


OPTIMIZING PROJECT TIMELINES: THE IMPACT OF E-PROCUREMENT IN ACCELERATING PUBLIC SECTOR PROJECTS IN NIGERIA

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ARTICLE INFO	ABSTRACT
<p>Article history: Received: December, 02nd 2023 Accepted: March, 07th 2024</p>	<p>Purpose: E-procurement is recognized globally as a tool for enhancing efficiency and transparency, with major intergovernmental bodies advocating its adoption. This study investigates the impact of electronic procurement (e-procurement) on project completion times in the Nigerian public sector. The research focuses on e-tendering, e-invoicing, and e-sourcing, hypothesizing their effects on project completion times.</p>
<p>Keywords: Nigeria; Project Time; E-Procurement; Public Sector Projects; Project Performance.</p> 	<p>Theoretical Framework: The study employs a conceptual framework highlighting the interplay between e-procurement practices and government policies. Theoretical frameworks, including Innovation Diffusion Theory and Technology Acceptance Theory guided the study.</p> <p>Design/Methodology/Approach: The study adopted a descriptive survey research design to collect primary data from 361 procurement staff from four agencies in Abuja using a structured questionnaire. Data collected were analysed using descriptive statistics and multiple regression analysis.</p> <p>Findings: The results indicate a positive relationship between e-procurement practices and project completion times, with e-invoicing having the most significant impact. However, the introduction of government e-procurement policies as a variable diminishes the individual effects of e-tendering, e-invoicing, and e-sourcing.</p> <p>Research, Practical & Social Implications: The study established a positive relationship between electronic procurement practices and project completion times, with higher implementation levels resulting in shorter project durations. However, organizations should evaluate their impact, balance oversight and efficiency.</p> <p>Originality/Value: By focusing specifically on the Nigerian public sector, testing clearly defined e-procurement elements, collecting robust primary data, and generating new context-specific evidence, this study makes an original, timely and valuable contribution to knowledge on the impact of e-procurement adoption.</p> <p>Doi: https://doi.org/10.26668/businessreview/2024.v9i3.4182</p>

OTIMIZAÇÃO DOS CRONOGRAMAS DOS PROJETOS: O IMPACTO DO E-PROCUREMENT NA ACELERAÇÃO DE PROJETOS DO SETOR PÚBLICO NA NIGÉRIA

RESUMO

Objetivo: A contratação eletrônica é reconhecida mundialmente como uma ferramenta para aumentar a eficiência e a transparência, com os principais órgãos intergovernamentais defendendo sua adoção. Este estudo investiga o impacto da aquisição eletrônica (e-procurement) nos tempos de conclusão de projetos no setor público nigeriano. A pesquisa se concentra em licitações eletrônicas, faturamento eletrônico e fornecimento eletrônico, levantando a hipótese de seus efeitos sobre os tempos de conclusão do projeto.

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Estrutura Teórica: O estudo emprega uma estrutura conceitual que destaca a interação entre as práticas de contratação eletrônica e as políticas governamentais. As estruturas teóricas, incluindo a Teoria da Difusão da Inovação e a Teoria da Aceitação da Tecnologia, orientaram o estudo.

Projeto/Metodologia/Abordagem: O estudo adotou um projeto de pesquisa de levantamento descritivo para coletar dados primários de 361 funcionários de compras de quatro agências em Abuja usando um questionário estruturado. Os dados coletados foram analisados por meio de estatísticas descritivas e análise de regressão múltipla.

Conclusões: Os resultados indicam uma relação positiva entre as práticas de compras eletrônicas e os prazos de conclusão dos projetos, sendo que o faturamento eletrônico tem o impacto mais significativo. No entanto, a introdução de políticas governamentais de compras eletrônicas como uma variável diminui os efeitos individuais da licitação eletrônica, do faturamento eletrônico e do e-sourcing.

Implicações Sociais, Práticas e de Pesquisa: O estudo estabeleceu uma relação positiva entre as práticas de compras eletrônicas e os tempos de conclusão do projeto, com níveis de implementação mais altos resultando em durações de projeto mais curtas. Entretanto, as organizações devem avaliar seu impacto, equilibrar a supervisão e a eficiência.

Originalidade/Valor: Ao se concentrar especificamente no setor público nigeriano, testar elementos de compras eletrônicas claramente definidos, coletar dados primários robustos e gerar novas evidências específicas do contexto, este estudo faz uma contribuição original, oportuna e valiosa para o conhecimento sobre o impacto da adoção de compras eletrônicas.

Palavras-chave: Nigéria, Tempo de Projeto, E-Procurement, Projetos do Setor Público, Desempenho do Projeto.

OPTIMIZACIÓN DE LOS PLAZOS DE LOS PROYECTOS: EL IMPACTO DE LA CONTRATACIÓN ELECTRÓNICA EN LA ACELERACIÓN DE LOS PROYECTOS DEL SECTOR PÚBLICO EN NIGERIA

RESUMEN

Propósito: La contratación pública electrónica está reconocida en todo el mundo como una herramienta para mejorar la eficiencia y la transparencia, y los principales organismos intergubernamentales abogan por su adopción. Este estudio investiga el impacto de la contratación electrónica (e-procurement) en los plazos de finalización de proyectos en el sector público nigeriano. La investigación se centra en la licitación electrónica, la facturación electrónica y la contratación electrónica, y plantea la hipótesis de sus efectos en los plazos de finalización de los proyectos.

Marco Teórico: El estudio emplea un marco conceptual que pone de relieve la interacción entre las prácticas de contratación electrónica y las políticas gubernamentales. El estudio se ha guiado por marcos teóricos como la teoría de la difusión de la innovación y la teoría de la aceptación de la tecnología.

Diseño/Metodología/Enfoque: El estudio adoptó un diseño de investigación de encuesta descriptiva para recoger datos primarios de 361 funcionarios de contratación de cuatro organismos de Abuja mediante un cuestionario estructurado. Los datos recogidos se analizaron mediante estadística descriptiva y análisis de regresión múltiple.

Resultados: Los resultados indican una relación positiva entre las prácticas de contratación electrónica y los plazos de ejecución de los proyectos, siendo la facturación electrónica la que tiene un impacto más significativo. Sin embargo, la introducción de políticas gubernamentales de contratación electrónica como variable disminuye los efectos individuales de la licitación electrónica, la facturación electrónica y la contratación electrónica.

Implicaciones Sociales, Prácticas y de Investigación: El estudio establece una relación positiva entre las prácticas de contratación electrónica y los plazos de finalización de los proyectos, ya que a mayor nivel de implantación, menor duración de los proyectos. Sin embargo, las organizaciones deben evaluar su impacto, equilibrar la supervisión y la eficiencia.

Originalidad/Valor: Al centrarse específicamente en el sector público nigeriano, probar elementos de contratación electrónica claramente definidos, recopilar datos primarios sólidos y generar nuevas pruebas específicas para el contexto, este estudio supone una contribución original, oportuna y valiosa al conocimiento sobre el impacto de la adopción de la contratación electrónica.

Palabras clave: Nigeria, Tiempo de Proyecto, Contratación Electrónica, Proyectos del Sector Público, Rendimiento de los Proyectos.

1 INTRODUCTION

Electronic procurement (e-procurement) has emerged as a crucial tool for enhancing efficiency and transparency in public sector procurement globally. Major intergovernmental bodies like the UN, WTO and EU have developed guidelines and policies aimed at promoting adoption of e-procurement practices (Ajibike, 2019). These guidelines highlight the ability of e-procurement solutions to reduce cycle times, improve transparency through detailed record-keeping, enhance compliance to regulations, and curb corruption.

In the Nigerian context, the 2007 Public Procurement Act was enacted to address challenges plaguing manual procurement methods in the public sector. However, systemic issues like inefficient bidding processes, selective tendering and lack of advertising persisted. Hence, technology-enabled procurement has become imperative to infuse greater competition, accountability and performance. E-procurement encompasses web-based purchasing workflows that simplify transactions and enable automation of processes from planning to payment. Studies highlight that implementing e-procurement in the Nigerian public sector can translate to substantial gains in project cost and completion time.

Key drivers spurring e-procurement adoption globally and in Nigeria include tremendous potential to drive efficiency, transparency, cost-savings and quality control. However, successful implementation necessitates significant investments in resources, knowledge building and governance mechanisms tailored to the public sector context (Ibem et al., 2021). Thus, while presenting major opportunities, integrating these systems entails addressing complex barriers related to change management and evolution of supportive regulations.

In recent years, the Nigerian government has struggled with various challenges related to public procurement, a key state function. Issues like corruption, unethical conduct, insider deals and lack of transparency have led to inflated contract prices, poor project quality, and misuse of funds intended for public projects (Omorodion & Jesuorobo, 2020). Additionally, vested interests and absence of merit-based contractor selection has resulted in incompetent project execution and frequent legal disputes that delay timelines (Shatta et al., 2020). These problems arising from financial mismanagement and administrative incompetence in procurement have caused massive losses for the government annually.

To address these systemic procurement hurdles, Nigeria introduced e-Procurement to streamline processes, enhance accountability and reduce costs, as evidenced by studies in

developed economies (Abdullahi et al., 2022). E-Procurement has been shown to promote transparency, prevent maverick purchasing, mitigate corruption and provide fair supplier opportunities - all contributing to superior organizational performance (Afolabi et al., 2022). Specifically, e-tendering, e-invoicing and e-sourcing can improve process efficiency, taxpayer value and transaction cost reduction.

In Nigeria, despite e-Procurement adoption, there remains a significant research gap regarding its impact on public sector project performance concerning key metrics like completion times and costs (Williams & Andrew, 2021). This study therefore aims to empirically evaluate the relationship between e-Procurement components and public sector project outcomes. Understanding this connection is vital for the government to accurately gauge progress, pinpoint shortfalls and implement changes to optimize procurement processes and project results. Therefore, the main objective of the study was to examine the impact of electronic procurement on project completion time public sector projects in Nigeria. The specific objectives were to;

- i. examine the effect of e-tendering on project completion time in public sector projects in Nigeria;
- ii. examine how e-invoicing affect project completion time in public sector projects in Nigeria;
- iii. examine how e-sourcing affect project completion time in public sector projects in Nigeria;
- iv. examine how government e-procurement policy affect project completion time in public sector projects in Nigeria.

The study hypothesised that;

- i. HO₁: There is no significant effect of e-tendering on project completion time of public sector organizations in Nigeria.
- ii. HO₂: There is no significant effect of e-invoicing on project completion time of public sector organizations in Nigeria.
- iii. HO₃: There is no significant effect of e-sourcing on project completion time of public sector organizations in Nigeria.
- iv. HO₄: There is no significant effect of government e-procurement policy on project completion time of public sector organizations in Nigeria.

2 THEORETICAL REFERENTIAL

The concepts, theoretical background, and empirical research submissions on relationship between e-procurement and project completion time were presented.

2.1 CONCEPTUAL CLARIFICATION

E-procurement refers to the use of internet-based information technologies to streamline and enable procurement activities between companies or between companies and government entities (Wen & Zeng, 2018). Core e-procurement processes include Identifying potential suppliers online, sending requests for information and price quotes, placing purchase orders, processing invoices, and making payments digitally (Sukawat & Mu, 2020; Verma, 2024). Benefits over traditional paper-based procurement include increased process efficiency, reduced transaction costs, improved spend visibility, and enhanced compliance (Wen & Zeng, 2018). Equally, E-tendering is the process of putting out tenders and receiving bids for contracts using electronic means, typically internet-based platforms (Kaleshovska et al, 2015). It facilitates the bid invitation process including publishing tender notices, distributing documentation, submitting bids, answering bidders' inquiries, and evaluating proposals digitally (Sukawat & Mu, 2020). Compared to traditional paper-based tendering, e-tendering reduces effort for procurement entities and bidders, enhances transparency, increases bidder participation, and speeds up processes (Kaleshovska et al, 2015).

E-invoicing refers to the digital creation, exchange, and processing of invoices using structured formats that enable automation (Caglio & Pizzini, 2020). E-invoices are transmitted electronically via the internet rather than printed and sent physically. This eliminates manual handling, speeds approvals and payments, decreases errors, and provides other benefits over paper invoices (Song & Jeong, 2022). Countries are increasingly adopting centralized e-invoicing platforms and standardized e-invoice formats based on regulations and policies (Caglio & Pizzini, 2020). Also, E-sourcing provides technologies to facilitate and enhance early procurement phases before tendering/requesting quotes from suppliers (Wen & Zeng, 2018). This includes searching supplier databases online, identifying new suppliers for specific spend categories, securely exchanging procurement documents with prospects, and prequalifying vendors digitally (Sukawat & Mu, 2020). E-sourcing expands market reach, reduces search

costs for buyers and suppliers, generates benchmark pricing data, and supports optimization of the supplier base (Wen & Zeng, 2018).

Governments globally have enacted policies and regulations to support adoption of e-procurement across public sector agencies and standardize practices (Vaidya et al, 2022). Policy objectives are to increase efficiency, competition, transparency and SME participation in public procurement through mandating electronic publishing of tender notices, digital submission of bids via centralized platforms, and meeting other e-procurement criteria (Mukonza & Swart, 2022). Compliance is often tied to funding eligibility to drive behavioural change (Vaidya et al, 2022). In the same vein, Project completion time refers to the total calendar time from start to finish of a construction or infrastructure project (Wang et al, 2018). Research shows automated workflows and information exchange in e-procurement can accelerate the material procurement cycle compared to paper-based methods, leading to faster overall project completion (Wang et al, 2018). Full integration of e-procurement with project scheduling and control systems can optimize activity sequencing and resource allocation to further improve project delivery times (Mukonza & Swart, 2022).

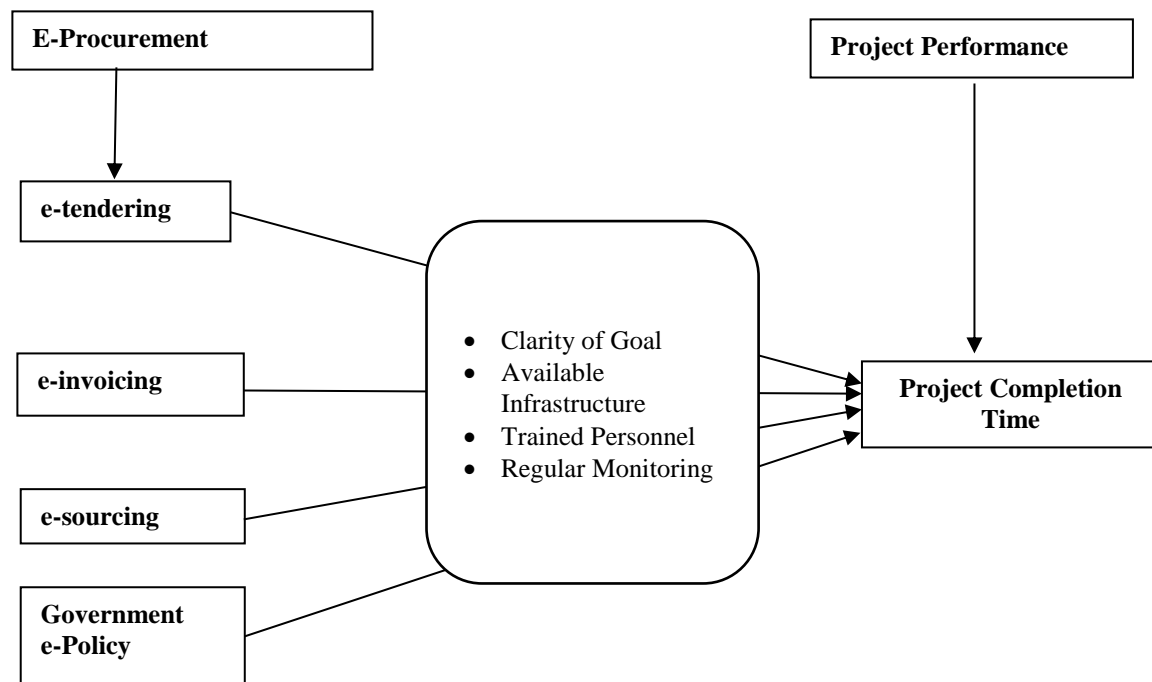
2.2 THE CONCEPTUAL FRAMEWORK

The conceptual framework serves as the theoretical backbone of the study, delineating intricate connections among the variables under investigation. It posits a hypothesis that underscores the potential positive influence of the effective implementation of E-Procurement, with a specific focus on e-tendering, e-invoicing, and e-sourcing, on the temporal aspect of project completion (as shown in Figure 1). This hypothesis aligns with existing literature suggesting that the adoption of electronic procurement practices can streamline processes and contribute to project efficiency. However, the framework introduces an additional layer of complexity by incorporating Government Policy as a control variable, acknowledging the nuanced role it might play in either moderating or mediating the relationships between E-Procurement practices and Project Completion Time. This recognition of government policy as a regulatory force introduces a crucial dimension to the study, postulating that the impact of E-Procurement practices on project performance is contingent on the broader governance framework. Moreover, the framework suggests that supportive government policies have the potential to amplify the positive effects of E-Procurement, thereby serving as a catalyst for improved project outcomes. This conceptual structure provides a comprehensive basis for

exploring not only the direct relationships between electronic procurement practices and project completion time but also the intricate interplay with government policies, contributing to a nuanced understanding of the dynamics within the public sector procurement landscape.

Figure 1

Conceptual Framework



Source: Author's Compilation.

2.3 THEORETICAL FRAMEWORK

The study applied two key theories - Innovation Diffusion Theory and Technology Acceptance Theory - to examine the effect of electronic procurement on project completion time in public sector projects in Nigeria. Innovation Diffusion Theory explains how new technologies spread in a society, categorizing individuals into adopter groups based on willingness to adopt innovations (Wijesundara et al., 2024). Technology Acceptance Theory highlights how perceived ease of use and usefulness determine individuals' acceptance of new technologies. Together, these theories provide insights into the adoption processes, stakeholders' perceptions, and potential barriers regarding implementing electronic procurement practices. However, they have limitations in capturing the complexity of social, cultural and political dynamics. Therefore, while offering a strong foundation, the theories should be complemented by considering the specific contextual factors at play in Nigeria's public sector.

2.4 EMPIRICAL REVIEW

Empirical research shows e-procurement adoption leads to improved procurement performance through increased process efficiency and compliance (Mastenbroek et al., 2021; Mukonza & Swart, 2022). Implementation challenges include lack of supplier adoption, perceived security risks, and inadequate employee training (Shrestha et al., 2019; Sukawat & Mu, 2020). Success factors are senior management commitment, defined e-procurement strategies and policies, and system integration with existing ERPs (Wen & Zeng, 2018).

Equally, studies found e-tendering allows construction firms to participate in more bids and reduces bidding costs (Kaleshovska et al., 2019). User satisfaction is driven by system quality, service quality and perceived usefulness (Mastenbroek et al., 2021). However, uptake varies based on technological readiness, legal environment, and perceived barriers like security risks (Shrestha et al., 2019). Training and change management are critical to adoption (Sukawat & Mu, 2020). Furthermore, firms adopting e-invoicing improved invoice processing efficiency by 60% and payment speeds by 3 days through automation based on a multinational survey (Song & Jeong, 2022). E-invoicing growth is attributed to government e-invoice mandates and major buyer requirements according to a Greek study (Tsamis et al., 2022). Cloud-based e-invoicing integration poses cyber security challenges needing mitigation (Caglio & Pizzini, 2020).

A manufacturing case study determined e-sourcing delivered savings from consolidated spending, reduced purchase order costs, and using reverse auctions (Wen & Zeng, 2018). Critical success factors were senior management support, employee engagement, and extensive supplier enrollment in e-sourcing tools (Mukonza & Swart, 2022). Data quality issues can inhibit achieving full benefits (Shrestha et al., 2019).

Analyses indicate national public e-procurement policies increased transparency, competition and SME participation across EU (Tsamis et al., 2022). Policy impacts were limited by varying agency readiness levels and e-procurement maturity influenced by economic factors (Mastenbroek et al., 2021). Mandates without adequate monitoring and training resources face compliance and vendor adoption obstacles (Sukawat & Mu, 2020). Equally, integration of e-procurement systems with construction project management software improved collaboration, workflows and decision response times, reducing overall project durations by 5-10% per Indian and Chinese cases (Wang et al., 2020). Automating material requisitions saved

up to 8 days versus manual methods (Shrestha et al., 2019). Full project visibility enables better coordination and scheduling (Wen & Zeng, 2018).

3 METHODOLOGY

The study adopted a pragmatic research philosophy and a descriptive survey research design to assess the effect of electronic procurement on the performance of public sector organizations in Nigeria. A structured questionnaire was distributed to 361 purposively selected procurement staff from the head offices of four public agencies in Abuja. These public organisations include Independent National Electoral Commission (INEC), Federal Inland Revenue Services (FIRS), Federal Ministry of Health, and Federal Ministry of Interior were the primary target population. The questionnaire gathered data on respondents' demographics and perceptions of e-tendering, e-invoicing, e-sourcing and government e-procurement policies in relation to project completion time. Multiple regression analysis was used to evaluate the relationships between the e-procurement components and performance proxies. Cronbach's Alpha reliability testing confirmed all variables had scores above 0.9, indicating excellent internal consistency of the measurement instrument. The results were tested for statistical significance at 95% confidence level based on p values from the regression models.

3.1 MODEL SPECIFICATION

In this study, performance was the dependent variable while e-procurement is the independent variable as adapted from Mwangi and Arani (2021), where the model was specified as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (1)$$

Where:

Y = Project Completion Time

X₁ = e-tendering

X₂ = e-invoicing

X₃ = e-sourcing

X₄ = Government's policy on e-procurement (Control Variable)

B₀ = Beta coefficient for the constant, β₁, β₂, β₃, and β₄ = Beta coefficients for the independent variables, and ε = Error term

4 RESULTS AND DISCUSSION

4.1 MULTIPLE REGRESSION RESULT

The regression output for Project Completion Time in Table 1 reveals significant findings. In Model 1, all three electronic procurement practices e-tendering, e-invoicing, and e-sourcing demonstrate statistically significant positive coefficients, indicating a positive relationship with Project Completion Time. Specifically, e-tendering has a coefficient of 0.187, e-invoicing has a coefficient of 0.424, and e-sourcing has a coefficient of 0.063. This suggests that higher levels of implementation of these electronic procurement practices are associated with longer project completion times. However, in Model 2, when Government's policy on e-procurement is introduced as an additional variable, it emerges as the most influential factor with a highly significant positive coefficient of 0.530. This implies that adherence to government policies on e-procurement is strongly correlated with increased project completion times. Notably, e-tendering, e-invoicing, and e-sourcing exhibit diminished impact in Model 2, suggesting that the influence of these practices on project completion time is moderated by the overarching government policies. The overall regression models indicate a complex interplay between specific electronic procurement practices, government policies, and their combined effect on project completion times in the public sector context.

Table 1

Regression Output (Project Completion Time)

Model	Variable	Coefficient	Std. Error	t-Statistic	Prob.
1	(Constant)	1.435	0.202	7.096	0.000**
	e-tendering	0.187	0.038	4.908	0.000**
	e-invoicing	0.424	0.036	11.661	0.000**
	e-sourcing	0.063	0.036	1.747	0.081
2	(Constant)	0.688	0.173	3.975	0.000**
	e-tendering	0.008	0.034	.252	0.801
	e-invoicing	0.258	0.032	8.080	0.000**
	e-sourcing	0.049	0.029	1.662	0.097
	Government's policy on e-procurement	0.530	0.039	13.630	0.000**

Source: SPSS Output from Author's Computation using the original Data

a. Dependent Variable: Project Completion Time

b. Predictors: (Constant), e-sourcing, e-invoicing, e-tendering

c. Predictors: (Constant), e-sourcing, e-invoicing, e-tendering, Government's policy on e-procurement

Note: Model 2 was used in the discussion

** : Significant at 5% Level of Significance

The Model Summary in Table 2 provides insights into the relationship between the independent variables (e-sourcing, e-invoicing, e-tendering, and Government's policy on e-procurement) and the dependent variable (Project Completion Time). In Model 1a, the multiple correlation coefficient (R) is 0.638, indicating a moderate positive correlation between the independent and dependent variables. The R Square value of 0.407 suggests that approximately 40.7% of the variability in Project Completion Time can be explained by the combined influence of e-sourcing, e-invoicing, and e-tendering. The Adjusted R Square, accounting for the number of predictors, is 0.402. The Standard Error of the Estimate is 0.605, reflecting the average distance between the observed and predicted values. In Model 1b, with the inclusion of Government's policy on e-procurement as a predictor, there is a notable improvement. The R value increases to 0.781, indicating a stronger correlation, and the R Square jumps to 0.610, signifying that 61% of the variance in Project Completion Time is now explained by the collective impact of all predictors. The Adjusted R Square remains high at 0.606, suggesting robust model fit. The lower Standard Error of the Estimate (0.491) in Model 1b indicates enhanced predictive accuracy. The Durbin-Watson statistic of 1.854 in Model 1b suggests a low likelihood of autocorrelation. Overall, the Model Summary underscores the enhanced explanatory power achieved by incorporating Government's policy on e-procurement into the model, reinforcing its crucial role in influencing Project Completion Time in the context of electronic procurement practices.

Table 2

Model Summary of the Relationship between the Independent Variables and the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin- Watson
1 ^a	0.638 ^a	0.407	0.402	0.605	
1 ^b	0.781 ^b	0.610	0.606	0.491	1.854

1^a. Predictors: (Constant), e-sourcing, e-invoicing, e-tendering

1^b. Predictors: (Constant), e-sourcing, e-invoicing, e-tendering, Government's policy on e-procurement

c. Dependent Variable: Project Completion Time

The Analysis of Variance (ANOVA) results in Table 3 provides valuable insights into the overall significance of the regression models. In Model 1a, the ANOVA test indicates a highly significant relationship, with a regression sum of squares of 89.666, mean square of 29.889, an F-statistic of 81.741, and a p-value of .000. These results suggest that the combination of e-sourcing, e-invoicing, and e-tendering significantly contributes to explaining the variance in Project Completion Time. Model 1b, which includes Government's policy on

e-procurement as an additional predictor, exhibits an even more significant relationship, with a regression sum of squares of 134.428, mean square of 33.607, an F-statistic of 139.481, and a p-value of .000. This indicates that the expanded model, incorporating government policies, is highly effective in explaining the variability in Project Completion Time. The results from the ANOVA test affirm the overall statistical significance of both regression models, highlighting the substantial impact of electronic procurement practices and government policies on the duration of project completion in the public sector.

Table 3

Analysis of Variance (ANOVA^a) Test for the Models

Model		Sum of Squares	Df	Mean Square	F	Sig.
1 ^a	Regression	89.666	3	29.889	81.741	.000 ^b
	Residual	130.538	357	.366		
	Total	220.204	360			
1 ^b	Regression	134.428	4	33.607	139.481	.000 ^c
	Residual	85.776	356	.241		
	Total	220.204	360			

Model 2. Dependent Variable: Project Completion Time

5 DISCUSSION

The findings of the study reveals that all three electronic procurement practices - e-tendering, e-invoicing, and e-sourcing demonstrate statistically significant positive coefficients, indicating a positive relationship with Project Completion Time. Specifically, e-tendering has a coefficient of 0.187, e-invoicing has a coefficient of 0.424, and e-sourcing has a coefficient of 0.063. This suggests that higher levels of implementation of these electronic procurement practices are associated with longer project completion times. Similar results were found in a study by Mwangi and Arani (2021), which showed that e-procurement adoption increased project completion times across various performance dimensions. They attributed this to the learning curve and adjustment period required when transitioning from manual to electronic systems. Additionally, Matimbwi and Mihang'andu (2022) found that complex e-procurement systems slowed decision making due to increased bureaucratic controls and compliance mechanisms.

The introduction of Government's policy on e-procurement as an additional variable within the study reveals a compelling narrative about its influential role in shaping project completion times. The highly significant positive coefficient of 0.530 underscores the paramount importance of adhering to government policies on e-procurement, suggesting a

robust correlation with prolonged project completion times. This finding aligns with the argument posited by Bloch and Bugarić (2022), who assert that public e-procurement policies tend to prioritize oversight and compliance over efficiency, imposing a set of rigorous rules that can inadvertently impede the fluid progress of projects. The positive coefficient implies that as organizations rigorously comply with government-mandated e-procurement policies, there is a corresponding increase in the time required for project completion. The implication is that while these policies may serve important purposes such as transparency, accountability, and fair competition, their stringent nature can introduce complexities and procedural hurdles that extend the duration of project timelines. As organizations navigate the intricate landscape of e-procurement within the framework of government policies, there appears to be a trade-off between the desired governance and control objectives and the efficiency and expeditious completion of public sector projects. This highlights the need for a delicate balance in policy formulation, where the objectives of oversight and efficiency are harmonized to ensure optimal project outcomes without compromising the integrity of the procurement process. Ultimately, the study underscores the pivotal role of government policies in shaping the landscape of e-procurement practices and their consequential impact on project completion times, offering valuable insights for policymakers, administrators, and researchers alike in the realm of public sector project management.

The observed diminished impact of e-tendering, e-invoicing, and e-sourcing in Model 2 highlights a nuanced relationship between these specific electronic procurement practices and project completion times when considered alongside the broader context of government policies. The implication is that while these practices individually demonstrated statistically significant positive coefficients in Model 1a, their influence on project completion time is tempered when Government's policy on e-procurement is introduced as an additional variable in Model 2. This nuanced result aligns with the findings of Mpako-Ayitonye and Ochiri (2020), who identified meeting comprehensive policy requirements as a major obstacle that significantly delayed project completion, superseding the direct impact of e-procurement tools themselves. The diminished impact in Model 2 suggests that the effectiveness of e-tendering, e-invoicing, and e-sourcing in expediting project completion is contingent on the overarching regulatory framework set by government policies. It underscores the intricate interplay between specific electronic procurement practices and the regulatory environment within which they operate.

The study's findings illuminate a complex relationship characterized by a delicate balance between the benefits of electronic procurement practices and the constraints imposed

by government policies. While e-procurement tools can enhance efficiency and transparency, their impact on project timelines is influenced by the regulatory parameters established by government policies. The observed moderation effect in Model 2 underscores the need for a comprehensive understanding of how electronic procurement practices interact with the broader governance framework. Policymakers and practitioners must navigate this intricate landscape to optimize the benefits of electronic procurement while ensuring compliance with regulatory requirements. The overall regression models contribute to a nuanced comprehension of the multifaceted dynamics between specific e-procurement practices, government policies, and their combined influence on project completion times, offering valuable insights for stakeholders engaged in public sector project management.

6 CONCLUSION

In conclusion, the study's findings underscore a significant positive relationship between electronic procurement practices specifically, e-tendering, e-invoicing, and e-sourcing and project completion times. The coefficients associated with each practice indicate that higher implementation levels are correlated with prolonged project durations, aligning with similar trends identified in previous research. Notably, the introduction of Government's policy on e-procurement emerges as a pivotal factor, revealing a compelling narrative about its influential role in shaping project completion times. The highly significant positive coefficient highlights the paramount importance of adhering to government policies on e-procurement, indicating a robust correlation with extended project timelines. This aligns with existing arguments that emphasize the oversight and compliance-focused nature of public e-procurement policies, potentially impeding project progress. The observed diminished impact of specific electronic procurement practices in Model 2 suggests a nuanced relationship moderated by overarching government policies. This nuanced interplay emphasizes the intricate balance between the benefits of electronic procurement practices and the constraints imposed by regulatory frameworks.

The study suggests that organizations should evaluate the impact of adopting e-tendering, e-invoicing, and e-sourcing on project completion times. It emphasizes the need for understanding the learning curves and adjustment periods. Policymakers should critically evaluate e-procurement policies, balancing oversight and efficiency. Collaboration between policymakers and practitioners is crucial for developing adaptive strategies that align with regulatory requirements.

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