

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