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E-Procurement Systems and Supply Chain Performance on Service Delivery in Public Hospitals in Burundi

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ABSTRACT: The study set out to examine the effect of electronic procurement systems and supply chain performance on service delivery in public Hospitals in Burundi. The study opted for descriptive and correlational designs and employed quantitative approach. The population of 134 subjects was used and selected using the random sampling. Descriptive statistics revealed that while Supply Chain Performance was the most favorably perceived variable (Mean= 3.02), Public Service Delivery showed the highest variance (SD= 0.720), indicating a need for greater consistency. Pearson correlation indicated a strong positive and significant relationship between e-procurement and supply chain performance (r=.706**, p=.000); a strong positive and significant relationship between supply chain performance and public service delivery (r=.735**, p=.000); and a strong positive and significant relationship between e-procurement system and public service delivery (r=.839**, p=.000). Multiple regression analysis confirmed a coefficient of determination (R^2) of 0.744 (R^2=.744) with the standard error of estimate being 0.367. This implies that e-procurement system and supply chain performance explain changes in public service delivery up to 74.4%. The study concludes that e-procurement is essential for optimizing public service and recommends prioritizing integrated digital infrastructure to ensure reliable and high-quality service delivery.

KEYWORDS: E-Procurement System, Supply Chain Performance, and Public Service Delivery.

INTRODUCTION

E-procurement has become an increasingly important element of contemporary public procurement reforms. Across the world, governments are adopting electronic procurement systems to improve efficiency, transparency, and accountability in the acquisition of goods and services. The Organisation for Economic Co-operation and Development (2019) notes that e-procurement strengthens good governance by digitalizing procurement processes, enhancing compliance with regulatory requirements, and improving the monitoring and oversight of procurement activities. As a result, these systems help reduce administrative inefficiencies while also limiting opportunities for corruption and promoting better value for public expenditure.

Globally, e-procurement has become increasingly popular, particularly with the rise of digital technologies. Through the internet, organizations are now able to develop long-term and effective working relationships with both customers and suppliers. Technological advancement has introduced significant changes in the field of procurement, transforming how purchasing processes are conducted (Van Weele, 2015). The rapid advancement in technology has enabled organisations to adopt e-procurement practices. Electronic procurement has therefore emerged as a key enabler in supply chain processes (Handfield, Monczka, Giunipero and Patterson, 2019).

E-procurement in Africa has gained increasing attention as governments and public institutions seek to modernize procurement systems. Across many African countries, electronic procurement platforms are being introduced to enhance efficiency, transparency, accountability, and cost-effectiveness in the acquisition of goods and services. These systems reduce manual paperwork, minimize opportunities for corruption, and improve real-time monitoring of procurement processes (OECD, 2019; World Bank, 2020). In the healthcare sector, e-procurement is particularly important due to the critical need for timely and reliable access to medical supplies. Evidence from health system reforms in Africa shows that digital procurement platforms are being adopted to strengthen supply chain management, reduce stock-outs, and improve the availability of essential medicines and equipment in hospitals (WHO, 2021; Katuu, 2015).

In Burundi, e-procurement in hospitals is still at an emerging stage and is closely linked to centralized pharmaceutical procurement systems. The national supply agency, CAMEBU, is responsible for procuring and distributing medicines and medical products to public health facilities. Although procurement processes have traditionally been manual, recent reforms are gradually introducing digital tools to improve efficiency, transparency, and coordination in the health supply chain (CAMEBU, 2022; Ministry of Health Burundi, 2021). At the hospital level, public health facilities such as district and referral hospitals are increasingly benefiting from regional and donor-supported digital health initiatives. However, the implementation of e-procurement systems remains constrained by limited ICT infrastructure, inadequate digital skills, weak internet connectivity, and resistance to organizational change among procurement staff (World Bank, 2020; WHO, 2021).

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LITERATURE REVIEW

Concept of e-procurement

E-Procurement refers to the use of internet-based system used to carry out individual or all stages of procurement process, including search, sourcing, negotiation, ordering, receipt, and post-purchase review (Barngetuny & Kimutai, 2015). E-procurement is the business-to-business or business-to-customer or business-to-government purchase and sale of supplies, work, and services through the Internet as well as other information and networking systems, such as electronic data interchange and enterprise resource planning (Neef, 2016). E-procurement creates a framework in which government agencies as buyers procure goods/services by browsing catalogues advertised by suppliers hence a one-stop portal for public sector procurement (Van Weele, 2015). The e-procurement value chain consists of indent management, e-Informing, e-Tendering, e-Auctioning, vendor management, catalogue management, Purchase Order Integration, Order Status, Ship Notice, e-invoicing, e-payment, and contract management (Baily, 2008).

Supply chain performance

Supply chain is the network of all the individuals, organizations, resources, activities and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end user (Rotich and Okello, 2015). Supply chain performance for a firm is defined by Srinivasan et al. (2016) as the performance of the various processes included within the firm's supply chain function. Supply chain performance is the entire chain's ability to meet end-customer needs through product availability and responsive, on-time delivery. Supply chain performance crosses both functional lines and company boundaries (Van Weele, 2015). Supply chain performance is the extent of supply chain's activities in meeting end customer requirements, including product availability, on time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner (Presutti, 2003).

Public service delivery

Services are generally understood as the application of specialized competencies, including knowledge and skills, through actions, processes, and performance activities aimed at benefiting another party or the provider itself (Lusch and Vargo, 2006). Public services are services offered to the general public with the aim of addressing social or economic problems or needs, and they may be delivered by the public sector, private sector, or third (non-profit) sector (Osborne, 2021).

Public service delivery is the process through which government bodies or other authorized institutions provide essential services to citizens to address public needs and improve social well-being. These services, such as healthcare, education, water supply, sanitation, and security, can be delivered through the public sector, private sector, or through collaborative arrangements between different actors. High-quality public service delivery is characterized by accessibility, efficiency, fairness, and responsiveness to citizens' needs (Sienkiewicz Małyjurek and Szymczak, 2024).

E-procurement and Supply chain performance

In public hospitals, e-procurement is a vital strategic tool for enhancing supply chain performance by addressing key challenges in healthcare delivery, including the timely availability of life-saving medicines and the reduction of corruption in public expenditure. The implementation of e-sourcing and e-invoicing has been shown to significantly improve procurement performance, particularly when supported by skilled personnel who are capable of effectively managing digital procurement processes (Atiga et al., 2026). In the demanding context of public healthcare, e-procurement systems help to reduce the procure-to-pay cycle time, which is crucial for ensuring the uninterrupted supply of temperature-sensitive medical products such as vaccines and blood components (Yaraa, 2024). In addition, replacing manual procedures with digital audit trails improves transparency and accountability, thereby minimizing opportunities for collusion and maverick spending while promoting more efficient utilization of limited public funds (Nambela, 2024). Furthermore, studies from different regions show that although e-tendering enhances market competitiveness, its success in hospital environments largely depends on institutional readiness, including strong ICT infrastructure and continuous staff training (Sangari, 2025).

Supply chain performance and Public Service delivery

According to Baltacioglu et al. (2007) cited in Sienkiewicz-Małyjurek and Szymczak (2024), a service supply chain could be 'the network of suppliers, service providers, consumers and other supporting units that performs the functions of transaction of resources required to produce services; transformation of these resources into supporting and core services; and the delivery of these services to customers. The performance of the public supply chain is essential for turning government policies into real benefits for society by ensuring that essential goods are available, accessible, and affordable. When key indicators such as order fulfillment and delivery time are well managed, public services improve significantly, as the efficient distribution of items like textbooks and vaccines enhances education and public health outcomes (Laryea, 2026). However, weak supply chain systems lead to inefficiencies, stockouts, and resource losses, which mainly affect vulnerable populations and reduce trust in public institutions (Banda, 2025). Improving transparency and efficiency in logistics helps governments achieve value for money and deliver reliable services even during crises and market disruptions (Kovács & Falagara Sigala, 2024).

E-procurement and public service delivery

Empirical studies indicate that the adoption of e-procurement in the public sector significantly improves service delivery by enhancing transparency and reducing administrative inefficiencies. Evidence shows that the digitalization of procurement processes reduces direct interactions between procurement officials and suppliers, thereby lowering opportunities for corruption and rent-seeking and promoting more efficient allocation of public resources to priority sectors such as healthcare and infrastructure (Tjilen, 2025). Furthermore, findings demonstrate that e-procurement systems improve the availability of essential goods, particularly medical supplies in public hospitals, by reducing the procure-to-pay cycle time and enabling real-time expenditure monitoring (Atiga et al., 2026). In addition, studies reveal that the use of e-sourcing and e-invoicing contributes to improved value for money through enhanced cost control and better utilization of limited public budgets, which strengthens public trust in procurement systems (Nambela, 2024). However, empirical evidence also suggests that the effectiveness of e-procurement is contingent upon the competence of staff and the adequacy of ICT infrastructure supporting system implementation (Atiga et al., 2026).

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E-procurement and Supply chain performance on Public service delivery

Empirical evidence shows that e-procurement significantly improves public service delivery by enhancing supply chain efficiency, transparency, and responsiveness. A 2026 SEM-based study of 251 procurement professionals in Ghana found that e-sourcing and e-invoicing positively and significantly improve procurement performance when supported by staff competence (Atiga et al., 2026). In Kenya, research in Kiambu County hospitals revealed that e-procurement and e-logistics reduce patient waiting times and medicine pilferage, thereby improving healthcare service delivery (Nyasetia, 2024). Similarly, a 2025 study in Lagos State, Nigeria, found that supply chain performance is a key mediator, showing that e-procurement alone is insufficient without an efficient supply chain system (Kazeem, 2025). Overall, the findings indicate that the effectiveness of e-procurement depends on supply chain efficiency and institutional readiness (Tjilen, 2025). However, a significant research gap exists due to the lack of empirical data on e-procurement and supply chain performance within Burundi's public hospitals, as current literature remains heavily concentrated in Anglophone Africa (Ghana, Kenya, and Nigeria). Methodologically, existing studies rely on simple descriptive designs, failing to use robust analytical models to examine complex variables. Furthermore, there is a critical lack of knowledge regarding how institutional readiness specifically ICT infrastructure and staff competence influences digital effectiveness in low-resource health systems. Furthermore, limited research has examined the mediating role of supply chain performance in connection with e-procurement and public service delivery, as well as patient-centered outcomes such as medicine availability and service efficiency in Burundi's context.

METHODOLOGY

Methodologically, the study employed descriptive and correlational research design and opted for quantitative approach (Deductive approach). Data were collected from a sample of 134 respondents. Probability sampling procedure and simple random sampling were used to select the respondents. The data were analyzed using several statistical techniques, starting with descriptive statistics analysis to establish mean scores and standard deviations (SD). The Pearson correlation was applied to determine the strength and direction of the linear relationships between the constructs, while Analysis of Variance (ANOVA) was used to verify the overall fitness and statistical significance of the model. Finally, Multiple Linear Regression analysis was conducted to quantify the predictive power of the independent variables and to construct a mathematical model for Public Service Delivery, ensuring a robust and objective interpretation of the data.

RESULTS

Both descriptive and inferential statistics were employed for the analysis. Under descriptive statistics, mean, standard deviation, skewness and kurtosis were computed. Inferential statistics were based on relationship and effect statistics as given by correlation analysis, coefficient of determination, analysis of variance and the regression coefficients.

Table 1. Descriptive analysis

	N	**Mean**	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
E-Procurement System	134	2.82	.666	-.383	.209	.077	.416
Supply Chain Performance	134	3.02	.464	-1.478	.209	2.858	.416
Public Service Delivery	134	2.79	.720	-.612	.209	-.322	.416

The descriptive analysis reveals that supply chain performance is the most favorably perceived construct, maintaining the highest mean of 3.02 and the greatest response consensus with the standard deviation of 0.464. Conversely, public service delivery represents the lowest rated area (Mean= 2.79) with the highest level of respondent variance of standard deviation of 0.720. While all variables exhibit negative skewness, the e-procurement system and public service delivery fall within standard normality thresholds, whereas supply chain performance shows a leptokurtic distribution (Kurtosis = 2.858), indicating a sharp concentration of similar scores. Collectively, the low standard error across all 134 responses confirms that these means are reliable estimators, providing a statistically sound basis for subsequent inferential analysis. The correlation was computed to find out the relationship between the study variables as shown in the table 2 below. Pearson Product Correlation Coefficients for these relationships were derived at 99% confidence level, 2-tailed test.

Table 2. Correlation Analysis

		1	**2**	**3**
E-Procurement System	Pearson Correlation	1	.706**	.839**
	Sig. (2-tailed)		.000	.000
	N	134	134	134
Supply Chain Performance	Pearson Correlation	.706**	1	.735**
	Sig. (2-tailed)	.000		.000
	N	134	134	134
Public Service Delivery	Pearson Correlation	.839**	.735**	1
	Sig. (2-tailed)	.000	.000	
	N	134	134	134
**. Correlation is significant at the 0.01 level (2-tailed).				

The results indicated that all variables were found to be positively strong correlating to the dependent variable at the 0.01 level ($p<.01$), indicating that improvements in one area are consistently associated with gains in the public service delivery. The findings revealed that there is a strong

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positive and significant relationship between e-procurement and supply chain performance (r=. 706**, p=.000) implied that the improvements in e-procurement system was associated with the improvements in supply chain performance. They revealed also that there is a strong positive and significant relationship between supply chain performance and public service delivery (r=.735**, p=.000) meant that the positive change in supply chain performance was connected with the positive change in public service delivery. The results revealed also that there is a strong positive and significant relationship between e-procurement system and public service delivery (r=.839**, p=.000) that implied that e-procurement do contribute greatly to public service delivery.

Table 3. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.862[a]	.744	.740	.367
a. Predictors: (Constant), Supply Chain Performance, E-Procurement System				

The R tests the prediction of the model. A value of 0.862 (R=.862) indicated a certain high level of prediction. Coefficients of determination (R^2) was used to determine the extent to which explanatory variables (predictors) explained any change in the predicted variable. The results in the table 3 show an R-Square of 0.744 (R^2=.744) with the standard error of estimate being 0.367. This implies that e-procurement system and supply chain performance explain changes in public service delivery up to 74.4%. The remaining 25.6% is explained by other factors that are not considered in this model. The Adjusted R^2 of 0.740 confirms that the model's robustness and the relevance of the predictors, while the low standard error of 0.367 indicates strong predictive precision.

Table 4. Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.338	2	25.669	190.178	.000[b]
	Residual	17.682	131	.135		
	Total	69.020	133			
a. Dependent Variable: Public Service Delivery						
b. Predictors: (Constant), Supply Chain Performance, E-Procurement System						

The results in the table 4 indicated that the ANOVA results confirm the overall statistical significance and fitness of the regression model. F-Calculated (2,131) =190.178 and a significance value of p <.001, the data indicates that the independent variables (E-Procurement System and Supply Chain Performance) significantly predict the dependent variable (Public Service Delivery). The substantial difference between the Regression Mean Square (25.669) and the Residual Mean Square (0.135) demonstrates that the model accounts for a significantly greater portion of variance than could be attributed to random error.

Table 5. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.490	.210		-2.329	.021	-.906	-.074
	E-Procurement System	.690	.067	.638	10.222	.000	.556	.823
	Supply Chain Performance	.441	.097	.284	4.557	.000	.250	.633
a. Dependent Variable: Public Service Delivery								

From the results, when all predictors e-procurement system and supply chain performance are held constant, public service delivery would remain at -0.490. In addition, when e-procurement system increases by 1-unit, public service delivery increases by 0.690 units. The same case happens when supply chain performance increases by 1-unit, public service delivery increases by 0.441 units respectively. All the predictors had p-value <0.05 at 95% confidence level implying that they were individually significant in influencing public service delivery. The unstandardized coefficients (B) allow for the construction of the following predictive regression equation model: **$Y(PSD) = -0.490 + 0.690X_1 (EPS) + 0.441X_2 (SCP)$**. In summary, the E-Procurement System is the primary determinant in this model, contributing significantly more to the improvement of Public Service Delivery than Supply Chain Performance alone. Public service delivery will vary based on the conditions under which e-procurement and supply chain performance are employed.

RECOMMENDATIONS AND RECOMMENDATIONS

Conclusions

The study concludes that e-procurement systems and supply chain performance are critical, statistically significant drivers of public service delivery, collectively accounting for 74.4% of its variance. The empirical evidence identifies E-Procurement as the primary catalyst for improvement, showing the strongest correlation (r = .839**) and predictive weight (beta = .638). While Supply Chain Performance also contributes

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significantly to service outcomes, the data suggests that digital transformation within procurement is the most effective lever for enhancing overall public service efficiency.

Recommendations

Based on the empirical evidence, the following recommendations are proposed to enhance organizational effectiveness:

i. The Institutional investment should be directed toward the full-scale integration and automation of the E-Procurement System to maximize its impact on service delivery;
ii. The Management should leverage the strong correlation between supply chain efficiency and procurement by synchronizing logistics data with digital platforms, ensuring that operational successes translate directly into public-facing results;
iii. Continuous training programs should be implemented to ensure staff can navigate evolving digital infrastructures, maintaining the high consensus and predictive precision identified in the study.

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