



## **SUPPLY CHAIN AGILITY AND PERFORMANCE OF SELECTED PRIVATE HOSPITALS IN NAIROBI CITY COUNTY, KENYA**

<sup>1</sup> Kuria Milkah Nyawira, <sup>2</sup> Dr. Ndeto Charles

<sup>1</sup>Masters Student, Jomo Kenyatta University of Agriculture and Technology

<sup>2</sup>Lecturer, Jomo Kenyatta University of Agriculture and Technology

### **ABSTRACT**

Supply chain agility is the capability of a business to swiftly and efficiently respond to changes in the market, customer preferences, or unforeseen disruptions. It involves the seamless integration of people, processes, and technology to create a flexible and adaptive supply chain. It also encompasses various aspects, including alertness, flexibility, decisiveness and swiftness. This study aimed at establishing the relationship between supply chain agility and performance of private hospitals in Nairobi County, Kenya. Specifically, this study sought to examine the relationship between supply chain alertness and the performance of private hospitals in Nairobi City County, Kenya and to assess the relationship between supply chain flexibility and the performance of private hospitals in Nairobi City County, Kenya. This research used a cross sectional survey research method because it inspects the prevalence of a condition in a defined population at a specific point or period in time without attempting to draw any inferences or offer any causes for the prevalence. The population targeted for this study was seventeen private hospitals in Nairobi, Kenya. The unit of analysis was head and three deputies of department in each facility namely: - procurement, administration, finance, and Public Health and Quality assurance. The target population was 340 respondents. From the target population of 340, Yamane (1973) sample size formula was used to select a sample size for this study. Primary data was collected through the use of structured questionnaires using a drop and pick method. The collected data from the questionnaire was given codes, keyed in the computer and edited for completeness. Statistical Package for the Social Sciences (SPSS) and Microsoft Excel was used for data analysis. This study focused only at seventeen private hospitals in Nairobi City County, however, future studies can consider expanding their scope to include more private, public and mission hospitals within the Nairobi City County. The study concludes that supply chain alertness has a positive and significant influence on the performance of private hospitals in Nairobi City County, Kenya. In addition, the study concludes that supply chain flexibility has a positive and significant influence on the performance of private hospitals in Nairobi City County, Kenya. Based on the findings, this study recommends that the management of private hospitals in Nairobi City County, Kenya should invest in advanced supply chain technologies to enhance their performance. By adopting cutting-edge technologies such as real-time tracking systems, predictive analytics, and automated inventory management, hospitals can improve their operational efficiency and responsiveness.

**Key Words:** Supply Chain Agility, supply chain alertness, supply chain flexibility, Performance of Private Hospitals

## **Background of the Study**

The present-day marketplace has been determined by severe competitive pressures, high uncertainty, and increased turbulence levels (Senbeto & Hon, 2020). Supply chain is a concept used to express time, labor, and cost efficiencies that help increase productivity. Supply chains in the various business facets worldwide experienced an unprecedented series of shocks especially after the COVID-19 virus outbreak and global pandemic, with new instigators of supply chain disruptions quite unlike any seen in recent times (Dmitry, 2020). The COVID-19 pandemic revealed a series of novel challenges for supply chain and operations management which beget an understudied research area and more so in the medical arena. The example of the COVID-19 pandemic shows that in cases of extraordinary events, supply chain resistance to disruption needs to be considered at the scale of survivability or viability to avoid supply chain and market collapses and secure the provision of goods and services. Such new dynamics, which constantly evolve require rethinking of some traditional analysis concepts to ensure supply chain viability.

The term agility refers to the process efficiency of businesses, while agility in terms of the supply chain is taken as the constituent of operational efficiency within whole supply chain operations (Zakir et al., 2022). Agility is a risk management tactic that enables companies and their partners to respond quickly to market changes and disruptions in the supply chain (Braunscheidel & Suresh, 2019). Supply chain agility needs to be able to respond to changes in supply and demand, ensure that the company remains competitive and has a shorter life cycle, promote the company's sustainable development, create new products and services, and foster social, environmental, and economic sustainability within the supply chain (Parera et al., 2019).

In an environment where the only constant is change, supply chain agility has become a source not only for competitive differentiation but in some instances also for the long-term sustainability of an organization (Lee, 2020). One of the first scholars to look at agility within the supply chain management context was Fisher (1997), with subsequent works enforcing supply chain agility as a business-wide capability, enabling the firm to respond to changing market environments (Braunscheidel and Suresh 2019). As such, agility is characterized by flexibility and speed/responsiveness and spans organizational structures, processes, information systems, and mindsets (Shaw et al. 2020). Supply chain agility thus extends beyond a single firm and involves alignment with major customers and suppliers (Braunscheidel & Suresh, 2019). Thus, an agile supply chain is considered a critical success factor in today's competitive market because a well-designed supply chain will enable companies to be more sensitive to market changes and better synchronize supply with demand (Isfianadewi, 2022).

In totality, supply chain agility is utilized to give businesses a competitive edge, it is the ability to adapt to quick changes in the market, shifting client preferences, and prioritize initiatives that benefit customers (Isfianadewi, 2022). Four factors of agility have been observed, and the impact of supply chain agility has been computed independently and collectively by different scholars providing multiple outcomes (Zakir et al., 2022). Integration of agility factors in the supply chain can assist the supply chain performance and supply chain process. Those factors of supply chain agility are typically alertness, flexibility, decisiveness and swiftness and they form the backbone of this study. In addition, different scholars deduced the impact of these factors in distinct ways and proposed that these factors are key tools to enhance the overall performance of any organization collectively or in part.

Agility capabilities created by firms translate into improved cost and operational performance. Further evidence provides that supply chain agility constitutes higher order dynamic

capabilities that enable the firm to reconfigure supply chain resources in a timely and flexible manner to cope with changes in supply and demand as well as in the structure of markets and economies, resulting in superior performance and competitive advantage. In addition, while supply chain agility may be able to contribute to performance through a more effective response to external supply disruptions, agility may also be able to provide significant benefits for the internal workings of the firm (Martin, 2020).

Opondo (2021) studied the influence of sustainable procurement and supply chain agility in all the county governments in Kenya. The outcome indicated that sustainable procurement influences the supply chain agility of the county governments; more specifically, green purchasing, supplier partnership, and supply chain responsiveness. The recommendations made from the study are that county governments must adopt sustainable procurement practices (green purchasing, supplier partnerships, adoption of ICT, ethical procurement, and eco-design and packaging) if they need to enhance their supply chain agility (supply chain efficiency and supply chain responsiveness).

Supply chain agility emphasizes fusing information about present product demand with projections for the immediate future to effectively deal with constraints and enhance the robustness of the supply chain (Kimaro et al., 2021). Effective execution of the agile strategy through vendor relationships and alliances enables the firm to deal with the limiting factors thus enhancing supply chain robustness. Various measures of supply chain agility have been fronted by various scholars and practitioners. They include responsiveness, flexibility, and extent of cooperation and information sharing (Ahmed & Huma, 2018). Other metrics include time to deliver, quality of the products, and customer satisfaction (Langela, 2022).

Mohammed (2022) explored the supply chain management practices, agility, and effects on the performance of manufacturing firms in the coastal region and the study concluded that supply chain agility positively intensified the relationship between customer relationship management, supplier management practices, and information sharing management practice. The study recommended that managers of manufacturing firms should exploit customer relationship management, supplier relationship management, information sharing management practice, and supply chain agility to refine the performance of manufacturing firms in the Region.

### **Statement of the Problem**

In today's competitive environment, service quality has become the most important and sustainable driver of competitive environment. Quality has become an important part of business thinking as it affects financial results of an organization. The best performing service organizations in terms of performance and market share are synonymous for the excellent quality of their services. It is important that quality of service is measured as it ensures that the expectations of the customers are met as it helps in improving on the areas that are below the threshold. Provision of quality service is important to the management of the private hospitals in Kenya and many organizations are keen on ensuring that they provide excellent care to their patients as it determines their performance. The private health sector are part of improving the access to quality services and this is done through the increase of quantity and quality of the services that they provide and helps in their growth

Despite the fact that many hospitals have taken into account the advantages of implementing supply chain practices, since best practices, methods, and techniques were initially implemented in the industrial settings, implementation of these practices in the health care organizations is problematic. Even firms with adequate internal processes have failed to facilitate international supply chain management. This factor results to minimized partnering

and collaboration among supply chain partners. Some players resort to traditional methods of operation which are expensive, time consuming and rigid. Due to the high number of the biggest private hospitals in Kenya being based in Nairobi city and the high number of people they offer specialized services, there exists a research gap on SCMP adopted by this private Hospitals.

In Nairobi County 47 % of resident use private hospital when they are unwell, medical consultation or any other diagnostics needed by the employers. This has made private hospital as an institution to play an integral part in ensuring the implementation process of government vision 2030 a reality. Given that healthcare system in Nairobi was greatly influenced by private hospital, which are uses mostly insurance company and other and other corporates medical scheme to finance the clients. However, increased fraud cases and insecurity are the major setbacks to financial performance of these private hospital facilities. It was noted that private hospitals account to about 38% of data security breaches in Kenya compared to 19% in financial services and 14% in retail.

Studies have been done on supplier chain agility in different sectors and contexts. For instance, Zakir et al. (2022) explored the nexus between supply chain agility and firms' performance within emerging nations by focusing on supply chain operations in the electronics and pharmaceutical sector; Haq et al. (2022) studied supply chain agility with a focus on the SMEs sector in Pakistan. Studies in Kenya on supply chain agility for instance by Opondi (2021) concentrated on county governments of Kenya, Mohammed (2022) studies supply chain agility on manufacturing firms in the coastal region, Hachu, and Nyang'au (2018) studied the influence of supply chain agility on competitiveness on LPG firms in Kenya, Keitany et al. (2019) studied supply chain agility on the cosmetic manufacturing firms. Studies done within the health sector in Kenya in both private and public hospitals have focused on supply chain quality management practices (Ondiek, 2021), supplier risk management practices on supply chain performance (Adala, 2022), Owich et al. (2022) studied the effect of supply chain collaboration practices on supply chain performance of county referral hospitals. This study sought to address the research gap by assessing the relationship between alertness and flexibility in the performance of selected private hospitals in Nairobi City County, Kenya.

## **Objectives of the Study**

### **General Objective**

The main objective of this study was to establish the relationship between supply chain agility and the performance of private hospitals in Nairobi City County, Kenya.

### **Specific Objectives**

- i. To examine the relationship between supply chain alertness and the performance of private hospitals in Nairobi City County, Kenya.
- ii. To assess the relationship between supply chain flexibility and the performance of private hospitals in Nairobi City County, Kenya.

## **Theoretical Literature**

### **Network Perspective Theory**

A firm's performance does not only rely on the consumer's relationship with the firm's partners but also on inter-business cooperation. Network perspective theory describes the relationship between companies, suppliers, and customers. Strategic relationships and alliances with others can help put together resources, and technologies for organizations to achieve more

competitiveness. Such a combination can be viewed as a quasi-organization (Haakansson et al, 2018). Network theory helps us to understand how information flows, collaborations, and partnerships formed among different partners, influence the overall efficiency and resilience of the supply chain (Trivedi, 2023).

Networks are also assumed to be gateways for information sharing among organizations thus presenting opportunities for increasing the learning potential. Zaheer et al. (2000) states that strategic networks provide organizations with access to information, resources, markets, and technologies; with advantage from learning, scale, and scope economies; and allows firms to achieve strategic objectives, such as sharing risks and outsourcing value-chain stages and organizational functions. This theory is key in this study as these networks are pivotal in identifying technologies for supply chain management that increase supply chain visibility, detecting threats to supply networks, detecting sudden changes in demand, and detecting unexpected changes in the physical flow throughout supply chains.

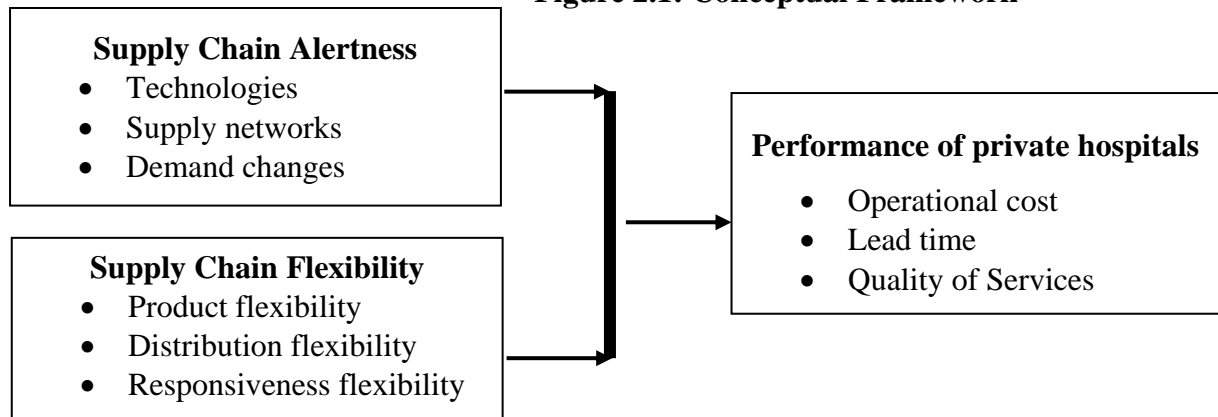
### **Systems Theory**

Systems theory is an interdisciplinary concept that studies the relationships, interactions, and interdependencies between components within a complex system. Systems theory states that the system itself is more important than all other individual parts that comprise it. Systems theory allows an organization to adapt to its environment, first by being morpho stasis, meaning "changing to adapt or adapting to change," and second by, morphogenesis, which is the organization's ability to grow and change for the better because of internal or external environmental conditions (Mack J. & Cloud D, 2023). Additionally, a system can have a feedback leeway from the individuals and other persons that modify and create it.

In supply chain management, system theory brings together various components of a complex supply chain such as human capital, information, materials, financial resources, etc to form a subsystem which then forms part of a larger system of supply chain networks (Paulra & Chen 2007). This theory argues that for a holistic approach, system theory must be employed to understand the internal and external factors that shape the organization's supply chain performance. Therefore, an organization should ensure that the supply chain topography is pertinent. This shows that the longer the supply chain links are, the less adaptable and flexible it is in terms of product, distribution, and responsiveness to various issues that may arise.

### **Conceptual Framework**

A Conceptual framework is a system of concepts, assumptions, and expectations that supports and directs research. The key variables in this study were categorized as independent variables and dependent variables. Mugenda (2008) explains that the independent variables are called predictor variables because they predict the amount of variation that occurs in another variable while the dependent variable, also called criterion variable, is a variable that is influenced by another variable.

**Independent Variables****Dependent Variable****Figure 2.1: Conceptual Framework****Supply Chain Alertness**

Alertness can be termed as a supply chain agility factor that has the potential to analyze abrupt changes or variations and grapple with those variations in the most optimistic way (Gligor et al., 2016). Supply chain alertness is understood as the capability to identify changes promptly (Li et al., 2008), which is the precursor to responsive actions. Supply chain alertness refers to the capability of a supply chain to detect changes, either from the external business environment or from the internal supply chain network, promptly (Li et al., 2009). Changes in an external business environment include threats and opportunities in the marketplace and among competitors (Christopher and Holweg, 2011). Supply chain alertness can contribute to a firm's financial performance at varying levels. At the firm level, it has been found that the alertness of a firm is positively related to its market influence (Li et al., 2016).

At the supply chain operational level, firms with alertness have better supply chain visibility and warning capability. Warning capability plays an important role in reducing the severity of supply chain disruption (Craighead et al., 2007). By identifying operational risks on time, alertness reduces potential financial losses caused by the bullwhip effect in supply chain disruptions. At a supply chain's strategic management level, alertness provides firms with an orientation toward adapting supply chains to structural shifts in the marketplace and, thus, sustaining their wealth-creating performance (Li et al., 2016).

Therefore, it argued that alertness is a critical component of supply chain resilience and has a positive influence on a firm's financial performance. Li et al., (2016) in studying supply chain alertness looked at the timeliness at which business units engaged in identifying technologies for supply chain management that increase supply chain visibility; identifying the supply networks and demand changes throughout supply chains.

**Supply Chain Flexibility**

Liu et al. (2005) refer to supply chain flexibility as the suppliers' capacity to respond rapidly to changes in subsequent demand with little increase in time and cost. Supply chain flexibility may be defined as the robustness of the buyer-supplier relationship under changing supply conditions. Supply chain flexibility measures the ability of the firm to flexibly respond to short-term, temporary changes in the supply chain and market environment with the existing supply chain (i.e. manufacturing, demand, and supply). Items refer, for example, to the firm's flexibility throughput times, production processes, or delivery times (Swafford, Ghosh, and Murthy 2016).

Vickery et al., (1999) looked at supply chain flexibility in five broad ways: Product flexibility, or the ability to customize products to meet specific customer demand; Volume flexibility, or the ability to adjust capacity to meet changes in customer quantities; New product flexibility or the ability to launch new or revised products; Distribution flexibility or the ability to provide widespread access to products and Responsiveness flexibility or the ability to respond to target market needs. Zhang and Wu (2013) classified supply chain flexibility into eight subsystems, namely research and development flexibility, resources flexibility, logistics flexibility, manufacturing flexibility, decision-making flexibility, information flexibility, corporate culture flexibility, and supply flexibility.

Wang and Xu (2016) offered a more detailed breakdown of supply chain flexibility. In their research, product flexibility is further classified into cost, quality, sales, and price flexibilities; time flexibility is classified into the flexibility of response and flexibility in delivery; resource flexibility is classified into flexibility as to material, energy, facility, human resources, information, technology, and capital; quantity flexibility is classified into the out-of-stock rate, the delayed orders rate, the orders ahead of schedule rate, and the average waiting order. Fang and Macclever et al. (2017) highlighted that supply chain flexibility should include 1) product flexibility, meaning the capability of the supply chain to introduce new products within a certain time; 2) time flexibility, being responsive towards customer demand; and 3) quantity flexibility, or the capability to deal with changes in the quantity of demand.

### **Empirical Literature Review**

Hachu and Nyang'au (2018) studied the influence of supply chain agility on the competitiveness of liquefied petroleum gas firms. The results suggest that higher effectiveness in the decisiveness of the supply chain led to better competitiveness of firms. The study finally concluded that the supply chain swiftness in action had significant and a positive influence on the competitiveness of firms. The study recommended that management of the competitiveness of liquefied petroleum gas firms must ensure that their agile supply chains are ready to face changes, within the supply chain itself and within the surrounding environment which thereafter will improve their competitiveness in terms of quality products and services. The study further recommends that once a change in the market is detected through the alertness capability, firms must also be able to access relevant data to decide how to provide an agile response which in turn will enhance their competitiveness.

Macclever, Annan & Boahen (2017) studied supply chain flexibility, agility, and firm performance. The study assessed the path between supply chain flexibility and firm performance using supply chain agility as a moderating variable. The findings revealed that supply chain flexibility and supply chain agility positively correlated with firm performance. Additionally, moderating supply chain agility on supply chain flexibility produced a positive effect; however, the effect was insignificant and this implies that supply chain agility does not significantly moderate the positive impact the supply chain flexibility has on firm performance. Supply chain flexibility better predicts firm performance through supply chain agility as a moderator and not a moderator. Therefore, it is rather necessary to appreciate the individual roles that both supply chain flexibility and supply chain agility play to ensure value for customers thereby contributing to firm performance and not necessarily moderating each other.

Wang and Wang (2022) examined supply chain agility as the antecedent to firm sustainability in the post-COVID-19. The authors sought to develop a model to incorporate supply chain agility and supply chain relationships that link firm sustainability to mitigate the impacts of the pandemic. The findings support that supply chain relationships and supply chain agility can be used to adapt to environmental circumstances. This study found that building supply chain agility and relationships may help to develop sustainable transformations in supply chains. This

may provide alternative instructions for managing sustainability in the post-COVID-19 era. The study also confirms that companies need to improve supply chain agility and build sustainability to mitigate the impacts of COVID-19 on supply chains in the post-COVID-19 environment. According to the study's empirical results, supply chain agility does not only refer to responsiveness and flexibility with both suppliers and customers but also contains problem-solving ability. Adding supply chain agility is costly, managers also must consider how much agility their companies and supply chains need to be helpful for businesses, and their supply chain strategies must support overall business objectives.

Irfan, Wang & Akhtar (2019) looked at enabling supply chain agility through process integration and supply flexibility. The purpose of the study was to emphasize the underlying mechanism through which firms can achieve supply chain agility and augment business performance from the vendor's perspective. The results revealed that supply flexibility (i.e. volume and mix) mediates the effect of process integration on supply chain agility. Supply chain agility, therefore, influences a firm's business operations and performance. Furthermore, the competence-capability framework is not consistent across the varying degrees of product complexity such as product complexity hinders the effect of supply flexibility on supply chain agility, whereas it amplifies the impact of process integration on supply chain agility. The conditional indirect effects suggest that the indirect effect of process integration on supply chain agility through supply flexibility becomes stronger when product complexity is high.

Fernandez-Giordano & Stevenson (2021) evaluated the relationship between firm supply chain agility and operational performance. The empirical evidence presented in the paper revealed that managers upon the successful implementation of firm supply chain agility strategies, enabled firms to compete in an increasingly dynamic and changing environment by simultaneously improving operations dimensions such as regarding product quality, production costs, product delivery, and production flexibility. The study further recommended that to enhance firm supply chain agility, managers need to develop both intra and inter-organizational resources. In terms of intra-organizational resources, the research provided evidence of how firms can improve firm supply chain agility by managing often overlooked aspects of the operations department.

## **RESEARCH METHODOLOGY**

### **Research Design**

This study adopted a cross-sectional survey research design. A cross-section survey is preferred since it inspects the prevalence of a condition in a defined population at a specific point or period in time without attempting to draw any inferences or offer any causes for the prevalence (Wang & Cheng 2020). The study intends to establish the relationship between supply chain agility and the performance of private hospitals in Nairobi City County, Kenya. Raw data was collected using questionnaires administered during the primary data-gathering period. The cross-sectional survey process does not permit control and manipulation of the variables of the study.

### **Target Population**

The population targeted for this study was private hospitals in Nairobi, Kenya. According to the NHIF classification, there are three categories of hospitals. Category A, B and C. Category C are private hospitals. It further classifies them into those with outpatient and inpatient services. The selected private hospitals in Nairobi are 17. The unit of analysis was head and three deputies of department in each facility namely: - procurement, administration, finance, and Public Health and Quality assurance. The target population was 340 respondents



**Table 3.1: Target Population**

Departments	Number Respondents	of Number of Facilities	Total Population
Procurement	4	17	68
Administration	4	17	68
Finance	4	17	68
Public Health	4	17	68
Quality Assurance	4	17	68
<b>Total</b>			<b>340</b>

Source: KPMDC, 2023

### Sample Size and Sampling Technique

Sampling is the process of selecting a number of individuals from a population such that the selected group contains elements representative of the characteristics found in the entire group (Orodho, 2019). A sample size refers to a small number of an entire target population. From the target population of 340, Yamane (1973) sample size formula was used to select a sample size for this study;

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size required

N is the population size =340

e is the level of precision =0.05

$$n = 340 / (1 + 340 * 0.05^2)$$

$$n = 184$$

The study used simple random sampling technique to select the 184 respondents from the 340-target population

**Table 3.2: Sample Size**

Departments	Samples size
Procurement	37
Administration	37
Finance	36
Public Health	37
Quality Assurance	37
<b>Total</b>	<b>184</b>

### Data Collection Instruments

This study used questionnaires for data collection. Questionnaires were semi- structured. Semi-structured questionnaires are suitable for measuring the perceptions and opinions of respondents being studied, Ekinici (2019). The questionnaire sought to answer the basic research objectives and the research questions. The questionnaires consisted of a series of specific, short questions to be answered by the respondents on their own. The questionnaire was in the format of 5-point Likert scale.

## **Pilot Study**

Cooper and Schindler (2019) posit that pilot test or pre-testing is conducted to detect weaknesses in design and data collection instruments and to provide proxy data for selection and probability sampling. This helps the researchers to minimize any potential errors that may crop up during the main study (Sreejesh, Mohapatra, & Anusree, 2019). Mugenda & Mugenda (2019) recommended that a pilot sample should be between 1% and 10% depending on the sample size. In this study, the pilot study was tested on 10% of the entire sample size, which translates to eighteen respondents. The pilot study enabled the researcher to restructure, modify, and eliminate any ambiguity for items in the questionnaire before the large study. In addition, it identified the gaps and limitations of data collection tools and address them before actual data collection.

## **Data Analysis and Processing**

IBM Statistical Package for the Social Sciences (SPSS) for Windows 10 was used for data entry, data cleaning, and data analysis.

The Pearson correlation model was used to evaluate the correlation between the dependent variable and the different independent variables in the study. To make an inference between the combined impacts of all four independent variables, multiple regression analysis defined by the model below was used. The coefficient of determination (RSquare) resulting from the regression equation was used to determine the goodness of fit (Ngechu, 2019). The research used a multiple regression model.

## **RESEARCH FINDINGS AND DISCUSSIONS**

### **Descriptive statistics**

#### **Supply Chain Alertness and the Performance of Private Hospitals**

The first specific objective of the study was to examine the relationship between supply chain alertness and the performance of private hospitals in Nairobi City County, Kenya. The participants were requested to indicate their level of agreement on various statements related to supply chain alertness and the performance of private hospitals in Nairobi City County, Kenya. The results were as shown Table 4.1.

From the results, the respondents agreed that their supply chain utilizes advanced technologies for real-time tracking of inventory levels. This is shown by a mean of 3.958 (std. dv = 0.636). As shown by a mean of 3.930 (std. dv = 0.972), the respondents agreed that they have implemented predictive analytics tools to forecast demand accurately. Further, with a mean of 3.872 (std. dv = 1.005), the respondents agreed that their organization invests in the latest supply chain management software. The participants agreed that they use automated systems to monitor and manage our supply chain operations. This is shown by a mean of 3.852 (std. dv = 0.608). As shown in the results, the respondents agreed that they regularly update their supply chain technology to keep up with industry advancements. This is shown by a mean of 3.773 (std. dv = 0.983). The respondents agreed that the technology they use allows for seamless communication with their suppliers. This is shown by a mean of 3.754 (std. dv = 0.786).

**Table 4. 1: Supply Chain Alertness**

	Mean	Std. Dev.
Our supply chain utilizes advanced technologies for real-time tracking of inventory levels.	3.958	0.636
We have implemented predictive analytics tools to forecast demand accurately.	3.930	0.972
Our organization invests in the latest supply chain management software.	3.872	1.005
We use automated systems to monitor and manage our supply chain operations.	3.852	0.608
We regularly update our supply chain technology to keep up with industry advancements.	3.773	0.983
The technology we use allows for seamless communication with our suppliers.	3.754	0.786
<b>Aggregate</b>	<b>3.864</b>	<b>0.819</b>

### Supply Chain Flexibility and the Performance of Private Hospitals

The second specific objective of the study was to assess the relationship between supply chain flexibility and the performance of private hospitals in Nairobi City County, Kenya. The participants were requested to indicate their level of agreement on various statements related to supply chain flexibility and the performance of select private hospitals in Nairobi City County, Kenya. The results were as shown Table 4.2.

From the results, the respondents agreed that their supply chain can easily accommodate changes in product design or specifications. This is shown by a mean of 4.255 (std. dv = 0.839). As shown by a mean of 4.242 (std. dv = 0.898), the respondents agreed that they can quickly introduce new products to their supply chain with minimal disruption. Further, with a mean of 4.115 (std. dv = 0.112), the respondents agreed that their supply chain supports the customization of products to meet specific customer needs. The participants agreed that they can rapidly adjust their production processes to manufacture different products. This is shown by a mean of 4.158 (std. dv = 0.969). As shown in the results, the respondents agreed that they have systems in place to manage changes in product demand without affecting supply chain performance. This is shown by a mean of 3.973 (std. dv = 0.983). The respondents also agreed that their supply chain can quickly adapt to changes in product regulations and standards. This is shown by a mean of 3.934 (std. dv = 0.873).

**Table 4. 2: Supply Chain Flexibility**

	Mean	Std. Dev
Our supply chain can easily accommodate changes in product design or specifications.	4.255	0.839
We can quickly introduce new products to our supply chain with minimal disruption.	4.242	0.898
Our supply chain supports the customization of products to meet specific customer needs.	4.115	0.112
We can rapidly adjust our production processes to manufacture different products.	4.158	0.969
We have systems in place to manage changes in product demand without affecting supply chain performance.	3.973	0.983
Our supply chain can quickly adapt to changes in product regulations and standards.	3.934	0.873
<b>Aggregate</b>	<b>3.985</b>	<b>0.598</b>

### Correlation Analysis

This research adopted Pearson correlation analysis to determine how the dependent variable (the performance of select private hospitals in Nairobi City County, Kenya) relates with the independent variables (supply chain alertness and supply chain flexibility).

**Table 4. 3: Correlation Coefficients**

		<b>Organization Performance</b>	<b>Supply Chain Alertness</b>	<b>Supply Chain Flexibility</b>
Organization Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	164		
Supply Chain Alertness	Pearson Correlation	.821**	1	
	Sig. (2-tailed)	.002		
	N	164	164	
Supply Chain Flexibility	Pearson Correlation	.831**	.297	1
	Sig. (2-tailed)	.001	.060	
	N	164	164	164

From the results, there was a very strong relationship between supply chain alertness and performance of private hospitals in Nairobi City County, Kenya ( $r = 0.821$ ,  $p$  value = 0.002). The relationship was significant since the  $p$  value 0.002 was less than 0.05 (significant level). The findings are in line with the findings of Aleman and Guererro (2016) who indicated that there is a very strong relationship between supply chain alertness and organization performance.

Moreover, there was a very strong relationship between supply chain flexibility and the performance of private hospitals in Nairobi City County, Kenya ( $r = 0.831$ ,  $p$  value = 0.001). The relationship was significant since the  $p$  value 0.001 was less than 0.05 (significant level). The findings are in line with the findings of Caritas, Julius and Zenon (2016) who indicated that there is a very strong relationship between supply chain flexibility and organization performance.

### Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (supply chain alertness and supply chain flexibility) and the dependent variable (performance of private hospitals in Nairobi City County, Kenya).

**Table 4. 4: Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.928 <sup>a</sup>	.861	.862	.10321

a. Predictors: (Constant), supply chain alertness and supply chain flexibility

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The  $r$ -squared for the relationship between the independent variables and the dependent variable was 0.861. This implied that 86.1% of the variation in the dependent variable (performance of private hospitals in Nairobi City County, Kenya) could be explained by independent variables (supply chain alertness and supply chain flexibility).

**Table 4. 5: Analysis of Variance**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	92.060	2	46.03	263.93	.002 <sup>b</sup>
Residual	13.868	161	.0872		
Total	105.928	163			

a. Dependent Variable: Performance of selected private hospitals

b. Predictors: (Constant), supply chain alertness and supply chain flexibility

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 263.93 while the F critical was 2.429. The p value was 0.002. Since the F-calculated was greater than the F-critical and the p value 0.002 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of supply chain alertness and supply chain flexibility on performance of private hospitals in Nairobi City County, Kenya.

**Table 4. 6: Regression Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.345	0.089		3.876	0.002
supply chain alertness	0.390	0.097	0.398	4.021	0.000
supply chain flexibility	0.382	0.097	0.389	3.938	0.001

The regression model was as follows:

$$Y = 0.345 + 0.390X_1 + 0.382X_2 + \varepsilon$$

According to the results, supply chain alertness has a significant effect on performance of private hospitals in Nairobi City County, Kenya ( $\beta_1=0.390$ , p value= 0.000). The relationship was considered significant since the p value 0.000 was less than the significant level of 0.05. The findings are in line with the findings of Macclever, Annan and Boahen (2017) who indicated that there is a very strong relationship between supply chain alertness and organization performance.

The results also revealed that supply chain flexibility has a significant effect on performance of private hospitals in Nairobi City County, Kenya ( $\beta_1=0.382$ , p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant level of 0.05. The findings are in line with the findings of Wang and Wang (2022) who indicated that there is a very strong relationship between supply chain flexibility and organization performance.

### Conclusions of the Study

The study concludes that supply chain alertness has a positive and significant influence on the performance of private hospitals in Nairobi City County, Kenya. The study found that technologies, supply networks and demand changes influence performance of private hospitals in Nairobi City County, Kenya

In addition, the study concludes that supply chain flexibility has a positive and significant influence on the performance of private hospitals in Nairobi City County, Kenya. The study found that product flexibility, distribution flexibility and responsiveness flexibility influence performance of private hospitals in Nairobi City County, Kenya.

## Recommendations of the Study

This study recommends that the management of private hospitals in Nairobi City County, Kenya should invest in advanced supply chain technologies to enhance their performance. By adopting cutting-edge technologies such as real-time tracking systems, predictive analytics, and automated inventory management, hospitals can improve their operational efficiency and responsiveness.

In addition, this study recommends that the management of private hospitals should prioritize enhancing their supply chain flexibility across product, distribution, and responsiveness dimensions. Hospitals should develop adaptable procurement strategies that allow for quick adjustments to product offerings based on changing patient needs and medical advancements.

## REFERENCES

- Adala, R. O., Miroga, J., & Malenya, A. (2022). Effect of Supplier Risk Management Practices on Supply Chain Performance of County Public Referral Hospital in Western Region, Kenya. *The Strategic Journal of Business & Change Management*, 9 (1), 236 – 250
- Balaji, M., Velmurugan, V., & Subashree, C. (2015). TADS: An assessment methodology for agile supply chains. *Journal of Applied Research and Technology*, 13(5), 504–509
- Blome, C., Schoenherr, T. and Rexhausen, D. (2020). Antecedents and Enablers of Supply Chain Agility and Its Effect on Performance: A Dynamic Capabilities Perspective. *International Journal of Production Research*, 51(4), 1295-1318
- Drost, E. A. (2011). Validity and Reliability in Social Science Research. *Education Research*
- Eckstein, D., Goellner, M., Blome, C. and Henke, M. (2015). The Performance Impact of Supply Chain Agility and Supply Chain Adaptability: The Moderating Effect of Product Complexity. *International Journal of Production Research*, 53(10), 3028-3046
- Ghadge, A., Er-Kara, M., Mogale, D., & Choudhary, S. (2020). Sustainability Implementation Challenges in Food Supply Chains: A Case of UK Artisan Cheese Producers. *Production Planning & Control*, 2, 1-16
- Haq, M., Khan, N., Parkash, R., & Jabeen, A. (2016). Impact of JIT, Waste Minimization, and Flow Management on Operational Performance of Manufacturing Companies. *Quality - Access to Success*, 17(153), 48-52
- Israel, G. (2012). Sampling: Determining sample size. Retrieved 12/9/2023 from the University of Florida IFAS Extension: <http://edis.ifas.ufl.edu/pd006>
- Kombo, D., & Tromp, D. (2009). *Proposal and Thesis Writing: An Introduction*. Nairobi: Don Bosco Printing Press
- Konstantina, I., Aggeliki, K., & Alexandros, A. (2020). The lack of access citizens have to health care of Kenya. *Cyprus Nursing Chronicles*, 20(1).
- Kothari, C. (2004). *Research Methodology: Methods and Techniques*, 2<sup>nd</sup> Edition. Sri Lanka: New Age International Publishers Ltd.
- Kothari, C. R., & Gang, W. (2014). *Research Methodology; Methods and Techniques*. 3<sup>rd</sup> Edition, New Delhi. New Age International Publishers Ltd.
- Mugenda, A. (2008). *Social Science Research: Conception, Methodology, and Analysis*. Nairobi: Kenya Applied Research and Training Services
- Mugenda, A. G. & Mugenda, O. M. (2003). *Research methods dictionary*. Nairobi: Applied.
- Mwihia, Francis. (2020). Performance of Public Hospitals in Kenya: The Essential Role of Mwihia, C. (2020). Gender difference in academic achievement of students in Kinangop sub-county, Nyandarua County, Kenya. *European Journal of Social Sciences Studies*, 5(4), 19–35. Doi: 10.46827/ejsss. v5i4.863.
- Owich, J., Kiongera, N., & Odero, J. (2022). Effect of Supply Chain Collaboration Practices on Supply Chain Performance of County Referral Hospitals in Western

- Region, Kenya. *International Journal of Economics, Commerce and Management*, 10, (11), 72-91
- Pallant, J. (2010). *SPSS Survival Manual. A step-by-step guide to data analysis using SPSS (4th ed.)*. Melbourne: Open University Press
- Sangari, M. S., Razmi, J., & Zolfaghari, S. (2015). Developing a practical evaluation framework for identifying critical factors to achieve supply chain agility. *Measurement*, 62, 205-214.
- Supply Chain Agility for Risk Mitigation and Response. *Journal of Operations Management*, 27(2), 119-140
- Wang X. and Cheng Z, (2020). *Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. American College of Chest Physicians*. Published by Elsevier Inc.
- Zakir, F., Wang, D., Waheed, A., & Rehman, A. (2022). Exploring the Nexus between Supply Chain Agility and Firms #39; Performance within Emerging Nations. *Journal of Engineering, Project, and Production Management*, 12(3), 202-208
- Zikmund et al. (2012). *Business Research Methods*. Edition: FirstPublisher: Cengage LearningEditor: Jennifer GreneISBN: ISBN-13: 9781473704855 / ISBN-10: 1473704855
- Zikmund, Babin, Carr, and Griffin (2012). *Business Research Methods*. Cengage Learning. ISBN 1285401182, 9781285401188.