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E-Invoicing and Supply Chain Performance in Selected Manufacturing Companies in Rubaga Division, Kampala, Uganda

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ABSTRACT

This study examined the relationship between e-invoicing and supply chain performance among selected manufacturing companies in Rubaga Division, Kampala, Uganda. It was motivated by persistent procurement challenges, including paper-based documentation, manual or partially automated invoice handling, delayed supplier payments, and limited integration of digital procurement and financial systems. A mixed-methods descriptive correlational design was used. Quantitative data came from 125 valid questionnaires (89.9% response rate) and qualitative evidence from 16 key informant interviews (88.9%), analysed using descriptive statistics, Pearson correlation, simple and multiple regression, and thematic analysis. Respondents agreed that suppliers submit invoices electronically ($M = 3.91$, $SD = 0.46$), that e-invoicing reduced processing errors ($M = 3.86$) and improved payment speed ($M = 3.86$) and transparency and record keeping ($M = 3.91$), and that companies had functional websites to support it ($M = 3.99$); the overall mean was 3.91 ($SD = 0.26$). E-invoicing correlated strongly and positively with supply chain performance ($r = 0.692$, $p < 0.001$) and alone explained 47.9% of its variance ($B = 0.660$, $\beta = 0.692$, $p < 0.001$). In the multiple regression, it made a significant unique contribution after controlling for e-sourcing, e-tendering, and e-ordering ($B = 0.255$, $\beta = 0.267$, $p < 0.001$), within a model explaining 67.2% of the variance ($F(4, 120) = 61.414$, $p < 0.001$). The null hypothesis was rejected. The study concludes that e-invoicing is a mechanism for supply chain reliability through timely, accurate, and well-documented payments, and recommends integrating it with purchase orders, goods-received notes, and e-payment systems, developing functional supplier portals, and setting clear e-payment standards.

KEYWORDS: e-invoicing, supply chain performance, e-procurement, supplier payment, manufacturing companies

Introduction

Global supply chains have become increasingly complex as organisations operate within interconnected markets characterised by heightened competition, supply uncertainty, technological disruption, and growing customer expectations. The rapid diffusion of digital technologies has transformed procurement from a predominantly transactional function into a strategically oriented organisational capability, enabling organisations to improve information visibility, streamline supplier interactions, and reduce

transaction costs. Within this transformation, e-invoicing has emerged as an important component of e-procurement because of its potential to accelerate invoice processing, improve transaction accuracy, and strengthen financial coordination between buyers and suppliers (Tiwari et al., 2023).

E-invoicing refers broadly to the electronic generation, submission, verification, and processing of invoices between organisations and suppliers through structured digital formats and procurement systems (European Commission, 2024; OECD, 2024; Tiwari et al., 2023). It is associated with faster invoice processing, improved accuracy, enhanced financial control, reduced administrative costs, faster payment processing, improved transaction visibility, and stronger compliance through accurate electronic documentation and audit trails (Tiwari et al., 2023). Its strategic significance is pronounced in manufacturing organisations because the timeliness and accuracy of supplier payments influence supplier confidence and the continuity of material supply. Supply chain reliability depends not only on the physical movement of goods but also on the timely exchange of financial information and the prompt settlement of obligations among supply chain partners (PwC, 2025).

In developing-country contexts, however, these benefits may be constrained by inadequate digital infrastructure, limited technological capabilities, inadequate employee competencies, and incomplete integration of procurement and financial systems. Uganda's manufacturing sector operates within such a transitional environment, where organisations increasingly adopt digital technologies while retaining elements of conventional and manual procurement. In such settings, paper-based procurement and accounting records remain susceptible to loss, duplication, delayed retrieval, and processing errors, whereas accurate, readily retrievable, and auditable records support effective organisational control (OECD, 2024). This creates an important empirical question: whether investments in e-invoicing translate into measurable improvements in supply chain performance.

Manufacturing companies in Rubaga Division, Kampala, provide a relevant context for investigating this question. They operate in an environment where procurement efficiency, supplier responsiveness, cost control, product quality, and compliance are critical to operational continuity and competitiveness (Uganda Manufacturers Association [UMA], 2024). Nevertheless, empirical evidence on the contribution of e-invoicing to supply chain performance within this context remains limited (Nakamya et al., 2025). Accordingly, this study investigated the relationship between e-invoicing and supply chain performance among selected manufacturing companies in Rubaga Division, Kampala, Uganda.

Statement of the Problem

Manufacturing companies in Rubaga Division play a significant role in Uganda's industrial development, yet their supply chain operations continue to experience procurement-related challenges that constrain performance. Manufacturing contributes approximately 15% of Uganda's gross domestic product (Uganda Bureau of Statistics [UBOS], 2024). However, Uganda ranked 96th out of 139 economies on the World Bank's Logistics Performance Index, with an overall score of 2.5 out of 5, indicating relatively weak logistics performance, particularly in customs efficiency, logistics competence, and shipment timeliness (World Bank, 2023). As a landlocked economy, Uganda also faces elevated logistics and procurement costs, believed to account for 25% to 40% of total product costs compared with a global average of about 10% (World Bank, 2023). These costs undermine the price competitiveness of Ugandan manufacturers in domestic and export markets and highlight the need for more efficient procurement practices (UMA, 2024).

Despite the growing availability of digital procurement technologies, many manufacturing enterprises continue to rely on manual or partially automated procurement processes involving paper-based documentation, fragmented supplier communication, and prolonged approval procedures (Nakamya et al., 2025). According to UMA (2024), such practices remain significant constraints on productivity, and delayed access to raw materials remains a persistent challenge for manufacturers in Kampala. At the invoicing and payment stage, paper-based invoice handling, repeated manual verification, and physical approvals can delay payment authorisation and add avoidable paper handling and manual checking costs (Van Weele & Van Raaij, 2024). Weak procurement monitoring and control may also limit traceability, supplier accountability, and compliance management (Gwiriza & Mpundu, 2024; Quartey et al., 2023), while inadequate integration of digital procurement systems further weakens supply chain visibility and agility (PwC, 2025).

These limitations have contributed to supply chain performance deficiencies among manufacturing firms in Rubaga Division, particularly in responsiveness, cost management, and quality assurance. Consequently, firms may experience delayed order fulfilment, increased operational costs, inconsistent product quality, and compliance challenges, undermining customer satisfaction and competitiveness in regional markets (Komukyeya, 2024; UMA, 2024). Where supplier payments are slow, error-prone, or poorly documented, supplier confidence and the continuity of supply may also be put at risk.

Although e-invoicing provides mechanisms through which some of these constraints can be addressed (Tiwari et al., 2023), limited empirical evidence exists on its specific contribution to supply chain performance among private manufacturing companies in Rubaga Division. Much of the literature examines digital procurement as a broad construct, without isolating individual techniques or determining their unique contributions when other techniques are considered simultaneously (Yamusa et al., 2024). Invoicing, in particular, is often treated as an accounting or administrative function rather than as a mechanism that supports supply chain reliability. The research gap is therefore both contextual and empirical: East African studies have focused largely on public institutions (Nakamya et al., 2025). This study addressed the gap by examining the relationship between e-invoicing and supply chain performance and assessing the unique contribution of e-invoicing after controlling for other major e-procurement techniques.

Objective of the Study

The study aimed to determine the relationship between e-invoicing and supply chain performance in selected manufacturing companies in Rubaga Division, Kampala, Uganda. In addition to establishing the strength and direction of this relationship, the analysis sought to determine whether e-invoicing retains a unique contribution once the other e-procurement techniques are accounted for.

Research Question

What is the relationship between e-invoicing and supply chain performance in selected manufacturing companies in Rubaga Division?

Research Hypothesis

The study tested the following null hypothesis:

H_{04}: There is no significant positive relationship between e-invoicing and supply chain performance in selected manufacturing companies in Rubaga Division, Kampala, Uganda.

Theoretical Review

The study was anchored in the Technology Acceptance Model (TAM) and the Resource-Based View (RBV).

Technology Acceptance Model

Davis (1989) developed TAM to explain users' acceptance and utilisation of information technology based primarily on perceived usefulness and perceived ease of use. In the context of e-invoicing, TAM suggests that finance, procurement, and warehouse personnel are more likely to adopt electronic invoicing systems when they perceive them as useful for reducing manual errors, improving transaction accuracy, and strengthening financial accountability, and when the systems are sufficiently easy to use. The theory is relevant because the effectiveness of e-invoicing depends not only on the availability of technology but also on employees' and suppliers' willingness and ability to use it in invoicing and payment activities (Kauppi & Brandon-Jones, 2023).

Resource-Based View

Barney (1991) argues that organisations achieve sustained competitive advantage when they possess valuable, rare, difficult-to-imitate, and non-substitutable resources and capabilities. RBV complements TAM, which has been criticised for giving limited attention to the organisational resources required for successful technology implementation (Venkatesh et al., 2003). Applied to e-invoicing, RBV suggests that technology alone may not generate superior outcomes; organisations also need reliable ICT infrastructure, functional websites and supplier portals, competent finance and procurement personnel, integrated procurement and accounting systems, and managerial support. These resources enable firms to transform e-invoicing technology into operational and strategic value.

Complementarity of TAM and RBV

TAM explains user-level acceptance and utilisation of e-invoicing technologies (Davis, 1989), while RBV explains the organisational resources and capabilities required to convert utilisation into superior performance (Barney, 1991). Together, they suggest that e-invoicing is most likely to generate meaningful supply chain benefits when users perceive the technology as useful and usable and the organisation has the resources to deploy it effectively (Venkatesh et al., 2003).

EMPIRICAL LITERATURE REVIEW

Concept of E-Invoicing

E-invoicing is the electronic submission, receipt, and processing of invoices in a structured digital format to facilitate efficient financial transactions within procurement and supply chain operations (OECD, 2024). Tiwari et al. (2023) define it as the exchange of structured electronic invoice documents that enables faster invoice processing, improved accuracy, and enhanced financial control. It represents the downstream, transactional dimension of e-procurement, in which supplier invoices are received, verified against purchase orders and delivery records, approved, and settled.

Through e-invoicing, organisations can reduce manual processing errors, strengthen compliance with organisational and regulatory requirements, and improve data accuracy (European Commission, 2024; OECD, 2024). Effective electronic procurement systems also enhance compliance through transparent processes, accurate documentation, and stronger accountability (Quartey et al., 2023), and digital

procurement technologies improve transaction transparency, traceability, and monitoring (Gwiriza & Mpundu, 2024). E-invoicing is also associated with reduced administrative costs, faster payment processing, improved transaction visibility, and stronger compliance through electronic documentation and audit trails (Tiwari et al., 2023). It may therefore contribute to shorter payment cycles, fewer invoice disputes, more reliable supplier relationships, and enhanced financial transparency.

Evidence has increasingly emphasised the performance relevance of the invoicing and payment stages of the procurement cycle. Van Weele and Van Raaij (2024) observed that these stages can generate measurable savings by reducing paper handling, minimising manual verification, and preventing delays in payment authorisation. Wamba and Queiroz (2024) emphasised that electronic document exchange reduces transaction costs and strengthens compliance. Frederico (2023) argued that the benefits of electronic procurement are cumulative, as efficiencies achieved at later stages reinforce gains realised earlier, and Bals et al. (2024) stressed that process integration is essential for realising the full benefits of electronic procurement. Megawati and Asri (2023) likewise indicated that e-procurement techniques, including e-invoicing, enable organisations to streamline procurement activities and minimise transactional costs. Despite these contributions, the extent to which e-invoicing independently influences supply chain performance remains insufficiently established in developing-country manufacturing environments (Yamusa et al., 2024). The present study therefore focuses specifically on e-invoicing rather than treating e-procurement as a single undifferentiated construct.

Supply Chain Performance

Supply chain performance is the extent to which an organisation's supply chain achieves its desired operational and strategic outcomes. In this study it was conceptualised as a multidimensional construct encompassing supply chain efficiency, responsiveness, cost reduction, and quality and compliance. Efficiency refers to the effective use of resources to reduce waste and delays; responsiveness is the ability to adapt quickly to changes in demand and supply conditions; cost reduction refers to lowering operational expenditure while preserving quality; and quality and compliance refer to meeting required standards and regulations (Quartey et al., 2023; Saunila, 2024).

This conceptualisation recognises that e-invoicing may affect performance through several interconnected mechanisms. Faster invoice receipt, automated verification, and electronic payment approval can reduce delays between delivery and settlement. Electronic documentation can reduce paper-based administrative and transaction costs (Komukyeya, 2024), and automated matching of invoices, purchase orders, and delivery records can improve accuracy, strengthen internal controls, and support compliance with procurement procedures. Timely settlement of supplier obligations can reinforce supplier confidence and support the continuity of supply, which is critical to responsiveness (PwC, 2025). The performance effects of e-invoicing may therefore extend beyond the finance function to influence broader supply chain outcomes.

RESEARCH METHODOLOGY

Research Design

The study employed a mixed-methods descriptive correlational research design. Mixed-methods research provides a more comprehensive understanding of complex organisational issues by integrating numerical data with qualitative insights (Creswell & Creswell, 2023), while the descriptive correlational design is appropriate for examining the strength and direction of associations in real-world organisational settings without manipulation. Quantitative data were collected using structured questionnaires and qualitative

evidence through key informant interviews. Integrating the two facilitated triangulation and allowed statistical findings to be complemented with contextual explanations of how e-invoicing was implemented and experienced within the participating organisations.

Study Population and Sampling Size

The study was conducted among selected manufacturing companies in Rubaga Division, Kampala. The target population comprised 230 employees involved in procurement and supply chain-related functions, of whom 18 (nine human resource managers and nine procurement managers) were purposively selected as key informants. A quantitative sample of 139 was determined from the remaining survey population of 212 using Yamane's formula at a 95% confidence level and a 5% margin of error. The survey yielded 125 valid questionnaires from 139 distributed (89.9% response rate), and 16 of 18 planned key informant interviews were completed (88.9%); both rates exceed the 70% benchmark generally considered very good. The high response rates strengthen confidence that the data represent the views of the target group. The participating companies were Aponye Uganda Limited, Bukoola Chemical Industries Ltd, Mandela Millers Limited, MBS Fruit Agencies Limited, Nile Plastic Industries Limited, Nova Recycling Industries Limited, Ntake Bakery and Company Limited, Old Continent Group Africa Limited (AL Fill Construction Materials), and Prayosha Enterprises. Purposive sampling was used to select key informants, while simple random sampling was used to select production officers, supply chain officers, warehouse officers, finance and accounts staff, and ICT technicians. Of the 125 respondents, 63.2% were male, 48.0% were aged 35–44 years, 76.8% held a bachelor's degree, and 63.2% had served their companies for one to four years. Finance and accounts staff (32.0%), production officers (24.0%), supply chain officers (20.0%), warehouse officers (14.4%), and IT technicians (9.6%) were represented, ensuring that data came from individuals with direct knowledge of invoicing, payment, procurement, and supply chain operations.

Measurement of Variables

E-invoicing was operationalised using five indicators: (1) electronic submission of invoices by suppliers; (2) reduction in invoice-processing errors; (3) improvement in the speed of supplier payment processing; (4) improvement in transparency and record keeping; and (5) availability of a functional website to support e-invoicing activities. E-procurement techniques were operationalised as e-sourcing, e-tendering, e-ordering, and e-invoicing, while supply chain performance was measured through 16 items across four dimensions: efficiency, responsiveness, cost reduction, and quality and compliance. Responses were recorded on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), using multi-item indicators adapted from the e-procurement literature (Tiwari et al., 2023).

Content validity was ensured through expert review and a pilot test with five respondents from non-selected firms; individual Content Validity Indices ranged from 0.76 to 0.85 (average 0.80), above the 0.70 threshold. Reliability was assessed using Cronbach's alpha, with 0.70 or above considered acceptable: the e-procurement techniques scale (17 items) recorded 0.790 and the supply chain performance scale (16 items) recorded 0.729. The interviews explored the implementation of e-invoicing, its perceived benefits, operational challenges, and organisational factors influencing the effectiveness of electronic invoicing systems.

Data Collection Procedures

Questionnaires were self-administered to procurement, finance, and supply chain personnel directly involved in procurement, invoicing, and supplier-management activities, which suits the collection of standardised responses from a large group. Semi-structured interviews were conducted with human resource and procurement managers to obtain detailed insights into their experiences, and participants

were assigned codes (KII_1 to KII_{16}) to protect their identities. An introductory letter was obtained from the School of Postgraduate Studies and Research, St. Lawrence University, and permission was sought from the participating companies before data collection. Questionnaires were distributed and collected in person, which supported the high response rate, and interviews were conducted at the respondents' workplaces.

Data Analysis

Quantitative data were analysed using SPSS Version 26. Descriptive statistics (frequencies, means, and standard deviations) summarised the responses; mean scores of 3.41–4.20 were interpreted as agreement and 4.21–5.00 as strong agreement, while standard deviations of 0.50 or below indicated high consensus. Pearson product-moment correlation established the direction and strength of the relationship between e-invoicing and supply chain performance, with coefficients interpreted as weak (0.10–0.29), moderate (0.30–0.49), or strong (0.50 and above) following Field (2018). Simple linear regression estimated the individual effect of e-invoicing, and multiple regression determined its unique contribution while controlling for e-sourcing, e-tendering, and e-ordering (Hair et al., 2019). Multicollinearity was assessed using tolerance and variance inflation factor (VIF) statistics, and significance was assessed at the 0.05 level. Interview data were analysed thematically and integrated with the quantitative findings (Creswell & Creswell, 2023).

Ethical Considerations

Informed consent and voluntary participation

Respondents were given clear information about the purpose of the study, the nature of their participation, and the intended use of the findings before data collection, and informed consent was obtained from each respondent. Participation was voluntary and free from coercion, and respondents could decline or withdraw at any stage without penalty.

Confidentiality and anonymity

Access to the data was restricted and used solely for academic purposes; findings were presented in aggregate form, no personally identifiable information was required, and interviewees were identified only by codes so that neither individuals nor participating organisations could be identified. **Institutional approval and integrity**

Institutional approval and company permission were obtained before data collection, and the researchers reported findings accurately and acknowledged all sources.

Limitations of the Study

Restricted access to respondents

Organisational confidentiality requirements limited access to information on procurement processes and supplier practices; this was addressed by obtaining formal permission from the firms, assuring respondents of confidentiality and anonymity, and clarifying that all information would be used solely for academic purposes.

Limited generalizability

The study covered nine companies within one division of Kampala, with random selection applied to respondents rather than firms, so findings should be generalised cautiously. High response rates and random selection within staff categories reduced this concern, although the interviews excluded suppliers, whose participation is central to electronic invoicing.

Respondent bias and measurement

The study relied substantially on perceptions, which may be subject to response bias and social desirability; this was addressed by triangulating survey and interview data. The scales showed acceptable but modest internal consistency (supply chain performance $\alpha = 0.729$), the pilot involved only five respondents, and the correlational design establishes association rather than causation. **Firm-specific differences**

Differences in infrastructure, financial capacity, digital competence, and organisational readiness across the firms were not controlled in the regression models, so their influence could not be statistically isolated; future firm-level or multilevel studies could address this. Finally, the model explained 67.2% of the variance in supply chain performance, so the remaining 32.8% may be attributed to factors not examined in this study.

ANALYSIS AND INTERPRETATION OF FINDINGS

Results and Discussions

This section presents the empirical findings on e-invoicing and supply chain performance using descriptive statistics, Pearson correlation, simple linear regression, and multiple regression, complemented by evidence from key informant interviews.

Descriptive Findings on E-Invoicing

Table 1: Descriptive Statistics on E-Invoicing

E-invoicing indicator	N	Min.	Max.	Mean	Std. Dev.
Suppliers submit invoices electronically to the company.	125	2	5	3.91	0.46
E-invoicing has reduced invoice processing errors.	125	2	5	3.86	0.62
E-invoicing has improved the speed of supplier payment processing.	125	2	5	3.86	0.59
E-invoicing has improved transparency and record keeping.	125	2	5	3.91	0.60
The company has a functional website to support e-invoicing activities.	125	2	5	3.99	0.20
Overall	**125**	**-**	**-**	**3.91**	**0.26**

Source: Primary Data (2026)

Table 1 indicates a generally high level of agreement on the utilisation and perceived benefits of e-invoicing. The highest mean was recorded for the availability of a functional website to support e-invoicing activities ($M = 3.99$, $SD = 0.20$), and the very low standard deviation indicates strong consensus. This suggests that the companies have established basic digital infrastructure to facilitate invoice submission, document exchange, and supplier transactions. KII_{16} observed that "the company's website is operational and enables suppliers to access the required documents and portals, although full integration with the accounting and procurement systems remains necessary."

Respondents agreed that suppliers submit invoices electronically (M = 3.91, SD = 0.46), indicating that invoices were commonly received through email, supplier portals, and scanned electronic documents, which reduces reliance on physical delivery and the risk of document loss. KII_{13} explained that "suppliers submit invoices by email or through the online portal, enabling same-day receipt by the accounts department and reducing the risk of loss in transit." Respondents also agreed that e-invoicing had improved transparency and record keeping (M = 3.91, SD = 0.60); centralised storage of invoices, payment approvals, and audit trails enables transactions to be traced from order placement to payment, as KII_{16} noted: "the electronic storage of invoices and payment approvals enables auditors to retrieve a complete transaction history within minutes, rather than search through physical files."

E-invoicing was perceived to have reduced invoice-processing errors (M = 3.86, SD = 0.62) and improved the speed of supplier payment processing (M = 3.86, SD = 0.59), with moderate standard deviations suggesting some variation in experiences. These results suggest that automated invoice capture, system-based validation of prices and quantities, and reconciliation with purchase orders and goods-received documents help to mitigate pricing discrepancies, calculation errors, and duplicate payments. KII_{14} explained that "the system automatically checks each invoice against the purchase order and delivery note, helping to identify incorrect prices or quantities and prevent duplicate payments for the same delivery," while KII_{15} reported that "electronic invoice verification and approval have reduced supplier payment times from approximately two months to two weeks, improving suppliers' cooperation with us."

The overall mean of 3.91 (SD = 0.26) demonstrates a favourable assessment of e-invoicing. Taken together, the findings suggest that electronic invoicing has become an established mechanism for receiving, verifying, and documenting supplier invoices, although the need for fuller integration with core accounting and procurement systems was acknowledged.

Pearson Correlation between E-Invoicing and Supply Chain Performance

Table 2: Pearson Correlation between E-Procurement Techniques and Supply Chain Performance

E-procurement technique	N	Pearson r	r^2	Sig. (2-tailed)
E-sourcing	125	0.755	0.569	$p < 0.001$
E-tendering	125	0.619	0.383	$p < 0.001$
E-ordering	125	0.626	0.392	$p < 0.001$
E-invoicing	**125**	**0.692**	**0.479**	**$p < 0.001$**

Source: Primary Data (2026)

Pearson correlation established a strong, positive, and statistically significant relationship between e-invoicing and supply chain performance ($r(123) = 0.692$, $p < 0.001$, $N = 125$), exceeding the 0.50 threshold for a strong relationship (Field, 2018). Higher levels of e-invoicing were associated with higher supply chain performance, and the coefficient of determination ($r^2 = 0.479$) shows that e-invoicing shared approximately 47.9% of its variance with performance. E-invoicing was the second strongest bivariate correlate, after e-sourcing (r = 0.755) and ahead of e-ordering (r = 0.626) and e-tendering (r = 0.619).

Since the probability value was below 0.001, the null hypothesis was rejected. Because correlation does not establish causality, the finding was interpreted as a significant relationship rather than a causal effect; it nonetheless indicates that firms reporting the most developed electronic invoicing also reported the strongest supply chain outcomes. KII_4 supported this result: "electronic receipt and approval of invoices

have accelerated payment processing, while timely settlement has helped the company maintain reliable supplier deliveries and avoid interruptions to its operations." E-invoicing was also positively correlated with e-sourcing (r = 0.626), e-tendering (r = 0.627), and e-ordering (r = 0.574), all below the 0.80 threshold commonly used to flag multicollinearity (Field, 2018), which justified the regression analyses.

Simple Linear Regression Results

Table 3: Simple Linear Regression of Supply Chain Performance on E-Invoicing

Predictor	B	SE	β	t	p
(Constant)	1.318	0.243	-	5.423	< 0.001
E-invoicing	**0.660**	**0.062**	**0.692**	**10.631**	**< 0.001**

Dependent variable: Supply chain performance. $R^2 = 0.479$; adjusted $R^2 = 0.475$; $F(1, 123) = 113.01$, $p < 0.001$.

Source: Primary Data (2026)

Simple linear regression showed that e-invoicing was a strong, positive, and statistically significant predictor of supply chain performance (B = 0.660, SE = 0.062, β = 0.692, t (123) = 10.63, p < 0.001, 95% CI [0.537, 0.783]). A one-point increase in e-invoicing was associated with an average increase of about 0.66 points in supply chain performance, the largest unstandardised effect among the four techniques. E-invoicing alone accounted for 47.9% of the variance ($R^2 = 0.479$, adjusted $R^2 = 0.475$, F (1, 123) = 113.01, p < 0.001). The estimated model was: Supply Chain Performance = 1.318 + 0.660(E-Invoicing). KII_8 corroborated this relationship: "the system does not release payment without a matching invoice, delivery note, and purchase order, thereby improving policy compliance and payment reliability, although a few urgent cases are still handled outside the system."

Multiple Regression Results

A multiple regression model was estimated to determine the unique contribution of e-invoicing while controlling for e-sourcing, e-tendering, and e-ordering.

Table 4: Multiple Regression Results for E-Procurement Techniques and Supply Chain Performance

Predictor	B	SE	β	t	p
(Constant)	1.042	0.200	-	5.219	< 0.001
E-sourcing	0.295	0.055	0.420	5.382	< 0.001
E-tendering	0.070	0.051	0.100	1.353	0.179
E-ordering	0.122	0.049	0.174	2.525	0.013
E-invoicing	**0.255**	**0.072**	**0.267**	**3.533**	**< 0.001**

Dependent variable: Supply chain performance. $R = 0.820$; $R^2 = 0.672$; adjusted $R^2 = 0.661$; $F(4, 120) = 61.414$, $p < 0.001$.

Source: Primary Data (2026)

The overall model was statistically significant, F (4, 120) = 61.414, $p < 0.001$, with R = 0.820, $R^2 = 0.672$, adjusted $R^2 = 0.661$, a standard error of the estimate of 0.146, and a Durbin–Watson statistic of 1.676, indicating no serious autocorrelation. The four techniques jointly accounted for 67.2% of the variance in supply chain performance, leaving 32.8% attributable to factors not examined. Tolerance values (0.450 to 0.576) and VIF values (1.736 to 2.222) were within acceptable limits; the VIF for e-invoicing was 2.087 (tolerance = 0.479), so multicollinearity was not a problem (Hair et al., 2019).

E-invoicing made the second-largest statistically significant unique contribution, after e-sourcing (B = 0.255, SE = 0.072, β = 0.267, t = 3.533, $p < 0.001$, 95% CI [0.112, 0.397]). Holding the other techniques constant, a one-unit increase in e-invoicing was associated with an estimated 0.255-unit increase in supply chain performance, and e-invoicing uniquely accounted for approximately 3.4% of the variance. E-sourcing (β = 0.420, $p < 0.001$) and e-ordering (β = 0.174, p = 0.013) also made significant unique contributions, whereas e-tendering (β = 0.100, p = 0.179) did not.

The estimated model was: Supply Chain Performance = 1.042 + 0.295(E-Sourcing) + 0.070(E-Tendering) + 0.122(E-Ordering) + 0.255(E-Invoicing). The coefficient for e-invoicing declined from B = 0.660 (β = 0.692) in the simple model to B = 0.255 (β = 0.267) in the multiple model, reflecting variance shared with the other techniques (r = 0.574 to 0.627), yet it remained highly significant. The simple regression thus shows the total relationship between e-invoicing and performance, while the multiple regression shows its independent contribution. KII_{14} affirmed: "electronic invoicing has reduced payment errors and delays, encouraged timely supplier deliveries and supported supply chain continuity."

Hypothesis Decision on E-Invoicing

The null hypothesis (H_{01}) was tested at the 0.05 level using both regression models, with the final decision resting on the multiple regression model, which controls for the other techniques.

Table 5: Hypothesis Decision on E-Invoicing

Regression model	B	β	p	R^2	Decision
Simple regression	0.660	0.692	< 0.001	0.479	Supported
Multiple regression	0.255	0.267	< 0.001	0.672	Supported
H_{04} (final decision)	-	-	-	-	**Null hypothesis rejected**

Multiple regression R^2 refers to the full model. Decisions are based on $p < 0.05$.

Source: Primary Data (2026)

E-invoicing was a statistically significant positive predictor of supply chain performance in both models. Tested alone, it was a strong predictor (B = 0.660, β = 0.692, $p < 0.001$) and explained 47.9% of the variance; with the other techniques controlled, it remained significant (B = 0.255, β = 0.267, $p < 0.001$) and was the second-largest unique contributor. Because the p-value was below 0.05 in both models, H_{04} was rejected and the alternative accepted, confirming a significant positive relationship between e-invoicing and supply chain performance. This shows that e-invoicing had both a strong individual relationship with supply chain performance and a distinct contribution beyond the other techniques. Given the correlational design, the decision reflects a significant relationship rather than a causal effect.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Discussion of Findings

E-Invoicing and Supply Chain Performance

The findings demonstrate that e-invoicing is more than an accounting or administrative digitisation mechanism; it is a supply chain capability that supports reliability. The strong positive correlation, and the significant unique contribution in the multiple regression model, indicate that greater adoption and effective use of e-invoicing are associated with improved supply chain outcomes. This is consistent with Van Weele and Van Raaij (2024), who observed that the invoicing and payment stages can generate measurable savings by reducing paper handling, minimising manual verification, and preventing delays in payment authorisation. It is also supported by Wamba and Queiroz (2024), who emphasised that electronic document exchange reduces transaction costs and strengthens compliance, by Frederico (2023), who argued that efficiencies at later stages of the procurement cycle reinforce gains realised earlier, and by Megawati and Asri (2023), who reported that e-procurement techniques minimise transactional costs. The present results extend this body of evidence to private manufacturing firms in Kampala, where such evidence has been scarce, and show that the payment stage contributes to performance independently of the upstream sourcing stage.

The positive relationship suggests that manufacturing companies can enhance performance by automating key invoicing activities, including invoice submission, matching, verification, approval, and payment processing. Electronic invoicing reduces the time and effort required to process supplier invoices while improving accuracy, traceability, and compliance (Gwiriza & Mpundu, 2024). The qualitative evidence reinforces this: respondents described automated matching of invoices, delivery notes, and purchase orders, the prevention of duplicate payments, and a reduction in supplier payment times from about two months to two weeks. The findings also underscore the importance of timely supplier payments in maintaining reliable supplier relationships, supporting the argument that supply chain reliability depends on the prompt settlement of obligations among partners (PwC, 2025).

The relationship has particular relevance for manufacturers in Uganda and similar economies, where delayed supplier payments, invoice disputes, and weak record-management systems can undermine supplier confidence and disrupt the continuity of supply. By speeding invoice processing, reducing disputes over invoice details, and providing reliable transaction records, e-invoicing may strengthen supplier relationships, lower dispute-resolution costs, and support a more dependable flow of materials and services. This is consistent with the emphasis on accurate, retrievable, and auditable procurement records in supporting organisational control (OECD, 2024).

In practical terms, the results suggest that settling supplier obligations accurately and on time is not merely a finance concern but a condition for dependable supply. The decline in the standardised coefficient from $\beta = 0.692$ in the simple regression to $\beta = 0.267$ in the multiple regression indicates that much of the individual relationship of e-invoicing with performance is shared with the other techniques. This is consistent with the view that the benefits of e-invoicing are greatest when it is integrated with the other e-procurement processes, particularly e-sourcing and e-ordering (Bals et al., 2024). Nonetheless, e-invoicing retained a significant independent contribution, suggesting that the downstream payment stage carries distinct explanatory weight.

Interpretation through the Technology Acceptance Model

The findings are consistent with TAM (Davis, 1989). The high descriptive scores suggest that respondents perceived e-invoicing systems as useful for reducing errors, accelerating supplier payments, and

improving transparency and record keeping. This perceived usefulness encourages greater utilisation, and the widespread electronic submission of invoices suggests that these functions are sufficiently easy to use in daily work. At the same time, respondents noted that a few urgent cases were still handled outside the system and that full integration with accounting and procurement systems remained necessary. Technology acceptance should therefore not be interpreted simply as system availability; effective utilisation requires users, including suppliers, to integrate the technology consistently into established invoicing and payment processes (Kauppi & Brandon-Jones, 2023).

Interpretation through the Resource-Based View

The findings also support RBV (Barney, 1991). E-invoicing technologies are unlikely to generate superior outcomes in isolation; their effectiveness depends on complementary resources such as ICT infrastructure, functional websites and supplier portals, competent finance and procurement personnel, and integrated accounting and procurement systems. The finding that companies had established functional websites ($M = 3.99$, $SD = 0.20$) indicates that a basic digital resource base exists, although key informants noted that fuller integration was still required. The significant contribution of e-invoicing may therefore reflect not only the technology but also the organisational capabilities surrounding its use, such as automated three-way matching, electronic payment approval, and the retention of auditable records. This reinforces the view of digital procurement as a capability-building process in which benefits accumulate as capabilities develop (Frederico, 2023).

Conclusion

The study concludes that e-invoicing is significantly and positively associated with supply chain performance among the selected manufacturing companies in Rubaga Division, Kampala. E-invoicing made the second-largest unique contribution to supply chain performance ($\beta = 0.267$, $p < 0.001$) after e-sourcing: timely, accurate payments sustain supplier confidence and the continuity of supply. Respondents reported favourable experiences with electronic invoice submission, reduced processing errors, faster supplier payment, and improved transparency and record keeping.

The correlation analysis established a strong, significant relationship ($r = 0.692$, $p < 0.001$), and the multiple regression showed that e-invoicing retained a significant unique contribution after controlling for the other techniques, so the null hypothesis was rejected. Electronic submission, matching, approval, and archiving of invoices improve the accuracy, traceability, and retrieval of payment records, which can reduce invoice disputes, minimise delays in settlement, and strengthen internal controls. The evidence supports the conceptualisation of e-invoicing not only as an accounting tool but also as a mechanism for supply chain reliability, whose benefits are likely to be realised more fully when it is integrated with the other techniques within an interoperable electronic procurement system. The findings show significant relationships, not causal effects.

Recommendations

Integrate Invoicing Systems

E-invoicing made the second-largest unique contribution to supply chain performance ($\beta = 0.267$). However, key informants noted that full integration of e-invoicing with other procurement and payment systems was still lacking. Firms should therefore connect e-invoicing with purchase orders, goods-received notes, and e-payment systems, while adopting structured invoice formats and recognized e-

invoicing standards (European Commission, 2024). Such integration can support automated three-way matching and approval, thereby reducing errors, duplicate payments, and payment delays.

Develop Supplier Portals

Companies already have functional websites (M = 3.99, SD = 0.20), and suppliers commonly submit invoices electronically (M = 3.91). These existing systems should be upgraded into full transaction portals where suppliers can submit invoices, track their status, receive payment notifications, and report disputes. Such portals would support the faster payments and stronger supplier cooperation reported by interviewees.

Set E-Payment Standards

Given that timely and accurate payment is the primary mechanism through which e-invoicing enhances supply chain reliability, organisations should establish clear payment timelines, exception-handling procedures, and escalation processes for unresolved issues. In addition, they should monitor key performance indicators, including invoice-processing time, error rates, on-time payment rates, and the frequency of disputed invoices, to sustain the benefits of e-invoicing

Contribution of the Study

This study contributes local empirical evidence from private manufacturing firms in Rubaga Division, a context that has received limited scholarly attention because most East African e-procurement studies have focused on public-sector institutions (Nakamya et al., 2025). By examining e-invoicing separately from other e-procurement techniques, the study shows that it has a distinct and significant effect on supply chain performance. This addresses the common tendency to treat e-procurement as one general construct rather than recognizing the individual contribution of specific tools (Yamusa et al., 2024).

The findings also support the combined use of the Technology Acceptance Model (TAM) and the Resource-Based View (RBV) in explaining how digital procurement capabilities improve firm performance (Venkatesh et al., 2003). Practically, managers should treat invoicing and payment as important parts of the supply chain, not merely back-office activities. Digital transformation should therefore cover the entire invoice-to-payment process, including invoice submission, matching, verification, approval, and payment (Frederico, 2023).

Areas for Further Research

Future research should examine other factors that may explain the remaining 32.8% of supply chain performance. These may include top-management support, employees' digital skills, ICT infrastructure, system integration, cybersecurity, and the regulatory environment. Researchers should also study suppliers' digital readiness, including their technology, skills, and willingness to use e-invoicing.

Further studies should assess whether integrating e-invoicing with accounting systems, e-payment platforms, and supplier portals improves payment reliability and supplier confidence. Future research should use longitudinal mixed-methods designs combining surveys and interviews with procurement managers, suppliers, and ICT staff over time. It should also use objective measures such as invoice-processing time, payment cycle time, and error rates to provide stronger evidence.

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