African Journal of Emerging Issues
Peer reviewed | Double blind | Interdisciplinary

African Journal of Emerging Issues (AJOEI)
Online ISSN: 2663 - 9335
Available at: https://ajoeijournals.org

PROCUREMENT & SUPPLY CHAIN

SUPPLY CHAIN TECHNOLOGIES AND PERFORMANCE OF INTER-GOVERNMENTAL ORGANIZATIONS IN NAIROBI CITY COUNTY

[1*]Elizabeth Ojuma Makheti, [2]Erastus Kiswili Nyile

[1]School of Business and Entrepreneurship, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya*

Email: ***Lizmakheti@gmail.com***

[2]School of Business and Economics, Murang'a University of Technology,

Murang'a, Kenya

March 2025

ABSTRACT

Purpose of the study: The purpose of the study was to explore the impact of Supply Chain Technologies on the performance of Inter-Governmental Organizations (IGOs) in Nairobi City County. The study was based on pivotal role of supply chain management in contemporary global economies and the need for automation to meet the demands of modern organizations.

Short introduction of problem statement: IGOs face significant inefficiencies due to outdated supply chain processes, resulting in high operational costs, delays, lack of transparency, and resource misallocation. These challenges hinder their ability to deliver services effectively and meet stakeholder expectations. The study seeks to address these inefficiencies by examining how supply chain technologies can enhance IGO performance.

Method/methodology: The study employed a descriptive research approach, targeting IGOs in Nairobi City County through a census approach due to the limited population size. Data collection involved a self-administered questionnaire, and a pilot study ensured reliability and validity. Data analysis included both quantitative and qualitative methods.

Results of the study: The findings revealed that all supply chain technologies—Electronic Procurement Systems, Inventory Management Systems, Information Management Systems, and Transport Management Systems—positively and significantly impact the performance of IGOs in Nairobi City County, Kenya.

Conclusion and policy recommendation: The study concludes that adopting these technologies is crucial for achieving operational efficiency, cost-effectiveness, and improved service delivery. Recommendations include investing in comprehensive e-procurement and inventory systems, integrating IMS with collaborative tools for enhanced data access, and maximizing TMS functionalities for route optimization and shipment tracking. These strategic implementations will enable IGOs to operate more effectively in a complex global environment, ensuring better resource utilization, cost control, and service delivery**.**

Keywords: *Supply Chain Technologies, Electronic Procurement System, Inventory Management, Information Management System, Transport Management System, IGOs Performance.*

INTRODUCTION

In today's rapidly evolving global economy, supply chain management has emerged as a critical component in achieving operational efficiency, cost reduction, and overall organizational success (Maaz & Ahmad, 2022). As businesses operate in an increasingly dynamic landscape where speed, accuracy, and efficiency are paramount, traditional supply chain management approaches struggle to meet the demands of modern organizations. The complexity of supply chains continues to grow, involving multiple stakeholders, diverse geographical locations, and intricate operational processes. In response, the adoption of automation has become a strategic necessity for organizations seeking to optimize their supply chain functions and enhance overall performance (Piprani, Mohezar, & Jaafar, 2020).

Supply chains have transitioned from linear, localized systems to complex, globally integrated networks. The expansion of global sourcing, just-in-time manufacturing, and omnichannel distribution has led to a significant increase in the volume of transactions and data exchanges. Managing such large-scale operations manually is not only time-consuming but also prone to inefficiencies and errors. Automation provides a solution by minimizing human intervention, ensuring accuracy, and maintaining consistency in supply chain processes (Dolgui & Ivanov, 2021). As a result, organizations are increasingly integrating advanced Supply Chain Technologies to streamline their operations and enhance productivity.

Supply Chain Technologies encompass the use of digital tools, software, and automated systems to improve procurement, inventory management, production, distribution, and transportation processes (Maaz & Ahmad, 2022). These technologies replace or augment manual tasks, leading to greater accuracy, speed, and operational efficiency. Organizations that adopt such technologies benefit from increased operational efficiency, cost savings, and improved customer satisfaction. The integration of automated systems into supply chain processes allows enterprises to develop robust management strategies, optimize operations, and gain a competitive advantage in the fast-paced business environment (Praveen, Farnaz, & Hatim, 2019).

The key applications of automation in supply chain management include Electronic Procurement Systems, Inventory Management Systems, Information Management Systems, and Transport Management Systems. Electronic Procurement Systems enable organizations to

digitize procurement functions, manage supplier relationships, and enhance transparency in sourcing and purchase order processing (Monczka et al., 2015). Traditional procurement processes, often plagued by inefficiencies, can be significantly improved through automation, leading to better accountability and cost-effectiveness.

Inventory Management Systems play a crucial role in maintaining optimal stock levels and preventing disruptions caused by overstocking or stockouts. The use of technologies such as Radio Frequency Identification (RFID), barcoding, and inventory management software ensures real-time tracking of inventory, accurate demand forecasting, and automated replenishment processes (Mishra et al., 2018). This leads to reduced carrying costs and improved service delivery.

Information Management Systems facilitate seamless communication and data exchange among supply chain stakeholders. The implementation of Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) software, and other collaborative platforms enhances decision-making, improves visibility, and optimizes supply chain functions (Gunasekaran et al., 2017). By leveraging such systems, organizations can ensure timely access to critical data and improve coordination across various operational segments.

Transport Management Systems are essential for ensuring the timely and cost-effective movement of goods within the supply chain. Traditional transportation planning and tracking methods are often inefficient and lack real-time visibility. Automation tools such as Global Positioning System (GPS) tracking, route optimization software, and electronic proof of delivery systems help organizations monitor shipments, reduce fuel consumption, and enhance delivery accuracy (Tan et al., 2018). By adopting these technologies, businesses can achieve streamlined logistics, minimize delays, and improve overall transportation efficiency.

This study aimed to explore the impact of Supply Chain Technologies on the performance of Inter-Governmental Organizations (IGOs) in Nairobi City County, providing insights into how automation can be leveraged to improve operational efficiency and effectiveness

STATEMENT OF THE PROBLEM

Traditionally, the purpose of Inter-Governmental Organizations (IGOs) has been to create mechanisms for the world's inhabitants to work more successfully together in areas of peace and security and to address economic and social questions. In this current era of increasing globalization and interdependence of nations, IGOs play a significant role in international political systems and global governance (Urquijo, 2022). They address a multitude of issues and involve governments from every region of the world, including offices in the U.S. Among the oldest IGOs are the United Nations, which replaced the League of Nations, the Universal Postal Union, and the North Atlantic Treaty Organization (NATO).

However, despite their importance in maintaining global stability, IGOs face substantial and unique challenges in supply chain management that hinder their ability to function effectively. For instance, the World Economic Forum reported that supply chain disruptions have surged by 42% in recent years, largely due to geopolitical instability, natural disasters, and health crises such as the COVID-19 pandemic (Urquijo, 2022). For IGOs operating internationally, such disruptions complicate the logistics of coordinating aid, managing resources, and

maintaining reliable communication channels across borders. Compounding these issues is the challenge of managing limited resources. Research suggests that inefficient supply chains can consume up to 25% of an organization's budget due to high transportation costs, delays, and resource misallocation (Urquijo, 2022). This is particularly significant for IGOs, whose funding often relies on contributions from member states, making efficient budget allocation imperative to their sustainability and success.

Several studies have attempted to explore the supply chain technologies adopted by IGOs and their impact on performance. Waganda (2018) studied the effect of electronic procurement on the performance of United Nations Agencies in Nairobi and found a positive association between e-sourcing and performance. However, this study focused solely on UN agencies, leaving out other IGOs. There is a lack of similar studies conducted in Nairobi or Kenya.

Furthermore, existing studies on Supply Chain Technologies and its impact on organizational performance reveal notable gaps that warrant further investigation. For instance, Barasa, Namusonge, and Fredrick (2017) focused on county-level organizations like the County Government of Bungoma in Kenya, leaving a gap in understanding how Supply Chain Technologies affects organizations with international reach, such as IGOs. Additionally, the study examined e-procurement, a subset of Electronic Procurement System, making it necessary to explore a broader spectrum of automation functions. Kipkemoi's (2017) research concentrated on manufacturing firms, overlooking service-oriented organizations prevalent among IGOs.

Waganda's (2018) investigation into the impact of electronic procurement on United Nations Agencies in Nairobi focused on specific automation functions like e-tendering, e-auctioning, e-invoicing, and e-sourcing but omitted other critical aspects like e-payment, leaving questions about the holistic effects of Electronic Procurement System. Panigrahi et al.'s (2021) study on inventory management and firm performance in India did not extensively explore inventory automation. Muyundo's (2018) research on inventory management in cement manufacturing firms in Kenya addressed Just-in-Time practices but did not establish a direct link between automated inventory management practices and organizational performance.

Ng'ang'a's (2022) exploration of the influence of electronic procurement in the energy sector in Kenya needs to extend its reach to other sectors beyond energy and had limited emphasis on the Information Management system aspect of automation. Lastly, Kiggira et al.'s (2015) study on the role of Electronic Data Interchange (EDI) in cargo distribution management at Mombasa Ports is sector-specific and may not fully align with the dynamics of IGOs, although it highlighted the importance of EDI and revealed challenges specific to the cargo distribution sector. Thus, a comprehensive assessment of the impact of Supply Chain Technologies on IGOs is vital to address these multifaceted challenges and optimize their operational efficiency, effectiveness, and global impact.

RESEARCH OBJECTIVES

The general objective of the study was to determine the influence of Supply Chain Technologies on Performance of Inter-Governmental Organizations in Nairobi City County.

The specific objectives include;

1. To establish the influence of Electronic Procurement System on Performance of Inter-Governmental Organizations in Nairobi City County
2. To determine the influence of inventory management system on Performance of Inter-Governmental Organizations in Nairobi City County
3. To explore the effect of Information Management system on Performance of Inter-Governmental Organizations in Nairobi City County
4. To examine the influence of Transport Management system on Performance of Inter-Governmental Organizations in Nairobi City County

RESEARCH QUESTIONS

1. What is the influence of Electronic Procurement System on Performance of Inter-Governmental Organizations in Nairobi City County?
2. What is the influence of inventory management system on Performance of Inter-Governmental Organizations in Nairobi City County?
3. What is the influence of Information Management system on Performance of Inter-Governmental Organizations in Nairobi City County?
4. What is the influence of Transport Management system on Performance of Inter-Governmental Organizations in Nairobi City County?

THEORETICAL REVIEW/ FRAMEWORK

The present study seeks to determine the influence of Supply Chain Technologies on performance of IGOs. The underlying theories of the study include: Transaction Costs Economics (TCE), Just in time Philosophy, resource-based view and Game theory.

The Transaction Cost Theory is predicated on the notion that costs associated with transactions, rather than resources, serve as the foundation for analysis and understanding. The idea, initially proposed by Coase in the 1930s in his renowned work "The Nature of the Firm," and subsequently expanded upon by Williamson in the mid-1970s (Williamson, 1985), posits that the prosperity of a firm hinges on effectively balancing the expenses associated with transactions and those related to internal production. Transactions refer to the process of exchanging products and services between distinct economic entities or individuals, whether they occur within or beyond the confines of an organization (Song et al., 2020). In this study, Transaction Cost Economics (TCE) is employed as a framework to comprehend the implications of implementing Electronic Procurement System. The Transaction Cost Economics (TCE) framework posits that firms engage in a decision-making process to determine whether to internally produce goods or services or engage in market transactions, with the primary objective of minimizing transaction costs (Song et al., 2020). Within the realm of Electronic Procurement System, the use of theory can elucidate the manner in which automation diminishes transaction costs, including activities such as information search, negotiation, and monitoring.

The concept of just-in-time production was initially conceived and refined by Taiichi Ohno within the manufacturing facilities of Toyota. Its primary objective was to efficiently fulfill consumer requirements while minimizing any unnecessary delays. Taiichi Ohno is commonly recognized as the progenitor of the Just-in-Time (JIT) production system. Toyota successfully

navigated the growing obstacles to its survival by adopting a strategic approach that prioritized human resources, manufacturing facilities, and operational systems (Mukwakungu et al., 2019). Toyota recognized that the effective implementation of Just-in-Time (JIT) methodology hinged upon the active involvement and unwavering commitment of all individuals within the organization (Mukwakungu et al., 2019).

The application of the Just-In-Time (JIT) inventory management theory can be utilized to evaluate the impact of automation in inventory management (Htun, Maw & Khaing, 2019). Just-in-Time (JIT) methodology places significant emphasis on the reduction of inventory holding costs through the strategic management of inventory availability in accordance with specific timing requirements. The implementation of automation in inventory management can effectively support the concepts of Just-in-Time (JIT) methodology, resulting in decreased carrying costs, minimized waste, and improved inventory turnover (Mukwakungu et al., 2019).

The Resource-Based View (RBV) is the result of a shift in emphasis since the early 1980s toward internal resources and capabilities as the primary source of competitiveness. Barney (1991) and Wernerfelt (1984) centered the resource-based theory on the internal competencies of firms and shifted the focus of strategic management inward. According to RBV, a firm's competitive advantage stems from its valuable and unique assets. The new perspective expects firms to compete based on their internal capabilities, competencies, and resource capabilities that are unique or distinctive (Hoskisson, Hitt, Wat, and Yiu, 1999). Grant (1991) states that a company's competitive advantage is determined by its capabilities or competencies, its management's ability to marshal its resources, and their deployment patterns in order to generate superior performance.

This theory supported the application of information technology as a resource for promoting and facilitating the adoption of contemporary supply chain practices and, as a result, fostering increased organizational performance (Grant, 1991). The theory played a significant role in determining the type of information technologies adopted, the skills required by organizations for their operation, and the deployment of resources by guaranteeing effective and efficient supply chains. ICT can be considered a valuable resource that, when properly deployed, enhances organizational capabilities, leading to improved performance in terms of communication, coordination, and decision-making within IGOs.

The intellectual framework for understanding circumstances known as game theory was initially introduced by John Von Neumann and Oskar Morgenstern in the year 1944. However, it did not establish a state of balance. John Nash (1951) made further advancements by providing a demonstration that the existence of equilibrium is contingent upon a game having a finite number of players and moves. According to Xu, Pan, and Ballot (2013), contemporary game theory can be characterized as a systematic examination of decision-making processes in situations involving multiple participants, when the choices made by one player have the potential to impact the interests of other participants. It is widely recognized as the established field of inquiry for analyzing both conflict and cooperative dynamics.

The utilization of game theory, specifically in the context of cooperative games, has demonstrated a notable impact on transportation logistics and the administration of centralized inventory systems. This has resulted in cost reduction and an enhancement in the level of

service provided to customers (Fiestras-Janeiro, Garcia-Jurado, Meca & Mosquera, 2011). The utilization of Game Theory as a valid and pertinent theoretical framework for examining the impact of Transport Management Systems (TMS) on the efficacy of Inter-Governmental Organizations (IGOs) within Nairobi City County is justified. This is primarily attributed to its capacity to effectively simulate strategic interactions and decision-making processes involving IGOs, transportation providers, and various other stakeholders.

EMPIRICAL REVIEW

Electronic procurement system

Several studies have been conducted on Electronic Procurement System and organization performance. Barasa, Namusonge, and Fredrick (2017) studied the Effects of e-procurement on the organizational performance of County Governments in Kenya and adopted a case study of Bungoma County Government. The study utilized a case study research design and targeted employees of Bungoma County Government in the departments of procurement totaling to 150. The study employed simple random Sampling and purposive sampling. The correlation and linear regression analysis employed for testing the two hypotheses revealed that; e-procurement has a significant effect on the organisational performance of the County Government of Bungoma and that there is a positive and significant relationship between e-procurement and organizational performance.

Kipkemoi (2017) studied the Effects of Procurement Practices on Organizational Performance within the Public Sector using a case Of East African Portland Cement Company Limited. Questionnaires were used as a form of data collection. The study population for this research were the finance and procurement employees of the East African Portland Cement Company Limited. This research embraced a descriptive design, which depicts participants in an accurate way; it describes the people who take part in the study. A survey was used and staff from the procurement and finance departments were asked to fill out questionnaires through a brief interview about specific topics. Primary data was collected through questionnaires that focused on staff from the procurement and finance departments. The study recommends the building of robust relationships with key suppliers to guarantee unfailing supply and quality of inputs. Manufacturing companies must assess where their greatest investments are made and the benefit procurement can bring to each category..

Waganda (2018) studied the Effect of electronic procurement on performance of United Nations Agencies in Nairobi. The study used exploratory research design seeking to unveil the effect that E-procurement has on organizational performance of UN Agencies in Kenya, more specifically in UNICEF, WFP, UNSOA and UNON. Primary data was collected by use of semi-structured questionnaires that were self-administered to the respondents. Secondary data was collected by use of journal publications, government reports and UN reports. The target population was drawn from UN Agencies in Nairobi. From the population of procurement managers and staff of the department, the researcher purposively selected 15 respondents from each agency, thus giving sample total of 60 respondents. Regression analysis was done so as to test the relationship between the independent variables and dependent variables. The study found that there exists a positive association of e-sourcing to performance of UN Agencies in

Nairobi. This positive association suggests that when one increases, performance of UN Agencies in Nairobi increases.

Inventory Management System

Panigrahi et al., (2021) studied Inventory management and performance of manufacturing firms. Data were collected from five selected manufacturing firms from the state of Odisha, India. Respondents of the study are some key officials, viz. operations manager, production manager, purchase manager and warehouse manager from various manufacturing firms. As per the need of the study, various statistical tools such as correlation, multiple regression, confirmatory factor analysis and Kolmogorov-Smirnov test were used. The outcome of the study concludes that inventory management practices have significant impact on firm performance and also contributes to the existing body of knowledge by helping inventory management practitioners of manufacturing industry.

Muyundo (2018) researched Inventory management and organizational performance of cement manufacturing firms in Kenya. The study adopted a descriptive research design. The target population comprised of 6 cement manufacturing firms in Kenya. A census was used with the 35 respondents. Data was collected data using structured questionnaire, and the data coded into SPSS software for analysis using descriptive and inferential statistics. Descriptive statistics included use of means and standard deviation while inferential statistics included use of regression analysis. The findings were presented using frequency distribution Tables. With a response rate of 62.85 % the study established that most cement manufacturing firms used JIT to reduce the stock and the carrying cost associated in the firm. The firm used ABC analysis to assess the status of the items in the stocks. The firm used FOQ to ensure that there was an efficient and effective level of inventory in the firm. The firm used Vendor Managed Inventory to allow flexibility of the customers demand.

Information Management System

Ng'ang'a (2022) explored the Influence of Electronic Procurement on Supply Chain Performance of Firms in the Energy Sector in Kenya. The study reviewed both theoretical and empirical literature and propose the research methodology that addressed the gaps identified in literature as well as answer the stipulated research questions. This research study adopted descriptive research design approach. The targeted firms in the energy sector that were listed at Nairobi Securities Exchange, that is Kenya Power Ltd, Kengen Ltd, KenolKobil Ltd and Total Kenya Ltd where a total of 256 respondents from the procurement, finance, administration, Information technology, Human resource and Marketing departments were targeted. A sample size of 30% was adopted and hence 77 respondents were targeted. Data was gathered using structured questionnaire, then analyzed using inferential and descriptive statistics where it was analyzed by use of descriptive and inferential statistics through SPSS 24. The study findings indicated an increase in Electronic Data Interchange leads to a significant improvement in supply chain performance of the firms in the energy sector in Kenya. It was also established that an increase in Electronic Material Management leads to a significant improvement in supply chain performance of the firms in the energy sector in Kenya.

Kiggira et al., (2015) explored the Role of Electronic Data Interchange On Supply Chain Performance in Cargo Distribution Management in Kenya using a case of Mombasa Ports. The research used descriptive research design as it provides information on the characteristics of the phenomenon. The population was 167 employees of the Mombasa Port and the population sample was 50 employees who work at the operations department both at the office and in the field and amongst them line managers were selected purposively. The response was 70% successful with a response of 35 out of 50 respondents. The sampling design that was used is the stratified random. A pilot test was done with the key informants before the full administration of questionnaire. Nevertheless, the researcher used questionnaires as the main method of data collection, although interviews and observations were applied as well. Data was then analyzed using the quantitative and descriptive statistics, then presented using tables and pie charts, whereas the quantitative data was coded and data was be entered in SPSS for analysis. The findings from this study showed that E.D.I plays a great role in the cargo distribution management at the Mombasa Port, although there are issues which include; inadequate non IT staff training, lack of trust of other EDI partners, negative staff employee culture by some employees and stakeholders, more requirements of changes in business requirements than expected, unforeseen technical problems and the system compatibility problem.

Transport Management System

Muhalia, Ngugi and Moronge (2021) studied the Effect of Transportation Management Systems on Supply Chain Performance of FMCG in Kenya. The study adopted descriptive research design. The unit of observation was the operations manager of the 51 FMCG manufacturers located in Nairobi. The sampling frame of the current study consisted of operations managers in the manufacturers of the FMCGs in Nairobi. The study used the census method to select 51 manufacturers of the FMCGs in Nairobi, thus the sample of the study was 51 respondents. Primary data was used in the study. The study used questionnaires to collect data. Mixed methods technique of analyzing data was used where both descriptive and inferential analysis were used. The data collected from the field was analyzed using SPSS 23 program. The questionnaires were referenced and the items in them coded for easier data entry. The presentation of the findings was done using tables. The study found that transport management systems positively and significantly influence Supply chain performance of FMCG in Kenya. The study established that transport management systems provides trade compliance information and documentation; transport management systems make it easier for businesses to manage and optimize their transportation operations, whether they are by land, air, or sea; transport management systems ensures timely delivery of freight and goods; transport management systems provides visibility into day-to-day transportation operations; and transportation management systems helps to streamline shipping process.

Musau et al., (2017) studied the effect of inventory management on organizational performance among textile manufacturing firms in Kenya. The study adopted the convergent parallel mixed methods design. The study targeted a total of 196 respondents drawn from employees of procurement departments and departmental heads of respective 15 textile manufacturing industries operating in Nairobi County. The sample size was therefore 139 respondents.

Stratified and simple random sampling methods were used to select employees of procurement departments from their respective textile firms. Questionnaires and interview schedules were used to gather the data from primary sources. The study applied the use of both qualitative and quantitative data which was analyzed using statistical package for social sciences (SPSS Version 22). Inferential statistics using hierarchical multiple regression and Correlation analysis was applied to test the relationship between the variable and formulated hypothesis. The study concludes that transport management possess the potential of positively influencing supply chain performance of Textile firms and therefore recognizes the importance of transport management in the supply chain.

CONCEPTUAL FRAMEWORK

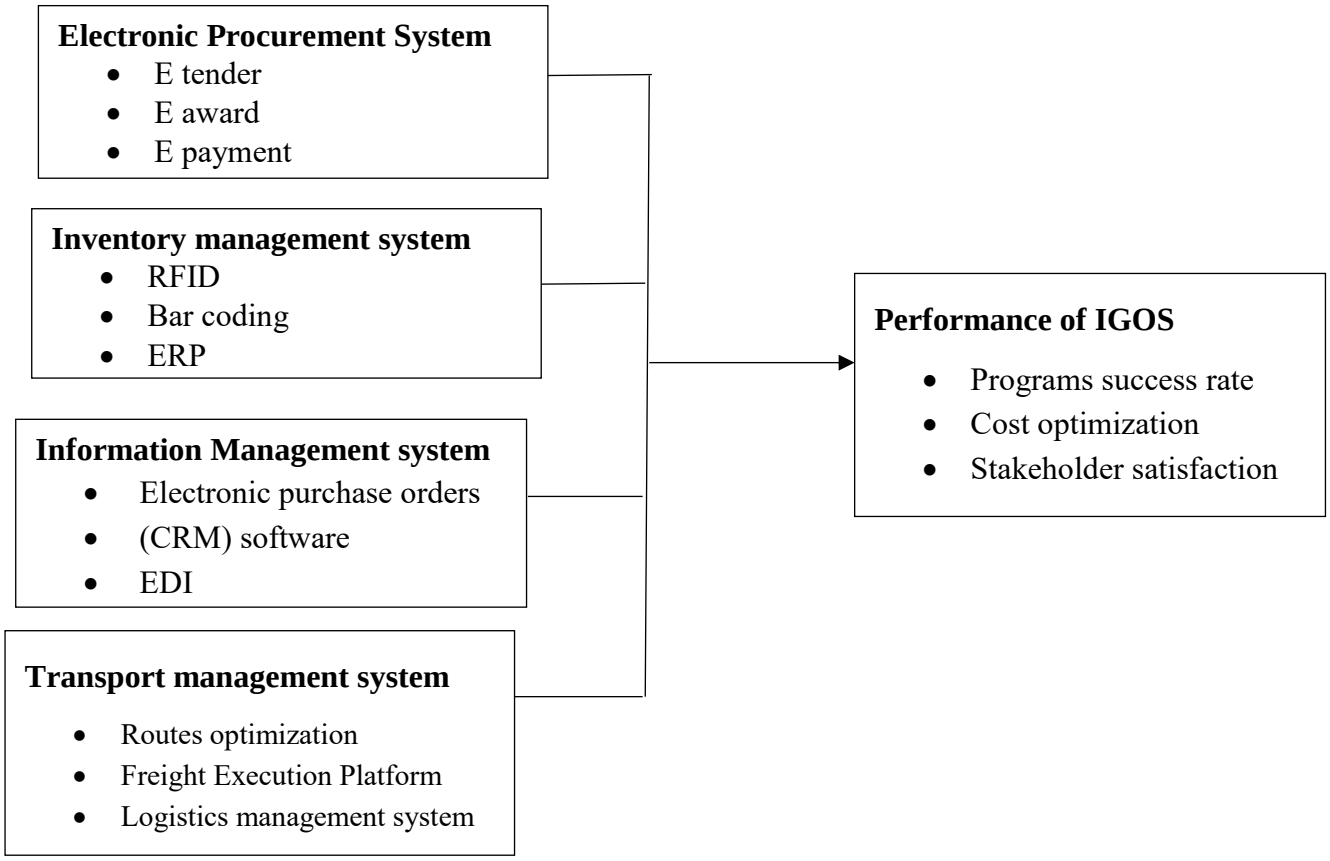

Figure 1: Conceptual framework

RESEARCH METHODOLOGY

The study employed a descriptive research approach to examine the effect of Supply Chain Technologies on the performance of Inter-Governmental Organizations (IGOs) in Nairobi City County (Kumatongo & Muzata, 2021). Descriptive research was deemed appropriate as it facilitates systematic observation, quantification, delineation, and classification of phenomena while capturing respondent perceptions and attitudes (Asenahabi, 2019; Pandey & Pandey, 2021). It also provides an accurate depiction of the features of individuals, circumstances, or groups and the frequency of occurrence (Bloomfield & Fisher, 2019).

The target population consisted of all IGOs operating in Nairobi City County, totaling 134 organizations, as identified by the Intergovernmental Relations Technical Committee (IGRTC, 2025). The sampling frame was derived from IGRTC (2025) and updated regularly to ensure accuracy (Stratton, 2021). Given the limited population size, the study employed a census approach, incorporating all 134 IGOs. The unit of analysis was the IGO, while the unit of observation was the supply chain manager in each organization, as they possess relevant expertise in automation and performance (Merriam & Tisdell, 2015).

Data collection relied on a structured questionnaire comprising both closed and open-ended questions to ensure efficient analysis and qualitative insights (Mohajan, 2020). The questionnaire was administered using a drop-and-pick-later method, with research assistants facilitating distribution and collection to enhance response rates and minimize errors. A pilot study was conducted two weeks before the main study, involving 10% of the sample size (13 organizations), to refine the instrument and ensure clarity and relevance (Aginako et al., 2021). Deputy supply chain officers participated in the pilot to avoid response bias in the final study.

Instrument reliability was assessed using Cronbach's alpha, a widely accepted measure of internal consistency, with a cutoff value of 0.70 (Garson, 2013; Nawi et al., 2020). Validity was established through expert opinions from supply chain and logistics professionals and academia. Construct validity was measured using correlation tests, while criterion-related validity was examined by assessing the correlation of the instrument's scores with an external criterion (Zohrabi, 2013).

Data analysis involved both qualitative and quantitative techniques (Albers, 2017). Thematic analysis was used for qualitative data, while quantitative data was analyzed using descriptive and inferential statistics. Measures of central tendency (mean) and dispersion (standard deviation) were used to summarize data. Multiple regression analysis was employed to determine the relationships between independent variables—Electronic Procurement System, Inventory Management System, Information Management System, and Transport Management System—and the dependent variable, IGO performance (Wang, 2015).

The multiple regression model used was:

$Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$

Where: - Y= Performance of IGOS

β_0=constant

$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 = regression coefficients

X_1= Electronic Procurement System

X_2= Inventory management system

X_3= Information Management system

X_4= Transport Management system

ε=Error Term

RESULTS AND DISCUSSIONS

Response rate

The response rate indicates the proportion of individuals who responded to a survey or questionnaire compared to the total number invited to participate. It's typically presented as a percentage and is determined by dividing the number of responses received by the total number of questionnaires sent out, then multiplying by 100. In this study, 113 out of 134 distributed questionnaires were completed and returned, resulting in a response rate of 84.33%, as shown in Table 1. According to Fincham (2018), a response rate above 65% is considered acceptable for most research purposes. Therefore, the high response rate of 84.33% in this study was regarded as satisfactory, suggesting that the collected data were reliable and valid for the study's objectives.

***Table 1*: Response Rate**

Category	Frequency	Percent
Response	113	84.33
Non response	21	15.67
Total	**134**	**100**

Correlation of study variables

Table 2 presents the correlation matrix among the independent variables. According Kumar and Singh (2021), correlation analysis is frequently employed to examine the relationships among a set of variables, which aids in testing for multicollinearity. When correlation values are neither close to 1 nor -1, this indicates that the variables are sufficiently distinct measures of separate factors (Jackson & Mathews, 2019). This also suggests that the variables are not multicollinear. The absence of multicollinearity means that all independent variables can be included in the analysis without redundancy issues. Furthermore, Saunders et al. (2018) state that correlation coefficients enable researchers to quantify the strength and direction of the linear relationship between two or more variables. Correlation essentially measures how closely variables are related (Smith, 2020). Several methods of correlation exist, with the choice primarily depending on the type of data being analyzed.

Correlation coefficients provide a numerical summary that indicates both the direction and strength of the linear relationship between two variables. The Pearson correlation coefficient (r) ranges from –1 to +1, where the sign denotes whether the correlation is positive or negative. The magnitude of the absolute value indicates the strength of the relationship. A value of 0 means that the variables have no relationship, while a value of +1 indicates a perfect positive correlation, and a value of -1 signifies a perfect negative correlation (Saunders et al., 2018). For this study, the Pearson Product-Moment Correlation was employed to determine the

strength and direction of the linear relationship between the independent and dependent variables, with the results summarized below.

Table 2. Correlation of the study variables

		Electronic Procurement System	Inventory management system	Information management system	Transport Management System	Performance
Electronic Procurement System	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	113	113			
inventory management system	Pearson Correlation	.422**	1			
	Sig. (2-tailed)	.000				
	N	113	113			
Information management system	Pearson Correlation	.294*	.304**	1		
	Sig. (2-tailed)	.003	.001		.	
	N	113	113	113		
Transport Management System	Pearson Correlation	.070	.456**	.470**	1	
	Sig. (2-tailed)	.461	.000	.000		
	N	113	113	113	113	
Performance	Pearson Correlation	.351**	.417**	.412*	.421**	1
	Sig. (2-tailed)	.001	.000	.000	.000	
	N	113	113	113	113	113

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis between the independent variables reveals various degrees of association. Electronic Procurement System has a moderate positive correlation with Inventory management system ($r = .422$, $p < .001$), suggesting that as organizations implement Electronic Procurement System, they are also likely to adopt inventory management system to some extent. There is a weaker yet statistically significant relationship between Electronic Procurement System and the Information Management System ($r = .294$, $p < .001$), indicating a mild association where organizations utilizing Electronic Procurement System may also incorporate information management systems. However, the correlation between Electronic Procurement System and the Transport Management System ($r = .070$, $p = .461$) is not significant, indicating little to no direct relationship between these two systems in the sampled IGOs.

Inventory management system has a moderately strong positive correlation with both the Information Management System ($r = .304$, $p < .001$) and the Transport Management System ($r = .456$, $p < .01$), suggesting that organizations that automate inventory management also tend to employ information and transport management systems. Similarly, the Information Management System demonstrates a moderate positive relationship with the Transport Management System ($r = .470$, $p < .001$), indicating that these two systems often coexist within the same organizations.

Examining the relationship between each independent variable and Performance, Electronic Procurement System exhibits a moderate positive correlation with Performance ($r = .351$, $p < .01$). This suggests that the implementation of Electronic Procurement System contributes to improved performance outcomes, although the relationship is not exceptionally strong. This indicates that while Electronic Procurement System enhances performance, other factors might also play a role. Inventory management system shows a stronger positive correlation with Performance ($r = .417$, $p < .01$), indicating that automating inventory processes has a more substantial impact on the overall performance of the organizations studied. This stronger relationship suggests that efficient inventory management is a key contributor to organizational success.

The Information Management System also demonstrates a moderate positive correlation with Performance ($r = .412$, $p < .01$). This suggests that the implementation of information management systems plays a crucial role in enhancing performance, likely due to better data management and decision-making processes. Lastly, the Transport Management System has a significant positive correlation with Performance ($r = .421$, $p < .01$) indicating that adopting transport management systems is closely linked with improved organizational performance. Overall, all independent variables show a positive and statistically significant relationship with Performance, implying that automation across various operational areas contributes to enhanced efficiency and effectiveness in the organizations studied.

Multiple Linear Regression for supply chain technologies and IGOs performance

A multiple regression analysis was conducted to determine the relationship between the independent and dependent variables. This study utilized multiple linear regression analysis to examine the relationship of the predictor variables with the dependent variable. Unadjusted R^2, which is known as the coefficient of determination, was used to explain how performance of IGOS in Nairobi City County varied with Electronic Procurement System, inventory management system, information management system, and transport management system.

The model summary in table 3 below presents the overall fit of the regression model used to predict IGO performance based on four independent variables: Electronic Procurement System, Inventory management system, Information management system, Transport Management System. The key metrics provided in the summary are R, R Square, Adjusted R Square, and the Standard Error of the Estimate. The R Square of 0.715 means that approximately 71.5% of the variance in performance is explained by the model, accounting for the number of predictors.

The model summary thus indicates that the regression model is a good fit for predicting IGO performance based on the four supply chain technologies.

Table 3: Model Summary for all the independent variables

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845[a]	.715	.704	.544

a. Predictors: (Constant), Electronic Procurement System , Inventory management system, Information management system, Transport Management System

To further assess the model, an analysis of variance (ANOVA) was performed, and the results are presented in Table 4 below. The F-value of 116.468 indicates a strong overall model fit, demonstrating how well the independent variables predict Performance. The significance level (Sig. = .000) is well below the conventional threshold of 0.05, confirming that the model is statistically significant. Therefore, the regression model provides a good fit, validating that Electronic Procurement System, Inventory Management System, Information Management System, and Transport Management System collectively influence the Performance of the organizations analyzed.

Table 4: Anova Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5542.990	4	1385.748	116.468	.000[b]
	Residual	1284.992	108	11.898		
	Total	6827.982	112			

a. Dependent Variable: Performance

b. Predictors: (Constant) Electronic Procurement System, Inventory Management System, information management system, Transport Management System

Table 5 below shows the regression coefficients. All the independent variables are regressed against the dependent variable.

Table 5. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.688	.917		4.021	.000
	Electronic Procurement System	.104	.030	.224	3.514	.001
	Inventory management system	.206	.044	.349	4.621	.000
	Information Management system	.272	.041	.462	6.693	.000
	Transport Management System	.213	.034	.517	6.249	.000

a. Dependent Variable: Performance of IGOs

The fitted model was:

$$Y = 3.688 + 0.104\,X_1 + 0.206X_2 + 0.272X_3 + 0.213X_4$$

Where: - Y= Performance of IGOS

β_0=constant

$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 = regression coefficients

X_1= Electronic Procurement System; X_2= Inventory management system; X_3= Information Management system; X_4= Transport Management system; ε=Error Term

The regression equation established based on table 5 shows that, holding all independent variables constant, the performance of IGOs will be 3.688 units. According to the regression coefficients, a unit increase in Electronic Procurement System results in a 0.104 increase in performance, indicating that Electronic Procurement System significantly enhances organizational performance. Similarly, a unit increase in Inventory management system leads to a 0.206 rise in performance, while a unit change in the Information Management System results in a 0.272 improvement in IGO performance. Lastly, a unit increase in the Transport Management System leads to a 0.213 increase in performance.

At a 5% level of significance and a 95% confidence level, all the independent variables—Electronic Procurement System , Inventory management system, Information Management System, and Transport Management System—show a significant influence on IGO performance, as all p-values are below 0.05 (0.000, 0.001, 0.000, and 0.000, respectively). Therefore, their coefficients should be retained in the final model. Among the predictors, the results suggest that the information Management System has the greatest impact on performance, followed by the transport Management System, inventory management system, and lastly Electronic Procurement System as indicated by their respective coefficients.

CONCLUSION

The study concludes that the adoption of Supply Chain Technologies significantly enhances the performance of Inter-Governmental Organizations (IGOs) in Nairobi City County. The integration of technologies such as Electronic Procurement System, Inventory management system, Information Management Systems, and Transport Management Systems has proven to be pivotal in achieving operational efficiency, cost-effectiveness, and improved service delivery. Electronic Procurement System emerged as a key factor influencing IGO performance by streamlining procurement processes, reducing manual errors, and enhancing transparency and accountability. The findings indicate that automation in procurement facilitates quicker decision-making, efficient supplier management, and more effective resource allocation, ultimately leading to improved organizational performance.

Inventory management system was also identified as a critical driver of efficiency within IGOs. Automated inventory systems have enabled organizations to monitor stock levels in real-time, forecast demand accurately, and reduce the risks of overstocking or stockouts. This has resulted in optimized inventory control, reduced operational costs, and enhanced customer satisfaction, demonstrating that inventory management system is essential for maintaining efficient supply chains. The implementation of Information Management Systems (IMS) has further

contributed to improved IGO performance by facilitating seamless communication, better data management, and informed decision-making. The adoption of centralized electronic repositories and real-time data sharing has enabled IGOs to achieve greater visibility, coordination, and collaboration, leading to enhanced supply chain effectiveness. Lastly, the adoption of Transport Management Systems (TMS) was found to have the most significant impact on performance. TMS technologies have improved logistics operations, reduced transportation costs, and ensured timely delivery of goods and services, which are critical to the success of IGOs. The study hence confirms that the integration of supply chain technologies is indispensable for the efficient functioning and performance of IGOs. These technologies offer a competitive advantage by enhancing operational processes, reducing costs, and ensuring the effective delivery of services within an increasingly complex and dynamic global environment.

RECOMMENDATIONS

The study revealed that Electronic Procurement System significantly influences the performance of IGOs, leading to increased efficiency, transparency, and cost savings. Therefore, it is recommended that IGOs should invest in Comprehensive E-Procurement Systems. To enhance procurement efficiency, IGOs should invest in advanced e-procurement platforms that support end-to-end processes, including e-sourcing, e-tendering, and e-invoicing. This integration will streamline procurement activities, minimize manual errors, and reduce processing time. For effective implementation, organizations should regularly train their staff on using Electronic Procurement System tools. This will improve proficiency, reduce resistance to change, and ensure the smooth adoption of these technologies across the organization. IGOs should also standardize procurement processes across departments to promote consistency and transparency. By establishing clear procurement policies and procedures, organizations can avoid delays and inefficiencies while ensuring compliance with procurement regulations. Supply chain technologies should be leveraged to build a more collaborative relationship with suppliers. By using supplier management portals, IGOs can improve communication, conduct better supplier evaluations, and foster stronger partnerships that lead to enhanced procurement performance.

Inventory management system was found to have a significant impact on the performance of IGOs by improving stock control and reducing costs. To leverage the benefits of inventory automation, IGOs should Implement Real-Time Inventory Tracking Systems**.** IGOs should adopt advanced inventory management software that provides real-time tracking of stock levels, demand forecasting, and automated replenishment processes. This will help in reducing instances of stockouts or overstocking, thereby ensuring smooth operations. Integration between inventory management systems and other organizational functions such as procurement, finance, and distribution is essential for seamless operations. This will enable better coordination, real-time data sharing, and more informed decision-making, ultimately leading to enhanced performance. By incorporating RFID (Radio Frequency Identification) and barcode scanning, IGOs can improve the accuracy and efficiency of inventory tracking, minimize human errors, and enhance the speed of inventory-related processes.

The study established that Information Management Systems (IMS) play a critical role in enhancing data accuracy, communication, and decision-making within IGOs. Based on this, the following recommendations are proposed: IGOs should invest in modern IMS platforms, such as Enterprise Resource Planning (ERP) systems, that provide a centralized repository for all organizational data. This will enable seamless information flow, improve data accuracy, and facilitate informed decision-making across different functions. To maximize the benefits of IMS, IGOs should foster a culture of data sharing and collaboration among employees. This can be achieved by encouraging the use of collaborative tools and platforms that allow real-time data access and communication. As IGOs handle sensitive data, it is crucial to implement robust data security measures, including encryption, access controls, and regular data backups. This will protect against data breaches, unauthorized access, and loss of critical information.

The Transport Management System (TMS) was identified as having the most significant impact on IGO performance. To maximize the benefits of TMS adoption, the following recommendations are made: IGOs should invest in comprehensive TMS solutions that provide functionalities such as route optimization, real-time tracking, and automated freight rate management. These features will enable efficient transportation planning, reduce fuel costs, and enhance delivery accuracy. To improve logistics operations, IGOs should use GPS and other real-time tracking technologies to monitor shipments, optimize routes, and ensure timely deliveries. This will enhance transparency, allow proactive monitoring, and improve customer service. Integrating the TMS with other supply chain management systems, such as procurement and inventory management systems, will create a unified platform for managing all aspects of transportation. This integration will facilitate seamless data exchange, improve decision-making, and ensure more efficient logistics operations.

REFERENCES

Albers, S. (2017). Data analysis and presentation. *Journal of Business Research, 85*, 1-10.

Ameso, E. A., Bukachi, S. A., Olungah, C. O., Haller, T., Wandibba, S., & Nangendo, S. (2018). Pastoral resilience among the Maasai pastoralists of Laikipia County, Kenya. *Land*, 7(2), 78. https://doi.org/10.3390/land7020078

Asenahabi, B. M. (2019). Basics of research design: A guide to selecting appropriate research design. *International Journal of Academic Research in Management Science, 8(1),* 27-34.

Bloomfield, R., & Fisher, P. (2019). Descriptive research methods in practice. *Social Research Methodologies, 14(3),* 102-118.

Cheboi, S. K., Ng'ang'a, W. S., Nyamanga, P., & Kibet, S. (2023). Providers' competencies and management practices for traditional palliative cancer care service delivery in Kenya. *Cancer Informatics*, 22, 11786329231211780. https://doi.org/10.1177/11786329231211780

Chehri, A., Sharma, T., Debaque, B., Duclos, N., & Fortier, P. (2022). Transport systems for smarter cities, a practical case applied to traffic management in the city of Montreal. In *Sustainability in energy and buildings 2021* (pp. 255-266). Springer Singapore.

Chen, S., Cowan, C. F. N., & Grant, P. M. (1991). Orthogonal least squares learning algorithm for radial. *IEEE Trans. Neural Netw*, *2*, 302-309.

Cui, R., Li, M., & Zhang, S. (2022). AI and Procurement. *Manufacturing & Service Operations Management*, *24*(2), 691-706.

Dash, R., McMurtrey, M., Rebman, C., & Kar, U. K. (2019). Application of artificial intelligence in automation of supply chain management. *Journal of Strategic Innovation and Sustainability*, *14*(3), 43-53.

Dolgui, A., & Ivanov, D. (2021). Ripple effect and supply chain disruption management: New trends and research directions. *International Journal of Production Research*, *59(1)*, 102-109.

Dolgui, A., & Ivanov, D. (2022). 5G in digital supply chain and operations management: fostering flexibility, end-to-end connectivity and real-time visibility through internet-of-everything. *International Journal of Production Research*, *60*(2), 442-451.

Fiestras-Janeiro, M. G., García-Jurado, I., Meca, A., & Mosquera, M. A. (2011). Cooperative game theory and inventory management. *European Journal of Operational Research*, *210*(3), 459-466.

Garson, G. D. (2013). *Validity and reliability in research design*. Statistical Publishing House.

Grant, G. (1991). *Technology and empire*. House of Anansi.

Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017). Information technology for competitive advantage within logistics and supply chains: A review. *Transportation Research Part E: Logistics and Transportation Review*, *99*, 14-33.

Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017). Information technology for competitive advantage within logistics and supply chains: A review. *Transportation Research Part E: Logistics and Transportation Review*, *99*, 14-33.

Hartman, A. L., Nambulli, S., McMillen, C. M., White, A. G., Tilston-Lunel, N. L., Albe, J. R., ... & Duprex, W. P. (2020). SARS-CoV-2 infection of African green monkeys results in mild respiratory disease discernible by PET/CT imaging and shedding of infectious virus from both respiratory and gastrointestinal tracts. *PLoS pathogens*, *16*(9), e1008903.

Herold, S., Heller, J., Rozemeijer, F., & Mahr, D. (2023). Dynamic capabilities for digital procurement transformation: a systematic literature review. *International Journal of Physical Distribution & Logistics Management*, *53*(4), 424-447.

Hoeft, M., Pieper, M., Eriksson, K., & Bargstädt, H. J. (2021). Toward life cycle sustainability in infrastructure: the role of automation and robotics in PPP projects. *Sustainability*, *13*(7), 3779.

Hoskisson, R. E., Wan, W. P., Yiu, D., & Hitt, M. A. (1999). Theory and research in strategic management: Swings of a pendulum. *Journal of management*, *25*(3), 417-456.

Htun, A. R. K. A. R., Maw, T. T., & Khaing, C. (2019). Lean manufacturing, just in time and Kanban of Toyota production system (TPS). *International Journal of Scientific Engineering and Technology Research*, *8*(1), 469-474.

IGRTC. (2025). *Intergovernmental Relations Technical Committee Report*. Nairobi: Government Press.

Jena, S. K., & Ghadge, A. (2021). An integrated supply chain–human resource management approach for improved supply chain performance. *The International Journal of Logistics Management*, *32*(3), 918-941.

Jepherson, M., Ngugi, P., & Moronge, M. (2021). Logistics management systems and performance of fast-moving consumer goods manufacturers in Nairobi, Kenya. *International Journal of Supply Chain Management*, *6*(1), 29-63.

Kafi, M. A., Saifudin, A. B. M., bin Zainuddin, N., Shahron, S. A., Abualrejal, H., & Mohamad, M. (2022, December). Essential of RFID technology in supply chain management: A review on digital perspective. In *2022 International Conference on Intelligent Technology, System and Service for Internet of Everything (ITSS-IoE)* (pp. 1-6). IEEE.

Kagiri, A., & Njung'e, R. M. (2020). Role Of Total Quality Management Practices On Performance Of Fairtrade Premium Projects In Kenya. *International Journal of Entrepreneurship and Project Management*, *5*(2), 1-26.

Kaplinsky, R., & Morris, M. L. (2019). Trade and industrialisation in Africa: SMEs, manufacturing and cluster dynamics. *Journal of African Trade*, *6*(1/2), 47-59.

Karim, M., Tahera, U., & Nasrin, S. (2020). Supply Chain Management: Materialization of Process Management to Attain Greater Accomplishment in Business Function. *Fareast International University Journal*, *104*.

Karlina, O., Ridwan, A. Y., & Fajrillah, A. A. N. (2019, July). Designing green procurement system based on enterprise resources planning for the rubber processing industry. In *2019 International Conference on Electrical Engineering and Informatics (ICEEI)* (pp. 608-613). IEEE.

Kumatongo, B., & Muzata, K. K. (2021). Understanding research design: A systematic approach. *International Journal of Research Methodology, 12(4)*, 43-59.

Maaz, M. A. M., & Ahmad, R. (2022). Impact of supply chain performance on organizational performance mediated by customer satisfaction: A study of the dairy industry. *Business Process Management Journal, 28(1)*, 1-22.

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.

Mishra, N., Mangla, S. K., Luthra, S., Singh, A., Rana, N. P., Dora, M., & Dwivedi, Y. (2018). Barriers to effective circular supply chain management in a developing country context. *Production Planning & Control, 29(6)*, 551-569.

Mohajan, H. (2020). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People, 9(1),* 7-38.

Monczka, R., Trent, R., & Handfield, R. (2015). *Purchasing and Supply Chain Management*. South-Western College Publishing.

Musanga, M. B., Ondari, N. G., & Kiswili, N. E. (2015). Buyer-supplier relationship and supplier responsiveness: A case of manufacturing firms listed in Nairobi stock exchange, Kenya. *International Journal of Economics, Commerce and Management, 3*(4), 1-23.

Mwamkuu, P. M., Namusonge, E., & Nyile, E. K. (2024). Succession Planning Practices and Service Delivery in the Health Sector of Taita Taveta County Government. *African Journal of Emerging Issues, 6*(6), 39-61.

Nawi, A., Ibrahim, M. F., & Rahman, M. N. (2020). A review of Cronbach's alpha test in reliability study. *International Journal of Research Methodology, 18(4),* 78-95.

Pandey, P., & Pandey, M. (2021). Research methodology: A practical and scientific approach. *Journal of Research in Science, 10(3),* 22-37.

Piprani, A. Z., Mohezar, S., & Jaafar, N. I. (2020). Supply chain integration and supply chain performance: The mediating role of supply chain resilience. *International Journal of Supply Chain Management, 9(3),* 58-73.

Praveen, U., Farnaz, G., & Hatim, G. (2019). Inventory management and cost reduction of supply chain processes using AI-based time-series forecasting and ANN modeling. *Procedia Manufacturing, 38,* 256-263.

Stehman, S. V., & Overton, W. S. (2020). Statistical considerations in sampling and data analysis. *Journal of Statistical Research, 25(2),* 56-72.

Stratton, S. J. (2021). Population frames and their impact on research validity. *Journal of Applied Research, 10(2),* 45-57.

Tan, L., & Jiang, J. (2018). *Digital signal processing: Fundamentals and applications*. Academic Press.

Waaswa, A., Nkurumwa, A. O., Kibe, A. M., & Kipkemoi, J. N. (2024). Adapting agriculture to climate change: Institutional determinants of adoption of climate-smart agriculture among smallholder farmers in Kenya. *Cogent Food & Agriculture*, 10(1), 2294547. https://doi.org/10.1080/23311932.2023.2294547

Wang, H. (2015). Statistical modeling in multiple regression analysis. *Statistical Methods Review, 32(4),* 79-101.

Zohrabi, M. (2013). Mixed method research: Instruments, validity, reliability, and reporting findings. *Theory and Practice in Language Studies, 3(2),* 254-262**.**