HEALTHCARE FINANCING: THE NEXUS BETWEEN ENTREPRENEURIAL SUPPLY CHAIN PRACTICES AND PERFORMANCE OF PUBLIC HOSPITALS IN KENYA

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ABSTRACT

The Vision 2030 development blueprint aspires to promote good health and well-being to all Kenyans. To support this, the Government of Kenya has instituted various reforms aimed at achieving good health. However, despite these reforms, there exists poor performance in the public hospitals in Kenya. To ensure effective, efficient, financially viable, and relevant service delivery, the entrepreneurial supply chain is critical, in public hospitals. Therefore, the study focused on Entrepreneurial Supply Chain practices, healthcare financing, and the performance of public hospitals in Kenya. Specifically, the study investigated the effect of innovative inventory management on the performance of public hospitals in Kenya, the influence of proactive strategic sourcing on the performance of public hospitals in Kenya, and the effect of risk-taking on the performance of public hospitals in Kenya. The study also sought to establish the moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya. The study was guided by resource orchestration, resource dependency, and Schumpeterian innovation theories. The study adopted a positivism philosophy and utilised descriptive and explanatory research designs. The study's target population was 243 public hospitals in Kenya. The sample size was 151 public hospitals selected through proportionate sampling and simple random sampling techniques. The study utilised primary data collected through a semi-structured questionnaire. The validity of the questionnaire was checked using face and content analysis from the supervisors and experts who work in public hospitals; while reliability was checked through the use of Cronbach Alpha. A coefficient value of 0.7 was acceptable. Both descriptive and inferential statistics were used for data analysis. The study used multiple linear regression analysis to establish the relationship between the independent and dependent variables and the results obtained were expressed using tables and figures. The study findings revealed that innovative inventory management ($\beta = 0.291$; P-Value < 0.05), proactive strategic sourcing ($\beta = 0.645$; P-Value < 0.05), and risk taking ($\beta = 0.313$; P-Value < 0.05) have a positive and statistically significant relationship with the performance of public hospitals in Kenya. The study revealed a statistically significant ($F=89.18$, Sig<0.005) moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and performance of public hospitals in Kenya. The study concluded that the adoption of entrepreneurial supply chain practices improves performance of

public hospitals and therefore recommends the Chief Executive Officers and Medical Superintendents of public hospitals to adopt innovative inventory management, proactive strategic sourcing and risk taking entrepreneurial supply chain practices will provide insights into the management of public hospitals on entrepreneurial supply chain practices as they promote healthcare service delivery, reduce operational costs, enhance hospital reputation and increase effectiveness. The study recommends the Ministry of Health, Social Health Authority, Treasury and County Executive Committee member for Health in the County Governments to institute policies and reforms that promote sustainable financing of healthcare. Such initiatives include vigorous risk pooling through social insurance schemes and selling of health bonds. This will ultimately reduce overdependence on donor funding.

1.0 INTRODUCTION

The World Health Organisation (WHO) proposes a framework that depicts the building blocks of a healthy healthcare system. The framework comprises of service delivery, healthcare workforce, Healthcare Management Information Systems (HMIS), medicines and technology, healthcare financing and leadership and governance (Lugada et al., 2022). The focus of this paper will be healthcare financing, which according to WHO, plays a critical role in achieving the basic right to health by reducing the financial burden faced by households when treating and managing diseases and ensuring the availability of healthcare resources promptly.

Healthcare financing according to the National Council for Population and Development (2018) is the process of mobilising, accumulating, and allocating resources to cater to individual and collective health goals in a country. Healthcare financing is built on three constructs; resource mobilisation, resource pooling, and resource allocation, and aims to avail required resources to hospitals thus promoting the performance of hospitals (Munala & Riang, 2023). Nungo et al., (2023) postulate that healthcare financing is a critical component in a healthcare system as it determines the ability of that healthcare system to contribute to the fundamental fulfillment of the right to health.

To achieve equitable healthcare service provision to the citizens, any country in Africa will have to commit USD 86 per capita and set aside 15% of Gross Domestic Product (GDP) for healthcare provision. This was a commitment made by leaders of the African nations through the Abuja Declaration in the year 2001. 11 years later in 2011, only 27 African countries had increased their healthcare budgets to constitute 15% of the national GDP, with only South Africa and Rwanda surpassing this target. Fast forward to 2016, more than 19 nations had reduced their healthcare budgets (Rimberia, 2022).

In South Africa, the public healthcare sector is underfunded despite the rising burden of sickness. The absence of adequate funding has resulted in poor healthcare workforce morale, long waiting times for patients, insufficient disease control and low stock levels of medical supplies. The situation in South Africa is mirrored to a great extent in Mauritius whereby the healthcare financing budget falls way below the Abuja Declaration. The national government funds only 2% of the healthcare budget which makes it difficult for the members of the public to access healthcare services in the public hospitals, efficiently. Over 15% of the disease burden in Mauritius fall under communicable diseases, but the country is not eligible for the Global Alliance Vaccination Initiative that provides investments and finances to support immunisation programmes. This raises the burden of non-communicable diseases in the country (Nundoochan, 2020).

Since 2001, Kenya has been dragging behind in the achievement of the Abuja Declaration. The budget for healthcare in Kenya usually falls below half the declaration level. Specifically, estimated budgets for 2012/13 on health were (7.8%); 2013/2014 (5.5%); 2014/2015 (7.5%); 2015/2016 (7.7%); 2016/2017 (7.6%); 2017/18 (8.2%); 2018/2019 (9.2 %) of the country's GDP (Rimberia, 2022).

Malakoane et al., (2020) identify that chronic underfunding of the public healthcare sector has consistently affected the ability of public hospitals to provide healthcare services across the globe. There is continuous inaccessibility, unavailability, and unaffordability of public healthcare services across the globe (Dixit et al., 2020). The provision of day-to-day services to patients and consumers in this case patients is not done in a timely and effective manner with patients waiting for long hours in queues to access healthcare services (Iyengar et al., 2023). Zeferino et al., (2023) emphasise that global public healthcare systems face similar challenges ranging from an ageing population, low digitisation and adoption of new technologies, increasing demand for health services, immense drug shortages, and medical personnel, and financial challenges.

Specifically, the utilisation of healthcare systems in Europe, the USA, Asia, and Africa is faced with inadequate supply and unequal distribution of healthcare facilities, poor product sourcing, unavailability of healthcare personnel, low technology use, lack of essential medicines, poor supplier relationships, lack of procurement planning, the upsurge of medical tourism to foreign countries and the rapid expansion of private healthcare facilities (Iyengar et al., 2023). According to Alumran et al., (2021), the Kingdom of Saudi Arabia as of 2021 had 274 public hospitals whereby half of the hospitals are moving towards privatisation to improve accessibility and quality of healthcare services.

In Indonesia, private hospitals are on a rise due to the inefficiencies encountered in the public healthcare sector. Additionally, the Indonesian healthcare expenditure is at 2.8% of the GDP of which 47% of the hospital expenses are paid out-of-pocket by the citizens, due to the inefficiencies in the public insurance payments. Notwithstanding, the introduction of the National Health Insurance (NHI) by the Indonesian government which was aimed at reducing the high financial burden, there remain gaps in the public healthcare sector as NHI emphasises curative care making preventive access to healthcare difficult (Mulynto et al., 2019).

The WHO Eastern Mediterranean Region experiences weak governance and leadership in healthcare, insufficient healthcare funding, shortage of healthcare workforce, lack of essential medicines, poor procurement and sourcing practices, rapid expansion of private healthcare facilities, and increased out-of-pocket payments by patients (WHO, 2022). In Africa, the disease burden for communicable and non-communicable diseases are on the rise. This is attributed to inadequate access to essential medicines, unaffordability of healthcare services, and high out-of-pocket payments by the residents. Noteworthy, in Africa, most medicines are imported making the affordability by patients hectic (Adebisi et al., 2022). The dilapidated state of public hospitals in Africa results in very high levels of medical brain drain and medical tourism. Specifically, in Nigeria, over 5,000 people leave the country every month to seek treatment abroad causing an overall loss of 1.2 Billion USD (Oleribe et al., 2019). In South Africa and across the world, half of the population has problems accessing essential medicines. In the USA over 450 types of drugs were in shortage inclusive of oncology treatments for cancer patients in 2022. In Europe, 91.8% of pharmacists have experienced drug shortages over the last 4 years. This shortage of drugs and essential supplies has been attributed to delays in awarding tenders, lack of manufacturing capacity making a country rely heavily on imports, long supplier lead times, failure of suppliers to meet demands, and general payment issues with suppliers. The provision of essential medicines relies heavily on an efficient supply chain system which is the focus of this study (Modisakeng et al., 2020)

In Kenya, there is an unavailability of medicines, equipment, and essential supplies with only 33% of public hospitals having adequate stock for 90 days or more and 67% accounting for an unavailable medical stock for up to 30 days or more (Barasa et al., 2020). This has been attributed to delays in procurement and the lack of a decentralised drugs and medical supply procurement system at the county level resulting in shortages of drugs for patients (Masaba et al., 2020; Osetinsky et al., 2020). Most healthcare facilities lack diagnostic, ambulatory services, and human resources specialists. The comprehensive coverage for non-communicable diseases is low. Specifically, cancer treatment is low with only 23% of cancer patients having access to radiotherapy services. Diabetic patients are faced

with discontinuation of essential medicines and a low doctor-to-patient ratio of 0.6 to 1000 every year (Osetinsky et al., 2020).

A recent report by the Kenya Council of Governors (2024) indicates that in public hospitals, only 14 doctors are available to serve 10,000 Kenyans, resulting in long waiting times for patients in hospital queues. The report indicates a high level of medical brain drain, where 591 doctors are away on study leave and 135 doctors who have completed their studies and ready to work are likely to remain in foreign countries in place of rendering their expertise in Kenya. Despite the Management Equipment Services (MES) leasing option by the national government which was meant to scale up medical infrastructure at the county level, access to diagnostic services in Kenyan public hospitals is low, with a majority of patients forced to obtain diagnostic services from external service providers (Masaba et al., 2020).

The adoption of entrepreneurial strategies in an organisation is embedded in healthcare financing through the availability and efficient utilisation of resources as this affects the effectiveness and quality of services offered in an organisation (Kairu et al., 2021). Healthcare financing impact is significant in Kenya as it aids in service provision and sustainability enhancement. Over 12.7% of sick persons in the country do not seek healthcare services when they get sick. This is attributed to the very high costs of treatment. 21% of the Kenyan population need assistance from the Kenyan government to enable them equitable access to healthcare services.

In this study, healthcare financing is built upon availability of resources and utilisation of resources. Limited resources and high demand of healthcare resources is a common condition facing the public healthcare sector across the globe with the Kenyan healthcare landscape the problem being more prevalent. The availability of healthcare resources plays a critical role in stimulating the performance of public hospitals as they influence the quality of services, operational efficiency, organisational relevance in the form of patient outcomes and overall efficiency (Nyawira et al., 2022).

Chereches and Pirlea (2019) argue that the utilisation of healthcare resources determines the effectiveness, organisational relevance, and quality of healthcare services in public hospitals. Efficient utilisation promotes optimal performance and value for available resources. According to Yazdani et al., (2020) allocation of resources in a transparent manner reduces misappropriation and mismanagement of public funds and this helps the public hospitals to align strategic goals and health priorities for the community (Fanelli et al., 2020).

Sengura and Renyan (2024) highlight that an entrepreneurial orientation is the creation of autonomy, competitive aggressiveness, risk taking, innovativeness and proactiveness in organisational processes. When entrepreneurship is adopted in a supply chain, an entrepreneurial supply chain is established. The entrepreneurial supply chain is more aggressive compared to the traditional supply chain as it breaks organisational inertia and comfort. Kloep (2020) emphasises that entrepreneurial supply chains can align participants in an entire supply chain which reduces risks and hazards. This is through a strategic collaboration between entities that produce products and services which maximise efficiency and effectiveness.

Kloep (2020), emphasises that entrepreneurial supply chain practices are established through risk taking, innovation orientation, relational capital, proactive orientation, and coordination capability. These practices increase effectiveness and efficiency throughout supply chain delivery channels and introduce relevant changes that lead to efficient resource utilisation and improved firm performance (Etemad, 2022). Innovativeness according to Kalyar et al., (2022) refers to the capability of a firm to transform opportunities into realities by adapting new practices instead of relying on the old techniques. According to Gauthier et al., (2021), innovativeness in hospitals can be through seeking new funding sources, introducing new products/services, and identifying new ways of delivering value to consumers.

Proactiveness is a forward-looking perspective that enables organisations to be early market movers and beat the competition easily (Mumaraki, 2020). Proactiveness helps organisations beat the competition and identify new opportunities (Cortes et al., 2021). Risk taking is the commitment of

enormous resources by organisations to unknown ventures to stimulate organisational growth (Mumaraki, 2020). In an environment of risk taking, bold investments are made in undiscovered areas (Cortes et al., 2021).

Entrepreneurial supply chain practices in this study revolved around innovative inventory management, proactive strategic sourcing, and risk taking. Innovative inventory management according to Smith (2024) is essential techniques that help achieve efficiency, reduce costs, and maximise customer satisfaction in any competitive environment. To navigate competition and industrial pressures, organisations should adopt innovations in managing their inventory as this creates a balance in organisational operations as there will be no stock-outs or obsolescence (Cortes et al., 2021).

Proactive strategic sourcing is a critical component of organisational growth, especially in the midst of competition as it helps reposition an organisation product offering to match the demands of different customers to the organisational supplies. This creates value for money for the customer and brings in resources to the organisation. Proactive strategic sourcing transcends purchase acquisition as it incorporates the establishment of supplier relationships to create a competitive advantage. It is a critical component of organisational growth, especially in the midst of competition (Cankaya et al., 2020). The establishment of long-term supplier relationships reduces costs and price volatility while enabling firms to evaluate supplier performance. Conversely, planning for procurement aggregates organisational needs reduces emergency purchases, and integrates expenses with set budgets (Changalima & Mushi, 2020).

Risk taking in this study is established upon collaborative leadership behaviour and income generating opportunities. Collaborative leadership behaviour in an organisation, entails the self-efficacy of leaders who engage in recognising opportunities, planning, and managing resources (McGee & Terry, 2022). The presence of declining budgets while the demand for services in the healthcare sector increases calls for the adoption of risk taking behaviour. This will help to develop new revenue streams to improve the healthcare sector by providing adequate resources to carry out day-to-day activities. Planning and managing resources in the presence of declining budgets create new revenue streams and create a competitive advantage for organisations (Hodgson et al., 2021).

A fundamental belief in the Kenyan public healthcare financing is that an increase in the government's budgetary allocation and out of pocket expenditure by the members of the public to the healthcare sector and an increase in healthcare resources should result in commensurate healthcare service improvement. However, this has not been the case as most public hospitals are constantly undermining health outcomes (Manda et al., 2021). Public hospitals are in struggle to mobilise the resources needed to promote and sustain healthcare operations and enhance the quality of life for Kenyan citizens (International Health Partnership, 2019). It is against this background that this paper sought to determine the moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya. The new Constitution of Kenya 2010 has entrenched the right to health; however, enjoyment of this right by the citizens accessing public hospitals will depend on what measures are implemented to improve access to healthcare services for all (Abdirahman et al., 2020).

1.1 STATEMENT OF THE PROBLEM

An aspiration of the Kenyan Government in the Vision 2030 plan is to transform lives through equitable, high-quality, and affordable healthcare to all, by improving public healthcare (GoK, 2021). To achieve this, the Kenyan Government has instituted various reforms and policies in the healthcare sector; Bottom Up Economic Transformation Agenda (BETA), Universal Health Coverage (UHC), the Fourth Medium Term Plan (2023-2027) establishment and revamping of Kenya Medical Supplies Authority (KEMSA), and a recent establishment of the Social Health Authority in October, 2024, all aimed at promoting good health for all (Ministry of Health, 2023).

However, despite these government interventions and heavy budgetary allocations, the quality of services offered in public hospitals keeps deteriorating. There is inefficient demand forecasting, a lack of a decentralised procurement system at the County level, low ICT utilisation, and inadequate medicines, equipment, and human resources. Only 14% of public hospitals are stocked with essential medicines continuously for 90 days or more (Toroitich et al., 2021). The order fill rate for essential medical supplies at KEMSA for the FY 2022/2023 was 51% resulting in huge drug shortages at the county pharmacies (Medium Term Expenditure Framework, 2023).

A recent report by the Kenya Council of Governors (2024) indicates that in public hospitals, only 14 doctors are available to serve 10,000 Kenyans, resulting in long waiting times for patients in hospital queues. The report indicates a high level of medical brain drain, where 591 doctors are away on study leave and 135 who have completed studies are likely to remain in foreign countries in place of rendering their expertise in Kenya. Most public hospitals operate for 8 hours resulting in underutilisation of invested capacities (Toroitich et al., 2021). All these challenges affect the effectiveness, financial viability, and relevance of public hospitals in Kenya (Okoth, 2021)

A functional entrepreneurial supply chain system is the backbone of quality public healthcare and improved organisational performance as it guarantees the provision of medicines, diagnostic services, and healthcare human resources in a timely and efficient manner (Olutuase et al., 2022). Therefore, the central objective of this study was to uncover the moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya.

1.2 Research Objectives

The study was guided by the following objectives: -

1. To determine the effect of innovative inventory management on the performance of public hospitals in Kenya.
2. To assess the effect of proactive strategic sourcing on the performance of public hospitals in Kenya.
3. To analyse the effect of risk taking on the performance of public hospitals in Kenya.
4. To establish the moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya.

2.0 Review of Literature

This section presents the theories and empirical literature that guided the study.

2.1 Theoretical Review

The theories utilised in the study were: resource orchestration, resource dependency, and the Schumpeterian entrepreneurship theories.

2.2.1 Resource Orchestration Theory

The Resource Orchestration Theory (ROT) integrates resource management and asset orchestration (Sirmon et al., 2011). Resource management entails the structuring, bundling, and leveraging of resources (Fawcett et al., 2022). Structuring is the acquisition, accumulation, and disposal of resources, while bundling refers to steadying, inspiring, and ground-breaking resources. Leveraging entails mobilising, coordination, and deployment of resources. To obtain the full value of resources, the structuring, bundling, and leveraging activities should be performed simultaneously to bring value to an organisation (Zeng et al., 2023). According to ROT, an organisation possesses various resources including human, information technology, capital equipment, knowledge, organisational culture, and management which when effectively structured, bundled, leveraged, and managed across a supply chain for a particular market contribute to a sustained competitive advantage and superior performance in organisations. Orchestration maximise efficiency, flexibility and value creation (Fawcett et al., 2022).

2.2.2 Resource Dependency Theory

The resource dependency theory (RDT) was developed by Pfeffer and Salancik (1978). According to RDT, the performance of an organisation is embedded in resources that exist in the operating environment. These resources have a high potential to impact business strategic decisions (Omisakin et al., 2022). The RDT also explains the process of resource acquisition and utilisation in an organisation; over-reliance on external organisations for an organisation's resources reduces the firm independence and consequently affects performance. Therefore, the main viewpoint of the RDT is the reduction of an organisation's dependence on other organisations for resources and an increase in organisations' dependence on themselves (Wang et al., 2020).

The lack of organisational resources needs inter-organisational partnering and mutual relationships; which according to RDT, are established through collaborative leadership behaviour and they help to proactively secure organisational resources amid scarcity and budgetary constraints, thus promoting business continuity (Katila et al., 2022). Partnerships created through resource needs result in joint planning and decision-making, information and resources sharing, long-term-supplier relationship, new ventures, collaborative behaviour, supply network visibility, and inventory control resulting in overall improved organisational performance (Spieske et al., 2021).

2.2.3 Schumpeterian Entrepreneurship Theory

The Schumpeterian entrepreneurship theory (SET) was developed by Schumpeter at the beginning of the 20th century. According to Schumpeter, entrepreneurship relates to creative destruction where entities destroy equilibrium and create new conditions in the marketplace. Changes occurring in the economy create opportunities that can be utilised for the benefit of the organisation (Vaz-Curado & Mueller, 2019). Entrepreneurship focuses on new products, processes, and innovations in an organisation. The theory postulates that organisations should motivate, inspire and recognise developments that are beneficial and that organisations should have the impulse to fight competition in a bid to prove superiority and success in the industry (Mehmood et al., 2019). Utilisation of opportunities in an arbitrary manner results in a stall in organisational improvements after a particular time. However, the existence of uncertainty in the operating environment equates to organisational opportunities. Opportunities, according to Schumpeter, are seized through innovation, proactiveness, and risk-taking. Utilisation of these available opportunities requires entrepreneurial thinking to leverage performance (Callegari & Fedder, 2021). According to the SET, organisations should always be on the lookout for opportunities in the marketplace and the identified opportunities should thereafter, be developed effectively to ensure the efficient provision of quality customer service (Korpysa, 2020)

2.3 Empirical Review

This section presents the empirical evidence from past research on entrepreneurship in supply chains, healthcare financing, and performance of organisations.

2.3.1 Innovative Inventory Management and Performance

The first objective of the study was to investigate the effect of innovative inventory management on performance of public hospitals in Kenya. The objective hypothesis was as follows:

H_{01}: Innovative inventory management has no significant effect on the performance of public hospitals in Kenya.

Innovation is the experimentation of new techniques, products, and services in an organisation. It is more of an organisational culture that relies on adapting new practices in place of old techniques. It is a core competency that builds the future of an organisation in a highly dynamic operating environment (Ferreira & Lisboa, 2019). Public hospitals across the globe are required to provide

healthcare services with commercialisation. This balance is established through innovations which can take place at any level in the public hospital, but with one major goal of enhancing competitive advantage and performance (Valka et al., 2020). Ketchen Jr and Craighead (2021), elaborate that innovativeness in inventory management can be achieved through new technology use and JIT principle. Technology is a unique organisational resource that can be leveraged to deliver strategic benefits for an organisation. Technology in a hospital has the unique capacity to provide quality healthcare, reduce healthcare costs, and improve patient experience.

The healthcare sector experiences excessive inventory accumulation, shortages and obsolescence more than any other sector. Shortages lead to loss of life which makes hospitals face liability lawsuits, while oversupply results in expired products, pilferage, and excessive wastage (Essila, 2022). People are finding it difficult to visit hospitals when sick since pharmacies at a retail level are treating low-acute illnesses which is easily manageable with minimum inventory levels (Berry, 2019). There is an urgent need for inventory optimisation and control through efficient new technology use (Karamshetty et al., 2022). This can be achieved through the JIT inventory principle as it reduces supply disruptions, holding costs, damages, inefficiencies and bottlenecks. (Essila, 2023). Smith (2024) postulates that the JIT principle minimises inventory holding by synchronising organisational supply and demand.

2.3.2 Proactive Strategic Sourcing and Performance

The second objective of the study was to investigate the effect of proactive strategic sourcing on performance of public hospitals in Kenya. The objective hypothesis was as follows:

H_{02}: Proactive strategic sourcing has no significant effect on the performance of public hospitals in Kenya.

When done correctly, proactiveness shapes the firm macro environment rather than the firm depending on the environment (Hamdan & Alheet, 2020). This helps create strategic relationships, alliances, and collaborations with industry partners which reduces uncertainties (Gauthier et al., 2021). Proactive strategic sourcing is key in improving the efficiency and adaptiveness of healthcare systems. The primary goal of healthcare is to promote equity, quality of care, efficiency, and responsiveness to citizens. Proactiveness in strategic sourcing can help meet these goals even in the midst of high demand (Montas et al., 2022). The adoption of strategic sourcing strategies is demanding and complex as it calls for committing funds to priority populations, and interventions and creating initiatives that enhance equity in access to healthcare (Munyua et al., 2022). Proactive strategic sourcing addresses problems in advance so that risks and negative consequences are avoided (Menga, 2020). Collaborative supplier relationships and the availability of proper strategies in procurement planning help improve healthcare performance (Oliech & Mwangangi, 2019). Planning for procurement helps in identifying sources of supply, determining resource quantities and their specifications, enhancing negotiations, establishing supplier relationships, and framework for delivery (Frederico, 2023). A breath of new hope is achieved in the abundance of procurement planning because a procurement plan stipulates the needed resources for essential medical supplies against available resources, therefore, minimising shortages and enhancing overall healthcare outcomes (Ahmed, 2019).

2.3.3 Risk Taking and Performance

The third objective of the study was to investigate the effect of risk taking on performance of public hospitals in Kenya. The objective hypothesis was as follows:

H_{03}: Risk taking has no significant effect on the performance of public hospitals in Kenya.

Risk taking entails the readiness of the public hospital to take advantage of opportunities, utilise resources and invest in projects that exist in an uncertain environment, and have uncertain returns. It is the propensity of the organisation's administration to take business-related perils in uncertain

business terrains. Public hospitals that fail to take the intended risks usually fail but those that commit to risky ventures reap greater benefits (Otolo et al., 2024). Risk-taking helps public hospitals to venture into unchartered waters. However, for the hospitals to do this, they require adequate resources (Uphadhyay et al., 2023). Among these resources, are risk-taking leaders who empower followers, share control and allow autonomous work, recognise opportunities, communicate consistently, collaborate effectively, show resilience, plan and manage resources to enhance performance (McGee & Terry, 2022). The presence of declining budgets while demand for services in the healthcare sector increases, calls for the adoption of risk taking behaviour in the form of income generating opportunities; which helps develop new revenue streams to carry day-to-day activities. A public sector entrepreneur identifies market opportunities within their landscape and optimises performance in a way that allows risk and recognises stewardship (Hodgson et al., 2021).

2.3.4 Moderating Effect of Healthcare Financing

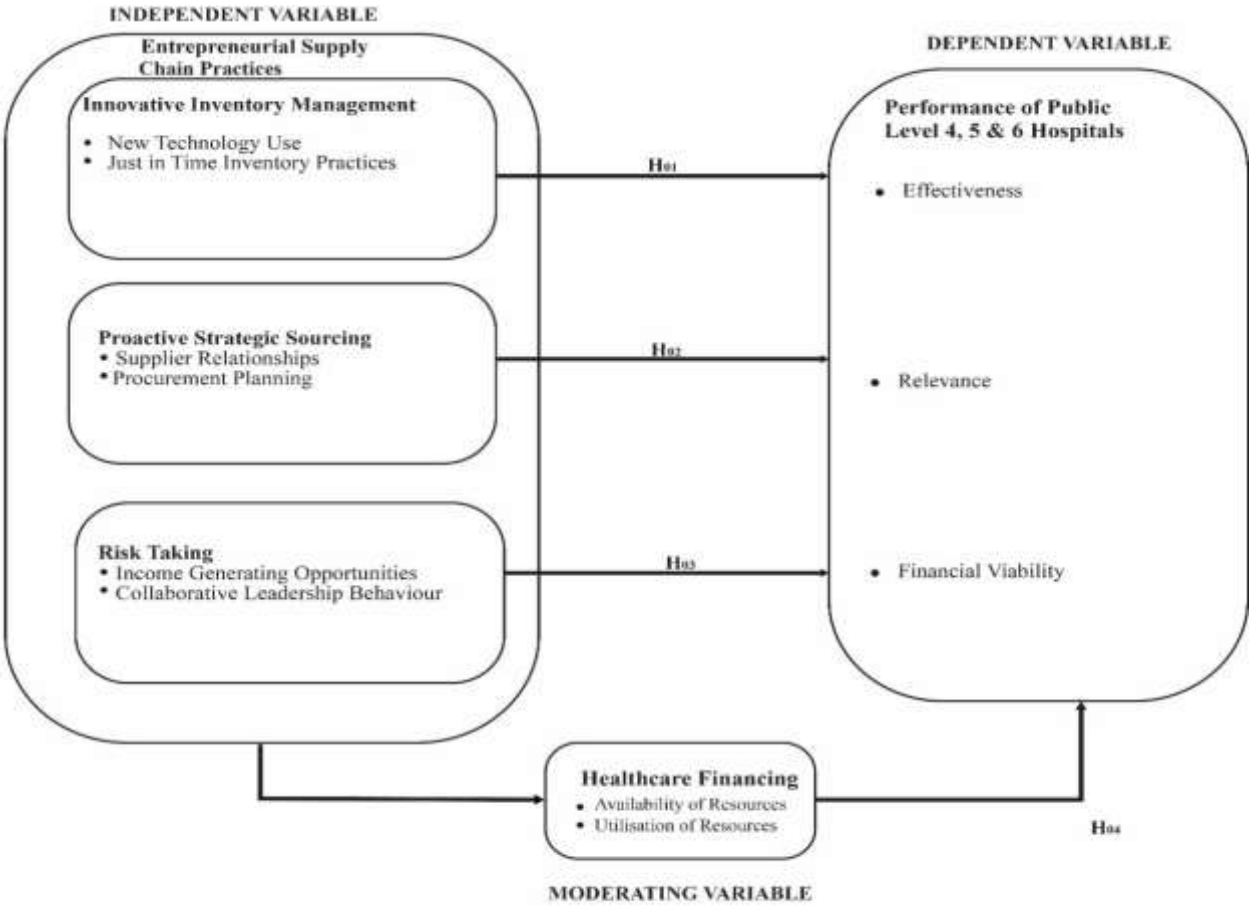
The fourth objective of the study was hypothesised as follows:

H_{04}: Healthcare financing has no moderating effect on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya.

Manda et al., (2020) recognise that operating efficiently requires the availability of healthcare financing. According to Asante et al. (2020), healthcare financing affects the performance of public hospitals. The authors suggest that improvements in public hospitals can be seen through the timely availability of funds and resources. Siena and Riviello (2021) who examined challenges in healthcare financing in Sub-Saharan Africa confirm this. The study found that unavailability and inadequacy of resources affect access to quality healthcare services. Kabaniha et al. (2021) assessed healthcare financing, economies, and strategies for sustainable healthcare and found that planning for resource use stimulates performance. Adequate financing empowers hospitals to fully implement and leverage innovative supply chain practices, leading to improvements in efficiency, cost control, patient outcomes, and resilience. However, insufficient financing can limit the effectiveness of these practices, reducing their potential to improve performance (Volland, 2020). Adequate and efficiently managed funding enables hospitals to provide high-quality care, invest in innovation, maintain a skilled workforce, and improve patient outcomes. Conversely, underfunded or mismanaged systems can result in inefficiencies, poor service delivery, and inequitable access to healthcare (Munala & Riang, 2023).

2.4 Conceptual Framework

Figure 2.1 shows entrepreneurial supply chain practices as the independent variable, the dependent variable is performance of public hospitals and the moderator variable is healthcare financing. Entrepreneurial supply chain practices incorporate; innovative inventory management built upon new technology use and just in time inventory; proactive strategic sourcing built upon supplier relationships and procurement planning; and risk taking which constitutes income generating opportunities and collaborative leadership behaviour. Healthcare financing is built upon availability of resources and utilisation of resources. Finally, performance of public hospitals in Kenya is built upon effectiveness, relevance and financial viability.



Source: Author, (2024)

3.0 Research Methodology

The study utilised the positivism philosophy which helps view the world objectively by distancing the researcher from his/her personal views and interrogating data in a practical setting thus building actionable knowledge (Park et al., 2020). The study utilised two designs; the descriptive research design and the explanatory research design. The descriptive research design helps obtain population characteristics and test hypotheses, thus preventing bias. The explanatory research design establishes causal and effect associations between variables enabling the researcher to manipulate data (Mishra & Alok, 2022). The study population for this study was 243 public hospitals in Kenya. The study utilised Slovin's formulae to determine the sample size of 151 public hospitals. The Slovin's formula was utilised as it permits a high degree of accuracy and helps to promote sample adequacy (Awino et al., 2022). The formula is stated below:

$$n = \frac{N}{1+Ne^2}$$

Where; n = sample size
N =Population
e = Margin of error
In this case our population is 243 which gives a sample size of 151.
The study used primary data collected using a semi-structured questionnaire which was subdivided into 3 sections and had a 5-point Likert Scale. Before data collection, a pilot study was conducted to enhance the instrument reliability and validity. The study used face, content, and construct validity by utilising similar variables; performance (dependent) and healthcare financing (independent) as used by most previous researchers. Reliability was tested through the test-retest method, and the

Cronbach alpha coefficient helped check the internal consistency. The acceptable threshold for this study was 0.6 as it is the optimal value as argued by Barbera et al., (2021). The obtained data was cleansed and coded. The SPSS Version 24 was used to analyse the data where both descriptive and inferential statistics were used. To establish the relationship between entrepreneurial supply chain strategies and performance without the moderator, multiple regression was utilised. The equation is given as follows:

The combined multiple regression model is stated in Equation 3.1

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_{2+} \beta_3 X_3 + \varepsilon} \text{ ……......1}$$

Where; Y is the composite index for the performance of public hospitals, β_0 is constant, β is the slope, X_1 is Innovative Inventory Management, X_2 is Proactive Strategic Sourcing, X_3 is Risk taking, β_1 is the regression coefficient of variable X_1 (Innovative Inventory Management), β_2 is regression coefficient of variable X_2 (Proactive Strategic Sourcing), β_3 is regression coefficient of variable X_3 (Risk Taking), and ε is the error term.

Testing the Moderating Effect

Moderation was tested using the equation recommended by Aiken and West (1991). In the first step, the predictor variables with the main effect were added to the model and in step two, the interaction term was added to the model to determine the moderation effect, as shown in Equation 3.2.

$$Y= \beta_0 + \beta_1 X_i*Z + \beta_2 X_2 *Z + \beta_3 X_3*Z + \varepsilon \text{…….....}\mathbf{.....2}$$

Where; Y is the dependent variable (performance of public hospitals), β_0 is constant, X_1 is the coefficient of the composite index of innovative inventory management * healthcare financing, X_2 is the composite index of proactive strategic sourcing * healthcare financing, X_3 is the composite index of risk taking * healthcare financing and e is the error term. A p-value of 0.05 will help accept or reject the hypothesis (H_{05}).

4.0 Findings and Discussions

This section presents the study findings, regression results and discussions.

4.1 Diagnostic Results

Before data analysis, diagnostic tests were conducted to ensure that the assumptions of linear regression were not violated as this would flaw the study findings as argued by Ndung'u (2021).

Table 1: Diagnostic Tests Results

S. No	Test	Method	Decision criteria	Results	Decision
1.	Sample Adequacy Test	Kaiser-Meyer-Olkin (KMO)	0.5 threshold	All variables surpassed 0.5	Sample adequate
2.	Normality Test	Shapiro-Wilk test	P value is greater than the level of significance of 0.05	p-values greater than 0.05	Date normally distributed
3.	Outliers Test	Cook's Distance	0 to 1 >1 considered outliers	<1 values obtained	No outliers
4.	Correlation Test	Pearson Correlation Coefficient	Values should fall between -1 and 1.	All variables exceeded the 0.05	Presence of linearity

				confidence level set.	
5.	Homoscedasticity	Breusch-Pagan test	P values greater than 0.05	Values had p value of 0.50>o.o5	presence of heteroscedasticity
6.	Multi-collinearity	Variance Inflation Factor	1 to 10	All variables below 10	Absence of Multi-collinearity
7.	Autocorrelation	Durbin-Watson	Durbin-Watson value of 2.447	value of 0.547	No autocorrelation

Source: Research Data (2024)

The results in Table 2 reveal that the sample was adequate as the KMO was above the set threshold of 0.05. The data was normally distributed as the obtained p values were greater than the set threshold of 0.05. there were no outliers as the obtained values ranged between 0 to 1. There was presence of heteroscedasticity as the obtained Breusch-Pagan value was greater than 1. There was absence of multicollinearity as the VIF values were between 0 to 9 and there was no autocorrelation as the obtained value met the threshold of 3.

4.2 Regression Analysis

This section presents the regression analysis and discussions

4.3.1 Model One Regression Results without the Moderator

The study sought to establish the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya without the moderator. The composite index of all the independent variables (innovative inventory management, proactive strategic sourcing, and risk taking) was regressed on the performance of public hospitals in Kenya. The results are captured in Table 2

Table 2: Entrepreneurial Supply Chain Practices on Performance of Public Hospitals in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.824[a]	.624	.618	.231670

a. Dependent Variable: Performance of public hospitals

b. Predictors (Constant): composite index of entrepreneurial supply chain practices (innovative inventory management, proactive strategic sourcing, risk-taking)

Source: Authors (2024)

From Table 2, 61.8% of the variations in the performance of public hospitals in Kenya can be explained by entrepreneurial supply chain practices. An improvement in the performance of public universities in Kenya can be achieved through the adoption of entrepreneurial supply chain practices. The results obtained above are in the same vein as a study by Ketchen & Craighead (2020) on the intersection between entrepreneurship, supply chain management, and strategic management which presented opportunities highlighted by COVID-19. The study highlights that entrepreneurial supply chain opportunities arise when they are sought for and organisational performance is improved when the identified supply chain activities are exploited. Another study by Prayetno and Ali (2020) confirms the obtained results as it found a positive significant relationship between entrepreneurial supply chain management and organisational performance. The study concluded that entrepreneurial capabilities in an organisation result in a considerable improvement in firm performance. Liu and Wang (2022)

concur with these observations and conclude that firms that are innovative achieve competitive advantage through product and process innovation; proactive firms can become first movers in a marketplace and firms that have a high-risk attitude achieve great success in innovative settings. The greater the entrepreneurial orientation in an organisation, the greater the organisational performance.

Table 3: Analysis of Variance

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	14.351	3	4.784	89.179	.000[b]
Residual	13.035	243	.054		
Total	27.386	246			

a. Dependent Variable: Performance of Public Hospitals

b. Predictors: (Constant): Innovative inventory management, proactive strategic sourcing, Risk-taking

Source: Authors (2024)

From the ANOVA results given in Table 3, it can be concluded that there exists a positive and significant relationship (F=89.179, sig <0.05) between entrepreneurial supply chain practices and performance of public hospitals in Kenya. Therefore, the model was considered fit for the analysis.

Table 4: Coefficients[a] for entrepreneurial supply chain practices on performance of public hospitals in Kenya

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.469	.281		15.88	.000
	Innovative inventory management	.291	.042	-.119	-2.547	.011
	Proactive strategic sourcing	.645	.026	.606	12.99	.000
	Risk taking	.313	.032	-.316	-7.123	.000

Dependent Variable: Performance of public hospitals in Kenya

Source: Authors (2024)

Equation 4.1 was used to predict the study variables.

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_{2+} \beta_3 X_3 + \varepsilon} \quad \text{.....3}$$

Whereby; Where; Y is a composite index for the performance of public hospitals, β_0 is constant, β is slope, X_1 is Innovative Inventory Management, X_2 is Proactive Strategic Sourcing, X_3 is Risk taking, β_1 is the regression coefficient of variable X_1 (Innovative Inventory Management), β_2 is regression coefficient of variable X_2 (Proactive Strategic Sourcing), β_3 is regression coefficient of variable X_3 (Risk Taking), and ε is the error term.

Based on the findings provided in Table 4, the predictor model incorporating the study variables is given in Equation 4.2.

$$Y = 4.469 + 0.29 X_1 + 0.645 X_{2+} 0.313 X_3 + \varepsilon \quad \text{..... 4}$$

Equation 4.2 provided above indicates that all the three entrepreneurial supply chain practices used in this study i.e. innovative inventory management, proactive strategic sourcing, and risk taking have a positive and significant relationship with the performance of public hospitals in Kenya.

The first objective of the study sought to establish the influence of innovative inventory management on the performance of public hospitals in Kenya. The hypothesis was as follows:

H_{01}: Innovative inventory management has no significant effect on the performance of public hospitals in Kenya.

The results in Table 4 reveal that the adoption of innovative inventory management practices has a significant and positive effect on the performance of public hospitals in Kenya ($\beta = 0.291$; P-Value < 0.05). From this finding, the null hypothesis (H_{01}) was rejected meaning that a unit increase in the adoption of entrepreneurial supply chain practices in the form of innovative inventory management leads to a significant increase in the performance of public hospitals in Kenya by 29.1%. These results are similar to a study by Illangakoon et al., (2021) who investigated the adoption of new technologies through Industry 4.0 and lean concepts in hospitals for healthcare operational performance improvement and found out that hospitals that adopt Industry 4.0 have a higher performance. Similar results are also revealed by Kauvukoglu (2023) who investigated the correlation between organisational innovation and business excellence with a focus on private hospitals. The study revealed that innovations in the hospital processes enable a hospital to progress towards excellence and increase the satisfaction of patients. Rastoka et al., (2022) also revealed similar results after investigating the influence of entrepreneurship on the quality of public healthcare institutions in Bosnia and Herzegovina.

The second objective of the study sought to establish the influence of proactive strategic sourcing on the performance of public hospitals in Kenya. The hypothesis was as follows:

H_{02}: Proactive strategic sourcing has no significant effect on the performance of public hospitals in Kenya.

The results in Table 4 reveal that the adoption of proactive strategic sourcing practices has a significant and positive effect on the performance of public hospitals in Kenya ($\beta = 0.645$; P-Value < 0.05). From this finding, the null hypothesis (H_{02}) was rejected meaning that a unit increase in the adoption of entrepreneurial supply chain practices in the form of proactive strategic sourcing leads to a significant increase in the performance of public hospitals in Kenya by 64.5%. Similar results are revealed by Fan et al., (2021) who concluded that a proactive supply chain creates a competitive advantage by being the first to make changes in its products/services and technologies. The results if this study also confirm the results of a study by Munyi et al., (2024) who found out that proactiveness in strategic sourcing results to positive firm performance. Similar results are revealed in a study by Oliech & Mwangangi (2019) who established that strategic sourcing reduces shortages, and wastages, improves accountability, and makes services affordable to all. The study further recognised that poorly organised supply chains place the health of millions of Kenyans at risk.

The third objective of the study aimed at investigating the effect of risk taking on the performance of public hospitals in Kenya. The hypothesis was as follows:

H_{03}: Risk taking has no significant effect on the performance of public hospitals in Kenya.

The results in Table 5 reveal that the risk taking practices have a significant and positive effect on the performance of public hospitals in Kenya ($\beta = 0.313$; P-Value < 0.05). From this finding, the null hypothesis (H_{03}) was rejected meaning that a unit increase in the adoption of entrepreneurial supply chain practices in the form of risk taking leads to a significant increase in the performance of public hospitals in Kenya by 31.3%. These results confirm the work of Hamdan and Alheet, (2020) who

looked into the influence of organisational risk taking on Small and Medium Enterprises in the United Kingdom. The study concluded that risk-taking positively influences firm performance. Another study by Silva et al., (2021) revealed similar results and concluded that risk taking is a critical factor that builds stronger supply chains and boosts performance. Zighan et al, (2022) obtained similar results and established that firms willing to take risks by committing and allocating resources to new markets, build a strong foundation of enhanced performance. In this cerebration is a study by Theresa and Hidayah, (2021) on owners of Micro, Small, and Medium Enterprises (MSMEs) in North Jakarta, which found a positive and significant relationship between risk-taking and the performance of SMEs. Consequently, entrepreneurial supply chain practices had a prediction model as shown in Equation 5:

$$Y = 4.469 + 0.29\ X_1 + 0.645\ X_{2+} 0.313\ X_3 + \varepsilon \quad \text{.....5}$$

The findings indicate a constant term of 4.469, implying that holding all other variables at a constant (0), improvement in public hospital performance would be at 61.8%. The 38.2% deficit can be attributed to other factors not taken into account by this study.

4.2.2. Testing the Moderating Effect of Healthcare Financing on Performance of Public Hospitals in Kenya.

The following hypothesis was tested:

H_{04}: Healthcare financing has no moderating effect on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya.

This hypothesis was tested using two regression models shown as follows:

Table 5: Model Summary for the Moderator Variable

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Standard Error			
Constant	4.469	.281		15.88	0.000
1 entrepreneurial supply chain practices	0.824	0.624	0.618	23.84	0.011
Healthcare Financing	0.435	0.763	0.645	14.99	0.000
Constant	4.373	0.293		14.93	0.000
2 Entrepreneurial supply chain practices* Healthcare Financing	0.837	0.672	0.621	23.14	0.000

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	14.351	3	4.784	89.179	0.000[b]
Residual	23.375	243	0.54		
Total	27.386	246			
2 Regression	15.285	4	3.654	93.452	0.000[b]
Residual	17.747	278	0.121		

Total	32.032	282	

R	R^2	Adjusted R^2	Standard Error of the Estimate	Change					
				R2 Change	F change	df 1	df 2	Sig. F Change	Durbin Watson
0.824	.624	.618	.2317	0.000	0.000	4	278	0.000	
0.837	.672	.621	.2314	0.048	4.273	4	282	0.002	2.243

Predictor variable (constant): entrepreneurial supply chain practices, *healthcare financing
Dependent variable: performance of public hospitals

Source: Authors (2024)

In the first model, intrapreneurial strategies were regressed on performance of public universities in Kenya and a statistically significant association was revealed at β1=0.475, t=3.944, p=0.000.

Public Hospital Performance= Y = 4.469 + 1.248 entrepreneurial supply chain practices…….....……..6

In the second model, a composite of entrepreneurial supply chain practices and healthcare financing were regressed on performance of public hospitals in Kenya.
According to Table 5, an R^2 of 0.672 is revealed; thus entrepreneurial supply chain practices and healthcare financing account for 67.2% of deviations in performance of public hospitals in Kenya. The obtained probability is 0.000, which is lower than the set threshold of 0.05 indicating that the model is statistically significant at 95% confidence level. Further, healthcare financing is statistically significant at β=0.435; F = 14.99; p = 0.000 indicating a 43.5% increase in performance of public hospitals when all factors are held constant.

Public hospital performance= 0.4373 + 1.242 entrepreneurial supply chain practices + 0.435 healthcare financing + 1.248 entrepreneurial supply chain practices*, healthcare financing....……..……...……7

The findings are similar to a study by Visconti and Morea (2020) did a study to analyse the impact of healthcare financing on hospital performance and found a positive and significant relationship between healthcare financing and firm performance. The study further reveal that healthcare financing is critical in a hospital as it provides adequate resources that helps reduce operational costs and shorten lead times through enhanced purchases. Another study by Sinambela et al., (2022) revealed a positive and significant relationship between availability of finances and the effectiveness of a public hospital. Another study by Amos et al., (2020) provides findings similar to the current study and emphasise that the abundance of resources obtained from multiple donors and in bulk ensures medical supplies and healthcare personnel are available while providing resources for investing in infrastructure. A study by de Almeida Botega et al., (2020) on the influence of autonomy in resource utilisation revealed similar results to the current study and concluded that when an organisation has autonomy in the utilisation of resources, they can make decisions faster as more decision-making power is

availed to them. Volland (2020) studied the moderating influence of healthcare financing on the relationship between entrepreneurship and firm performance and found a significant moderating effect.

It can therefore be deduced that healthcare financing has a significant moderating effect on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya. Consequently, the null hypothesis that there is no moderating effect on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya was rejected.

5.0 Conclusion

The objective of the study was to investigate the moderating effect of healthcare financing on the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya. The researcher considered aspects of availability of resources and utilisation of resources. The study concluded that healthcare financing moderates the relationship between entrepreneurial supply chain practices and the performance of public hospitals in Kenya. The public hospitals have a planned budget that guides resources allocation. The public hospitals receive funds from the county governments in a timely manner and also receive the funds in bulk. The public hospitals also receive resources from donors and other parties frequently. The public hospitals have autonomy in the utilisation of resources and allocate resources in a transparent and electronically visible and integrated process. The public hospital possesses a collaborative spirit in regard to resource use and availability.

5.1 Policy Implications

The right to health is a basic human right that promotes productivity and growth in a country. The right is affirmed clearly in global, regional, and national health frameworks. The United Nations (UN) Sustainable Development Goals (SDGs) in the global level, the African Union Agenda 2063, the East African Community (EAC) Vision 2050 in the regional level and the Kenyan 2010 Constitution possess pillars aimed at high standards of living, improved quality of life and well-being for all people, healthy-well-nourished citizens, and the expansion and equitable access to quality healthcare services for all.

The study provides great insights to several stakeholders as follows: - the study recommends the Chief Executive Officers (CEOs) and Medical superintendents of public hospitals to have a planned budget that guides in resource allocation. The public hospital should also have autonomy in the utilisation of resources to avoid over-dependence on other parties for operational resources. The Finance Department in public hospitals should utilise electronic payment methods when delivering healthcare services. This will ensure transparency, traceability, and integration of processes so that organisational resources are utilised well.

Over-dependence on out-of-pocket pay by patients limits the hospital resource base. Consequently, the Ministry of Health should explore innovative financing models for additional resources and be able to meet resource gaps that exist in the environment of resource constraints such models including insurance. The governors heading county governments should adopt community-based healthcare financing programs that will improve access to healthcare by the majority of citizens. The County Governments are recommended to pay partial contributions for SHA for the poor citizens in their counties to stimulate community-based financing. The County Executive Member for Finance and Planning should ensure timely disbursements of healthcare resources to public hospitals and that the public hospital receives the funds in bulk. On the other hand, the Ministry of Health should support results-based financing mechanisms through the creation of policies that reward well-performing hospitals. The rewards may include the provision of new technologies such as diagnostic equipment free of charge, training of staff, and infrastructural development. In addition, the Ministry of Health should encourage partnerships with donors and other private entities to secure external grants and funding for countrywide healthcare projects.

The National Treasury should increase the funding stipulated for healthcare through innovative financing mechanisms such as increased capitation and selling health bonds. The National Treasury in tandem with SHA and the Ministry of Health should consider expanding access to insurance by Kenyans in the SHA by offering subsidies to low-income communities. The SHA on the other hand should expand insurance coverage for health and remit reimbursements to the County Governments on time to ensure continuous access to healthcare by the majority of Kenyans. The donors: WHO, Community Based Healthcare Organisations, USAID, and World Bank should make an effort to continue providing grants and support to healthcare projects in Kenya, especially in all areas be it communicable, or non-communicable diseases, and/or road traffic injuries. They should partner with the national Ministry of Health and County Governments to implement innovative measures of finance such as crowdfunding that promote access to healthcare by many Kenyans. The donors should support research in the area of healthcare and ensure knowledge from the research publications is well utilised.

5.2 Limitations and future Research

There is paucity of current local research and empirical evidence on entrepreneurship in supply chain management. Consequently, the study utilised findings from developed and developed nations creating economic, political and social challenges. There exist a vast number of parameters for public hospitals performance while the current study uses a few. The study focused on the moderating influence of healthcare financing on the relationship between entrepreneurial supply chain practices and performance of public hospitals in Kenya. It is recommended that the study be replicated in other service and manufacturing sectors in Kenya and in other countries to establish whether the results agree or disagree.

DECLARATION OF COMPETING INTERESTS

"The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper."

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