Supply Chain Resilience and Service Delivery of Public Health Care Facilities in Western Region Kenya

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ABSTRACT

Supply chain management is a crucial activity that entails overseeing the movement of materials from the source, throughput, to the end consumer. However, in this endeavour, there are increased instances of uncertainties, i.e., speeds of delivery, flexibility, and environmental factors that affect the services rendered to the end consumer. This drives the concept of supply chain resilience as the ability of an organization to cope with stress from any factors in its environment and manage to maintain functionality in spite of unexpected or disruptive events. The healthcare sector has undergone significant changes over the past decades. Amidst these changes, attaining efficient and effective healthcare service delivery remains a distant prospect for many nations. This study therefore sought to find out the effect of supply chain resilience on service delivery in the public health care sector in the Western Region of Kenya. The hypothesis for the study was that supply chain resilience has no significant influence on service delivery in the public health care sector in the Western Region of Kenya. The study was anchored on two theories: the theory of human service delivery and strategic choice theory. The study adopted a positivist research philosophy and a descriptive survey research design, and the target population was 284 respondents from the four level 5 county hospitals in the western region. Questionnaires were used for data collection and analyzed using descriptive and inferential statistics. Data was presented using tables, scree plots, and scatter plots. The study is of value to researchers and academicians, county government authorities, and residents of the four counties. 258 respondents participated in the study, and preliminary data checking, screening, and cleaning were done. Validity and reliability statistics were done, and they indicated that the research instruments were adequate for their purpose. Diagnostic tests were also conducted, and none of the variables violated normality, linearity, homoscedasticity and multicollinearity assumptions. Regression analysis shows that there is a statistically significant relationship between resilience and service delivery (t = 6.115, p<0.05). The null hypothesis was thus rejected. The study recommended that hospitals maintain communication and information sharing with suppliers to enhance collaboration, resilience, and responsiveness in their supply chains. Hospitals should engage in frequent forecasting of demand to ensure that their services are aligned with seasonal changes in demand.

Key words: Supply Chain Resilience, Service Delivery, Public Health Care Facilities, Western Region, Kenya

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I. INTRODUCTION

Supply chain management is a crucial sector that facilitates smooth industry operations. Essentially, supply chain management entails the processes involved in the transformation of raw materials into finished goods that are of value to the customer. Initially, it was regarded as a mere clerical function within the broader organization. However, the function holds strategic importance as the business environment features an increasing number of competitors, both locally and internationally, forcing organizations to design ways of improving their internal processes to remain ahead of their competitors. Today, the supply chain function's relevance is not only restricted to industries and manufacturers of goods but also to the service sector, which also relies more on its supply chains as a source of competitiveness.

The health-care sector is one such industry whereby researchers and professionals have begun to pay attention to the supply chain as a strategic area for cost efficiencies and quality improvements (Kwon, Kim, & Martin, 2016). The healthcare sector has undergone significant changes in the past decade. Most recently, the COVID-19 pandemic

has accelerated healthcare industry change, causing increased shortages and lowered speeds of delivery of medical supplies and equipment as organizations and governments struggle to curb the spread of the virus (World Health Organization, 2017). In Busia and Bungoma counties, lack of resources to train the hospital management committees on effective supply chain strategies and shortages of drugs, staff, and limited bed capacities, respectively, are some of the reported challenges (Okedi & Adungo, 2021; Matheshe & Inimah, 2017).

Masaba et al. (2020) are in agreement with these studies, citing a lack of sufficient human, physical, and financial resources in the country's health care sector, hampering effective supply chain agility. The pandemic has placed new pressures on healthcare delivery systems, most of them attributed to supply chain disruptions, inadequate healthcare staff and infrastructure, and other related global inequities (Deloitte, 2021).

The healthcare supply chain entails the manufacturing of health resources such as equipment and drugs and distributing them to healthcare providers and patients in a timely manner. The availability of medical equipment and drugs is correlated with effective healthcare service delivery (Zamzam et al., 2021). In general, healthcare organizations face the unavailability of medical equipment due to delays in delivery, supply chain risks, unaffordability due to financial constraints, poor information systems, and a lack of resilience and responsiveness. Besides availability, adequate equipment and drugs also enhance timely and cost-effective healthcare service delivery (Ogundele & Olafimihan, 2009).

Supply chain resilience has become an issue of concern in the health care sector nationally. According to the Kenya National Commission for Human Rights (KNCHR, 2017), resilient supply chains in hospitals provide the ability to cope with stress from any factors in their environments and manage to maintain functionality in spite of unexpected or disruptive events. County governments have a right to ensure that their population has access to fast, efficient, and affordable health care. However, in pursuit of this agenda, there have been concerns about poor service delivery among county hospitals, as occasioned by a lack of medical supplies and a shortage of human resources (KNCHR, 2017). The Global Fund (2021) reports that 28% of orders in public hospitals face delays of more than 30 days, thereby creating poor service delivery in the public health care sector.

Despite significant effort from the county governments to improve the state of public health in Kenya, the health sector of the country is still marred by key challenges such as a lack of sufficient human, physical, and financial resources, which hamper effective supply chain agility (Masaba et al., 2020). The devolution of the health sector in Kenya has brought unique challenges. One of the common challenges within hospitals is delayed deliveries of medical equipment that inhibit effective service delivery in the population (The Global Fund, 2021). According to a social audit by Transparency International (2020), Vihiga County Hospital is underfunded, which results in instances of low medical supplies and undermines the facility's infrastructure and services.

Studies have been done on the supply chain resilience and service delivery of organizations in the United States of America, France, Nigeria, South Africa, Pakistan, etc. The findings of these studies cannot be generalized to the Kenyan context owing to the different governance systems and different external environmental forces. This study therefore sought to fill this gap by examining the effect of supply chain resilience on service delivery in the public health care sector in the county governments of the Western Region, Kenya.

1.1 Research objectives

To ascertain the influence of Supply Chain Resilience on Service Delivery of the Public Health care sector in the County Governments of Western Region, Kenya

1.2 Research Hypothesis

Ho_1 Supply Chain Resilience has no significant influence on Service Delivery of the Public Health care sector in the County Governments of Western Region, Kenya

II. LITERATURE REVIEW

2.1 Theoretical Literature Review

The study was supported by strategic choice theory, dynamics capability perspectives, health network metrics, institutional theory and theory of human service delivery.

2.1.1 Strategic Choice Theory

John Child first proposed the theory of strategic choice in 1972.The theory states that the leaders or top management within an organization have a significant influence on the choices made by the organization. Initially, scholars placed emphasis on theories that focused on the role of the environment in organizational decisions, such as

resource dependence and contingency theories (Rohof, 2013). However, the strategic choice theory sought to emphasize the power of organizational agency, whereby the top leaders make decisions that determine the actions and subsequent performance of organizations. As time progressed, more scholars developed the strategic choice theory to apply to various industries. Kochan et al. (1984) focused on industrial relations and built upon systems theory to include strategic choice as a way of understanding industrial relations. In their view, alongside the environment, the decisions made by top employers, labor organizations, and the government influence industrial relations, and their effects are experienced across all levels of organizations, even those that were not involved in the decision-making process.

The theory of strategic choice provides a suitable basis for understanding supply chain resilience. The theory attempts to provide answers to some aspects of supply chain resilience, for instance, the impact of top managers' decisions about supply chain resilience on organizational performance. Essentially, strategic choice theory can be used to understand supply chain resilience approaches as a mode of attaining best value rather than traditional supply chains. The leaders within organizations could make strategic decisions with supply chain resilience as their primary driver, thus veering away from generic strategies such as low-cost leadership (Miles & Snow, 1978). However, a weakness of strategic choice theory is that it overlooks the roles played by the processes of strategy execution within an organization and places all the emphasis on the environment and strategic decision-making.

2.1.2 Theory of Human Service Delivery

In 1990, Peter Senge first proposed the theory of human service delivery. It theorizes that human beings are a resource within systems for service delivery. In a study that was conducted in the insurance context, Senge (1978) argued that it was difficult to develop metrics that could be used to measure intangible aspects of the industry, such as the quality and delivery of services. In later years, more scholars began to apply the model to other service-based industries. Theorists have begun to work to develop a system that can be used to build a system that ensures optimized service delivery for customers. The theorists suggested that every organization should develop internal metrics that they use to measure the quality of human services (Pue, 1996). They should also be able to have aspirational guidelines that direct the human resources within the organization on how to meet their shared vision and goals.

The health sector is primarily a service-centered industry. Even though hospitals also provide goods such as medicine and equipment, their core business is made up of people: medical professionals who work within the healthcare system to deliver services to patients. This research focuses on the public health sector, where the key indicator for measuring performance is service delivery. The theory of human service delivery can be used to inform this research by shedding light on the challenges that hospitals face in measuring the quality of their services and suggesting indicators that they can use to objectively draw conclusions about the quality of their service delivery.

2.2 Conceptual Review of Variables
2.2.1 Supply Chain Resilience

Scholars conceptualize supply chain resilience as the ability of an organization to cope with stress from any factors in its environments and manage to maintain functionality, in spite of the unexpected or disruptive events (Alfarsi et al., 2019). Organizations manage to stay resilient because of capabilities that they develop over time. In supply chain, resilience is majorly reactive. Reactive resilience, on the other hand, entails reacting after a disruptive event occurs. Reactive supply chain resilience is largely characterized by speed of response and recovery (Alfarsi et al., 2019).

Building supply chain resilience begins with being quick to recognize a problem. A problem may result from external risks driven by upstream and downstream activities, such as demand, environmental, supply, business and regulatory risks, or it may be internal, such as due to personnel, manufacturing operational and process risks as well as, quality planning and control risks (Blackhurst et al., 2005). Second, companies should be able to develop an appropriate recovery plan. Third, the companies should redesign their supply chains to align to resilience needs. After strategy formulation, it is important that organizations implement them through matching their cultures and structures to their new goals.

Discussions about supply chain resilience have taken center during the period of COVID19 pandemic. Some of the new risks that came with the pandemic include changes in demand with preference for some increasing as others decrease, changes in customer behavior as the use of internet purchasing increased, creation of new customers through a reprioritization of needs, lock down initiatives that led to the need to seek for alternative suppliers and work from home requirements that changed organizational work structures, and thus their output (Ivanov & Das, 2020). These trends disrupted the supply chain activities on both upstream and downstream phases. Supply chain velocity is

recommended as a suitable strategy to remain resilient and responsive in the face of the pandemic, however, larger firms are better placed to practice risk management strategies efficiently (Konstantinou et al., 2021).

Buffers have been recognized as an important aspect of enhancing supply chain resilience (Rajesh 2018; Carvalho & Cruz-Machado, 2011). Buffering refers to the ability to maintain enough supplies or resources as a safety net within agile supply chains networks (Carvalho & Cruz-Machado, 2011). There are three main types of buffers that can be used to create sustained supply chain resilience- inventory, time and capacity buffers. Inventory buffers include the safety stocks that organizations can keep to respond to demand changes or delays in delivery and maintain customer satisfaction (Rajesh, 2018). Time buffers refer to allowing for extra time to allow for decision making and taking action to cater for any unforeseen variability. Capacity buffers refer to utilizations of operations below their maximum level to cater for changes in demand, delays or stoppages.

Multisourcing is yet another recognized indicator of supply chain resilience. Multisourcing entails the spreading of risk across various suppliers by having alternative supply sources (Hohenstein et al., 2015). Having multiple sourcing can be a shock absorber for organizations experiencing short term disruptions. Together with other strategies such as having risk mitigation inventory, relying on multiple suppliers increases the absorptive capacity of organizations allowing them to cope with the effects of disruptions along the supply chain (Hosseini, Ivanov & Dolgui, 2019).

An organization's risk management culture is also a significant indicator of supply chain resilience. Organizational culture comprises of the beliefs, attitudes and norms in a firm and as reflected in the shared objectives and goals. Essentially, culture differentiates one group of people from another. Organizational culture may either demonstrate a likelihood to be open to change or prefer stability (Kumar & Anbanandam, 2020). The occurrence of risks produces change within organizations requiring the players to depict risk-tolerant cultural behavior and attitudes that supports risk management. The different cultures towards risk affect organizational performance through influencing its ability to cope with perturbations in the supply chain (Chunsheng et al., 2020).

2.2.2 Service Delivery

Service delivery is a concept that is used in the context of public administration to describe the degree to which it is able to fulfill its duties. There are various indicators that are used to demonstrate the level of service delivery provided for citizens. One of the measures of service delivery is efficiency which focuses on the economic use of resources (Shepherd & Günter, 2010). Following the generic structure of a supply chain, measuring service delivery would then evaluate the efficiency of different activities along the value chain such as supplier, inbound, manufacturing, outbound, marketing, distribution and customer activities. In the field of healthcare, efficiency is demonstrated by comparing the inputs of the system such as cost and labor against the outputs such as health outcomes and physical visits (Mathur et al., 2018).

Public organizations rely on various ways of measuring service delivery. Some of these measures include flexibility, quality, price, technology and innovativeness and cost, among others. Shepherd and Gunter (2010) recommend that organizations distinguish between cost and non-cost aspects of supply chain service delivery since it is inadequate to solely rely on cost measures. These types of measures fall into either of two categories- quantitative or qualitative supply chain performance measurement. Additionally, measuring service delivery should be a continuous process that is embedded within an organization's operations.

Another measure of service delivery is speed. Speed addresses the time that it takes for citizens to receive services from the providers. Speed is especially important in healthcare. The ability to get healthcare services speedily following an injury or a sickness often has an impact on the likelihood and speed of recovery (Yang et al., 2015). It could be the speed of a physician's response, delivery of drugs or necessary equipment required to provide healthcare. The supply chain is an important determinant of the speed of service delivery in the healthcare context. A proper supply chain is that which is able to monitor and manage the flow of drugs, and healthcare services from the manufacturers to hospitals and patients ensuring that they receive the medical supplies at the right time and place (Mathur et al., 2018).

Accessibility is yet another measure of service delivery, especially in the health sector. Even though developed nations have established systems to increase accessibility of healthcare services, developing nations still struggle with providing their citizens with accessible healthcare. According to the Agency for Healthcare Research and Quality (2018), there are four main components of healthcare service accessibility; availability of workforce, timeliness, availability of required services and adequate coverage that gives patients access to the healthcare system. Accessibility is a key challenge for the Kenyan healthcare system evidenced by disparities between urban and rural contexts a well as people from different social classes (Otieno et al., 2020). The introduction of the devolved system

held the promise of increasing accessibility to healthcare services through transferring power, and resources closer to the people.

Like the case for other areas of public service, quality is a significant indicator of the level of service delivery that citizens receive. Quality of service refers to the difference between the expectation of customers and that which is delivered to them (Shahin & Samea, 2010). In the public sector, quality of service can be attained by identifying standards of performance and comparing actual performance to identify any issues in the operational processes that impede high quality of service delivery. Most measures of quality originated in the good sector, however, some of them are inapplicable to the services sector since the latter is a different context with intangible aspects that are difficult to measure objectively (Mugambi & Kiruthu, 2015). A framework for measuring the quality-of-service delivery was established by Parasuraman et al., (1985) which entails assessing the quality of the physical aspects of their operations such as workers and facilities, how reliable the services are, how responsive they are to customer needs, empathy that the workers show to customers and assurance. These dimensions of quality are also well applicable to the health care sector.

2.3 Empirical Literature Review
2.3.1 Influence of Supply Chain Resilience on Service Delivery

Research on supply chain resilience and service delivery also reveal conflicting findings with some reporting significant, while others reporting the insignificant relationship between the two variables. A study by Jüttner and Maklan (2011) investigates supply chain resilience from the perspective of the global financial crisis that was experienced at the beginning of the millennium. The study sought to research on supply chain resilience and draw empirical connections with key concepts in supply chain risk management and vulnerability. The researchers collected data from three global companies; a wood wholesaler, chemicals and cables suppliers and used a mixed method approach whereby the researchers conducted semi structured interviews with employees within these companies as well as analyzed internal documents. The findings of the study revealed that both supply chain risk management and supply chain vulnerability categories were significant for supply chain resilience. Supply chain resilience, in itself was also significant for supply chain performance.

The significance of supply chain resilience is also affirmed by an Indian study in the manufacturing sector intended to investigate how supply chain resilience affects performance in the manufacturing sector. Kumar and Anbanandam (2020) approach the study by focusing on supply chain risk management culture as a moderating factor that influences supply chain resilience and eventually, organizational performance. The study used data that was collected through surveys administered high-ranking professionals within Indian manufacturing firms. The findings revealed that resilience had a statistically significant relationship with firm performance.

At a regional level, there is a parallel pattern in result findings whereby scholars report mixed results about supply chain resilience and supply chain performance. In Nigeria, Olaleye et al., (2021) focus on tertiary institutions to investigate factors that build their supply chain resilience. The research seeks to demonstrate whether innovation positively influences firm resilience and agility and whether agility is a mediating factor between innovation levels and resilience of tertiary firms in Nigeria. The researchers carried out the study through administering survey questionnaires to members of top management within 5 universities in Nigeria. The findings of the study revealed a positive insignificant relationship between supply chain resilience and firm performance.

The importance of supply chain resilience is however, demonstrated through a study in Ghana by Asamoah et al. (2020). The research is contextualized in small and medium enterprises within the country. Studied alongside, customer-oriented perspectives and social network relationships, the study seeks to investigate whether supply chain resilience has a significant effect on the performance of businesses. The study relied on data which was collected through surveys that were administered to 110 small businesses in Ghana, each represented by a single respondent in a managerial position. The findings revealed that there was a positive significant relationship between supply chain resilience and customer-oriented performance. Therefore, the researchers conclude that supply chain resilience mediates the relationship between social network relationships, customer-focused services and thus, overall organizational performance.

Studies in Kenya have also documented empirical evidence regarding the influence of supply chain resilience on performance. Ndiema and Muli (2021) sought to investigate how supply chain resilience affects performance in the Kenyan retail industry. Supply chain resilience was operationalized and measured using supply chain recovery, flexibility, robustness and the use of Vendor-Managed Inventory systems. A multiple regression analysis revealed that recovery, flexibility, robustness and the use of vendor managed inventory systems, all operationalized as measures of supply chain resilience accounted for a significant change in the performance of the retail stores.

A similar study had been conducted in Kenyan sector to investigate the influence of supply chain resilience. The study by Kariuki (2018) focuses on hospitals categorized by the National Health Insurance Fund as providing inpatient and outpatient services. The main research objective was to investigate whether supply chain strategies within the selected hospitals had an influence on their performance. The researchers administered surveys to 264 supply chain officers within 770 Kenyan hospitals. A regression analysis was conducted on the collected data and the results revealed that there is a positive significant relationship between supply chain resilience and organizational performance in the health sector.

Studies have been conducted on supply chain resilience and performance and they have indicated positivity and significance (Asamoah, Agyei-Owusu & Ashun, 2020; Jüttner & Maklan, 2011; Kumar & Anbanandam, 2020; Ndiema & Muli, 2021; Kariuki, 2018). However, a Nigerian study depicted an insignificant relationship between Supply Chain Resilience and performance (Olaleye et. al., 2021) hence prompting further research on Supply Chain Resilience and Service Delivery in the Public Health Care Sector in Western Region, Kenya.

III. METHODOLOGY

The study adopted the positivism research philosophy and descriptive survey research design. The study was carried out in the Western region of Kenya. The study focused on county referral hospitals within the four counties. The target population for this study was employees with clinical roles within the four level five county hospitals - Vihiga County Referral Hospital, Busia County Referral Hospital, Kakamega County Referral Hospital and the Bungoma County Referral Hospital. For each of the strata of the study, the researchers used simple random sampling to select 284 respondents from a target population of 984. The study relied on the formula proposed by Yamane (1973) for calculating sample size since it provided an easy formula for calculating sample size. The formula is depicted as below:

$$n = \frac{N}{1 + 0.05^2 \, (N)}$$

Where : n= is the required sample size
N = number of people in the target population
e = allowable error term
When the values were substituted in the formula, the sample population was selected as below:

$$n = \frac{984}{1 + 0.05^2(984)} = 284$$

The solution translated to 284 respondents. Therefore, the sample population was as follows: -

Table 1
Sample Size

Strata	Bungoma	Vihiga	Kakamega	Busia	Total
Doctors	11	12	15	9	47
Clinical Officers	11	10	10	9	40
Nurses	54	28	78	37	197
Total	**76**	**50**	**103**	**55**	**284**

The main source of primary data for this research was questionnaires and interview schedule developed by the researcher. The study measured the validity of the research instrument for its content and construct validity. The study used factor analysis to test for construct validity which demonstrated if the items selected adequately reflected the constructs /phenomena of the study. Cronbach Alpha was used to test reliability of the research instrument and all the coefficients of the variables were above 0.7 meaning they were good. The data was then coded and analyzed and the results presented in the form of charts, graphs and tables and done per the objective of the study. The study conducted a simple regression analysis and the model is as below:-

Y = α + βX + ε

Where:
Y = Health Service delivery
α = constant
β = Slopes of regression for the independent variables
X= Supply Chain Resilience

Before regression was carried out, the assumptions of regression were tested. They included the assumption of normality, linearity, homoscedasticity and multicollinearity.

IV. FINDINGS AND DISCUSSIONS

4.1 Response rate

This study attained a 90.8% response rate which can be deemed as very good. The high response rate was attributed to the data collection procedures.

Table 2
Response Rate

	Frequency	Percent
Returned	258	90.8
Not Returned	26	9.2
Total	284	100.0

4.2 Factor Analysis

According to Guzami (2013), factor analysis is a statistical method used in describing variability among variables observed in terms of a potential unobserved numbers called factors. This was used in measuring construct validity and the results for each variable were explained below: -

Table 3
KMO and Bartletts Test for Supply Chain Resilience

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.762
Bartlett's Test of Sphericity	Approx. Chi-Square	1138.422
	Df	28
	Sig.	.000

The table 4.6 above shows results for Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. KMO measures sampling adequacy and checks on the appropriateness of use of factor analysis (Hair et al. 2010). A range of 0.5-1.0 indicates the appropriateness for use of factor analysis. The above results indicated a KMO value of 0.762 which was greater than 0.5. This showed that factor analysis was appropriate for this study. Bartletts test of sphericity provided a significance value of 0.000 which was less than 0.05 at 5% significance level indicating correlation between the variables.

Table 4
Rotated Component Matrix

Rotated Component Matrix[a]	Component	
	1	2
Our institution faces high levels of Supply Chain Risks	.220	.791
Our institution responds quickly to Supply Chain Risk	-.086	.776
Our organization has a good Supply Chain Risk Management System	.242	.813
Our Institution maintains high levels of safety stocks (Extra Supplies) for emergency	.349	.735
Safety stocks (Extra Supplies) maintained by our institution takes care of urgent resource needs	.703	.547
Safety stock maintained by our institution avoids rush orders	.870	.034
Our institution practices sourcing of resource inputs from different suppliers	.861	.137
Broadened product scope attracts the company's operation cost	.775	.224

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

For this study, the statements with factor loading greater than 0.4 were deemed appropriate. From the findings of the table above, none of the variables had a factor loading less than 0.4 which meant that all of them were

considered for analysis. According to Tabachnick and Fidell (2007), factor loadings greater than 0.4 were to be retained for further statistical analysis hence no statement was dropped.

Table 5
KMO and Bartletts test for Service Delivery

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.657
Bartlett's Test of Sphericity	Approx. Chi-Square	353.618
	Df	6
	Sig.	.000

The table above shows results for Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. KMO measures sampling adequacy and checks on the appropriateness of use of factor analysis (Hair et al., 2010). A range of 0.5-1.0 indicates the appropriateness for use of factor analysis. The above results indicated a KMO value of 0.657 which was greater than 0.5. This showed that factor analysis was appropriate for this study. Bartletts test of sphericity provided a significance value of 0.000 which was less than 0.05 at 5% significance level indicating correlation between the variables.

Table 6
Component Matrix

Component Matrix[a]	Component
	1
Our hospital provides treatment, diagnostic tests and other services in an acceptable time period	.872
Our hospital has up to date and well maintained equipment	.799
Our hospital has effective and efficient health care service delivery	.796
Our hospital provides speedy delivery of medical supplies to patients	.639
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

For this study, the statements with factor loading greater than 0.4 were deemed appropriate. From the findings of the table above, none of the variables had a factor loading less than 0.4 which meant that all of them were considered for analysis. According to Tabachnick and Fidell (2007), factor loadings greater than 0.4 were to be retained for further statistical analysis hence no statement was dropped.

4.3 Regression Analysis

Further, the study conducted regression analysis on the data by using linear regression models between the different independent variables and the dependent variable of the study. Regression analysis was done to predict the effect of each of the independent variables of the study on the outcome variable (service delivery). This analysis was important in determining how well supply chain agility could predict service delivery of health facilities in Western Kenya.

Table 7
Simple Regression Model Summary for Supply Chain Resilience and Service Delivery

Model Summary									
						Change Statistics			
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.357[a]	.127	.124	.82781	.127	37.392	1	256	.000
a. Predictors: (Constant), Resilience									

The findings of the study displayed in table 4.30 demonstrate that the value of R-square is 0. 127. This value implies that, 12.7% of variation of service delivery was explained by supply chain resilience.

Table 8

ANOVA Results for Supply Chain Resilience

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.623	1	25.623	37.392	.000[b]
	Residual	175.427	256	.685		
	Total	201.051	257			

a. Dependent Variable: SeDel

b. Predictors: (Constant), Resilience

Table 9 above highlights the ANOVA results at 0.05 level of significance. The findings demonstrate that in the model, the independent variable of study; supply chain resilience is important in predicting of service delivery as indicated by an F value of 37.392 and significance value of .000, a value that is less than 0.05 significance level.

Table 9

Regression Coefficients for Supply Chain Resilience

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.133	.189		11.301	.000
	Resilience	.351	.057	.357	6.115	.000
a. Dependent Variable: SeDel						

From Table 9 above, the study findings reveal that supply chain resilience does have a significant influence on service delivery (significance value=0.000). These findings imply that increasing supply chain resilience by a single unit or level causes a 0.351 increase in service delivery with all other factors held constant. Hence, at a 0.05 level of significance, the null hypothesis of the study is rejected since supply chain resilience positively influences service delivery (t = 6.115, p<0.05).

The findings of this study are supported by Dubey et al. (2017), Alfarsi et al. (2019), Dickens et al. (2021), Ochieng (2018), and Martinez (2018). Dubey et al. (2017) draw a link between supply chain resilience and firm performance by ensuring increased information sharing, cooperation, and supply chain visibility. Corroborating findings are reported by Alfarsi et al. (2019), who highlight that supply chain resilience within the manufacturing sector is crucial to enhancing delivery of services by ensuring a robust supply chain network. Likewise, Dickens et al. (2021) focused on 15 different industries in the United States and reported that supply chain resilience positively impacts service delivery for a firm, allowing it either to bounce back to pre-disruption levels or set new performance standards following disruptions. Further, Ochieng (2018) contextualized a supply chain resilience study within the Kenyan manufacturing sector and affirmed that supply chain resilience had a positive influence on the performance of firms. Similarly, Martinez (2018) studies supply chain resilience in relation to internal and external supply chain risks and reports that supply chain resilience has a positive impact on firm performance.

CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

Supply chain resilience has a significant correlation with service delivery, evidenced through the coefficient of r = 0.357 (from table 4.4). This coefficient depicts that the association between the two variables is fairly strong and thus, practically significant. Even though supply chain resilience has been recognized as a key factor that determines the performance of supply chains and organizations in general, adaptation of the practice in the public sector remains slow. Perhaps this could be attributed to the rigid and bureaucratic nature of policies and systems within the public sector, specifically the health sector in Kenya.

Supply chain resilience as a predictor of service delivery explains 12.7% of the variations in service delivery. A unit change in supply chain resilience influences change in service delivery by 0.351 units, all factors held constant. The model is positive and significant and therefore fit for testing the relationship between the Independent variable and the dependent variable.

5.2 Recommendations

The results of this study demonstrate that supply chain resilience is a significant predictor of service delivery. The study recommends sufficient and timely disbursement of funds from the treasury so that they are able to recover from any mishaps in their operations. The study also recommends that Public Hospitals should have a wider range of drugs which they can purchase form local sources as this will enable them to be able to respond effectively after a disruptive event e.g. Corona. Over dependence on the Kenya Medical Supplies Agency (KEMSA) usually creates mishaps in the processes.

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