

# Inventory Automation and Performance of Distribution Firms in Nairobi City County, Kenya

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**Purpose:** the aim was to establish the relationship between Inventory automation and performance of distribution firms in Nairobi City County, Kenya. The specific objectives of this study were; E- sourcing, E-tendering, E-invoicing and E-payment respectively. The study was employ a descriptive research design. The study preferred this method because it allowed an in-depth study of the subject.

**KEYWORDS:** E- sourcing, E-tendering, E-invoicing and E-payment and performance of distribution firms

## 1.1 Resource Based Theory

Resource based theory is the study of how the exterior resources of an organization affect the performance of the organization. According to Chiappori and Salanie (2003), the procurement of exterior resources such as production scheduling software's is a significant tenet of both the strategic and tactical management of any company, an implication in the procurement efficiency of the buying firms especially in tapping into the connection with suppliers as their important and dependable associates through resources such as just in times systems of delivery. Thus, this theory props up the concept of supply chain management, resource-based theory proposes that actors lacking in crucial resources will seek to create relationships with others in order to acquire required resources such as sales scheduling resources (Eisenhard & Graebner, 2007). Just like sellers on buyers for precious markets and buyer will depend on suppliers for external resources. Also, organizations endeavour to alter their reliance relationships by lessening their own reliance or by increasing the dependence of other organizations on them.

## 1.2 Theory of Constraints

The theory of constraints is a method for managing operations that was created. It offers a supply chain management philosophy of how businesses should be operated, particularly the categorization of inventories, according to Chiappori and Salanie (2003). The concept was extended to theory of constraints (TOC) with a publication which views any manageable system as being limited in achieving more of its objectives by a very small number of constraints. There is always one constraint and the TOC uses a focusing process to identify the constraint and restructure the supply base around it. TOC emphasizes on the optimization of performance within a defined set of constraints of the existing process and it provides an action framework which combines the activities of the managers and the visible system elements (Eisenhard & Graebner, 2007).

## 1.3 Innovation Diffusion Theory

Diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread. Feidler and House (1994), a professor of communication studies, popularized the theory in his book Diffusion of Innovations; the innovation must be widely adopted in order to self-sustain. Diffusion of Innovation (DOI) theory is a popular model used in information systems research to explain user adoption of new technologies. Rogers defines diffusion as 'the process by which an innovation is communicated through certain channels over time among the members of a social society'. According to Chiappori and Salanie (2003), DOI, the rate of diffusion is affected by an innovation's relative advantage, complexity, compatibility, trialability and observability. He also defines relative advantage as 'the degree to which an innovation is seen as being superior to its predecessor'.

Complexity, which is comparable to perceived ease of use construct, is 'the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand (Christopher, 2009).

#### 1.4 Transaction Cost Economic Theory

Transaction cost economics (TCE) has been the predominant theory used to examine business sourcing and inventory control systems from a just in time perspective (Christopher, 2009). TCE tenets imply that sourcing decisions involve a comparison of the just in time and economic order quantity. The total transaction costs included in the inventory control systems include the direct economic costs associated with sourcing service development and delivery, transaction-based monitoring and control costs incurred to ensure that the purchaser acts in the best interest of the firm. Inventory control transaction costs also increase with asset specificity, where the increased complexity of interactions required to produce sourcing outputs necessitates increased monitoring and control costs to protect source investments. Chiappori and Salanie (2003), TCE offers a very rational view for evaluating make versus buy decisions, where the sourcing choice is made strictly based on the economic merits of market versus hierarchy costs associated with each individual inventory control systems. In such cases, the level of analysis implied by TCE moves from the individual transaction to the network of inventory control systems at the organizational level, with firms making inventory control systems that maximizes the economic value added from interactions with sourcing partners. The overall value of these inventory control systems includes the minimization of economic costs incurred from managing a nexus of inventory control systems, as well as maximizing the value of network connections and other knowledge gained from inventory control systems and transactions; this is very applicable in procurement functions in the distribution firms (Christopher, 2009).

#### 2.1 E-Sourcing

The idea of e-invoicing is not new. Electronic invoices have been around for 30 years, using electronic data interchange (EDI) and XML formats. More recently, the main driver behind e-invoicing adoption has come from a government level. Fatonah, Yulandari and Wibowo (2018), in Europe the world's most active region with regard to e-invoicing a series of legislation has been created to promote the uptake of e-invoicing across the European Union. In fact, as of April 2020, EU countries are required to transpose the European Union's e-Invoicing Directive into their national laws and comply with its associated standards. The benefits of e-invoicing: Significant cost and time savings can be achieved by removing paper and manual processing from your invoicing. But the real benefits of e-invoicing come with the level of integration you can achieve, not only with your trading partners but also between your invoicing software and other business systems. For accounts payable in particular, integrating e-invoices directly into the AP automation solution further drives touchless invoice processing - which frees up time and resources for more value-adding and strategic tasks (Ongeri & Osoro, 2021). Starting to send and receive e-invoices can be an excellent first step of your organization's digital transformation journey, and a critical step in ensuring that your business operations are efficient and scalable to support future growth.

Technological innovation in the supply chain has become very important, allowing improvements, in terms of efficiency and quality, in the management of physical, information and financial flows. Fatonah et al. (2018), an automated inventory management system contributes greatly to business digitalization, leading to increased system accuracy, the tuning of real-time tracking, early problem detection, and increased efficiency. Obviously, an automated inventory system is able to grant new possibilities to your business. Either you are an e-commerce executive, small, medium, or perhaps a fortune-level supply chain business owner. You might even have deep roots in logistics. If so, that's great news! Going digital and optimizing and streamlining your inventory management will increase bottom-line Return on investment. Moreover, it will free up cash flow to invest in the latest and greatest emerging tech. We can help support those efforts, but first, let's take a look at an automated inventory management system works (Ongeri & Osoro, 2021). A lot of digital transformation companies provide a variety of automated inventory management systems to optimize business scalability, address human error issues, save time, and, as a result, gain cost-effective company operations.

How can you reach a smoother performance of supply chain business processes? Regarding inventory, automation is defined as utilizing certain software or technology to manage warehouse stock in real-time with minimum effort and errors (Feizabadi, Gligor & Alibakhshi, 2021). This sophisticated method grants new possibilities in: processing customer order deliveries; inventory demand fulfillment; managing real-time data, which is essential for warehouse operations; comprising all the warehouse management systems already applied; and performing tracking tasks (Li, & Zhao, 2020). Inventory automation includes many options. Among the most widespread ones used by the retailers is automated reordering; keeping accurate track records of stock transferring; uniting multiple locations reporting in your chain; processing store orders; notifying about the goods dispatch. These and other options give opportunities to address operational cases when workers manually log each item into the inventory system and errors occur as well as visually inspect products' quality and quantity (Feizabadi et al., 2021). Intel reports 5% of inventory inaccuracy only due to manual processing. However, other problems exist as well to be solved by digitalizing business operations.

That is why utilizing inventory management software grants the potential to the whole business to perform better. Mainly inventory is grouped into: raw materials as components for the production of the finished goods; finished goods as the products ready for selling; MRO (maintenance, repair, and operating supplies stands for everything supporting the manufacturing process. What's interesting is that the screws, for example, used for machinery assembling are classified as raw materials, but when they are the spare parts for machinery repairing, they are grouped like MRO; work-in-progress inventory items, which are the goods waiting for the next stage of processing having been produced such as goods placed in the stock for quality control. Sunmola and Shehu (2020), an asset tracking expert on the market, uses the concepts of perpetual and periodic inventory control systems (Obradovi, Vla & Dabi, 2021). Perpetual control apps update information about the stock in real-time via barcodes and special scanning equipment. Periodic ones utilize manual item counting and number comparing in the beginning and in the end of the period. Once a company applies a perpetual system to count on MRO or raw materials, it needs special equipment; but when it uses a periodic control system, it should consider counting errors and time limits to provide the sales department with accurate information.

## 2.2 E-Tendering

According to Feizabadi et al. (2021), E-procurement is the use of internet to operate the transactional aspects of requisitioning, authorizing, ordering, receiving and payment process for the required services and products. Sheik and Singh (2020) defines e-procurement as the electronic integration and management of all procurement activities including purchase request, authorization, ordering delivery and payment, between a purchaser and a supplier. E-procurement system is a probable means in reducing operation costs allowing wider choice of products, deducting manual order processing costs and administrative costs. E-procurement system (EPS) is an electronic system used to automate all or part of the procurement function by enabling the scanning, storage and retrieval of invoices and other documents, management of approvals; routing of authorization requests; interfaces to other finance systems and matching of documents to validate transactions (Masudin, Aprilia, Nugraha & Restuputri et al., 2021). E-procurement is not just about reducing the operational costs of an organization; but more about promoting the well-being of the employees and the enterprise as a whole through organizational efficiency.

Barcode is a visually represented picture available to be read by special scanners and giving the possibility to process inventory data quickly with no burden of the documents and manual counting (Mutuku, Muathe & James, 2019). This way of warehouse automation minimizes human errors and simplifies the stock records process. Radio-Frequency Identification (RFID) stands for recording crucial product data in smart labels, and this technology has several advantages in comparison with barcode systems. It can be performed off-site and Radio-Frequency Identification (RFID) tags can be reused in comparison with the possibility of barcode optical scanners usage. Thus, for example, the Intel Radio-frequency identification sensor platform (RSP) is reported to increase warehouse visibility, perform high "dock-to-stock" outcomes such as the goods are always ready and available for delivery) as well as smoothen the return-flow warehouse processes (special Intel RSP technology to track the movements of the boxes around premises. Both solutions enhance warehouse control greatly. They are part and parcel of inventory control workflow which includes the following key stages helpful in managing stock effectively: items design such as on this stage one needs to know the demand for the product; purchase order creation; goods delivery; purchased products return; reordering (Feizabadi et al., 2021).

That is why utilizing inventory management software grants the potential to the whole business to perform better. Mainly inventory is grouped into: raw materials as components for the production of the finished goods; finished goods as the products ready for selling; MRO (maintenance, repair, and operating supplies stands for everything supporting the manufacturing process. What's interesting is that the screws, for example, used for machinery assembling are classified as raw materials, but when they are the spare parts for machinery repairing, they are grouped like MRO; work-in-progress inventory items, which are the goods waiting for the next stage of processing having been produced such as goods placed in the stock for quality control. Sunmola and Shehu (2020), an asset tracking expert on the market, uses the concepts of perpetual and periodic inventory control systems (Obradovi, Vla & Dabi, 2021). Perpetual control apps update information about the stock in real-time via barcodes and special scanning equipment. Periodic ones utilize manual item counting and number comparing in the beginning and in the end of the period. Once a company applies a perpetual system to count on MRO or raw materials, it needs special equipment; but when it uses a periodic control system, it should consider counting errors and time limits to provide the sales department with accurate information.

## 2.3 E-Invoicing

Electronic invoicing (e-Invoicing) is the exchange of the invoice document between a supplier and a buyer in an integrated electronic format (Yevu, Yu, Nani, Darko & Tetteh, 2022). The adoption of technological solutions involves both organizational changes and reengineering of processes. The use of B2B tools provides a new role to management, who can spend more attention to strategic activities with greater added value (Harelimana, 2018). The traditional mode of acquisition is changed going from centralized to decentralize and this leads to a fundamental change in the role of employees in purchasing. A summary of the evolution of the purchasing function following the adoption of tools for e-procurement. This change is proportional to the intensity with which company uses the electronic market. The management will have to develop the rules that define the relationship between suppliers and customers. A new corporate figure, will have to design tools for decision making that allows employees to set the criteria for purchase (Feizabadi et al., 2021). So, these tools provide support and supervision in the purchase phase and an integrated view of the process. E-Procurement is defined as "a technology solution that facilitates corporate buying using the Internet". It 'a set of e-businesses and e-

solutions that support the buying process (Mutuku et al., 2019). In this specific case he focus along the chain moves from downstream, and then from the last links in the chain, to upstream, directly in contact with the supply network. With e-procurement the entire procurement process is handled online, so the company decided to make the purchases of various types, from raw materials to services, using B2B systems: these tools allow enterprises to reduce the cost and time of the procurement process, improve inventory and stocks management and, consequently, this is reflected in a decisive improvement in the management of all business processes (Harelimana, 2018).

This is a necessary solution for large companies because it makes easier and more effective the management of the entire process of purchasing and supply network, and, on the other hand, for smaller companies that, in adopting e-procurement solutions, can become part of a global business with many opportunities for growth (Harelimana, 2018). The entire process of Procurement involves a series of processes of implementing as well as series of evaluations on strategic choice. The entire process of e-Procurement is then divided into two phases: the phase of e-sourcing and the phase of e-Supply Chain Management. The e-supply chain is the series of processes involving a company and its main partners, managed in an integrated manner with the potential of new technological solutions that allow the planning of processes and objectives and the sharing of information relevant for the entire chain. In order to understand in detail the characteristics of e-supply chain, it can be adopted an analytical model based on two variables interpretative: the application environment which includes the processes of e-supply chain execution and collaboration; the technological choices of the company (Mogoi & Osoro, 2022).

## 2.4 E-Ordering

E-ordering is the electronic application, ordering and receiving of mainly facility products and services by the employees of an organization, The adoption of web-based e-ordering systems in the B2B purchasing transactions allows firms to reduce transaction costs, improve internal process efficiency and increase collaboration with suppliers. Lamorte (2019), the benefits of technology-based supports for procurement activities can be organized into two broad categories: Organizational level and Inter-organizational level. In organizational levels, previous studies suggested that implementing e-procurement systems could make companies' procurement process more efficient and effective through automating procurement process, re-engineering the internal process and enhancing inter organizational co-ordination. Mogoi and Osoro (2022) noted that by implementing e-procurement, the firm could shorten order fulfillment cycle time, lower inventory levels, and the price paid for goods, and reduces administrative costs of procurement.

Lamorte (2019), argued that the benefits of e-ordering can be classified into hard benefits, soft benefits, and intangible benefits such as cultural change, financial approval for all spending, and high visibility of supplier performance. He found out that e-procurement systems can bring benefits to the company such as reducing time to market cycles, reducing material and transactions costs, and reducing stock levels. He argued that the benefits of e-procurement include reduced purchasing cycle time and cost, enhanced budgetary control, elimination of administrative errors, increasing buyers' productivity, lowering prices through product standardization and consolidation of buys, improving the payment process, and improving information management (Mogoi & Osoro, 2022).

Implementing web-based e-procurement systems not only could make the operational processes of the buyer organization more effective but could also make order fulfillment process of the supplier organization more efficient and improve partner relationship management. The order fulfillment performance can be achieved through information sharing between buyer and supplier. Web-based e-procurement enables the information to be shared among trading partners, such as sales forecasts, production schedules, inventory levels and product specifications. Oteki, Namusonge, Sakwa and Ngeno (2018) assert that there are a number of requirements relating to the adoption e-procurement system. They include technology, objectives, information, staffing and skills. These requirements make the adoption process to face a number of challenges such as compatibility, integration, adoption and regular use by employees and lack of capacity by small suppliers (Tondon, 2018).

A good e-procurement system must have all elements that enable the buyers and sellers interact effectively including all supply chain activities from procurement planning information to supplier evaluation (Mogoi & Osoro, 2022). Both buyers and sellers should have access to each other's information as and when required electronically for smooth functioning of E-procurement. The commonly adopted e-procurement practices used in the public procurement includes: E-Tendering, E-Request for Quotations, E-Auctions, E-Catalogues, and E-Invoicing. According to Tondon (2018), tools such as E-Notice, E-Auction, E-Catalogue, E-Dossier, E-Submission and E-Signatures are part and parcel of e-procurement. In this study, Enterprise Resource planning (ERP); an information system package that integrates information and processes across organizational functions, E-maintenance; maintenance managed through computer over the internet, E-tendering, tendering through online platforms and E-Sourcing (online sourcing). Enterprise Resource Planning (ERP) followed in the 1970s, and then came the commercial use of the Internet in 1980s (Mogoi & Osoro, 2022).

It was only in the 1990s that the World Wide Web - the multimedia capability of the Internet became widely enabled and provided the essential resource for the automation of procurement. According to Tondon (2018), there are three types of e-Procurement Systems: Buyer e-Procurement Systems, Seller e-Procurement Systems and Online Intermediaries. While various e-Marketplaces have been launched based on the Enterprise Portal philosophy, the implementation of e-Procurement systems usually consists of two technologies within the Enterprise Application philosophy: a workflow system integrated with an e-Procurement application that supports requisition to payment; and the electronic catalogue that lists suppliers' items and prices over the Internet. Within these two philosophies, there are again two different approaches that the public sector agencies have used for implementation of e-Procurement: an end to end e-Procurement solution (the "big bang" approach), and the incremental implementation (Mogoi & Osoro, 2022).

## 2.5 Performance of Distribution Firms

The transmission of commodities from one business to another is referred to as distribution. Factory to supplier, supplier to retailer, or retailer to final consumer are all possible scenarios. It is described as a series of middlemen who each pass the product on to the following company before it finally reaches the customer or end-user. The "distribution chain" or "channel" is the term used to describe this procedure. The manufacturer must take into mind both the needs of the crucial end-user and those of each individual link in these chains, as each will have unique requirements (Alene, 2008). Due to the increasingly competitive global corporate climate over the past few decades, global supply chain management has significantly increased in relevance. Mogoi and Osoro (2022) emphasize the necessity of supply chain design for international operations and contend that the selection of a supply chain strategy affects performance in a competitive environment. The globalization or internationalization of supply chains has boosted foreign rivalry in the local marketplaces of the nations. Because of this, businesses must act swiftly and carefully when making strategic and tactical decisions on the global sourcing of goods and services in order to reduce the severity of any associated risks or issues (Mutuku, 2020).

Procurement firms establish relationships networks with their key suppliers when they perceive supply risks (Ominde, Osoro & Monari, 2022). Their study on supply risk management via relational approach in the Chinese business context reveals that improved communication and supplier trust are positively related to supplier performance and emphasized that in order to "mitigate quality risks, supply chain members are coordinated by sharing their information". This result supports on integration of the global supply chain. Supply chain management (SCM) has received in recent years a great deal of attention by researchers and practitioners. Effective SCM will lead to a lowering of the total amount of resources required to provide the necessary level of customer service to a specific segment and improving customer service through increased product availability and reduced order cycle time; engage in information exchange (forecasting techniques, inventory management, delivery) and structural collaboration (just-in-time system, outsourcing, vendor-managed inventory and co-locating plants) relationships with downstream supply chain partners to create end-customer value and maximize benefits and minimize costs along the supply chain (Mogoi & Osoro, 2022).

Supply chain is a dynamic process and involves the constant flow of information, materials, and funds across multiple functional areas both within and between chain members (Puckett, 2019). Members in the chain need to cooperate with their business partners in order to meet customer's needs and to maximize their profit. However, it is a very difficult task in managing the multiple collaborations in a supply chain because there are so many firms involved in the supply chain operations with its own resources and objectives. The interdependence of multistage processes also requires real-time operation and decision making across different tasks, functional areas, and organizational boundaries in order to deal with problems and uncertainties. The strategic move of focus for mass customization, quick response, and high quality service cannot be achieved without more complex cooperation and dynamic structure of supply chains. Supply Chain Management is the function within and outside a company that enables the value chain to make products and provide services to the customer (Nyaboke et al., 2015). It is the network of entities through which material flows. Those entities may include suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers. Supply Chain Management coordinates and integrates all these activities into a seamless process. The ultimate goal of strategy is "long-term, sustainable superior performance." Such superior performance depends on the ability of an organization to become a fully integrated partner in a supply chain (Puckett, 2019),

This requires that organizations adopt a supply chain strategy that focuses on how both internal and external business processes are integrated and coordinated throughout the supply chain to better serve ultimate customers and consumers while enhancing the performance of the individual supply chain members. Examples of business processes that must be integrated include manufacturing, purchasing, selling, logistics, and the delivery of real-time, seamless information to all supply chain partners. Managing at the level of a supply chain requires a new focus and new ways of thinking as pointed out by Nyaboke et al. (2015). Managers must learn to communicate, coordinate, and cooperate with supply chain partners. Ongeru and Osoro (2021), described supply chain management as a "strategic level concept." Supply Chain Management (SCM) as having three core elements: value creation, integration of key business processes and collaboration. Based on this conceptualization, they define SCM as "the philosophy of management that involves the management and integration of a set of selected key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders through the collaborative efforts of supply chain members (Nyaboke et al., 2015).

## Research Design

Research design refers to a detailed outline of how the overall strategy integrates the different components of the study in a coherent and logical way to effectively address the research problem (Kothari, 2011). It is the plan on how to answer research questions. The different types of research designs included descriptive research design. The study adopted a descriptive research design since the study gathered quantitative and qualitative data was described by the nature and characteristics of the effects of inventory automation on performance of distribution firms in Kenya. Descriptive survey research design is the type of design used to obtain information concerning the current status of the phenomena to describe 'what exists' with respect to variables or conditions in a situation. It was

also in deriving quantitative measures that helped in making inferences about possible relationships that exists between independent and dependent variables (Kothari 2011).

### 3.1 E-sourcing

Respondents were asked to give their opinion on the variable e-sourcing. From table 1.1, the respondents unanimously agreement that calling vendors to supply e-sourcing, on performance of distribution firms in Nairobi City County viable (M=3.732 SD=1.1492); Through Digital Purchase distribution firms are able to make rational decisions on priority and non-priority to performance of distribution firms (M=3.723, SD=.8052); online expediting management assessment has contributed to the quality and innovation of performance of distribution firms (M=3.845, SD=.8124); online tracing assessment for performance of distribution firms can put in place quick delivery and maintain inventory automation in procurement optimization (M=3.173, SD=.8525); in Nairobi City County performance of distribution firms to prevent complaints (M=3.842, SD=1.1762); and inventory automation management practices enhances performance of distribution firms in Nairobi (M=3.850, SD=.8022). These findings were in line with the findings of Ominde et al. (2022), who observed that clear description of inventory e-sourcing, can enhance effective performance of distribution firms in Nairobi City County, Kenya.

**Table 1.1:E-sourcing**

Statement	Mean	Std. Dev.
Digital purchase ensures conformance of inventory automation management	3.833	1.1492
Through inventory auto notification to vendors approaches the county can improve performance of groups	3.373	.8052
Online expediting of enhances performance of distribution firms	3.335	.8124
Online tracing management improving performance	3.174	.8525
The management of automation by e-ordering	3.842	1.1762
Inventory management practices enhances performance of Nairobi city County for all distribution firms	3.842	.8022

### 3.2 E-tendering

From table 1.2, respondents agreed that: The Nairobi City County considers by spend on e-tendering (M=3.811, SD=.8081);digital ordering is likely to improve performance of distribution firms in Nairobi City County (TORs) (M=4.180, SD=.7443); Instance delivery of goods on performance of distribution firms in Nairobi City County (M=4.425, SD=.8292); through online award supply chain management can get performance of better chain networks for improvement in Nairobi City County (M=4.408, SD=.7317); digital document receipts can enhance performance of distribution firms in Nairobi City County, Kenya (M=4.581, SD=.8305); Through online delivery management enhances performance of distribution firms in Nairobi City County, Kenya (M=4.302 SD=.8230) . These findings concur with Nyile et al. (2021), they observed that that the goal of just in time in inventory management practices is to ensure performance of preferences groups in Nairobi City County, Kenya. Effective of just in time minimizes or eliminates delays s and potential claims and compensation to our clients. This is concurs with the finding of Mwangi (2019). It is essential for just in time to understand the provisions of the inventory management practices, have the ability to perform to all parties involved, and maintain control over the performance of distribution firms in the said county.

**Table 1.2: E-tendering**

Statement	Mean	Std. Dev.
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Digital ordering enhances performance of distribution firms

County	3.811	.8081
By use of online award enables performance of distribution firms County	4.182	.7443
By digital document receipts enhances Performance of Distribution firms County	4.425	.8292
Engagement of quick response enhances performance of Distribution firms County	4.408	.7317
Sound inventory enhances procurement Performance of distribution firms County	4.581	.8305
Engagement of supplier can boast procurement performance of distribution firms County	4.302	.8300

**3.3 Regression Analysis**

To establish the degree of the effect of supply chain for a regression analysis was conducted, with the assumption that: variables are normally distributed to avoid distortion of associations and significance tests, which was achieved as outliers were not identified; a linear relationship between the independent variables and dependent variable for accuracy of estimation, which was achieved as the standardized coefficients were used in interpretation. The multiple regression model was as follows: Where;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Performance of distribution firms =  $\beta_0 + \beta_1$  (e-sourcing) +  $\beta_2$  (E-tendering) +  $\beta_3$  (e-invoicing) +  $\beta_4$  (e-ordering) + error term. Regression analysis produced the coefficient of determination and analysis of variance (ANOVA). Analysis of variance was done to show whether there is a significant mean difference between dependent and independent variables. The ANOVA was conducted at 95% confidence level.

**3.4 Model of Goodness Fit**

Regression analysis was used to establish the strengths of relationship between the performance of distribution firms (dependent variable) and the predicting variables; s e-sourcing, e-tendering, e-invoicing and e-ordering (Independent variables). The results showed a correlation value (R) of 0.734 which depicts that there is a good linear dependence between the independent and dependent variables. This finding is in line with the findings of Mogoi and Osoro (2022). They observed that this also to depict the significance of the regression analysis done at 95% confidence level. This implies that the regression model is significant and can thus be used to evaluate the association between the dependent and independent variables. This finding concurs with the findings of Okumu and Bett (2019), they observed that analysis of variance statistics examines the differences between group means and their associated procedures.

**Table 1.3 Model of Goodness Fit**

R	R2	Adjusted R	Std. Error of the Estimate
0.734	0.737	0.763	0.061

With an R-squared of 0.737, the model shows that e-sourcing, e-tendering, e-invoicing and e-ordering can contribute up to 73.7% on performance of distribution firms in Nairobi City County, Kenya, while 26.3% this variation is explained by other indicators which are

not inclusive in this study or model. A measure of goodness of fit synopsis the discrepancy between observed values and the values anticipated under the model in question. This finding is in line with the findings of Nyile *et al.* (2021).

### 3.5 Analysis of Variance (ANOVA)

From the results in table 1.4, analysis of variance statistics was conducted to determine the differences in the means of the dependent and independent variables to show whether a relationship exists between the two. The P-value of 0.005 implies that county performance of distribution firms have a significant relationship with e-sourcing, e-tendering, e-invoicing and e-ordering, which is significant at 5 % level of significance.

**Table 1.4 ANOVA TEST**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	5.356	1	1.013	.441	.004
Residual	6.477	98	.539		
<b>Total</b>	<b>11.733</b>	<b>99</b>			

### 3.6 Regression Coefficients of Determination

To determine the relationship between the independent variables and the dependent variable and the respective strengths, the regression analysis produced coefficients of determination. Findings in table 4.16 reveal a positive relationship between the performances of distribution firms in Nairobi City County, Kenya,

**Table 1.5 Regression Coefficient Results**

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-.132	.060	-1.144	1.002	.001
E- sourcing.	.234	.132	.830	5.401	.002
E- tendering	.134	.062	.163	2.231	.003
E-invoicing	.251	.057	.587	4.086	.002
E-ordering	.211	.115	.384	2.504	.002

A unit change in e-invoicing would thus lead to a .251 effect on performance of performance of distribution firms in Nairobi City County sector *ceteris paribus*; while a unit change in e-tendering would have an effect of .134 change in performance of performance of distribution firms in Nairobi City County; also unit change of e-sourcing would lead to .234 of performance of County, further unit change in e-ordering would lead to .211 of sector also a unit on performance of distribution firms in Nairobi City County and finally a unit change in dispute resolution would have an effect of -.132 of performance of distribution firms in Nairobi City County, Kenya This finding concur with the findings of Ominde *et al.* (2022). This implies that among other factors, e-sourcing, e-tendering, e-invoicing and e-ordering, are significant determinants of performance of distribution firms in Nairobi City County, Kenya.

### Conclusion

Therefore, from the foregoing, this study concludes that supplier engagement have broadly impacted on performance of distribution firms of Nairobi City County, Kenya. The findings conclude that any county should drive to embrace the best performance of distribution firms after improving supplier evaluation in Kenya. When public-private partnerships is embraced through supplier



engagement, supplier segmentation, risk management, and supplier development towards better performance of distribution firms in Nairobi City County, Kenya.

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