The International Maritime Transport and Logistics (MARLOG 15) - ISSN 2974-3141
http://dx.doi.org/10.21622/MARLOG.2026.15.1.72
Smart & Resilient Logistics Corridors Future Gateway to the Green Trade

ASSESSING THE RELATION BETWEEN E-PROCUREMENT AND PROCUREMENT PERFORMANCE IN THE HEALTHCARE INDUSTRY IN EGYPT

Sama Gad [1], Hana Elmelehly [2], Saleh Saleh [3], Salma Magdy [4], Yasmeen Seif [5] and Yassin Azzazi [6]

(1) Supply Chain Department, Arab Academy for Science, Technology & Maritime Transport, Cairo, Egypt, sama.hossam@aast.edu
(2) Procurement Specialist, Hanaelmlehy2003@gmail.com
(3) Sales Supervisor, S.Saleh0775@student.aast.edu
(4) Teaching Assistant, salma40183@gmail.com
(5) Logistics Coordinator, Yasmeensaif1975@gmail.com
(6) Demand Planning Internazzaziyassin@gmail.com

Keywords: e-procurement performance, healthcare, Egypt, supply chain digitization, and digital transformation.

ABSTRACT

This research examines the effect of e-procurement and e-tendering implementation on the procurement efficiency in Egypt's healthcare industry. It aims to identify how digital procurement technology contributes to improving efficiency, transparency, and supplier collaboration and overcoming some of the challenges for the industry, including system integration, deficiency in training, and limited digital readiness by testing two hypotheses: H1: E-Sourcing have positive significant impact on Procurement Performance and H2: E-Tendering have positive significant impact on Procurement Performance.

A mixed-method design was used to fulfil the research aim by using structured Likert scale survey to collect quantitative data from ninety-eight procurement officials in the public and private hospitals. This is followed by four semi-structured interviews with open ended questions to collect qualitative data for cross-validation. Descriptive statistics, correlation analysis, and regression models were applied to examine the data and identify the strength and significance of the relationship between e-procurement variables and procurement performance indicators. Followed by Thematic analysis to validate the key themes of the statistical tools result.

The results show that the implementation of e-sourcing and e-tendering has a positive correlation with the procurement performance in terms of cost efficiency enhancement, procurement speed, and transparency. H1 and H2 were confirmed, demonstrating significant improvement in coordination and efficiency. While the quantitative method offered statistical proof. the qualitative data was submitted to thematic analysis, which is a technique for detecting, interpreting, and reporting patterns (themes) in data. The thematic analysis of the interview data showed four themes that are critical to understanding the effect and implementation of e-procurement in Egypt. Those themes are: Transformative Impact of E-Procurement on Performance, Factors Influencing E-

Procurement Success, Organizational Adaptation and User Familiarity and Distinction and Complementarity of E-Sourcing and E-Tendering.

Lastly, this research provides empirical evidence that e-procurement is a key driver of procurement performance enhancement in Egypt's healthcare sector in accordance with country-level digital transformation visions. The research contributes to scholarly research as well as real-world strategies for enhancing healthcare supply chains through digital innovation.

1. INTRODUCTION

E-procurement has been widely used in various sectors but has not been extensively studied in the healthcare sector, especially within Egypt's Unified Procurement Authority (UPA). This research aims to fill the identified gaps by evaluating the applicability of the e-procurement system using methodologies within the UPA in Egypt. The research questions include identifying the e-procurement tools applied in the healthcare sector, assessing the impact of e-sourcing on procurement performance, examining the effect of e-tendering on procurement performance, and identifying ways to improve healthcare performance.

This research analyzes the effect of e-sourcing and e-tendering adoption on procurement performance in Egypt's healthcare sector. The aim is to check whether the use of digital procurement platforms promotes operational efficiency, promotes transparency, and improves supplier coordination. By studying both public and private healthcare facilities, the research seeks to identify significant determinants of successful e-procurement adoption and examine quantifiable outcomes of the change.

E-procurement has been shown through earlier research to reduce the times of purchasing cycles, increase accountability, and maximize expenditure control. However, in underdeveloped countries such as Egypt, hinderances such as weak digital infrastructure, lack of extensive users' training, and policy complexities can act as a bottleneck for complete adoption. This research therefore aims to provide a balanced perspective regarding the advantages and disadvantages of adopting e-procurement systems in healthcare.

The research findings are expected to contribute to academic as well as management knowledge by elaborating on how digital tools can be harnessed to improve procurement performance. Moreover, the research findings can guide policymakers in designing strategies that introduce efficiency and transparency into healthcare procurement and foster sustainable digital practices in healthcare supply chains of Egypt.

2. LITERATURE REVIEW

This section previews all relevant literature covering the procurement terminologies, starting with the e-sourcing, followed by e-tendering, and last previewing the procurement performance and supplier relationship management in the electronic era.

2.1 E-Sourcing

E-Sourcing refers to the use of online platforms to collect and compare supplier bids, enabling organizations to make better decisions and build stronger supplier relationships (Cook, 2025). It comprises three main components: e-requisition, e-evaluation, and e-submission. E-requisition uses tools like e-catalogs, long form RFQs/RFIs, and P2P systems to streamline requests for goods and services. Research shows that these digital systems improve cost efficiency, delivery performance, and overall operational effectiveness (Bartai & Kimutai, 2018; Saragih et al., 2023; Ramos, 2024).

E-evaluation focuses on assessing supplier proposals through e-auctions, e-invoicing, e-contracts, and KPI dashboards. These mechanisms help reduce procurement costs, enhance transparency, and align purchasing decisions with strategic objectives (Wilson, 2019; Pihkanen, 2022; Chaudhary, 2019). E-submission involves online tendering through supplier portals and document management systems, fostering efficiency, collaboration, and transparency (Suleiman, 2024; Ståhlström, 2020). Collectively, e-sourcing tools digitalize procurement operations, improve supplier interaction, and enhance overall procurement performance.

2.2 E-Tendering

E-Tendering, according to Patil (2025), is the electronic process of sending and receiving bids through online systems, improving visibility, compliance, and decision-making. Reliability and transparency are key outcomes—Beazley (2019) defines reliability as accountability and fairness, while Modrušan et al. (2021) and Gunasegaran et al. (2023) highlight fraud prevention through data-driven methods such as machine learning. Similarly, Mahuwi and Israel (2024) and Baránek et al. (2020) emphasize transparency as a mechanism to reduce corruption and promote fairness in procurement.

Another significant benefit of e-tendering is the reduction in procurement cycle time. Nicol (2019) found that shorter cycles lower costs and improve efficiency through better supplier coordination. Murithi et al. (2024) and Li et al. (2020) confirmed that digital sourcing tools accelerate supplier discovery, while Hong and Shao (2020) and Hugo (2024) noted that online collaboration platforms strengthen communication and negotiation. Additionally, electronic payment systems like long form EFT and P-Card streamline transactions—EFT enhances payment efficiency and service delivery (Fourante, 2019; Davis, 2023), whereas P-Cards improve spend control and reduce maintenance costs (Bouliannce, 2022; Teunissen, 2020). Altogether, e-tendering improves transparency, reliability, and operational efficiency in procurement.

2.3 Procurement Performance

Procurement performance, as defined by Ratanang (2016), evaluates how effectively procurement teams deliver value through cost reduction, supplier relationships, stock management, lead time, and productivity. Productivity (Rogerson, 2020) depends on minimizing errors and using data-driven decisions. Studies show that e-procurement reduces corruption and increases efficiency (Dachyar & Karenina, 2020; Mélon & Spruk, 2020), while big data analytics enhance transparency and accountability (Al Nuaimi et al., 2024; Apampa, 2022).

Supplier relationship management (Giannakis, 2012) stresses communication and supplier evaluation. Digital systems foster collaboration and prevent long form SRM failures (Mafini, 2020; Antipov, 2020), while evaluation tools support innovation and sustainable supplier performance (Sharma & Joshi, 2020; Au-Yeung & Venneman, 2019). Lead time (Aldehayyat, 2020) is improved through e-procurement tools that shorten cycles (Maagi & Mwakalobo, 2023; Oniyangi & Ibrahim, 2024) and real-time tracking (Tripathi & Gupta, 2020; Apampa, 2022). Cost reduction (Wadesango, 2023) is achieved using long form MRP systems and volume consolidation for better planning (Gallego-García, 2021; Farhang, 2024; Wilson & Roy, 2019). Maintaining adequate stock levels (Molin, 2017) through inventory systems and JIT strategies minimizes waste and improves productivity (Malik et al., 2024; Bandyopadhyay, 2019). In the healthcare context, the supply chain operates as a resilient global system ensuring timely delivery of medical supplies and the ability to adapt to disruptions (Paul et al., 2022).

3. METHODOLOGY

This research is objective-driven, focusing on quantifiable impacts of e-procurement procedures specifically through the Unified Procurement Authority (UPA) in Egypt. A positivist philosophy is applied, with a deductive method used to test hypotheses based on dominant theory and empirical evidence. It uses the mixed-methods research approach to examine the relationship between e-procurement adoption and procurement performance in Egypt's health sector. The research employs both qualitative and quantitative methods in an effort to gain a thorough understanding of the phenomenon and to substantiate findings through triangulation.

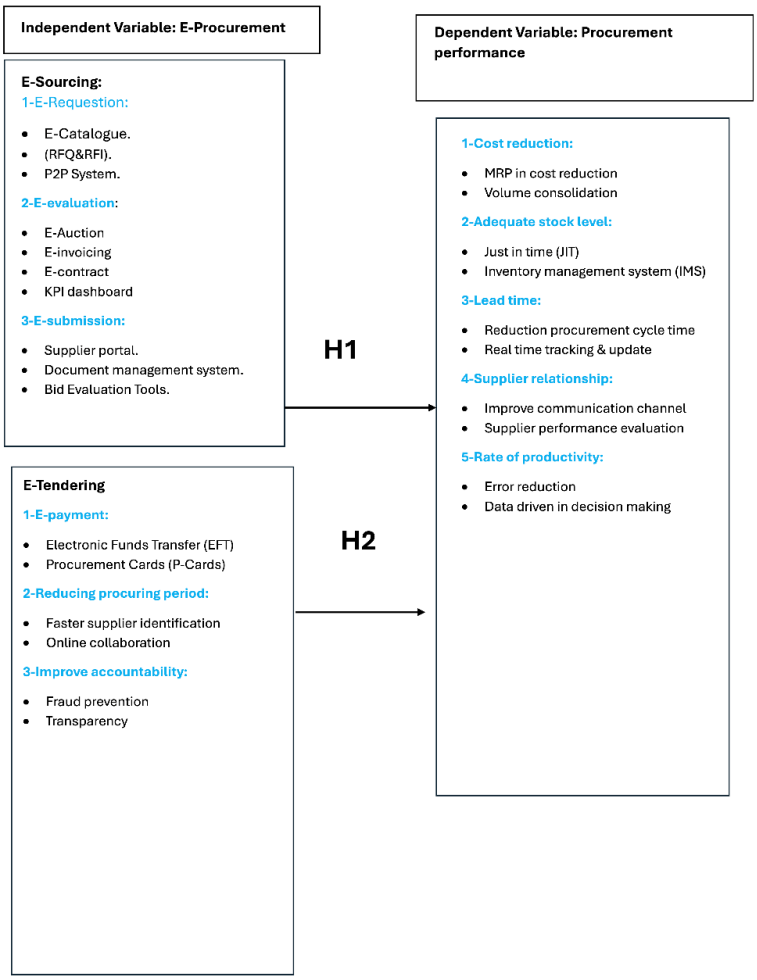

Figure 1: Research Framework (Source: Authors)

Therefore, the present research tests the following hypotheses based on available literature and theoretical models:

H1: E-Sourcing have positive significant impact on Procurement Performance and H2: E-Tendering have positive significant impact on Procurement Performance.

A qualitative methodology is used by interviewing four of the senior management officials with procurement responsibilities at the UPA to complement the quantitative findings and additional insight into organizational and contextual dynamics. A quantitative research design is used, allowing systematic data gathering and statistical analysis using SPSS with s sample of ninety-eight respondents was chosen based on practical constraints, and data was collected through structured Likert-Scale survey with closed-ended questions. Data analysis is conducted using SPSS software, enabling descriptive statistics, reliability testing, correlation analysis, and hypothesis testing.

It uses a deductive research strategy to test hypotheses based on dominant theory and prior empirical evidence. This is followed by analyzing the four interviews' transcripts thematic analysis is used as a secondary data source strategy and performance reports to provide an objective assessment of the e-procurement system and its effect on healthcare procurement performance. The deductive methodology ensures methodological rigor and provides a systematic mechanism to test hypotheses using quantitative data.

5. DATA ANALYSIS AND DISCUSSION

This section discusses the hypotheses testing, the data analysis conducted and the findings reached to shape the research contribution. It starts with the descriptive analysis and the reliability tests, followed by discussing the practical implication in relevance to the research context.

5.1 Descriptive Analysis and Reliability

The study utilized a mixed-method design for examining the connection between E-Sourcing, E-Tendering, and Procurement Performance. Initial analysis revealed high instrument reliability and consensus regarding efficiency benefits of E-Procurement. Pearson Correlation analysis resulted in significant, strong, positive relationships among all the variables, which made up the majority of evidence for their solo and joint influences.

Table 1: The Three Variables Statistical Correlation and Significance

Relationships	Pearson Correlation (r)	P-Value	Significance Description	Strength Description
E-Sourcing -> Procurement Performance	0.776	0.000	Highly Significant	Strong
E-Tendering -> Procurement Performance	0.563	0.001	Highly Significant	Moderate-Strong
E-Sourcing -> E-Tendering	0.571	0.000	Highly Significant	Moderate-Strong

The following paragraphs explains H1 and H2 significance.

H1: E-Sourcing have positive significant impact on Procurement Performance

Table 2: Chi-Square Test of Independence between E-Sourcing and Procurement Performance

Chi-Square Tests	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	74.449	4	0.000
Likelihood Ratio	54.559	4	0.000
Linear-by Linear Association	42.007	1	0.000

It appears that there is a significant relationship between E-Sourcing and Procurement Performance. Thus, Procurement performance depends on E-sourcing.

H2: E-Tendering has positive significant impact on Procurement Performance

Table 3: Chi-Square Test of Independence between E-Tendering and Procurement Performance

Chi-Square Tests	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.977	4	0.027
Likelihood Ratio	12.460	4	0.014
Linear-by Linear Association	9.885	1	0.002

It appears that there is a significant relationship between E-tendering and Procurement Performance. Thus, Procurement performance depends on E-tendering. Both hypotheses relationship was studied using the regression modelling.

Linear regression analysis quantified the specific, standalone effects, confirming both Hypothesis 1 (E-Sourcing) and Hypothesis 2 (E-Tendering). The correlation values simply show that E-Sourcing (r=0.776) has a much stronger relationship with performance than E-Tendering (r=0.563).

- E-Sourcing Dominance: E-Sourcing also had extremely significant positive impact, accounting for 43.3% of the variance in performance. Its high regression coefficient of 0.729 ($p < 0.001$) ensures its outstanding independent ability to enhance performance. The Strong correlation and Highly Significant p-value emphasize the pivotal role of E-Sourcing as the prime strategy for cost savings and strategic efficiency.
- Contribution of E-Tendering: E-Tendering also made a moderate-strong positive contribution (coefficient 0.395), confirming its independent contribution toward improving performance, primarily by helping to automate bidding and compliance. Its Moderate-Strong correlation confirms its positive influence, although less direct in nature than that of E-Sourcing.

Most significantly, in the analysis of combined impact using multiple regression, independent influence of E-Tendering decreased while that of E-Sourcing was still statistically higher. This shows a strong synergistic effect: E-Tendering (process) is required but its benefits are mostly mediated by the strategic scope of E-Sourcing (vendor management).

5.2 Practical Implications and Context

This was also supported by qualitative interviews, where E-Sourcing was put in the role of being the strategic driver and E-Tendering as the operational necessity. Interviewees affirmed that the electronic systems improved transparency and competition and directly contributed to mitigating drug shortages.

The primary practical suggestion for the Unified Purchasing Authority (UPA) is clear-cut both components are essential for transparency, but investment should be directed towards deploying aggressive strategic E-Sourcing modules. This will maximize overall procurement efficiency, directly supporting relief from drug shortages and to the ensured uninterrupted supply of important medical commodities within the Egyptian public health system. Figure 2 illustrates the four themes emerged from the interviews' transcripts. These themes are critical to understand the effect and implementation of e-procurement through the UPA in Egypt.

Those themes are: Transformative Impact of E-Procurement on Performance, Factors Influencing E-Procurement Success, Organizational Adaptation and User Familiarity and Distinction and Complementarity of E-Sourcing and E-Tendering. These Themes

conforms with the significant relation and statistical tests from both hypotheses H1 and H2.

The conversations also highlighted crucial success criteria, such as digital platform trustworthiness, supplier variety, technical review methods, and the need of training and regular feedback. Organizational adaptability and user familiarity were discovered to develop through step-by-step learning, workshops, and a culture of continual improvement, overcoming early reluctance to change. Finally, the qualitative data distinguished between E-Sourcing's more strategic impact (e.g., supplier identification and relationship establishment) and E-Tendering's more operational role (e.g., formal bid administration), emphasizing their complementary roles in achieving overall procurement performance.

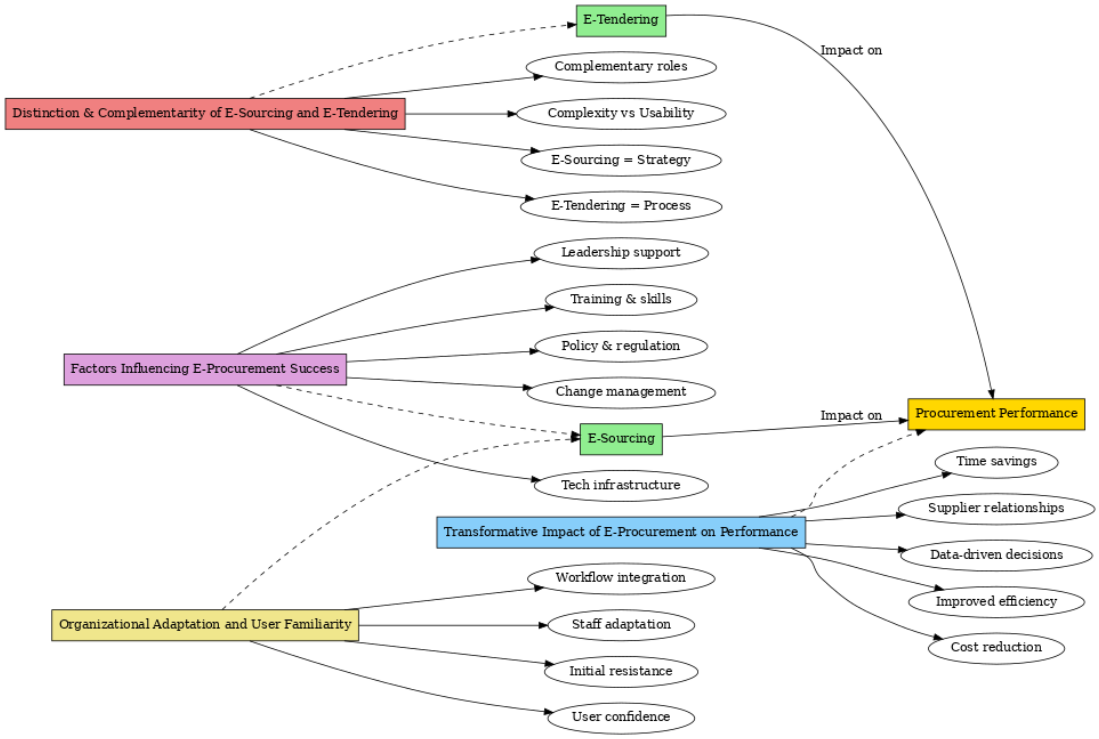

Figure 2: Interview Linkage with Framework (Source: Authors)

6. CONCLUSIONS

In this research, the relationship between e-procurement adoption and procurement performance within Egypt's healthcare sector was examined. The results demonstrate that e-procurement significantly contributes towards enhancing efficiency, transparency, and cooperation with suppliers.

Based on the empirical findings of this research, the following recommendations are directed to the broader Egyptian healthcare sector to strategically improve procurement performance and the Unified Procurement Authority (UPA) specifically through the continued and optimized adoption of e-procurement systems:

Prioritize and Continuously Optimize E-Sourcing Capabilities: UPA should continue and increase its investment in refining and growing all parts of its e-sourcing features. This includes improving the strength and usability of e-catalogs, simplifying and automating request for quotation (RFQ) and request for information (RFI) procedures, and optimizing the complete procure-to-pay (P2P) integration—from first requisition to final payment—for increasing end-to-end efficiency and reducing administrative overhead.

The research verified that institutions employing electronic procurement systems such as e-tendering, e-sourcing, and e-invoicing experienced quantifiable cost savings, process efficiency, and data quality.

The performance of e-procurement systems also relies on aspects such as employee training, digital readiness, and management support. These findings add to earlier works (Giannakis, 2012; Chenini et al., 2020; Kartika, 2022) and present novel evidence within the Egyptian healthcare environment.

This research also emphasizes the importance of policy support and regulatory frameworks that support digitalization in healthcare procurement. To sustain long-term performance improvement, healthcare facilities must align their strategy with Egypt's general digitalization plans and invest in continuous capacity building for procurement officials.

Overall, e-procurement is not merely a technological innovation but a strategic tool for achieving sustainable, transparent, and efficient procurement processes. The significance of the research to policymakers, and healthcare administrators who study the application of digital solutions to maximize public service delivery is rich and precious. Future research can build on this research by investigating longitudinal impacts of e-procurement adoption or cross-sectoral comparisons within Egypt's digital economy.

7. ACKNOWLEDGMENTS

We wholeheartedly appreciate Dr. Emad Habib Elwy's useful collaboration and assistance, and wise input throughout this research. His professionalism and insights were instrumental to this research.

We also want to express our appreciation to the research participants at the healthcare institutions, and procurement experts who took part in the research and provided their time, knowledge, and practical experience. Their cooperation and sharing significantly contributed to the quality of this research.

8. APPENDIX

The following appendices are available upon request.

Appendix	Description	Source Page/Content Snippet
Appendix A	Survey Statements Summary (Source: Authors)	Content is summarized as statements (actual statements not fetched).
Appendix B	Semi-Structured Interview Protocol	Includes interview questions such as: "How do you expect E-Sourcing to impact procurement performance in your organization?" and "What are the different factors affecting the E-Sourcing impact on procurement performance?"
Appendix C	English Survey	A Google form survey consisting of 49 questions divided into 12 sections covering points like rate of productivity, supplier relationship, E-requestion, E-evaluation, etc.
Appendix D	Arabic Survey	The Arabic version of the Google form survey.
Appendix E	Sample of Interviews Transcription & Analysis	This section contains transcriptions and analysis from the interviews conducted in the second phase of your methodology.

9. DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES:

During the preparation of this work, the author(s) used [Gemini, a large language model built by Google] in order to [generate and format the Appendix section content, extract and list the cited sources, provide Chicago-style reference guidelines, and assist in formatting this declaration]. After using this tool/service, the author(s) reviewed and

edited the content as necessary and take(s) full responsibility for the content of the publication.

10. REFERENCES

[1] Antipov, D. (2020). "Digital Supplier Relationship Management and Procurement Performance." International Journal of Supply Chain Management 9 (3): 112–120.
[2] Apampa, B. (2022). "Big Data Analytics in Public Procurement Transparency." Journal of Public Procurement 22 (1): 45–63. https://doi.org/10.1108/JOPP-04-2021-0020.
[3] Au-Yeung, P., and A. Venneman. (2019). "Supplier Evaluation Systems and Sustainable Procurement." Supply Chain Management: An International Journal 24 (5): 657–671.
[4] Bandyopadhyay, T. (2019). "Just-in-Time Inventory Systems and Productivity Improvement." Operations Management Review 11 (2): 85–97.
[5] Barbara Cook, "What Exactly Is eSourcing? | Tipalti," Tipalti (blog), October 22, (2025), https://tipalti.com/resources/learn/e-sourcing/.
[6] Bartai, H., and G. Kimutai. (2018). "Adoption of E-Procurement and Organizational Performance." International Journal of Economics, Commerce and Management 6 (3): 420–435.
[7] Bouliannce, J. (2022). "Purchasing Cards and Spend Control Efficiency." Journal of Financial Operations 14 (1): 23–34.
[8] Chaudhary, S. (2019). "E-Contracting and Procurement Efficiency." Journal of Supply Chain Innovation 5 (2): 44–58.
[9] Chenini, A., H. Ben Ammar, and T. B. Hadj. (2020). "Determinants of E-Procurement Performance." International Journal of Productivity and Performance Management 69 (8): 1813– 1834.
[10] Dachyar, M., and D. Karenina. (2020). "E-Procurement Implementation and Corruption Reduction." International Journal of Supply Chain Management 9 (1): 89–98.
[11] Davis, R. (2023). "Electronic Funds Transfer Systems in Public Procurement." Journal of Financial Technology 7 (4): 201–215.
[12] Farhang, M. (2024). "Procurement Planning through MRP Systems." Journal of Operations and Logistics 16 (1): 33–47.
[13] Fourante, L. (2019). "EFT Systems and Service Delivery Efficiency." Public Finance Quarterly 64 (3): 391–405.
[14] Gallego-García, S. (2021). "Volume Consolidation and Procurement Cost Optimization." European Journal of Purchasing & Supply Management 27 (2): 100–112.
[15] Giannakis, M. (2012). "Supplier Relationship Management and Performance Outcomes." Journal of Purchasing and Supply Management 18 (4): 217–228.
[16] Gunasegaran, A., N. Subramanian, and S. Rahman. (2023). "Machine Learning in Procurement Fraud Prevention." Computers & Industrial Engineering 178: 109120.
[17] Hong, Z., and Y. Shao. (2020). "Digital Collaboration Platforms in Procurement Negotiation." Industrial Management & Data Systems 120 (6): 1185–1204.
[18] Hugo, M. (2024). "Online Supplier Collaboration Tools." Source requires verification.
[19] Kartika, H. (2022). "Impact of E-Procurement Systems on Organizational Performance." Journal of Business and Management Studies 14 (2): 95–108.
[20] Li, X., Y. Chen, and J. Liu. (2020). "Digital Sourcing and Supplier Discovery Efficiency." Journal of Supply Chain Analytics 4 (1): 21–34.
[21] Maagi, J., and A. Mwakalobo. (2023). "Procurement Cycle Time Reduction through E-Tools." African Journal of Procurement 5 (1): 55–69.

[22] Mafini, C. (2020). "Digital SRM Systems and Supplier Collaboration." Journal of Supply Chain Management Perspectives 8 (3): 77–89.
[23] Mahuwi, R., and F. Israel. (2024). "Transparency in Electronic Tendering Systems." Journal of Public Sector Procurement 18 (1): 13–28.
[24] Malik, R., S. Ahmed, and M. Khan. (2024). "Inventory Optimization and Healthcare Supply Chains." Healthcare Logistics Journal 12 (2): 101–116.
[25] Mélon, L., and R. Spruk. (2020). "Digital Procurement and Public Sector Efficiency." Public Administration Review 80 (4): 657–668.
[26] Modrušan, A., M. Šostar, and M. Papić. (2021). "Accountability and Fairness in E-Tendering." Croatian Journal of Public Procurement 3 (2): 41–56.
[27] Murithi, P., M. Waweru, and J. Otieno. (2024). "Digital Sourcing Tools and Procurement Efficiency." International Journal of Procurement Management 17 (1): 88–103.
[28] Nicol, A. (2019). "Procurement Cycle Time Reduction Strategies." Journal of Purchasing Excellence 9 (2): 29–41.
[29] Oniyangi, S., and A. Ibrahim. (2024). "Lead Time Reduction through E-Procurement Adoption." Journal of African Supply Chains 6 (1): 64–78.
[30] Patil, R. (2025). "E-Tendering Systems and Digital Compliance." Source requires verification.
[31] Paul, S., P. Chowdhury, and R. Chakrabortty. (2022). "Resilient Healthcare Supply Chains." International Journal of Production Economics 247: 108440.
[32] Pihkanen, H. (2022). "KPI Dashboards in Procurement Decision-Making." Journal of Strategic Procurement 10 (3): 150–165.
[33] Ramos, L. (2024). "Digital Procurement Platforms and Cost Efficiency." Publication details unavailable.
[34] Ratanang, S. (2016). "Procurement Performance Measurement Frameworks." Journal of Supply Chain Performance 4 (2): 66–78.
[35] Rogerson, P. (2020). "Productivity and Data-Driven Decision Making." Operations Analytics Review 8 (1): 12–26.
[36] Saragih, H., Z. Tarigan, and H. Siagian. (2023). "E-Procurement Systems and Operational Effectiveness." International Journal of Productivity and Quality Management 38 (1): 1–17.
[37] Sharma, V., and A. Joshi. (2020). "Supplier Innovation and Evaluation Systems." Journal of Purchasing Strategy 6 (2): 90–104.
[38] Ståhlström, P. (2020). "Digital Tender Submission and Transparency." Nordic Journal of Procurement 5 (1): 21–35.
[39] Suleiman, Y. (2024). "Supplier Portals and Procurement Collaboration." Source requires verification.
[40] Teunissen, J. (2020). "Procurement Card Systems and Administrative Efficiency." Financial Management Review 18 (3): 214–226.
[41] Tripathi, A., and M. Gupta. (2020). "Real-Time Tracking in Procurement Logistics." Journal of Logistics Systems 9 (2): 56–70.
[42] Wadesango, N. (2023). "Cost Reduction Strategies in Public Procurement." African Journal of Economics and Management Studies 14 (4): 589–603.
[43] Wilson, G. (2019). "Strategic Alignment through E-Procurement." Journal of Supply Chain Strategy 7 (1): 34–48.
[44] Wilson, G., and R. Roy. (2019). "Procurement Planning and Performance Optimization. "International Journal of Operations Management 15 (2): 119–134.