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Operational resilience as a mediator between digitalisation and sustainable performance of fast-moving consumer good firms in Nairobi County.

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OPERATIONAL RESILIENCE AS A MEDIATOR BETWEEN DIGITALISATION AND SUSTAINABLE PERFORMANCE OF FAST-MOVING CONSUMER GOOD FIRMS IN NAIROBI COUNTY

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis/dissertation (use as appropriate) contains no material previously published or written by another person except where due reference is made in the thesis/dissertation itself.

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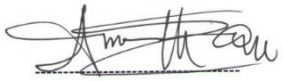
Signature: 

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DEDICATION

I dedicate this thesis to my parents Eliud Kiangi and Zipporah Wambua who have always fully given themselves to me in all ways, praying and loving me always. I would not be here if it were not for their unending love. Special dedication to Anne Mutheu, Grace Mumo, Brian Muuo, and Felix Nga'ng'a for their great support, encouragement, and love as I went through this journey praying that this will motivate them to always work smart to achieve all that they hope to achieve in life.

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May God bless you all abundantly.

ABSTRACT

Since 2019, trade tensions between the US and China and Brexit-related trade uncertainty contributed to a decrease in global industrial production. The COVID-19 pandemic, the Suez Canal blockage in 2021, and the conflict between Russia and Ukraine in 2022 further intensified supply chain disruptions and raised concerns about essential business services on a global scale. Supply disruptions faced by organizations and supply chains can be both external, such as natural disasters (e.g., earthquakes), and man-made disasters (e.g., terrorism), as well as internal, originating from within the boundaries of the supply chain. This study aimed to examine the role of operational resilience in mediating the relationship between digitalization and the sustainable performance of fast-moving consumer goods (FMCG)- food and beverage firms in Nairobi County. The food and beverage sector occupy the highest percentage; 42% in the FMCG industry making it the biggest sector. The specific objectives of the study were to determine the relationship between digitalization and sustainable performance, the relationship between digitalization and operational resilience, the relationship between operational resilience and sustainable performance, and the mediating effect of operational resilience on the relationship between digitalization and sustainable performance. The study was guided by the resource-based view theory, stakeholders' theory, and the disruption profile framework. The unit of analysis was supply chain managers or coordinators working in the FMCG industry. An explanatory research design was adopted, and purposive and convenient sampling methods were used to select participants. The study followed a positivist research philosophy and employed a quantitative approach to analyze the interaction between the study variables. The population of the study comprised FMCG manufacturing firms operating in Nairobi County. Data were collected using questionnaires, and the validity and reliability of the questionnaire were ensured through appropriate testing. The collected data were analyzed using descriptive and inferential analysis techniques to gain insights into the research objectives. By adopting this research design and methodology, the study aimed to contribute to the understanding of the relationships between digitalization, operational resilience, and sustainable performance in the FMCG industry in Nairobi County. The structural equation modeling (SEM) through SmartPLS revealed a positive and statistically significant relationship between digitalization and sustainable performance in FMCG companies. The study further found that digitalization positively relates to operational resilience. In addition, the study found that operational resilience significantly contributes to sustainable performance. Finally, it was found that operational resilience significantly mediates between digitalization and sustainable performance. Thus, all the hypotheses were supported. These findings suggest that digitalization and operational resilience play significant roles in improving the sustainable performance of FMCG companies in Nairobi County. The study concluded that organizations with higher levels of digital integration and platform capabilities are likely to achieve better sustainable performance outcomes. The research recommended that organizations should establish key performance indicators (KPIs) and metrics to monitor the impact of digitalization efforts on sustainable performance. Regularly tracking and analyzing these metrics will provide valuable insights into the effectiveness of digital initiatives and enable data-driven decision-making.

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DEFINITION OF TERMS

Digitalization The use of digital technologies to change a business model and provide new revenue and value-producing opportunities (Gartner , 2021)

Digital integration Capability The ability to broadly incorporate digital assets and business resources and leverage digital networks to innovate products, services, and processes to achieve organizational learning and customer value (Annarelli et, al, 2021).

Digital platform capability It is the firm's ability to make connections with other firms using online platforms (Blaschke et al., 2018).

Operational resilience The ability of a firm's operations to absorb and recover from disruptions" (van der Vegt et al., 2015).

Sustainable performance The ability to meet the needs and expectations of customers and other stakeholders on long-term, balanced by an effective management organization by organization staff awareness by learning and applying appropriate improvements, innovation (Anca-Cristina, Mihaela & Elena, 2014).

Supply chain disruption The combination of an unintended and unanticipated triggering event that occurs at a certain point in the supply chain and the consequent scenario that presents a severe threat to the normal course of business operations of the focal firm (Bode & Wagner, 2015).

ABBREVIATIONS AND ACRONYMS

AVE	Average Variance Extracted
BSC	Balanced Scorecard
CBSEM	Covariance-Based Structural Equation Modelling
CR	Composite Reliability
DPC	Digital Platform Capabilities
ESG	Environmental, Social and Governance
FMCG	Fast-moving Consumer Goods
GDP	Gross Domestic Product
KAM	Kenya Association of Manufacturers
KEU	Kenya Economic Update
KNBS	Kenya National Bureau of Statistics
KPMG	Klynveld Peat Marwick Goerdeler
NACOSTI	National Commission Of Science Technology And Innovation
SEM	Structural Equation Modelling
SU-IREC	Strathmore University Institutional Ethics Review Committee
VBSEM	Variance-Based Structural Equation Modelling

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The vulnerability of supply chains to disruptions is evidenced by major events in the past; for example, the earthquake in Japan in 2012 not only impacted the Japanese and Asian economies, but led to shortages in the automobile and technology industry supply chains in Europe (Scholten, Scott, & Fynes, 2014) and most recently Wuhan, the epicenter of the COVID-19 outbreak, which is a significant auto component manufacturing hub and a supplier of crucial components to major automakers including Volkswagen, General Motors, Hyundai, and Toyota on a global scale (Kumar & Managi, 2020; Sharma et al., 2020). Several suppliers based in the Wuhan car factory hub had already warned their global clients of their inability to deliver parts due to plant closures and other knock-on effects (LMC, 2020). The most agile and resilient supply chains are those that are built to do more than just withstand and recover. Supply chain disruption is defined as:

the combination of an unintended and unanticipated triggering event that occurs at a certain point in the supply chain and the consequent scenario that presents a severe threat to the normal course of business operations of the focal firm (Bode & Wagner, 2015).

It has been argued that the success of today's businesses increasingly, depends on their intellectual assets as opposed to their tangible resources (Stewart, 1997). Such assets include the workforce's attitude, knowledge, and talents, among others. These resources are referred to as competencies, according to the American Society for Training and Development (ASTD). Operational resilience helps to reduce and overcome exposure to risks by developing strategies that enable the supply chain to recover to its original functional state following a disruption (Juttner & Maklan, 2011). Therefore, industrial companies can employ supply chain resilience to avoid interruptions and handle them if they do happen. The adoption of digital technologies improves the efficiency of organizational knowledge management, which in turn promotes product innovation, process innovation, and brings competitive advantages to companies (Mingaleva et. al ,2019). and digital transformation affects company competitiveness, mainly through innovation, efficiency and cost

reduction (Leao & Siva , 2021). The digital transformation of companies is not simply the adoption of emerging technologies, but involves the interaction of technology, business, and society (Veldhoven et al., 2021). Companies need to understand their digital capabilities and how they affect supply chain resilience before spending a lot of money on supply chain risk management strategies.

The fast-moving consumer goods (FMCG) industry in Nairobi County is a critical sector that plays a significant role in the economic development of the region (Macharia et al., 2019). As digitalization continues to reshape industries worldwide, FMCGs are also embracing digital technologies to improve their operations and enhance performance (Tetteh et al., 2021). However, the specific relationship between digitalization, operational resilience, and sustainable performance of FMCGs in Nairobi County remains relatively unexplored. This study seeks to fill this research gap by investigating the mediating effect of operational resilience on the relationship between digitalization and sustainable performance in FMCGs operating in Nairobi County.

Digitalization, characterized by the integration of digital technologies into business processes, has become a transformative force across various industries (Ozturk et al., 2020). In the context of FMCGs, digitalization offers numerous opportunities for improving operational efficiency, customer engagement, and overall performance. Technologies such as e-commerce platforms, online marketing, and supply chain automation have the potential to enhance customer reach, increase sales, reduce costs, and improve organizational agility (Gebauer et al., 2021). However, limited research has specifically examined the impact of digitalization on the sustainable performance of FMCGs in Nairobi County.

Understanding the relationship between digitalization and sustainable performance is crucial for FMCGs in Nairobi County to develop effective strategies that leverage digital technologies for long-term success (Wamukoya et al., 2022). By investigating this relationship, this study aims to provide insights into how FMCGs can optimize their digitalization efforts to achieve sustainable performance outcomes. This knowledge can guide FMCGs in the region to make informed decisions regarding technology adoption, resource allocation, and business process optimization.

Operational resilience is another key concept that plays a vital role in the performance of FMCGs. Operational resilience refers to an organization's ability to withstand and recover from

disruptions, maintain service delivery, and adapt to changing circumstances (Vafaei et al., 2020). In the context of FMCGs, operational resilience involves managing supply chain disruptions, responding to market changes, and ensuring the uninterrupted availability of products and services. Digitalization is closely linked to operational resilience as digital technologies enable organizations to build agile and flexible operational systems that can withstand and adapt to disruptions (Kasvi et al., 2021). Despite the recognized importance of operational resilience, there is limited research on its relationship with digitalization and its impact on the sustainable performance of FMCGs in Nairobi County.

This study also aims to explore the mediating effect of operational resilience on the relationship between digitalization and sustainable performance. Understanding the mediating role of operational resilience can provide a comprehensive understanding of how digitalization influences sustainable performance in FMCGs (Chai et al., 2021). By examining this mediation, the study will shed light on the mechanisms through which digitalization impacts the sustainable performance of FMCGs, offering valuable insights for both practitioners and policymakers in Nairobi County.

1.2 Digital Transformation

Digital transformation changes the business model of the company by changing for example value creation processes, organizational tasks, and how the business is made (Verhoef et al., 2021). Singh et al .(2020) defined digital transformation as enterprises taking all-round actions to deal with the opportunities and risks brought by digital technologies. The generation and use of computerized information as well as the processing of the enormous volumes of data that are produced at all stages of the supply chain are all aspects of digitalization in the fast moving consumer goods (FMCG) sector. The main aim of digitalization is to improve efficiency. While digitalization gives individuals the tools to generate and/or enhance the value of conducting business as well as the products, it is essential for the industrial sector to be able to share, learn from, and collaborate. The study will examine two aspects of digitalization capabilities: digital platform capabilities and capabilities for digital integration. The aspect of digital innovation capabilities will largely not have an effect on the study as known data is based on manufacturing industries in developed countries.

1.2.1 Digital Integration Capabilities

While many firms now have access to broadband networks, the diffusion of more advanced digital tools and applications is far from complete and differs significantly across countries (McKinsey Global Institute, 2018). To operate in increasingly digitalized business environments, and as a part of the digital ecosystems, companies need not to only find innovations and innovative ways to change their businesses but also develop capabilities to exploit innovation in changing surroundings (Delgosha et al. 2020; Pappas et al. 2018). To derive value from the growing opportunities of digitalization, such as big data, companies need to develop the organizational capacity to recognize how their businesses can benefit from the data-driven insight, as well as develop capabilities to implement these recognized possibilities (Mikalef et al. 2020).

The origins of digital innovation can be traced to digitalization which acts as an enabler of and creates essential conditions for exploiting digital innovation (Chan et al. 2019). This exploitation requires capabilities, relevant to digitalization, that respond appropriately to market opportunities and digital transitions. According to Pappas et al. (2018) , to reach digital transformation and the creation of sustainable societies, none of the operators in society should be seen in isolation; instead, there is a need to improve the understanding of how their interactions lead to knowledge, innovation, and value creation. Concentration on the firm-level capabilities needed to identify, assimilate, and apply valuable knowledge from both inside and outside the firm with regard to opportunities for digital innovation, known as initiate activity (Kohli & Melville 2019).

Organizations require the mitigation of inflexibility in order to better equip themselves in the face of transformations (Kohli & Melville 2019). In order to boost their chances of surviving in the current competitive environment, businesses are advised to develop their human, collaborative, technical, and innovative capabilities in relation to digital-related capabilities. Organizational capabilities in terms of multidimensional constructs have been used to define digital-related capabilities (Nasiri et, al, 2022). Examples include human capabilities, which are seen as the source of digital innovation, employee support, readiness, and digital know-how, collaboration capabilities to maintain a viable alliance and build value networks with the right partners, technical capabilities, which are a complementary channel for ensuring the provision of advance market offerings and innovation capabilities to innovate, identify, and exploit business opportunities, as well as to diversify the business area, (Chan et al. 2019 , Sousa & Rocha 2019). These capabilities

enable companies to respond quickly to digital transformation and to thereby exploit digital innovation.

1.2.2 Digital Platform Capabilities

The continuous improvement is a fundamental requirement for the digital economy and businesses are seeking more opportunities to upgrade their innovation performance (Teece, 2018). Digital platform capability (DPC) is firm's ability to make connections with other firms using online platforms (Blaschke et al., 2018). DPC offers a valuable exchange between network participants at zero marginal-cost to improve innovation performance (Helfat & Raubitschek, 2018). Digital platforms provide useful information in a form of forecasting, production information and customer trends (Warner & W€ager, 2019). Digital platform capabilities have been considered as firms' abilities to establish connections with stakeholders based on the online platform of information and communication technology (Cenamor et al., 2019). Firms are capable of supplying revolutionary data support and solutions in many areas to enhance the digital value proposition and digital benefits based on digital platforms (Blaschke et al.,2018); Jun et al. (2021) pointed out that firms that still achieve innovation in the dynamic environment usually obtain complete digital platform strategies, which can help them prepare for necessary changes. From the standpoint of dynamic capabilities, previous literature has outlined the significance of businesses' digital platform capabilities to enhance innovation. Cenamor et al. (2019) proposed that digital platform capabilities are two-dimension notions consisting of "platform integration capability" and "platform reconstruction capability" on the foundation of information technology capabilities. The capacity to communicate timely and distinctive information with partners is referred to as platform integration capabilities while platform reconstruction capability describes the capacity to reorganize platform resources using modular architecture and defined interfaces in programs and procedures. It is vital to the improvement of firms' digital platform capabilities because they represent creating, sustaining or capturing more values (Witschel et al., 2019). These capabilities represent the integration of IT-based resources with other internal and external resources (Mikalef & Pateli, 2017). They allow firms to integrate critical knowledge effectively, leveraging resources within and outside the organization to better respond to the rapidly changing market needs (Teece, 2018).

1.3 Operational resilience

Essuman , Boso & Annan (2020), proposes a two-dimensional conceptualization of operational resilience, with components consisting of disruption absorption and recoverability, defining disruption absorption as the ability of a firm to maintain the structure and normal functioning of operations in the face of disruptions and recoverability as the ability of a firm to restore operations to a prior normal level of performance after being disrupted. A greater drop in normal performance level suggests that the operations lack disruption absorption capability, and a smaller drop in normal operations implies the operations possess a disruption absorption capability (Blackhurst et al., 2011) while, longer recovery time suggests that an operations lacks recoverability, and the opposite is true (Li et al., 2019).

Operational resilience, is defined as "the ability of a firm's operations to absorb and recover from disruptions" (van der Vegt et al., 2015). Research indicates that resilient firms have mechanisms for dealing with disruptions, enabling such firms to reap superior performance outcomes (Wong et al., 2019). While research interest in resilience is growing, knowledge of the operational resilience construct is limited in two important ways. First, besides the recognition that the resilience construct is not completely understood (Manhart, 2020), previous research is limited to the study of the construct at supply chain network and firm levels. Understanding the nature and consequences of resilience at the operations level is important in that operations is a unique subsystem of the firm and constitutes a primary value-creation function that generates earnings for firms and their supply chain partners (Essuman et al.,2020).

Ivanov & Dolgui (2019) propose the idea of low-certainty-need to suggest that resilience and efficiency can coexist when resilience-building behavior is less dependent on certainty of knowledge about the occurrence and impacts of disruptions. Subsequently, Wong et al. (2019) investigate the complexities associated with these variables by linking resilience to financial performance. Sheffi ,(2021) , said executives should prepare to seize the opportunity of the downturn to evaluate suppliers and customers along the supply chain and make transformative changes as part of their recovery efforts. When demand contracts, it leads to excess inventory and capacity and, potentially, supplier instability and an economic downturn, said referring to bullwhip effect. Given the limited scholarly work on the resilience construct, therefore, calls for further research to establish its performance outcomes keep growing (Pettit, 2019) .

1.4 Sustainable performance

Growing consciousness regarding sustainability and the Triple Bottom Line approach requires an integral performance based on three main goals: economic growth, environmental preservation, and social responsibility (Rafael, William & Ivan ,2018) . All businesses have been disrupted in some way by the COVID-19 pandemic. Sustainable performance of an organization has been referred as its ability to meet the needs and expectations of customers and other stakeholders on long-term, balanced by an effective management organization by organization staff awareness by learning and applying appropriate improvements, innovation (Anca-Cristina, Mihaela & Elena, 2014). ESG metrics are a set of various performance indicators, primarily nonfinancial in nature, that help to assess companies in relation to sustainable and responsible practices(Farmer, 2023).

In this study the focus was on Supply chain ESG presented as the approach that accounts for the entire footprint of your operations, meaning seeing deep into the supply chain to understand where materials come from, whose hands touch those materials, and the journey they take from around the world to reach processing at your sites (Edgren, 2022). The supply chain bit of ESG covers majorly ecological and social metrics hence the analysis of the two under sustainable performance. In the FMCG industry consumers are increasingly concerned about the social and environmental impact of the products and services they buy, and many are more likely to support companies that are transparent about their ESG performance (Vooren, 2023). These metrics are both quantitative and qualitative, quantitative metrics were used in this study as they are based on numerical data that often can be directly measured and compared. Examples of quantitative ESG metrics include greenhouse gas emissions, energy usage, employee turnover rates and reported HR violations (Farmer, 2023). These metrics are useful for benchmarking and tracking performance over time and were used for this study.

The environment is the core of the sustainability dimension and represents the ability to safeguard the reproducibility of natural resources and preserve fundamental functions of the environment over time,(Ivo & Antonio (2019). Social sustainability is primarily related to fostering communication between the external and internal communities, providing equal opportunity and ensuring and improving the health and safety and well-being of society (Shahzad et al., 2019). Social sustainability measures an organization's influence on its most significant stakeholders, including consumers, suppliers, local communities, and employees and their families. Saka &

Oshika, T. (2014) highlighted the relevance of social indicators in the value creation process. To maximize the value of products and services within a supply chain to enhance the ultimate value for customers, a company should ensure corporate competitiveness by cooperating with other partner firms to secure its position within the business ecosystem and to build trust with other ecosystem members (Lee et, al, 2017). Hence, to achieve a sustainable business firms should continuously implement sustainable activities.

KAM has had sustainability initiatives and partnerships such as Women in Manufacturing (WIM) Program with UN Women aimed at increasing Women's participation in the sector and grow the contribution of manufacturing , Kenya Hazardous Waste Producer Responsible Organization (KEHAPRO) Initiative, KAM, Coca-Cola Beverages Africa, and Junky Bins collaboration , the Net Zero Initiative, as well as other initiatives; water efficiency, waste management, circular economy and Responsible Care " Growth & Gain' (KAM, 2022) with sensitization forums for ESG in the industry.

1.5 Fast-moving consumer goods manufacturers in Kenya

Fast-moving consumer goods (FMCGs) are arguably the largest and fastest-growing industry in the world (KPMG, 2016). FMCGs refer to high-demand products that are sold at low prices in vast quantities. Examples of FCMGs in Kenya include personal hygiene products like toothpaste, hair treatment, beauty products, foodstuffs like juices, alcoholic beverages, plastic goods, and small electronic appliances like batteries and light bulbs (KPMG, 2016). L'Oréal East Africa, Kevian Kenya, Kapa Oil, Bidco Oil Refineries, Coca-Cola, HACO Industries, Unilever Kenya Limited, and Nestle Foods Kenya are a few of the well-known and leading brands in the nation. Due to the undifferentiated nature of FMCGs, customers can easily switch from one company to the other without experiencing a significant amount of costs.

The high similarity in FMCG products means that companies compete based on price, company margins, and market share (Machuki & Wasike, 2019). FMCG industry is characterized by firms manufacturing products with short shelf life, regularly purchased, and at relatively low cost. Thus, the FMCG sector is a classic case of low margin, high volume business (Consultancy Group, 2018). The FMCG industry is thriving, offering a wide range of goods and services from several businesses working in various sectors which have a limited shelf life due to the strong demand for

these products. The number of FMCG companies entering and exiting the Kenyan market has increased during the previous few decades along with the economy's vibrancy leading to increase the level of competition experienced by most firms (Mwazo, 2020). Due to difficulties faced by some industry participants, poor overall performance has been displayed in the areas of market expansion, customer satisfaction, product growth, investor confidence and supply disruptions resulting to acquisitions and closure of the firms. Kenya's economic performance in 2020 and 2021 was dismal, and the country has shown patchy signs of recovery although there has been a 6.9% growth rate in 2021 compared to a 0.4% contraction recorded in 2020 (KNBS,2022). This is attributed to a number of factors which among others are the low growth in employment in the formal sector ,the declining GDP share of the manufacturing sector, which has seen a proportionate reduction from 9.3% in 2016 to 7.6% in 2020(KNBS, 2021). Also, infrastructure investments, funded by public debt, have not had a positive impact on either the cost base or the efficiency in manufacturing or cumulative fiscal deficit is causing the country's rising cost of living.

For any manufacturer of FMCGs, meeting customer requests promptly, delivering items on time, and using effective operational procedures are top priorities. Therefore, FMCGs manufacturers need agility in absorptive disruption and recoverability for survival and to achieve sustainable competitive advantage. According to Graham & Frankenberger (2015), FMCG firms have been encountering numerous sustainability challenges during the past two decades, including competition, recessions and image problems during the previous two decades. Organizations that produce fast-moving commodities have been pushed to embrace business excellence strategies to survive and expand in today's fast-paced marketplace (Otieno & Maina, 2022). Digitalization has been a stumbling block for many in the industry due to challenges such as capital associated with acquisition and integration with existing processes. Aiming to shed light on these issues, the project aimed to examine the influence of Operational resilience on both digitalization and sustainable performance of fast-moving consumer goods manufacturers in Nairobi County Kenya.

1.6 Statement of the Problem

Recently, climate change has received significant attention. Businesses, for example, have begun to address the possibility of climate change-induced disruptions of their supply chains, which could disrupt connections with suppliers and customers (Lee et, al, 2017) . The BSR (Business for Social

Responsibility) report “The Future of Sustainable Business” predicted that no company will be unaffected by climate change (Cramer et. al, 2017). Businesses and business ecosystems are transformed by digitalization, which makes use of data and digital technologies. It has important ramifications for economic and social organization, innovation, and competitiveness and transforms markets and manufacturing methods (Kohtamaki et, al, 2019). Given that Kenya's economic growth is still susceptible to outside shocks, particularly changes in the world economy, regional security, and supply shocks caused by weather. A study in this domain would help advance knowledge on how digitalization could enhance sustainable performance (KEU, 2022). In the context of a supply chain, a changing climate makes risk's incidence and effects unpredictable, particularly for extreme events that occur seldom but have serious effects, especially in the industrial sector. Additionally, only few studies address the relation amid digitalization and the SDGs, being a nexus, which remains underrepresented in the scientific literature (i.e. Kostoska & Kocarev, 2019; Tjoa & Tjoa, 2016; Wu et al., 2018).

To diversify supply chain inputs, includes evaluating alternate sources, making production adjustments, and using sourcing techniques (Deloitte, 2022). This means organizations can avoid more disruption by being proactive rather than reactive by doing a thorough review and planning. Pioneer studies are mainly focused on mapping the contribution of ICTs for monitoring sustainable development goals (SDGs) indicators within stand-alone “for good” projects in specific domains, instead of understanding the role of digital capacities (Castro et al., 2021). Therefore, little is known about whether and to what extend the huge opportunities brought by digitalization could be responsibly leveraged to enhance sustainable performance (Fukuda-Parr **&** McNeill, 2019; Goralski &Tan, 2020). The fact is firms that lacked operational resilience and digital capabilities, made them vulnerable or exposed through COVID-19 (Zhu et, al 2020). Studies have shown the importance of operational resilience on sustainable performance as well as digitalization to sustainable performance (Shahatha, 2021 Mwangi, 2022, Irawan, 2022, Cui, Jin & Wang, 2023 and Onyango &Ondiek 2021,) .

Considering our unit of analysis is highly subjective to changes in customer taste , technology among other changes, this creates the need for further research on impact of digitalization on operational resilience on sustainable performance in the FMCG manufacturing firms in Kenya thus creating a knowledge gap. In the KAM ‘Resilience and sustainability report’ , 2020, an

intervention was proposed to increase resilience of the manufacturing sector and ease of doing business through policy stability, development of selected domestic value-chains to minimise exposure to external shocks and an improve the business environment and investment climate. Studies on the FMCG industry in Kenya have been widely conducted, e.g., Muthoni (2017), Anita (2019), and Mwazo (2020), these have, however, not specifically focused on operational resilience. This motivates the need for the current study, to establish the effect of the disruption absorption and recoverability of an organization towards realizing sustainable performance through digitalization in the FMCG manufacturing firms in Nairobi.

1.7 Objective of the Study

The general objective of the study was to investigate the mediating effect of operational resilience on the relationship between digitalization and the sustainable performance of FMCGs in Nairobi County.

1.7.1 Specific Objectives of the Study

The study was guided by the following specific objectives;

i. To determine the relationship between digitalization and sustainable performance of FMCGs in Nairobi County.
ii. To determine the relationship between digitalization and operational resilience in the FMCGs in Nairobi County.
iii. To examine the relationship between operational resilience and sustainable performance of FMCGs in Nairobi County.
iv. To examine the mediating effect of operational resilience on the relationship between digitalization and sustainable performance of FMCGs in Nairobi County.

1.8 Research Questions

i. What is the relationship between digitalization and sustainable performance of FMCGs in Nairobi County and how does it depend on an organization's ability to absorb disruptive change?

ii. What is the relationship between digitalization and sustainable performance of FMCGs in Nairobi County and how does it relate to recoverability of an organization?

iii. What effect do using digital-related capabilities have in improving firm's sustainable performance ?

iv. What is the effect of operational resilience affect the sustainable performance of FMCGs in Nairobi County?

1.9 Scope of the Study

The contextual scope of the study was in the fast-moving consumer goods (FMCG) industry. The research was aimed at investigating the mediating effect of operational resilience on the relationship between digitalization and the sustainable performance of FMCGs in Nairobi County. As of the 2021- 2022 Kenya Association of manufacturers directory, there are 288 FMCG,s in Nairobi County making the 72% of all FMCGs in Kenya. Participants who are in the food and beverage sector were selected using convenience and purposive sampling due to limited resources and time and alignment with the sustainability practices and guidelines respectively. The study's unit of analysis was supply chain managers drawn from the FMCGs industry. Questionnaires were administered within a period of two to three weeks.

1.10 Significance of the Study

To practioners:

These research findings will help the senior level management understand the importance of creating and nurturing organization operational resilience. Operational resilience cushions a firm against adverse disruptions like COVID-19, providing basis for absorbing disruption and enabling advantageous recoverability.

To policymakers:

To the association of Kenya Manufacturers, the study results will help in identifying the gaps in operational resilience levels of the firms as well as point out key digital capabilities that firms in the sector can adapt to strengthen and increase their level of sustainable performance. Additionally,

the study will make a major contribution to economic expansion; as a result, identifying the areas that can promote greater performance in the sector is crucial to better policy-making in the sector. Thus, the outcomes will provide crucial data that institutional authorities can use to streamline the business.

To scholars:

The study results will expand the available empirical evidence that can be used as a basis of future research work and scholarly review as well as form a reference material for future research work in fast-moving consumer good firms. The findings from this study could provide more knowledge of the operational resilience in relation to both digitalization and sustainable performance and elaborate the links that exist between and among the three variables better.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This second chapter focused on the review of relevant literature to the themes of this research.

The chapter specifically conducted a review of the various theories anchoring the study, a

A systematic review of the empirical literature, the research gaps, the conceptual framework, and

the operationalization of the variables.

2.2 Theoretical Review

Various theories exist to explain technological advancement, adoption, and existence in firms. This study however will study was grounded on the resource-based theory underpinning the independent variables, while the disruption profile framework will anchor the mediating variable and the stakeholder theory underpinning dependent variables.

2.2.1 Resource-based theory

Resource-Based Theory (RBT) provides a valuable framework for understanding the relationship between digitalization and sustainable performance of FMCGs in Nairobi County. RBT emphasizes the role of unique resources and capabilities that firms possess in creating and sustaining competitive advantage (Barney, 1991). In the context of the study's first objective, RBT can help analyse how digital resources and capabilities influence FMCGs' performance.

One advantage of RBT is its focus on internal strengths and resources within organizations. It allows for a comprehensive examination of how firms utilize digital resources, such as advanced technology systems, data analytics, and digital marketing strategies, to enhance their performance in the FMCG sector. By identifying and leveraging these resources, FMCGs can gain a competitive edge in the market (Tukamuhabwa, Eyaa & Derek, 2011).

However, RBT assumes that resources are immobile and heterogeneously distributed among firms. This assumption implies that not all FMCGs have equal access to or capabilities in utilizing digital

resources. Some firms may possess superior resources and capabilities, enabling them to achieve sustainable performance through digitalization. Identifying and valuing these resources can be challenging, as they may be intangible assets such as knowledge, reputation, or organizational culture (Cocks, 2010).

Another limitation of RBT is the dynamic nature of resource-based advantages. Technology and market conditions change rapidly, requiring firms to continuously adapt and upgrade their digital resources. What may be a valuable resource today may become obsolete tomorrow. Therefore, FMCGs need to continually invest in developing and maintaining their digital capabilities to sustain their competitive advantage in the long run (Barney, 1991). Resource-Based Theory offers valuable insights into the relationship between digitalization and sustainable performance of FMCGs. By examining the unique resources and capabilities that FMCGs possess, RBT helps identify how digitalization can contribute to their competitive advantage. However, it is essential to recognize the assumptions and limitations of RBT, such as the immobility and dynamic nature of resources, to ensure a comprehensive understanding of the relationship between digitalization and sustainable performance in the FMCG sector.

2.2.2. Disruption profile framework

Disruption profile framework to propose a two-dimensional conceptualization of operational resilience (Li et al., 2019). The Dynamic Capabilities Theory focuses on how organizations develop and deploy their resources and capabilities to adapt to changing environments and exploit new opportunities (Teece et al., 1997). In the context of disruptions, this theory can help examine how FMCGs leverage their digital resources, organizational flexibility, and strategic decision-making processes to respond to and recover from disruptions. By developing dynamic capabilities, organizations can enhance their operational resilience and maintain sustainable performance.

The Resilience Engineering perspective, on the other hand, focuses on understanding and improving the resilience of complex socio-technical systems (Hollnagel et al., 2006). This perspective emphasizes the importance of system design, adaptability, and learning from failures to ensure resilience. Applying this perspective to FMCGs would involve examining the organization's ability to identify potential disruptions, respond effectively to mitigate their impact, and learn from such experiences to enhance their resilience.

By drawing on these theories and perspectives, the study can analyse how disruptions impact FMCGs' operational resilience and subsequent sustainable performance. It is important to note that the limitations and challenges associated with studying disruptions and resilience include the complexity of modelling disruption networks, generalizing findings across different industries and contexts, and the dynamic nature of disruptions and organizational responses (Li et al., 2019).

2.2.3 Stakeholders Theory

Stakeholder Theory offers a valuable perspective for analyzing the relationship between digitalization and operational resilience in FMCGs in Nairobi County. This theory emphasizes the impact of various stakeholders on organizations and highlights the importance of considering their interests and involvement in business operations (Freeman, 1984). In the context of the study's second objective, Stakeholder Theory can provide insights into how digitalization affects the engagement and satisfaction of stakeholders, thereby influencing sustainable performance.

One advantage of Stakeholder Theory is its holistic perspective, which goes beyond solely focusing on financial performance. It recognizes that organizations operate within a complex network of stakeholders, including employees, customers, suppliers, and the community. By understanding and addressing the needs and expectations of these stakeholders through digitalization initiatives, FMCGs can enhance their operational resilience (Freeman, 1984). Stakeholder Theory assumes that organizations have a moral responsibility towards stakeholders and that their interests should be considered in decision-making processes. By prioritizing stakeholder engagement, FMCGs can build trust, improve their reputation, and establish long-term relationships that contribute to their operational resilience (Freeman, Dmytriyev, & Philips, 2021).

However, one limitation of Stakeholder Theory lies in the potential difficulty of identifying and prioritizing stakeholders and their diverse interests. Stakeholder identification requires a comprehensive assessment of both primary and secondary stakeholders, considering their power, legitimacy, and urgency. Additionally, stakeholders may have conflicting interests, making it challenging for organizations to meet the expectations of all parties simultaneously (Freeman, 1984).

Furthermore, balancing stakeholder interests can be complex, particularly in the context of digitalization, where strategic decisions may have unintended consequences. FMCGs need to

carefully navigate the potential trade-offs between stakeholder interests, such as customer privacy concerns versus personalized digital marketing efforts. Striking the right balance is crucial for ensuring operational resilience while maintaining positive stakeholder relationships (Freeman, 1984). Stakeholder Theory provides a valuable lens to examine the relationship between digitalization and operational resilience in FMCGs.

For this study as mentioned in chapter 1, the environmental and social aspect of supply chain ESG is more applicable. Through the Voluntary disclosure ESG reporting frameworks (IBM) which allows for reporting to select the questions they want to report against, depending on factors such as the industry of operation and their materiality, the Global reporting initiative suits this study as it give the freedom to choose specific standards of reporting on environmental and the social aspects of sustainable performance in the supply chain. This framework is rooted more on two lenses; stakeholders and potential impact and influence which are a great backbone of the supply chain under which FMCGs operate in hence, the evaluation of the social and environmental development goals for this study leading to more sustainable and adaptable business operations. It's also easier for companies with well-managed ESG strategies to adapt to changes in regulatory and legal requirements, as well as the effects of climate change, depletion of natural resources and other environmental issues, (Techtarget, 2023).

By considering the interests and involvement of various stakeholders, FMCGs can strategically utilize digitalization to enhance operational resilience and effectively address stakeholder needs. However, it is essential to navigate the complexities of stakeholder identification, conflicting interests, and decision trade-offs to ensure a balanced approach (Hörisch, Schaltegger & Freeman).

2.3 Empirical Review

The empirical review focuses on the analytical review of the different relevant studies in line with the research topic carried out in the past and their findings on the same.

2.3.1. Digitalization and sustainable performance

Existing research has explored the impact of digital technologies in multiple areas, including how the coordination of the digital transformation of globally dispersed factories in international manufacturing networks has become a key issue for competitiveness (Badasjane et. al ,2022). The

benefits and challenges that the new digital era provides are making it more necessary for enterprises to implement digital solutions. Digitalization and sustainable performance in the supply chain process go hand in hand with the different supply chain entities. Digitalization in the supply chain process is interlinked with the different processes by employing the different skills, capabilities, and resources at the levels of the supply chain from the acquisition of the raw materials to the delivery of the final product to the customers. Sustaining performance has been described as integrating financial, social, and environmental goals into essential business practices to optimize value is essential for success in today's modern industrialized world (Zhai et al., 2018).

The reviewed empirical studies consistently highlight the positive impact of digitalization on sustainable performance across different industries. One recurring finding is the role of digital technologies in enhancing operational efficiency and reducing resource consumption. Automation, data analytics, and supply chain optimization through digitalization have led to cost savings, improved productivity, and reduced environmental impact (Smith et al., 2018; Chen & Huang, 2020).

Furthermore, digitalization facilitates innovation and product/service development, enabling organizations to create sustainable offerings that meet customer demands while considering environmental and social aspects. The integration of digital technologies in marketing and customer relationship management has also enhanced customer satisfaction and loyalty, positively impacting organizations' economic performance (Porter & Heppelmann, 2014; Shin et al., 2019). Leading supply chains are increasingly adopting emerging technologies to create a competitive advantage through optimized business processes or entirely new business models. Organizations are feeling the pressure to keep up with industry leaders, and the hype surrounding many technologies complicates the ability for supply chain leaders to identify solutions relevant to their current and future business needs (Gartner, 2020).

Additionally, digitalization enables organizations to measure, monitor, and report sustainability-related metrics more effectively. Through digital platforms and data analytics, organizations can collect and analyze sustainability data, identify areas for improvement, and make data-driven decisions that contribute to sustainable performance (Rogers et al., 2016; Tseng et al., 2020)

2.3.2 Digitalization and Operational Resilience

Digitalization in different entities can enable them to be able to absorb and recover from any challenges faced. According to T. Saarikko et al. (2020), The ability to stay relevant and competitive in the wake of massive and rapid technological development thus requires digitally conscious business strategies that thread the needle between purposeful development and tumultuous disruption. Digitalization in the supply chain will be of help to entities which face challenges in their operations and will be able to come up with measures to recover from any challenges faced which could be brought up by natural, individual or political factors (Amos,2021).

Nyatwongi (2015), digitalization of the different operations processes will enable the firm to have plans for the different integrated processes from Production, marketing, research and development and customer and supplier relationships. Production processes should be automated in the different entities to make their production process and final products to be easily monitored. Production requests for the raw materials should be integrated to ensure that the initial cost of acquiring the raw materials is well captured for the final unit cost to be well computed and hence set the correct price for the same. Automation of processes enables improved efficiency and minimization of the losses in production and effective monitoring of the inventory. Marketing of the different products and services being offered by the entity can be done via the use of online platforms like the company website and the creation of feedback sites from different customers. The continued research and development of different product improvement measures cost cutting measures and customer satisfaction can be of great help to the firm as they will be able to improve from their prior dealings and hence increase production (Khadka, 2017). Digitalization of the different processes enables the entity to be able to overcome the prior faced challenges while at the same time planning for the future and ways to mitigate the same. Consistent quality production will win more customers and this will enable the entity to have a consistent increase in their cashflows hence improving going concerned.

Digitalization has revolutionized organizations' capabilities to enhance their adaptive capacity and response capabilities in the face of disruptions (Konopik, 2022). By leveraging technological advancements, data analytics, and automation, organizations can improve their ability to identify and mitigate risks promptly. Real-time monitoring, early warning systems, and agile decision-

making processes enabled by digitalization empower organizations to proactively address potential disruptions (Kieliszewska et al., 2017; Aspraki et al., 2019). This allows organizations to stay ahead of the curve and maintain operational resilience.

Moreover, digitalization facilitates the integration of various stakeholders within organizations' supply chains, leading to improved collaboration, information sharing, and transparency. The interconnectedness enabled by digital platforms strengthens organizations' resilience by promoting swift communication and coordination during disruptive events. The ability to collaborate effectively with suppliers, partners, and customers enables organizations to respond rapidly and effectively to disruptions, minimizing their impact on operations (Vakulenko et al., 2020).

Furthermore, the use of digital platforms, cloud computing, and virtualization has significantly enhanced organizations' ability to maintain operational continuity during disruptions. These digital tools and technologies provide the necessary infrastructure for remote work capabilities, remote access to systems and data, and digital communication tools. As a result, organizations can continue their operations seamlessly, ensuring business continuity even when faced with disruptions (Rocha et al., 2020; Sanches & Santos, 2021). The flexibility and adaptability provided by digitalization allow organizations to overcome physical barriers and maintain their operations regardless of the circumstances.

Research by Abidi & Herradi (2022), on the Role of digitalization on the operation resilience of the corporate sector, identified that digitalization is critical for innovations in different entities which has enabled different firms to overcome economic shocks during pandemics. Firms which have employed ICT can mitigate any economic challenges through innovation and reorganization of the production process compared to entities with no digital setups. This improves the firms' competitiveness while firms lagging in digitization face the risk of being faced out of the market.

2.3.3. Operational resilience and Sustainable performance

Operational resilience is achieved when the entity can reach and maintain pre-disruption levels or desired levels after unexpected occurrences. The supply chain flexibility, rapidity and visibility are key to operational resilience. The ability of systems to recover within the shortest time is what builds flexibility. Velocity will entail the shortest time in which the services or goods will be provided at the shortest time possible upon demand by the different customers (Ganin, 2016).

Supply chain resilience aims at unifying the firm's skills, ideas and culture, hence enhancing decision-making and reducing conflict of interest, risks and cost implications imposed on the firm while at the same time enhancing greater customer value through systematic and frequent measurement of customer satisfaction and monitor the commitment of customers' needs. According to Lee (2018), Sustainable monitoring activities can help improve a sustainable business environment, monitoring of internal activities: employee safety in workplace; the use of energy, water, and waste. In contrast, external monitoring activities such as providing environmental protection requirements to partners ,health and safety improvement goals as well as sustainable activities of suppliers are also important because end-product makers become a source of competitiveness (Lee , 2018).

Empirical studies have consistently highlighted the positive relationship between operational resilience and sustainable performance. Organizations that prioritize and invest in operational resilience strategies are better equipped to mitigate the negative impacts of disruptions and maintain their sustainable performance objectives. For instance, research has shown that organizations with effective risk management practices, robust contingency plans, and flexible operational processes are more likely to achieve long-term sustainability goals (Singh et al., 2016; Sutrisno et al., 2019). There exist a wide array of intersections between operational resilience and sustainable performance. This study incorporate most of them in relation to the supply chain existing under the FMCGs industry among them, resource use, health and safety, labor management and business ethics.

Furthermore, operational resilience contributes to sustainable performance by enhancing organizational agility and adaptability. Organizations that can quickly respond to market changes, customer demands, and emerging trends are more likely to remain competitive and achieve sustainable growth. By building resilience into their operational systems, organizations can effectively navigate uncertainties, optimize resource allocation, and seize opportunities for innovation and market expansion (Pettit et al., 2018; Yang et al., 2020).

However, it is important to note that achieving sustainable performance requires a holistic approach that goes beyond operational resilience. While operational resilience helps organizations withstand and recover from disruptions, sustainable performance also encompasses other dimensions such as environmental stewardship, social responsibility, and ethical business

practices. Integrating sustainability principles into operational resilience strategies can create a synergistic effect, leading to long-term success and positive societal impact (Akkermans et al., 2020; Walker et al., 2021).

Ochieng, (2018) in his study on Supply chain resilience and Organizational performance in Pharmaceutical companies identified that most organizations can react to changes in operations. The most adopted supply chain resilience practices are supplied chain collaboration, risk mitigation culture, risk mitigation culture, agility supply chain and reengineering of the supply chain. Reengineering the supply chain leads to a reduction in cost in the operations. Risk management culture aims at the reduction of all risky activities in the production systems and processes of most organizations. Early supplier involvement in product design ensures that the customer's needs are captured in the design. Organizational performance is highly influenced by supply chain reengineering and risk mitigation measures.

Wakasala, (2020), in his research on Supply chain resilience in the Performance of Supermarkets in Nairobi, Kenya identified that there exists a compelling relationship between supply chain resilience practices and the performance of supermarkets in Nairobi. This concludes that the use of Supply chain resilience practices affects how organizations' supply chains perform. Improvement in the supply chain of an entity can be evidenced by increased profits, responsiveness and reliability. The supply chain has been improved among the different stakeholders by ensuring that there have been increased operational relationships and obtaining the demands of the different parties and meeting them. The supply chain resilience practices contribute significantly to the performance of retail stores in Nairobi, hence able to counter the supply and demand shocks caused by the global Covid-19 pandemic.

2.3.4. The mediating effect of Operational resilience on the relationship between Digitalization and Sustainable performance.

The performance of the entities which employ the use of digitization in their operations during unexpected occurrences and the ones that don't employ the same are different. The firms which employ digitization in their operations will reap more as compared to the ones which did not employ the same.

Aspraki et al. (2019) focused on the value proposition of digitalization in the supply chain context. Their findings highlighted that digitalization facilitated collaboration, information sharing, and transparency among stakeholders within the supply chain. This enhanced interconnectedness contributed to operational resilience by enabling swift communication and coordination during disruptive events. Consequently, organizations were able to achieve sustainable performance goals.

Singh et al. (2016) investigated the role of operational resilience in the relationship between supply chain integration and organizational performance. Their study revealed that operational resilience mediated the relationship between supply chain integration and sustainable performance. Organizations that effectively built and maintained operational resilience were able to leverage digitalization and supply chain integration to achieve their economic, social, and environmental objectives. Sutrisno et al. (2019) examined the link between operational resilience and sustainable performance, with supply chain integration as a mediating factor. They found that operational resilience played a significant mediating role in enhancing sustainable performance. By embracing digitalization and building operational resilience, organizations were able to effectively integrate their supply chains and achieve long-term sustainable performance outcomes. Vakulenko et al. (2020) conducted a systematic literature review to explore the role of digitalization in supply chain resilience. Their findings highlighted that digitalization played a crucial role in enhancing operational resilience. By leveraging digital platforms and technologies, organizations were able to improve communication, information exchange, and collaboration within their supply chains. This, in turn, contributed to operational resilience and influenced sustainable performance outcomes.

Ochieng, (2018) in his study on Supply chain resilience and Organizational performance in the Pharmaceutical industries in Kenya, there has been improved performance in the entities that have employed risk management measures in times of unforeseen occurrences. Most of the pharmaceutical industries have enacted operational resilience by ensuring that their production processes and supply are well managed through the use of advanced technologies in their batch scheduling and analysis of the target population. The employment of technology in the production process has enabled industries to be able to produce based on the targeted population in the future as analyzed with the current situation in their areas of operations. The industries have been able to

cut operational costs as their costs are based on the perceived demand in the future. Early supplier involvement enables the entities to be able to capture the customer needs in their designs. The entities which didn't employ the supply chain resilience processes like risk management, and reengineering, though have been in operation, have faced difficulties in their operations and this has translated to more cost in the running of their operations and meeting the customer demands.

Akinyi, (2021) in her study on Emergency Supply chain preparedness and performance of large food and beverage manufacturing firms in Nairobi, Kenya amid COVID-19, carried out the study by comparing the effects of COVID-19 on manufacturers with their preparedness. She identified that preparedness enabled most of the entities to improve their performance by minimizing costs, enhancing profits and better flexibility. She concluded that firms ought to adopt emergency supply chains preparedness measures like collaboration, risk management culture and visibility which leads to reduced operational costs and increased sales. Adoption of emergency supply chain preparedness has been found to have a statistically significant correlation with an entity's performance.

2.4 Summary of Research Gaps

The review of various empirical studies has been integral in expanding the available knowledge. The systematic review of analytic evidence indicates several contextual, methodological, and empirical gaps. The summary of the gaps is shown in the table below. Several studies have been conducted examining the FMCG firms in Kenya and offer valuable insights and gaps that this research examined.

Table.2.1 Research Gaps

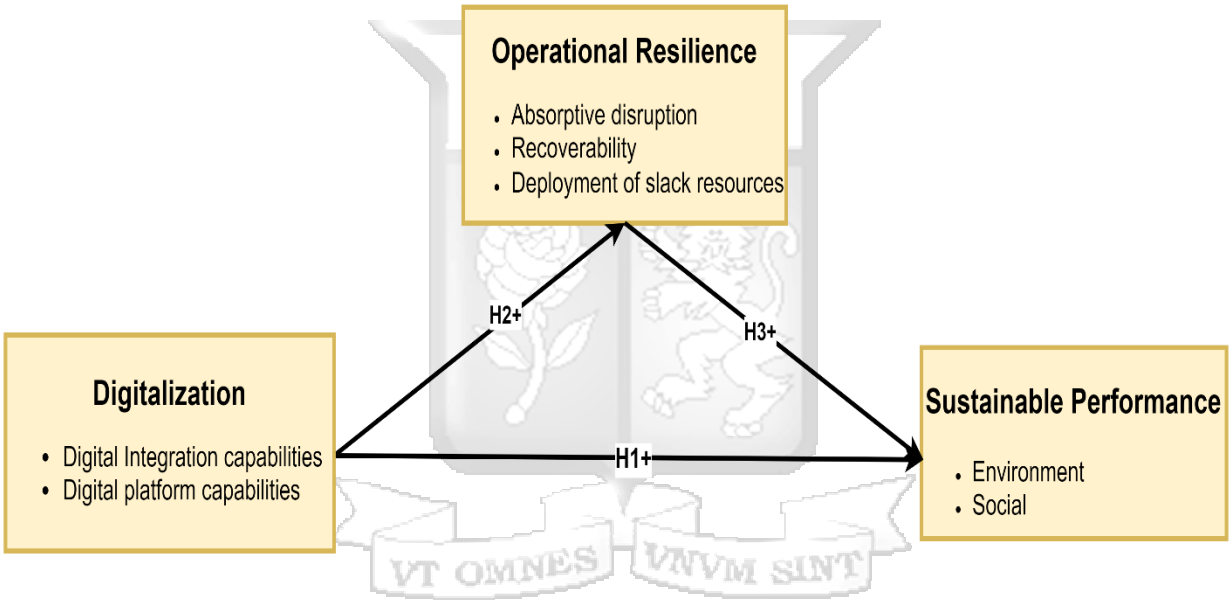
Author	Title	Findings	Gaps
Anitah (2019)	Influence of Industry 4.0 technologies on the operational performance of FMCG firms	The study established that Industry 4.0 technologies improve the operational performance of FMCG firms	The study fails to consider the holistic nature of performance which this study will incorporate for FMCG industry at large
Mwazo, (2020)	Effect of firm capabilities on the non-financial performance of fast-moving consumer goods	The study concluded that firm capabilities do have a positive and significant influence on the non-	Our study will consider a mediating variable in evaluating firm

	firms in Nairobi metropolitan area	financial performance of FMCG firms.	performance by adoption of digital capabilities.
Muhalia, Ngugi, Moronge, (2021)	Effect of transportation management systems on supply chain performance of FMCG in Kenya.	The study found that transport management systems positively and significantly influences Supply chain performance of FMCG in Kenya.	The study focused on only one bit of digitalization without mention of any mediating or moderating effects
Muthoni, (2017)	Effects of Innovation on Competitive advantage in FMCG, A case Study of PZ Cussons East Africa LTD	Innovations in products, processes and markets leads to improved performance. There is a positive significant influence of product innovation, process innovation and market innovation on the competitive advantage of an organization.	The study focused only on one firm in the FMCGs industry. There is need for empirical data.
Gichuki , (2017)	Effect of Agile Supply Chain Strategy on Competitive Advantage of Firms in the Fast-Moving Consumer Goods Industry: A Case of Unilever Kenya	The study therefore concludes that agile supply chain management is an important strategy in the FMCG industry as it influences the firm's competitiveness**.**	The study lacked focused on digital integration capabilities which will be covered by the study on attaining holistic firm performance of a firm. The study focused only on one firm in the FMCGs industry.
Achola & Were, (2018)	Influence of Marketing Strategies on Performance of Fast-Moving Consumer Goods Companies in Nairobi County, Kenya	The study found that product specialization strategy, price leadership strategy, distribution channel strategy and promotion mix strategy had a positive and a significant effect on organizational performance.	The study was focused on marketing in relation to performance.

Source: Researcher (2023)

2.5 Conceptual Framework

A conceptual framework is a diagrammatic representation of the hypothesized interaction between study variables. It is also defined as an interconnected set of ideas regarding how a given phenomenon functions or is related to its parts (Kana, 2017). The below conceptual framework identifies the relationship between digitalization and sustainable performance as well as the mediating variable; operational resilience of fast-moving consumer goods firms in Nairobi County.



Source: Researcher (2023)

Figure 2.1: Conceptual framework

2.6 Operationalization of the variables

Table 1.2 Operationalization of the variables

Variable	Indicators	Data collection tool	Data analysis	Supporting literature
Digital Integration Capabilities	Human capabilities. Collaborative capabilities. Technical capabilities. Innovative capabilities.	Structured questionnaire; 5-point Likert scale	Descriptive analysis and inferential analysis	Chan et al. (2019), Kohli & Melville (2019)
Digital platform Capabilities	Platform integration capability. Platform reconstruction capability.	Structured questionnaire; 5-point Likert scale	Descriptive analysis and inferential analysis	Cenamor et al., (2019) Blaschke et al., (2018)
Environment & Social Performance	Monitoring of internal activities. Employee safety procedures in the workplace; Industrial accidents; the number of accident claims The use of energy, water, and waste.	Structured questionnaire; 5-point Likert scale	Descriptive analysis and inferential analysis	(Ivo & Antonio 2019). Lee et, al (2019)
	Monitoring external activities. Providing environmental protection requirements to major suppliers and implementing them. Monitoring suppliers' compliance with regulations Implementing health and safety improvement goals; Monitoring suppliers' employees' health and safety.			
Operational Resilience	Absorptive disruption Recoverability	Structured questionnaire; 5-point Likert scale	Descriptive analysis and inferential analysis	Essuman D, Boso N, Annan J, (2020).

Source: Researcher (2023)

2.7 Chapter Summary

This chapter consisted of a review of the existing literature on the relationships in dependent variables, mediating variables and independent variables. The chapter is made up of the theoretical review of the resource-based theory, the disruption profile framework and the stakeholder theory, the empirical review of the research variables, the summary of the research gaps, the conceptual framework, and concludes with the operationalization of research variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers in detail a systematic description of the methodology used to conduct the research. It covers research design, target population, sampling frame, sample size and sampling techniques. This chapter also describes the data collection methods and instruments. Pilot testing, data processing and analysis and ethical issues are also described.

3.2. Research Philosophy

Saunders, Lewis & Thornhill (2009) noted that the four pillars of research philosophy are Positivism, Realism, Interpretivism, and Pragmatism. According to Blaxter, Hughes, & Tight (2013), positivism posits that the procedures of social sciences should mirror the natural science ones. Researchers should conduct their studies with objectivity. The goal of positivist research is to clarify conclusions that result in control and predictability. It is a predominant method of understanding the social world, as evident from its usage (Mitchell & Jolley, 2012). The positivist philosophy gives preference to utilizing observable social realities research, and the quantitative analysis can be generalized (Saunders, Lewis, & Thornhill, 2016). This research adopted a positivist philosophy because the concept of positivism relates to the philosophical stances of natural scientists. The philosophy depends on quantifiable observations that lead to statistical analyses; hence it was ideal for this research to generally rely on a quantitative approach. According to Saunders et al. (2009), positivism paradigm relies on theoretical models developed and generalizable to explain cause-and-effect relationships. This study therefore, adopted positivist research philosophy assumptions of social reality made where hypotheses were tested, often using quantitative techniques (Stile, 2003).

3.3 The Research Design

A research study's direction is provided by a research design. This suggests that a sound research design forms the basis of a sound study (Myers, Well, & Lorch, 2010). Kothari (2004) asserts that

a research design includes choices made on the what, where, when, how much, and how they would be accomplished for a specific research topic. According to Gikenye (2012), the purpose of research design is to provide a framework for the collection and analysis of data by answering the questions of who to study, what to observe, and when to observe. For this study, an explanatory research strategy was chosen. The goal of explanatory research is to explain the phenomenon and attributes reasons to the behaviour of a particular relationship. Such a study focuses on making precise forecasts while narrating the facts (Mitchell & Jolley, 2012). This study used a survey to acquire quantitative data, therefore explanatory research was be crucial to its success. In keeping with the objectives of the study, survey research was deemed to be appropriate in that it would not be possible to collect data from all the FMCGs companies operating in Nairobi due to the huge geographical dispersion of the sector, the limited time and limited resources.

3.4 Target Population

According to Berg (2001), as cited by Waiganjo (2013), the term target population refers to the larger population from which the researcher generalizes the results of study. Saunders, Lewis & Thorn (2009), defined the term population as the full set of cases from which a sample is selected. Cooper & Schindler (2008) defined population as the total collection of elements about which one wishes to make some inferences. FMCGs in the Nairobi County made up the research's sample. The population was compiled using data from several directories, including KAM (2022), which showed that there were 396 registered firms and 288 FMCGs with 121 firms in the food and beverage sector operating in Nairobi County. The unit of analysis was one supply chain manager or supply chain coordinators or procurement managers within the firm. The respondent was selected for the research since, as an executive manager, the study assumed that they were aware and part of the operational resilience of the firm , digital capabilities employed as well as sustainability initiatives adopted for performance of the firm.

3.5 Sampling and sampling size Sampling Frame

According to Johnson and Gill (2010), a sampling frame is a list of elements from which the sample is actually drawn and is a complete and correct representation of the target population from where

the sample is drawn. The sampling frame for FMCG companies was a list from the Kenya Association of Manufacturers (KAM) directory of 2022.

3.5.1 Sample size

The sample size for this study was 121 Food & Beverage fast moving consumer goods companies (FMCG) operating in Nairobi County.

Table 3.1: Food & Beverage FMCGs – Other sectors under FMCGs in Nairobi County

Nairobi County	**Number of Firms**	**% Represented**
Food & Beverage FMCGs	121	42%
Other sectors under FMCGs	167	58%
Total Number	**288**	**100%**

Source: KAM Directory (2022)

3.5.2 Sample Size and Sampling Techniques

In consonance with Saunders, Lewis, & Thornhill (2016), generalizations about a population from collected data from any probability sample are based on statistical probability. The probability of generalization errors decreases with sample size. The sample size choice hinges on the confidence required in the data, the acceptable margin errors, and the total population size (Myers, Well, & Lorch, 2010). According to Mutai (2013), a sample size for a survey is decided at the planning stage, together with the sample design. The aim of sampling is to make cuts on the use of resources in gathering information. Kothari (2013) defined sampling design as a plan for obtaining a sample from a given population. It refers to the technique the researcher uses in selecting an item for the sample. This study utilized cluster (area) sampling detailed convenience. Kothari (2013) stated that area sampling, which is a special type of cluster sampling and, is primarily used when the unit of analysis is based on a geographic area. The research used a purposive sampling to select FMCGs in the food and beverage sector firms Nairobi County. This is supported by Zikmund et al. (2010) who stated that purposive sampling involves deliberate selection of a particular unit of the population and is normally used when a researcher wishes to isolate a sample that has qualities or

characteristics which are required for the study and that only a small sample is required if the population is homogeneous. In such a case, a small sample size with similar characteristic will give an objective representation of the population. In addition, this is in line with Creswell (2009), who stated that the respondents purposefully selected because they can inform an understanding of the research problem and central phenomenon in the study, hence the selection of supply chain managers.

3.6. Data Collection Methods and Instruments

The study utilized a questionnaire to collect primary data from the supply chain managers of FMCGs – food and beverage companies. The findings and conclusions were based on this questionnaire only.

3.6.1 Administration of Research Instruments

The questionnaire was self-administered through a google link. The respondents were given two to three weeks to fill up the questionnaires and a follow-up will be done through their mobile's phones. Any unclear questions were cleared as they arose. The procedure for issuing the questionnaires to the respondents was through self-introduction. A self-introduction letter and an authority letter for data collection from Strathmore University.

3.7. Research Quality

Questionnaires are subjected to pilot testing to ascertain that they are reliable before issuing to intended respondents (Sekaran & Bougie, 2016). To make sure the survey achieved the study's intended objectives, a pilot test was carried out. It involved 12 respondents. According to Saunders, Lewis, and Thornhill (2016), pilot testing ensures that the questionnaire is refined such that problems in answering them are reduced or eliminated. In addition, to develop items based on a literature review, a pilot survey was conducted to screen the questionnaires to ensure that research questions were practically applicable in the field before the final survey. The pilot tests assisted in conducting both the reliability and validity tests of the research instrument.

3.7.1 Pilot Testing

Zikmund et al. (2010) defined pilot testing as a small-scale research project that collects data from respondents similar to the full study. Babbie (2010) indicated that a pilot study is conducted when a questionnaire is given to just a few people with an intention of pre-testing the questions. Pilot test is an activity that assists the researcher in determining if there are flaws, limitations or other weaknesses within the interview design. It allows the researcher to make necessary adjustments prior to the implementation of the study (Kvale, 2007). Piloting of the questionnaire was done using 12 supply chain coordinators from FMCGs companies. The Pilot tests was of 10% of the research instrument and was not included in among the final study. According to Babbie (2010), this is a good representation to test the reliability and validity of the research instruments. This helped the study to identify any ambiguous and unclear questions in the questionnaire before administering them to the selected population.

3.7.2 Reliability and Validity

In structural equation modelling (SEM), reliability and validity are two important criteria that must be satisfied for the results to be trusted (Hair et al., 2019; Henseler et al., 2015). Mugenda and Mugenda (2003), defined reliability as the degree a research instrument yields consistent results after repeated trials. Reliability in a study is influenced by the random error, such that when random error increases, reliability decrease and vice versa. Cronbach's alpha, Average Variance Extracted (AVE), Composite Reliability (CR), and Factor Loading are some of the criteria that must be met when conducting an analysis to establish the validity and reliability of latent variables (Henseler et al., 2015). The CR and Cronbach alpha values are used to examine the internal consistency and reliability of latent variables (Hair et al., 2014). The factor loadings should be greater than 0.70 (Henseler et al., 2015), and the CR should be at least 0.70 in accordance with the established norms (Henseler et al., 2015). Cronbach's alpha should also be greater than or equal to 0.70 (Nunnally, 1978). The study utilized the Cronbach's formula; the Cronbach's measures internal consistency and the composite reliability to test for reliability. Composite Reliability and Cronbach Alpha scores assessed the constructs' internal consistency reliability. All values were more than 0.7, making this sample trustworthy, with Cronbach's alpha ranging from 0.854 to 0.934 and composite reliability scores from 0.902 to 0.952. (Hair et al., 2019).

Mugenda and Mugenda (2003) defined validity as the accuracy and meaningfulness of references, which are based on the study results. Validity is a measure of the extent to which the data collection tool measures what it purports to measure (Brewer & Crano, 2001). According to Zikmund et al. (2010), good measures should be both consistent and accurate and validity is the extent to which a score truthfully represents a concept. Validity portrays the level of authenticity of the research findings or outcomes. The validity of research instrument is determined using factor analysis and pre-test. One important factor about the pre-test is that, it helps the researcher to achieve face and content validity. The latent variables' AVE values, however, show whether or not they have a considerable level of convergent validity (Henseler et al., 2015). More specifically, the AVE must be 0.50 or above (Henseler et al., 2015). Average variance extracted (AVE) across all items on a collection of variables is a measure of overall convergent validity. Results of 0.50 or higher are acceptable. Conditions were satisfied since AVE values were between 0.632 and 0.868. Table 4.8 summarizes the convergent validity tests. VIF was used to test multicollinearity before the hypotheses were tested. The results showed that the values of VIF that were recorded in this study were below the 3.3 thresholds recommended by (Kock, 2015) (see Table 4.8).

3.8 Data Processing and Analysis

Data processing is normally preceded by data cleaning, editing and coding (Zikmund et al., 2010). According to Gathenya (2012), data analysis has three main objectives namely, getting the feel of the data, testing the goodness of data and testing the hypotheses for the proposed study. To make sure that the questionnaires chosen for analysis were completed and the responses were consistent with the directives given, the completed questionnaires gathered from the field were checked. Data screening was intended to eliminate outliers that are brought on by non-responses and improper responses (Mitchell & Jolley, 2012). The data was organized in SPSS (Statistical data processing for Social Sciences) version 20. To perform the analysis, a Structural Equation Modelling (SEM) approach was followed and conducted using SmartPLS Version 4. Due to the small sample, a Variance-based Structural Equation Modeling (VBSEM) technique through SmartPLS was chosen over the Covariance-based Structural Equation Modelling (CBSEM) technique, which often deals with large sample sizes.

3.8.1 Quantitative Analysis

The descriptive statistics were employed in the analysis of data in terms of frequency distribution tables, mean and standard deviation. The models were determined whether the independent variables namely; digital platform capabilities and digital integration capabilities together predict the growth of FMCGs sustainable performance in Kenya. Correlation analysis were used to show the correlation and the strength of the relationship between independent variables and the dependent variable. The t-test was used to test the hypotheses.

3.8.2 Variable Measurement

According to Kiriinya (2015), a variable is defined as a measurable characteristic that assumes different values among the subjects. Component and regression analysis of variables in this study was based SEM. According to Zikmund at al. (2010), interval and ratio scales are used frequently in social science studies when a researcher collects product rating information. The independent variable was digitalization; digital platform capabilities and digital integration capabilities. The sustainable performance of the fast-moving consumer goods companies was the dependent variable while the mediating variable is operational resilience.

3.8.3. Structural Equation Modelling (SEM)

A structural equation modelling (SEM) was employed to carry out the statistical analysis. Structural equation modelling is a multivariate statistical analytic technique used to examine structural relationships. This technique combines component analysis and multiple regression analysis to analyze the structural relationship between measured variables and latent constructs. This method was preferred by the researcher because it estimated the multiple and connected dependences in a single analysis.

This analytical technique employs two kinds of variables, which are endogenous variables and exogenous variables. Endogenous variables are equivalent to dependent variables whiles exogenous variables are equivalent to independent variables. In this study, endogenous variable for a particular path refers to the dependent variable of that path while the exogenous variables for a particular path refers to the independent variables (predictors) of that path. Considering the path from digitalization to operational resilience, digitalization becomes the exogenous (independent) variable or predictor and operational resilience as an endogenous (dependent) variable. Similarly,

considering the path from digitalization to operational resilience and to sustainable performance (i.e., the full model), digitalization and operational resilience become the exogenous (independent) variables or predictors and sustainable performance as the endogenous (dependent) variable.

In SEM analysis, two models are presented: measurement model and the structural model: the measurement model represents the theory that specifies how measured variables, often called the indicators or items come together to represent the theory. The structural model, on the other hand, provides the theory that explains how constructions connect to one another.

In testing the hypothesis, a number of SEM-based tools have been employed in prior studies, such as partial least square (PLS), AMOS and LISREL (Wong, 2019). However, the PLS produces better results and is preferred to the other tools when the subject has limited or small sample size (Nyamah et al., 2022; Ong and Puteh, 2017), as is the case of this study. Lowry and Gaskin (2014) argue that, PLS performs SEM analysis by estimating variance-based (VB) or ordinary least square (OLS) analysis, while AMOS and LISREL analysis are based on covariance-based (CB) SEM with high sample sizes. Even when the CB-SEM assumptions are violated, PLS gives more accurate and robust findings than AMOS and LISREL (Hair et al., 2011; Henseler et al., 2015). Based on the above, the PLS approach was used to assess the study's hypotheses. By integrating regression and factor analysis into its measurement models, PLS-SEM is capable of investigating causal links among constructs with numerous measurement items (Ullman and Bentler, 2012). To cope with complicated models, PLS-SEM provides rigorous and strong statistical approaches (Hair et al., 2014). Henseler et al. (2012) assert that PLS-SEM may be used to maximize the variance of all dependent variables. It sets less constraints on sample size, residual distribution, measurement scales, and the use of multiple predictor variables (Götz et al., 2010).

As a way of testing the indirect effect (mediation), a bootstrap 95% confidence interval was performed through the SmartPLS from 5000 different samples. Mediation is confirmed when zero (0) does not fall within the confidence interval generated.

3.8.3.1 Mediating Variable Analysis

The indirect effect (mediation) was further tested through the bootstrapping confidence interval approach in structural equation modelling (SEM). Although a number of studies have employed the Baron and Kenny “causal steps” to test mediation, this approach has come under critique (Hair et al., 2017; Nitzl et al., 2016) and recent development of rigorous analytical approaches, such as

structural equation modelling (SEM) proves superior to this approach because SEM estimate every relationship simultaneously (Zhao et al., 2010). Iacobucci (2008) argues that SEM approaches dominate the "causal steps" approach of Baron and Kenny (1986). Also, a methodological study on "Reconsidering Baron and Kenny: Myths and truths about mediation analysis" by Zhao et al. (2010), in testing for mediation effect indicates that "whether the analytical approach is through regression or SEM, only the indirect effect needs to be significant and bootstrap tests should be used to test this effect" (p. 205). Accordingly, this study tested the mediation effect through the bootstrapping. Thus, a bootstrap 95% confidence interval was performed through the SmartPLS from 5000 different samples. Mediation is confirmed when zero (0) does not fall within the confidence interval generated.

To understand the type of mediation, Zhao et al. (2010) proposed the following that; Firstly, Complementary mediation (partial mediation): Mediated effect (a × b) and direct effect (c) both exist and point at the same direction while Competitive mediation (partial mediation): Mediated effect (a × b) and direct effect (c) both exist and point in opposite directions as, Indirect-only mediation: Mediated effect (a × b) exists, but no direct effect. Fourthly, Direct-only nonmediation: Direct effect (c) exists, but no indirect effect as No-effect nonmediation: Neither direct effect nor in- direct effect exists. Relevant to this study: The path from the independent variable (digitalization) → mediator (operational resilience) while, the path from the mediator (operational resilience) → Dependent variable (sustainable performance) and the path from the independent variable (digitalization) → Dependent variable (sustainable performance).

3.9 Objectivity of the research

Remaining objective or unbiased means not being swayed by one's past experiences, moral standards, or preconceived views. Any step of the scientific method can include bias, including the creation of hypotheses, the design of experiments, the gathering and analysis of data, and the publication of results. The study made sure that research design principles helped ensure that the study remained objective, valid, and reliable and that ethical standards were properly followed in order to combat bias, which can be confirmation bias, observer bias, or selection bias.

3.10. Ethical Considerations

The study observed and be contacted on an ethical basis prior to, during, and after carrying out the study. Before embarking on data collection pertinent to this study, the researcher sought the approval of the University (SU-IERC) and also the consent of the management of FMCG firms in Kenya from which the data in respect of both the pilot and main studies was collected. The study also obtained an authorization letter and a research permit from the NACOSTI, which is the body mandated by the government of Kenya to give authorization in respect of research studies. The study refrained from seeking sensitive and perceptibly intrusive data from the respondents. In this respect, therefore, the respondents did not indicate any personal information. The research also ensured that all the responses are considered only for academic purposes, and confidentiality is maintained throughout the research. The study also ensured ethical consideration by acknowledging the authors and contributions of all literature that was used in the study. Throughout all processes of data collection, objectivity was maintained where there was no misinterpretation of information

CHAPTER FOUR
PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

The results of the data analysis are presented in this chapter. The study used descriptive statistics, exploratory factor analysis (validity), correlation analysis confirmatory factor analysis (reliability) and regression analysis (Path structure). Study hypotheses were evaluated using SmartPLS 4. In this section, the researcher looks more closely at the study's key results and compare them to those of similar research.

4.2 Background Characteristics of Respondents

The study presents some background information about the respondents. These include the position in the firm, educational level, experience level with the firm and the number of years the firm has been operating within FMCG industry. These are presented in table 4.1 below.

Out of the 85 respondents, 12 (14.1%) occupy top-management position, 43 (50.6%) occupy middle level management position, 16 (18.8%) occupy lower-level management position whiles 14 (16.5%) indicated other positions. These results suggest that respondents were dominated by middle level managers of the various firms.

To assess the competence of the respondents, information about their educational background were also collected. The sample was unevenly distributed among the educational categories employed in the study. 8 (9.4%) were diploma holders, 43 (50.6%) were graduates, 30 (35.3%) were masters holders while 4 (4.7%) were other certificate holders. These results suggest that majority of the sampled respondents were graduate certificate holders.

Table 4.1 Background of the respondents and firm

Variables	Frequency	Percent (%)
Position of respondents		
Top management	12	14.1
Middle management	43	50.6
Lower management	16	18.8
Others	14	16.5
Educational Level		
Diploma level	8	9.4
Graduate level	43	50.6
Masters level	30	35.3
Others	4	4.7
Experience level		
Less than 5 years	55	64.7
5-10 years	26	30.6
More than 10 years	4	4.7
***Firm experience within the* FMCG industry**		
0-3 years	31	36.5
4-7 years	26	30.6
8-11 years	8	9.4
12-15 years	5	5.9
Over 15 years	15	17.6
TOTAL	***85***	***100.0***

The experience level of the respondents was also assessed. The study found that 55 (64.7%) were having less than 5 years' experience with the firm, 26 (30.6%) have been with the firm between

5 – 10 years while 4 (4.7%) have been working with the firm for more than 10 years. This suggests that most of the respondents have been working with the firm for less than 5 years.

Finally, the number of years the firms have been working within the FMCG industry was assessed. The study found that most of the firms 57 (67.1%) have been within the FMCG industry for between 0 – 7 years and over 15 years, representing 15 (17.6%), whilst 13 (15.3%) have been in the industry for 8 – 18 years.

4.3 Descriptive Analysis

The research's variables are analyzed statistically below. The standard deviation indicates the degree to which the mean values accurately represent the data, whereas the mean values provide a summary of the data (Field, 2009).

4.3.1 Descriptive Statistics on Digitalization

Table 4.2 contains a summary of the descriptive analysis's findings. The average mean can be seen in table 4.6 to range from 3.67 to 4.26. Additionally, the standard deviation varies between 0.912 and 1.106. The skewness of a real-valued random variable's probability distribution is measured in relation to its mean in probability theory and statistics. The skewness and the kurtosis can be positive, zero, negative. From table 4.2, the skewness ranges from -1.728 to -.715 and kurtosis ranging from .060 to 3.367.

Table 4.2: Descriptive Statistics on Digitalization

Code		Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
DHC1	The firm’s employees are well-trained in using digital tools.	1	5	3.67	1.106	-.715	.063
DHC2	Digitalization of the operating environment is easily accepted by your employees.	1	5	3.82	1.071	-.769	.060
DCC1	Digital cooperation with other companies occurs.	1	5	3.69	1.035	-.933	.526

DCC2	Digital channels are used to share information with other companies.	1	5	3.87	1.044	-1.149	1.067
DTC1	Digitalization enables up-to-date, location-independent services for your customers.	1	5	4.00	.988	-1.289	1.693
DTC2	Digitalization allows the firm to work across boundaries of time, place, or activities.	1	5	4.15	1.075	-1.609	2.350
DIC1	Digitalization enables innovation and new ideas in your company.	1	5	4.25	.912	-1.577	2.924
DIC2	Digitalization forces us to develop new solutions.	1	5	4.26	.953	-1.728	3.367
DPI1	The firm's platform provides a seamless connection between our partners' IT systems and our IT systems	1	5	3.94	.968	-.848	.597
DPI3	The firm's platform easily aggregates relevant information from our partners' databases	1	5	3.82	1.002	-.943	.747
DPR1	The firm's platform can be easily extended to accommodate new IT applications or functions.	1	5	3.94	.968	-1.171	1.563
DPR2	The firm's platform employs standards that are accepted by most current and potential partners	1	5	3.96	1.017	-1.388	1.878

4.3.2 Descriptive Statistics on Operational Resilience

Table 4.3 contains a summary of the descriptive analysis's findings. The average mean can be seen in table 4.7 to range from 3.47 to 3.85. Additionally, the standard deviation varies between 0.923 and 1.097. The skewness and kurtosis can be positive, zero, negative. From table 4.3, the skewness ranges from -1.075 to -.371 and kurtosis ranges from -.561 to 1.574.

Table 4.3: Descriptive Statistics on Operational Resilience

		Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
RDA1	The firm grants us much time to consider a reasonable response	1	5	3.59	.979	-.720	.601
RDA2	without much deviation, the firm is able to meet normal operational and market needs	1	5	3.84	.962	-.976	1.140

RDA3	without adaptations being necessary, the firm performs well over a wide variety of possible scenarios	1	5	3.48	1.019	-.400	-.552
RR1	It does not take long for the firm to restore normal operation	1	5	3.76	.972	-.863	.797
RR2	The firm reliably recovers to its normal operating state.	1	5	3.80	.923	-1.075	1.574
RR3	The firm easily recovers to its normal operating state	1	5	3.85	.932	-1.041	1.533
RR4	The firm effectively restores operations to normal quickly.	1	5	3.79	.989	-.995	.854
RSR1	The firm often has uncommitted resources that can quickly be used to fund new strategic initiatives	1	5	3.56	.993	-.818	.766
RSR2	The firm often is able to obtain resources at short notice to support new strategic initiatives	1	5	3.58	1.095	-.645	-.061
RSR3	The firm has substantial resources at the discretion of management for funding strategic initiatives	1	5	3.55	1.041	-.371	-.561
RSR4	The firm usually has a reasonable amount of resources in reserve	1	5	3.47	1.097	-.477	-.301

4.3.3 Descriptive Statistics on Sustainable Performance

Table 4.4 contains a summary of the descriptive analysis's findings. The average mean can be seen in table 4.8 to range from 3.39 to 4.08. Additionally, the standard deviation varies between 1.042 and 1.234. The skewness and kurtosis can be positive, zero, negative. From table 4.4, the skewness ranges from -1.182 to -.262 and kurtosis ranges from -.731 to 1.010.

Table 4.4: Descriptive Statistics on Sustainable Performance

		Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
SEvP1	The firm has high efficiency in the use of materials (raw materials packaging, etc.	1	5	3.58	1.106	-.712	-.112
SEvP2	The firm has high efficiency in energy consumption.	1	5	3.65	1.043	-.660	.189

SEvP3	The firm has high percentage of investment in reducing atmospheric emissions (greenhouse gases (GHGs), ozone-depleting substances, and other major atmospheric emissions)	1	5	3.39	1.216	-.262	-.731
SSP1	The employees in the firm have accepted and adopted the cultural change.	1	5	3.48	1.042	-.566	.104
SSP2	The firm guarantees respect for human rights.	1	5	4.08	1.049	-1.182	1.010
SSP3	The firm highly encourages and participates in social initiatives.	1	5	3.75	1.234	-.838	-.159

Source: Field Data, 2023

4.4 Exploratory Data Analysis

The study began with an exploratory phase based on the collected data. To guarantee that at least some basic quality control checks on the data have been performed, an exploratory factor analysis was run. SPSS was the primary software for this task. Response rate, non-response bias, and common method bias or variance are each broken down into their respective part. What follows is a breakdown of the numerous analyses performed and their respective interpretations for this preliminary data quality assessment.

4.4.1 Test for Common Method Bias and Sampling Adequacy

Survey research must test for CMB in order to account for the possibility that relying on a single respondent can break the link between the dependent variable and predictors (Podsakoff and Organ, 1986; Bahrami et al., 2022). Consequently, incorrect assessments. Podsakoff et al. (2003) discovered CMB in social desirability or consistency. Other strategies have the potential to reduce the amount of data generated by CMB. The Exploratory Factor analysis supported Harman's single component method by demonstrating that a single factor could account for less than half of the variance. Principal component analysis was used to determine the cause of 72.66% of the variation.

Table 4.5: Test for Common Method Variance (CMV)

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.976	51.641	51.641	14.976	51.641	51.641	5.439	18.755	18.755
2	2.104	7.257	58.898	2.104	7.257	58.898	4.409	15.204	33.959
3	1.517	5.231	64.129	1.517	5.231	64.129	4.068	14.026	47.985
4	1.308	4.512	68.641	1.308	4.512	68.641	3.625	12.501	60.486
5	1.166	4.021	72.662	1.166	4.021	72.662	3.531	12.176	72.662
6	.896	3.091	75.753						
7	.847	2.922	78.675						
8	.689	2.376	81.051						
9	.613	2.113	83.164						
10	.572	1.973	85.137						
11	.525	1.810	86.947						
12	.438	1.511	88.457						
13	.420	1.450	89.907						
14	.371	1.281	91.188						
15	.352	1.215	92.403						
16	.309	1.065	93.468						
17	.255	.880	94.348						
18	.240	.828	95.176						
19	.225	.777	95.953						
20	.179	.616	96.569						
21	.172	.593	97.162						

22	.157	.541	97.703
23	.136	.471	98.174
24	.115	.395	98.569
25	.107	.368	98.937
26	.087	.302	99.239
27	.079	.274	99.512
28	.074	.256	99.768
29	.067	.232	100.000

Extraction Method: Principal Component Analysis.

Source: Field Survey (2023)

The accuracy of the sample was further evaluate using the Bartlett sphericity test and the Kaiser-Meyer-Olkin (KMO) test. On the basis of the data in Table 4.3, the Kaiser-Meyer-Olkin Sampling Adequacy score was 90.5%, and Bartlett's test demonstrated statistical significance ($\mathcal{X}^2$= 2148.742, df: 406, p = 0.000). This provides proof that the sampling was done correctly.

Table 4.6: Bartlett's Test of Sphericity and KMO Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.905
Bartlett's Test of Sphericity	Approx. Chi-Square	2148.724
	df	406
	Sig.	.000

Source: Field Survey (2023)

4.5 Correlation Analysis

The data shown in Table 4.7 reveals that there are very significant correlations between the three variables of digitalization, operational resilience, and sustainable performance. For instance, a correlation value of 0.0 indicates that there is absolutely no link, 0.30 indicates that there is just a moderate correlation, and 0.70-0.90 indicates that there is a considerable association. There is a considerable relationship between all of the different factors as shown in Table 4.7.

Table 4.7: Correlation Analysis

Construct	Digitalization	Operational Resilience	Sustainable Performance
Digitalization	1		
Operational Resilience	0.776	1	
Sustainable Performance	0.711	0.759	1

Source: Field Data, 2023

4.6 Confirmatory Factor Analysis

This research evaluated the measuring model according to Hair et al (2019). Partial least squares structural equation modelling (PLS-SEM) was utilized to analyse the data using SmartPLS version 4. (Ringle et al., 2015). Indicator loadings were first tested to see whether they were more than 0.70. That is positive since it implies the construct is significant enough to explain over half the variation in the indicator, indicating the items may be trusted. Table 4.8 shows that the researcher preserved only items that met the outer loading requirement of 0.700.

The construct's convergent validity was then tested. The amount to which a concept can explain changes in its components indicates its convergent validity. Average variance extracted (AVE) across all items on a collection of variables is a measure of overall convergent validity. Results of 0.50 or higher are acceptable. Conditions were satisfied since AVE values were between 0.632 and 0.868. Table 4.8 summarizes the convergent validity tests. VIF was used to test multicollinearity before the hypotheses were tested. The results showed that the values of VIF that were recorded in this study were below the 3.3 thresholds recommended by (Kock, 2015) (see Table 4.10).

Table 4.8: Confirmatory Factor Analysis

Scale	Codes	Outer loadings	CA	CR	AVE	VIF
Digitalization	DCC1	0.71				2.021
	DCC2	0.731				2.371
	DIC1	0.829				3.441
	DIC2	0.82				2.84
	DPI1	0.8	0.937	0.940	0.641	3.06
	DPI3	0.808				3.365
	DPR1	0.804				2.895
	DPR2	0.785				2.578
	DTC1	0.828				3.643
	DTC2	0.878				4.085
Operational Resilience	RDA2	0.745				1.927
	RDA3	0.793				2.648
	RR1	0.843				3.728
	RR2	0.847				3.789
	RR3	0.876	0.932	0.937	0.650	3.999
	RR4	0.887				4.278
	RSR2	0.774				3.475
	RSR3	0.753				3.394
	RSR4	0.719				2.536

Sustainable Performance	SEvP2	0.778				2.12
	SEvP3	0.834				2.489
	SSP1	0.864	0.891	0.898	0.696	2.616
	SSP2	0.849				2.686
	SSP3	0.843				2.769

Source: Field Data, 2023

4.6.1 Discriminant Validity

The extent to which an independent variable differs from the other independent variables in the structural model of the experiment was then evaluate using discriminant validity. According to Fornell & Larcker (1981), the association of variables must be greater than the square root of the average variance across elements (AVE) in order for the discriminant to be valid. Table 4.9 displays square roots of AVEs in bold diagonal figures, while off-diagonal figures emphasize the relationship between variables. Because diagonal values are greater than non-diagonal ones in this example, there is strong discriminant validity.

Table 4.9: Fornell-Larcker criterion

Construct	**Digitalization**	**Operational Resilience**	**Sustainable Performance**
Digitalization	0.801		
Operational Resilience	0.776	0.806	
Sustainable Performance	0.711	0.759	0.834

Source: Field Data, 2023

4.6.2 Model fitness indices

The values for the Extracted-Index Fitness, SRMR, Root Mean Square of Approximation, and Chi-Square are all appropriate (Table 4.10). Both the rare and extracted indices are much lower than 0.9, the threshold for acceptability. Considering that the square of the residual is not close to zero, the root demonstrates that the residual is unsatisfactory. These numbers are much larger than 0.1 and 3. This suggests that all relevant factors need to be considered in future research. A SRMR for the estimated model of 0.08 was found in Table 4.10, which is within the range of values considered acceptable in this research. Chi-square = 563.319, and the normed fit index was 0.715.

Table 4.10: Model fitness indices

Model fitness indices	**Saturated model**	**Estimated model**
SRMR	0.08	0.08
d_ULS	1.934	1.934
d_G	1.37	1.37

Chi-square	563.319	563.319
NFI	0.715	0.715

Source: Field Data, 2023

4.6.3 Coefficient of Determination (R^2)

Henseler (2018) defines very significant, moderate, and low R^2 values as 0.75, 0.50, and 0.25, respectively. Nevertheless, Chin et al. (2020) emphasizes the significance of comprehending the R^2 in light of the connected region's context. As should be visible in Table 4.11 and Figure 4.1, the model has a moderate R^2 changed value of 0.597 for predicting sustainable performance. Operational resilience was found to be responsible for 60.2% of the variation in sustainable performance. The model is able to accurately forecast and even anticipate events in the future as a result of this.

Table 4.11: Coefficient of Determination

Construct	R-square	R-square adjusted
Operational Resilience	0.602	0.597
Sustainable Performance	0.614	0.605

Source: Field Data, 2023

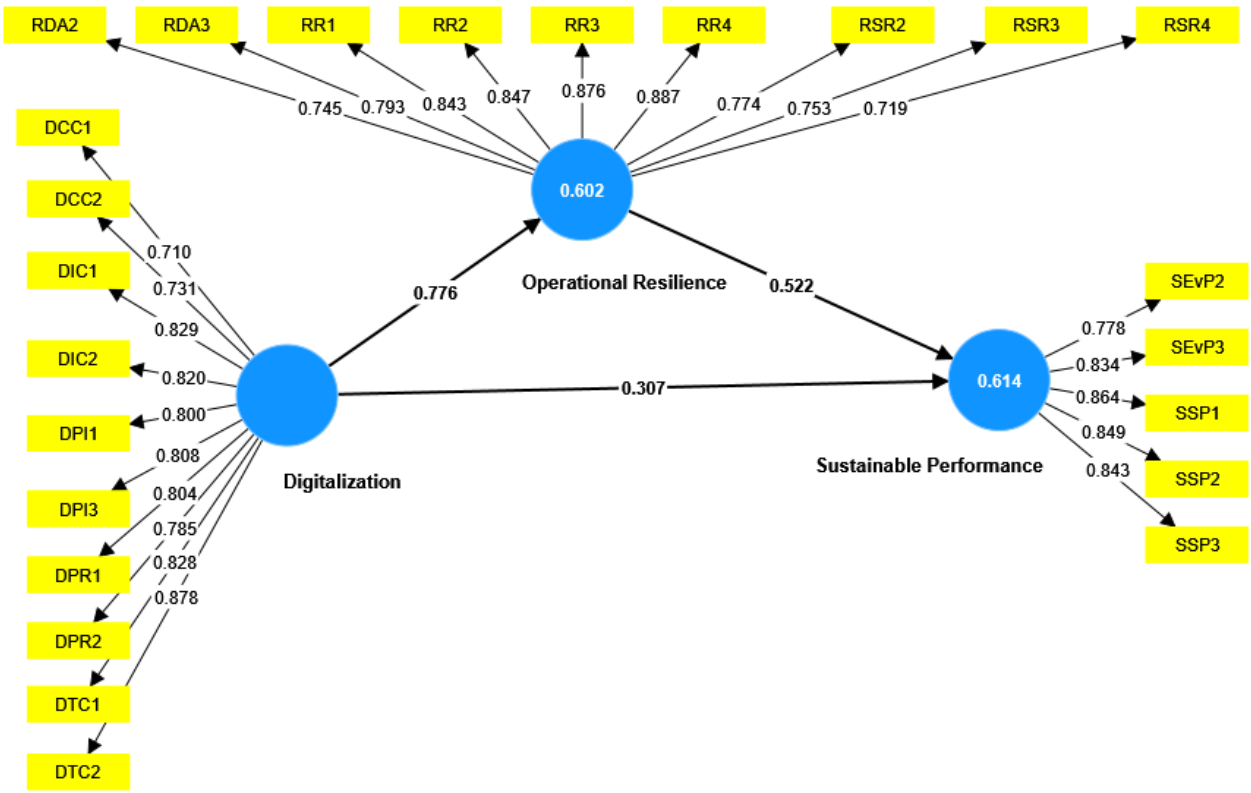


Figure 4.1: Measurement Model Assessment

4.7 Hypotheses for Direct Relationship

Figure 4.2 depicts the structural model evaluation portion of the second phase of the analysis. Table 4.12 and Figure 4.2 display the evaluation of the structural model's findings. The significance of the four (4) paths in the model was evaluated using the PLS bootstrapping technique with 5,000 samples. The purpose of this study was to examine the effect of digitalization on sustainable performance, the mediating role of operational resilience. The analyses of the direct and indirect relationships as depicted in Table 4.12 and Figure 4.2 are discussed in this section.

Table 4.12: Hypotheses for Direct Relationship

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
H1: Digitalization -> Sustainable Performance	0.307	0.318	0.114	2.686	0.007	Supported
H2: Digitalization -> Operational Resilience	0.776	0.774	0.06	12.843	0.000	Supported
H3: Operational Resilience -> Sustainable Performance	0.522	0.516	0.111	4.699	0.000	Supported
H4: Digitalization -> Operational Resilience -> Sustainable Performance	0.405	0.398	0.09	4.493	0.000	Supported

Source: Field Data, 2023

Table 4.12 reveals that the relationship between digitalization and sustainable performance of FMCGs in Nairobi County is significant (B = 0.307, t = 2.686, P = 0.007, and Sig < 0.05). Digitalization positively influenced sustainable performance since the p-value for H1 was less than 0.05 and the path coefficient was positive. Digitalization therefore enhances sustainable performance and sustainable performance is predicted to improve by 31.8% when digitalization goes up by one unit.

Digitalization directly impacts operational resilience (B = 0.776; t = 12.843; P = 0.000; Sig < 0.05). Digitalization positively influenced operational resilience since the path coefficient was positive and the p-value for H2 was less than 0.05. operational resilience is predicted to improve by 77.4% when digitalization goes up by one unit.

Operational resilience directly influenced sustainable performance (B = 0.522; t = 4.699; P = 0.000; Sig < 0.05). Operational resilience positively influenced sustainable performance, corroborating the third hypothesis (H3). With value operational resilience, sustainable

performance improves. Sustainable performance is predicted to improve by 51.6% when operational resilience goes up by one unit.

Operational resilience indirectly influenced digitalization and sustainable performance (B = 0.405; t = 4.493; P = 0.000; Sig < 0.05). Since the p value for H4 was smaller than 0.05 and the path coefficient was positive, operational resilience positively and partially mediates digitalization and sustainable performance.

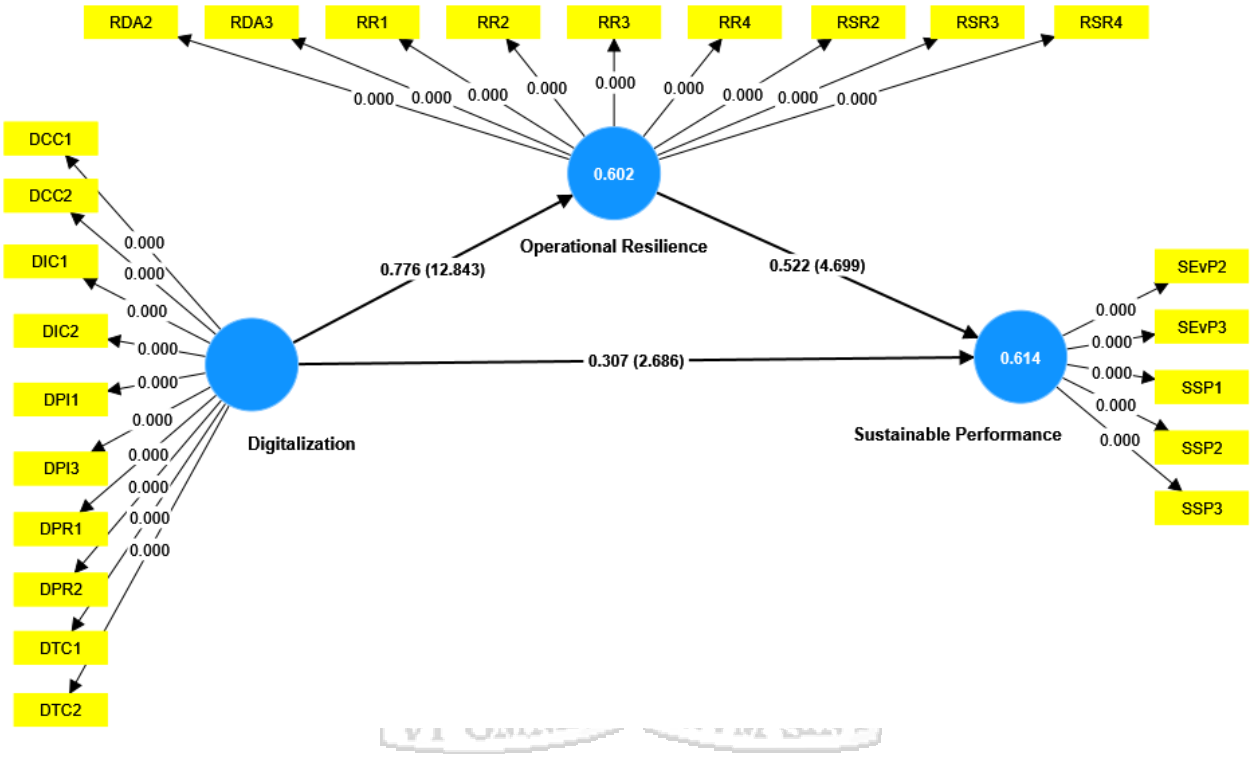


Figure 4.2: Structure Model Evaluation

The indirect effect (mediation) was further tested through the bootstrapping confidence interval approach in structural equation modelling (SEM). Although a number of studies have employed the Baron and Kenny "causal steps" to test mediation, recent development of rigorous analytical approaches, such as structural equation modelling (SEM) proves superior to this approach because SEM estimate every relationship simultaneously (Zhao et al., 2010). Iacobucci (2008) argues that SEM approaches dominate the "causal steps" approach of Baron and Kenny (1986). Also, a

methodological study on "Reconsidering Baron and Kenny: Myths and truths about mediation analysis" by Zhao et al. (2010), in testing for mediation effect indicates that "whether the analytical approach is through regression or SEM, only the indirect effect needs to be significant and bootstrap tests should be used to test this effect" (p. 205). Accordingly, this study tested the mediation effect through the bootstrapping. The bootstrap result from 5000 samples is presented below.

Table 4.13: Testing the indirect effect (mediation): Bootstrap Confidence intervals

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	97.5% Confidence interval
Indirect effect: DIGI→ORES→SP	0.405	0.398	0.09	4.493	0.000	(0.224 0.573)

From table 4.13 above, the indirect effect of 0.398 after bootstrapping has a the confidence interval, i.e., CI (0.224 0.573) and this interval do not include zero, hence, there is mediation (Hair *et al.*, 2017; Nitzl *et al.*, 2016).

To understand the type of mediation, since the paths from the independent variable (digitalization) to the mediator (i.e., 0.776**), and also the path from the mediator (operational resilience) to the dependent variable (sustainable performance) (i.e., 0.522**) are all significant, including the direct path, i.e., from the independent variable to the dependent variable (0.307**) and are all positive, the mediation is referred as complementary (partial mediation) (Hair *et al.*, 2017; Nitzl *et al.*, 2016; Zhao *et al.*, 2010).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The research findings, as described in chapter four, were summarized and discussed in this chapter. The chapter also provided recommendations for further investigation as well as the conclusions reached.

5.2 Summary

By offering goods and services to the general population, the FMCG business plays a significant role in economic growth. In the recent past, all of the local firms have faced challenges of supply chain disruptions with the pandemic cutting across all supply chain of different sectors. Responses to the disruptions varied from, recoverability, absorption to closure. This study sought to establish the mediating effect of operational resilience on the relationship between digitalization and the sustainable performance of FMCGs – food and beverage sector in Nairobi County. The study addresses four key objectives: (1) to determine the relationship between digitalization and sustainable performance of FMCGs in Nairobi County; (2) to determine the relationship between digitalization and operational resilience in the FMCGs in Nairobi County; (3) to examine the relationship between operational resilience and sustainable performance of FMCGs in Nairobi County. (4) to examine the mediating effect of operational resilience on the relationship between digitalization and sustainable performance of FMCGs in Nairobi County. This section has presented a discussion of the key findings in line with existing theories and studies. These goals were addressed using survey data from Food and Beverage fast moving consumer goods companies (FMCG) operating in Nairobi County. The study's results are detailed in the paragraphs that follows.

5.2.1 Relationship between Digitalization and Operational Resilience

The study found a positive relationship between digitalization and operational resilience with a which indicates that an increase in digitalization would enhance operational resilience of the firms.

This implied that organizations that actively adopted and integrated digital technologies and practices were more likely to have enhanced their operational resilience in the past. By leveraging digitalization, organizations could have improved their ability to respond to and recover from disruptions, ensuring their continued functionality and success**.**

Digitalization in supply chain through technological and digital advancements will pave way towards more interconnected activities and transparency information flow among entities, customers and suppliers. This creates a supply chain that is customer-centric, system-integrated, globally connected and data-driven mechanism that leverages new technologies to deliver valuable products and services that are more accessible and affordable which leads to better performance. The ability of the supply chain to bounce back to normalcy in times of disruption is there increased. The findings from the literature and the study's results support the notion that digitalization positively influences operational resilience in organizations. Leveraging digital technologies and practices enhances organizations' ability to respond to and recover from disruptions, ensuring continued functionality and success. By leveraging technological advancements, data analytics, and automation, organizations can proactively identify and mitigate risks, enabling them to stay ahead of the curve and maintain operational resilience (Kieliszewska et al., 2017; Aspraki et al., 2019).

5.2.2 Relationship between Digitalization and Sustainable Performance

The study found a positive relationship between digitalization and sustainable performance which indicates that an increase in digitalization would enhance sustainable performance of the firms. The strong positive relationship emphasized the significant connection between digitalization and sustainable performance in the past. This is an implication that a firm's ability to interlinked different processes in its supply chain by employing different skills, capabilities, and resources at the levels of the supply chain through the application of digital technologies to plan and execute transactions, communications, and actions from the acquisition of the raw materials to the delivery of the final product to the customers helps the firm to attain sustainable performance. This hence leads to the creation of awareness which turns to value additions to the relevant parties and in end leads to improved operations and performance in the harmonization of environmental and financial objectives in the delivery of core business activities to maximize value.

Organizations that embraced digital transformation and implemented digital strategies were more likely to have achieved higher levels of sustainable performance. The findings implied that digitalization played a crucial role in driving sustainable performance outcomes. According to RBT, digital capabilities and resources can provide organizations with a competitive advantage and contribute to their long-term performance (Barney, 1991). The findings of the study support this perspective by indicating that organizations that embraced digitalization achieved higher levels of sustainable performance. Stakeholder Theory also supports the findings by emphasizing the importance of digitalization in fostering collaboration, information sharing, and transparency among stakeholders. By leveraging digital technologies, organizations can enhance their stakeholder relationships and create value for both the organization and its stakeholders, which can positively impact sustainable performance outcomes.

5.2.3 The Relationship between Operational Resilience and Sustainable Performance

The study found a positive relationship between operational resilience and sustainable performance which indicates that an increase in operational resilience would enhance sustainable performance of the firms. Organizations that exhibited higher levels of operational resilience were more likely to have achieved better sustainable performance outcomes. The findings suggested that operational resilience played a significant role in influencing sustainable performance. That is, a resilient supply chain will automatically perform sustainably. A firm's capacity to reach and maintain pre-disruption levels or desired levels after unexpected occurrences creates ability of the firm to unify its skills, ideas and culture, hence enhance decision-making and reduce conflict of interest, risks and cost implications imposed on the firm. This strengthens the firm's ability to be able to effectively and efficiently provide quality services to meet customer demands thereby leading to sustainable performance.

According to the DPN framework, organizations that possess strong operational resilience are better equipped to withstand and respond to disruptions, thereby improving their overall performance (Aldrich, 2012). The findings of the study support this perspective by indicating that organizations with higher levels of operational resilience achieved better sustainable performance outcomes. Moreover, the findings align with the reality of organizations operating in dynamic and uncertain business environments. In today's complex and volatile markets, disruptions and uncertainties are prevalent. Therefore, organizations that have built operational resilience, such as

robust contingency plans, flexible supply chains, and effective risk management strategies, are more likely to achieve sustainable performance.

5.2.4 The Mediating effect of Operational Resilience on the Relationship between Digitalization and Sustainable Performance

The Indirect Effect coefficient revealed that operational resilience played a partial mediating role between digitalization and sustainable performance. This implied that a portion of the positive effect of digitalization on sustainable performance was transmitted through the enhancement of operational resilience. It suggested that organizations that effectively developed and maintained operational resilience were more likely to experience improved sustainable performance as a result of digitalization. The Mediation Effect coefficient emphasized the significant role of operational resilience in mediating the relationship between digitalization and sustainable performance. This coefficient indicated that operational resilience accounted for 40.5% of the total effect of digitalization on sustainable performance. The findings underscored the importance of fostering operational resilience alongside digitalization initiatives to fully harness the benefits of digital transformation and achieve sustainable performance improvement. This implies that a firm that adopts digitalization in its processes will perform well sustainably through the introduction of operational resilience. The enactment of operational resilience by ensuring production processes and supply are well managed through the use of advanced technologies in their batch scheduling and analysis of the target population will improve social and environmental of the firm in order to maximize value.

According to RBT, digitalization can enhance a firm's resources and capabilities, leading to improved performance (Barney, 1991). The findings of the study support this perspective by indicating that digitalization has a positive direct effect on sustainable performance. Furthermore, the findings highlight the mediating role of operational resilience. The Disruption Profile Network (DPN) Theory suggests that operational resilience enables organizations to effectively respond to disruptions and uncertainties, ultimately influencing performance outcomes (Aldrich, 2012). The study findings support this perspective by indicating that operational resilience mediates the relationship between digitalization and sustainable performance.

5.4 Conclusion

The findings suggest that a significant percentage of participants agreed that digitalization is easily accepted by employees, digital cooperation with other companies occurs, digital channels are used for information sharing, and digitalization enables up-to-date, location-independent services for customers. There is also a positive perception that digitalization allows the firm to work across boundaries, enables innovation and new ideas, and pushes for the development of new solutions. The firm's platform ability to provide a seamless connection and ease of extension also received moderately positive sentiments.

Based on the analysis of the regression equation and correlation coefficients, it can be concluded that digital integration capabilities and digital platform capabilities have a significant impact on sustainable performance. The structural equation suggests that both variables contributed positively to sustainable performance, indicating that organizations with higher levels of digital integration and platform capabilities are likely to achieve better sustainable performance outcomes. The regression coefficients further support this conclusion by indicating strong positive relationships between digitalization and both operational resilience and sustainable performance.

5.5 Recommendations

5.5.1 Managerial Recommendations

The firm should continue to prioritize and allocate resources to digitalization initiatives. This includes providing necessary training, support, and resources for employees to effectively embrace and utilize digital technologies. Moreover, the management should identify the areas where employees have neutral responses towards digitalization and investigate the underlying reasons. Take appropriate actions to improve employee engagement and acceptance of digitalization. This may involve additional training, communication, or addressing any concerns or barriers.

Management should invest in digital platforms across all genre such as knowledge-based platforms like Reddit, service-based platforms like, Ajua, Prohapa, along the already existing business model to facilitate collaboration, innovation, and seamless connectivity with partners and customers.

Leverage these platforms to create new value propositions, expand reach, and improve overall performance. Regularly assess and update digital platforms to stay ahead in the market. Finally, focus on integrating digital technologies such as Artificial intelligence (AI) and machine learning , Internet of Things (IoT), blockchain technology, augmented reality and virtual reality ,robotics and automation, wearable technology which can inform product development and marketing strategies for FMCG companies, and systems across various business functions and processes. This will improve efficiency, agility, and responsiveness, leading to enhanced sustainable performance. Develop strategies to streamline operations and optimize digital integration.

5.5.2 Policy Recommendations

As a significant contributor to the GDP and the generation of wealth, the Kenyan FMCG industry is essential to achieving economic progress within the nation. Two years post-pandemic, most firms are yet to recover and struggle to make the digital transformation in operations, the findings of this study can advance policy formulation. The findings can be vital to institutions such as the Kenya Association of Manufacturers which can leverage the results in developing guidelines/strategies that can be adopted by firms to build operational resilience alongside the Manufacturing resilience and sustainability policy toolkit launched in partnership with KPMG (KAM, 2021). This will help in improving the recoverability rate as well as disruptive absorption capability of firms as it to aid in charting forward the growth, development, and resilience of the manufacturing sector to attain the 15% contribution to Kenya's Gross Domestic Product (GDP) as envisioned in the Big Four Agenda.

Partnerships and collaborations pertaining sustainability such as Women in Manufacturing (WIM) Program with UN Women aimed at increasing Women's participation in the sector and grow the contribution of manufacturing , Kenya Hazardous Waste Producer Responsible Organization (KEHAPRO) Initiative, KAM, Coca-Cola Beverages Africa, and Junky Bins collaboration , the Net Zero Initiative, as well as other initiatives; water efficiency, waste management, circular economy and Responsible Care " Growth & Gain' (KAM, 2022) with sensitization forums for ESG in the industry, should be formulated. Seek partnerships with other organizations, industry leaders, and technology providers the likes of Oracle, Amazon among others to stay at the forefront of digital advancements. Collaborate with experts to develop and implement effective

digitalization strategies. Sharing knowledge and resources can accelerate digital transformation and improve sustainable performance. Finally, Policy-makers created 10 policy priorities for Kenya which provided for policies under these 3 categories; policies for building digital capabilities , policies for fostering competitiveness for a digital economy , and policies for managing inclusive digital change in manufacturing (Banga & Velde, 2018). It will be of great benefit for FMCGs to adopt and operate under these policies to reap from digitalization to achieve high sustainable performance benefits and to build firm resilience. It then fall under KAM to establishing more regulations and frameworks that facilitate digital innovation, data security, and privacy protection and to encourage public-private collaborations to drive digitalization initiatives and promote sustainable performance across industries.

5.5.3 Theoretical Implications

Theoretically, the findings of this research foster the available evidence on the importance of digitalization in building a firm's operational resilience as well as a key predictor of sustainable performance. The study results thus expand the available empirical evidence that can be used as a basis of future research work and scholarly review of digitalization and resilience of firms.

5.6 Limitation of the Study

The study's findings were based on data collected within a specific timeframe, which may limit their applicability to long-term effects or changes in the relationships between digitalization, operational resilience, and sustainable performance. Additionally, the results were specific to the FMCG industry and may not be generalizable to other contexts or industries. It is important to recognize that the study did not account for other potential factors or variables that could influence these relationships, such as organizational culture, leadership, or external market conditions. The absence of these factors in the analysis may limit the comprehensiveness of the findings and their ability to fully explain the observed associations.

5.7 Suggestions for Further Research:

To gain deeper insights into the factors influencing the perception of digitalization within the firm, further research could explore the specific challenges and barriers faced by employees in accepting and adopting digital technologies. Additionally, conducting qualitative studies or focus groups can

provide a better understanding of employees' attitudes, experiences, and suggestions for improvement in the digitalization process. Furthermore, comparative studies across different industries or organizations can help identify best practices and strategies for successful digital transformation. Further research that considers a broader range of variables and contexts is necessary to gain a more comprehensive understanding of the relationships between digitalization, operational resilience, and sustainable performance.

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APPENDICES

Appendix I: Introduction Letter

To the Managing Director ……..

Dear Sir/Madam

Ref: Request to Collect Research Data from your Organization

Greetings, I am Georginah Ngina, an MCOM student at Strathmore University. As part of partial requirements for the award of my degree, I am undertaking a study that filled the knowledge gap and enhance professional practice within the FMCG industry in the country. I am currently undertaking a study on the '**the mediating effect of operational resilience in the relationship between digitalization and sustainable performance of FMCG firms in Nairobi county'**.

I humbly request that you grant me access to the pertinent data that your company's target respondents have to offer in order to solve the study challenge. All FMCG companies in the nation are anticipated to benefit practically from the research's findings as they enrich the body of knowledge. The research data will only be used for the indicated purposes and with the strictest confidentiality. The research's results will be made available to your respected office upon request.

All the assistance rendered will be highly appreciated.

With Regards,

Appendix II: List of FMCG Firms – Food and Beverage Sector

- ✓ Acee Limited
- ✓ Afribon (K) Ltd
- ✓ Afrimac Nut Company
- ✓ Agri Pro-Pak
- ✓ Agriscope (Africa) Ltd
- ✓ Al-Noor Fiesal & Co.Ltd
- ✓ Al-mahra Ltd
- ✓ Alpine Coolers Ltd
- ✓ Amki Kenya Ltd
- ✓ Aquamist Limited
- ✓ Azaavi Collections
- ✓ Bakemark Ltd
- ✓ Bakers Corner Ltd
- ✓ Bakeville Ltd
- ✓ Bigcold Kenya Ltd
- ✓ Bloc Enterprises Ltd
- ✓ Blue plastics & Water Co. Ltd
- ✓ Brandon Foods Limited
- ✓ Brenntag Kenya Ltd
- ✓ Britannia Food Limited
- ✓ British American Tobacco Kenya Plc
- ✓ C Dormas SEZ Ltd

- ✓ C.Czarnikow Sugar (EA) Ltd
- ✓ Candy Kenya
- ✓ Capel Food Ingredients
- ✓ Caroline Cupcakes Ltd
- ✓ Centerfood Industry
- ✓ Cocacola Central East and West Africa Ltd
- ✓ Confini Limited
- ✓ Crofts Limited
- ✓ Convex Commodity Merchants Limited
- ✓ Danone Baby nutrition
- ✓ Devkan Enterprise Ltd
- ✓ Deyvan Food Industries K. Ltd
- ✓ Deylin Ultimate Springs Ltd
- ✓ DPL Festive
- ✓ East African Breweries Limited
- ✓ East African Sea Food Limited
- ✓ Eastern Produce Kenya Limited (Kakuzi)
- ✓ ECO Living International Limited
- ✓ Elekea Ltd
- ✓ Edible Oil Products
- ✓ Farmers Choice Ltd
- ✓ Fresh N Crunchy
- ✓ Freshlife Initiative Limited

- ✓ Frigoken Ltd
- ✓ Global Mark Foods Limited
- ✓ Glacier products
- ✓ Gonas Best Ltd
- ✓ Grainuts Craft Ltd
- ✓ Green Forest Foods Ltd
- ✓ Gubanx Ventures
- ✓ Hephzibah International Ltd
- ✓ Heritage Foods Limited
- ✓ Her Kitchn Foods Ltd
- ✓ Highlands Canners Ltd
- ✓ Hope tasty Cake Baker Ltd
- ✓ House Of Bona Ltd
- ✓ Sigma Supplies Ltd
- ✓ Java House
- ✓ Kalabashi Investments Ltd
- ✓ Kamili Packers
- ✓ Kapa oil Refineries Ltd
- ✓ Kay Salt Ltd
- ✓ Kenafric Beverage & Bottling Ltd
- ✓ Kenafric bakery
- ✓ Kenafric Biscuits Ltd
- ✓ Kenchic Ltd

- ✓ Kenya Highland Seeds
- ✓ Kenya Nut Company
- ✓ Kenya Sweets Ltd
- ✓ Kevian Kenya Ltd
- ✓ Kigelia Fresh Produce Ltd
- ✓ Kijani Agro Products Ltd
- ✓ Kirinyaga Flour Mills
- ✓ Kenya Wine Agencies Ltd
- ✓ Koba Waters Limited
- ✓ Lactacare Kenya Limited
- ✓ Landeco limited
- ✓ Mamaz Spices Limited
- ✓ Manji feeds
- ✓ Mars-Wrigley
- ✓ Massatech Kenya Limited
- ✓ Mini Bakers
- ✓ Miritini Kenya
- ✓ Miyonga Fresh
- ✓ Mjengo Limited
- ✓ New KCC
- ✓ Nestle Kenya
- ✓ Norda Industries
- ✓ Orchard Juice

- ✓ Palmhouse Dairies
- ✓ Patco Industries
- ✓ Patiala Distillers Ltd
- ✓ Pembe flour Mills
- ✓ Pernod Ricard Ke
- ✓ Premier Food Insudtries
- ✓ Prime Soy Limited
- ✓ Propack K Ltd
- ✓ Razco Ltd
- ✓ Re-Suns Spices Lt
- ✓ Sahara venture
- ✓ Sasini PLC
- ✓ Savannah brands
- ✓ SBC KE
- ✓ Scepter Millers
- ✓ Scrumptious Eats
- ✓ Simply foods
- ✓ Spice World
- ✓ Stawi Foods & Fuits Limited
- ✓ Suntory Beverage & Food Kenya Ltd
- ✓ Tropical Heat L
- ✓ The Chocolate Bar Limited
- ✓ TruFoods Ltd

- ✓ Umami Foods Limited
- ✓ Unga Group Ltd
- ✓ Upfield Kenya Limited
- ✓ Victory Farms Limited.
- ✓ Weetabix East Africa
- ✓ Winnie's Pure Health
- ✓ Zheng Hong (K) Ltd

Appendix III: The Data Collection Instrument – Questionnaire

THE MEDIATING EFFECT OF OPERATIONAL RESILIENCE IN THE RELATIONSHIP BETWEEN DIGITALISATION AND SUSTAINABLE PERFORMANCE OF FMCG FIRMS IN NAIROBI COUNTY.

QUESTIONNAIRE FOR FMCG FIRMS SENIOR-LEVEL MANAGERS

This questionnaire seeks to establish the mediating effect of operational resilience on the relationship between digitalization and the sustainable performance of FMCGs in Nairobi County. Kindly reflect on your personal experience in your company and its operating environment to respond to the items in the survey following the instructions given. The answers you give will be treated with the outmost confidentiality.

RESPONDENT'S CONSENT:

I agree to participate in this research:

Yes ( )

No ( )

SECTION A: BACKGROUND INFORMATION

1. What is your highest education level?

Diploma level ( ) Graduate level ( )

Masters level ( ) PhD level ( ) Others ( )

2. What is your current position within the organization?

Top management ( ) Middle management ( )

Lower management ( ) Others ( )

3. How long has your organization been working within the FMCG industry?

0-3 years ( ) 4-7 years ( ) 8-11 years ( ) 12-15 years ( ) Over 16 years ( )

4. For how long have you worked in your organization?

a). Less than 5 years [ ]

b). 5-10 years [ ]

c). More than 10 years [ ]

SECTION B: MEASUREMENT OF VARIABLES

Digitalization

This section is concerned with assessing the influence of Digitalization on the sustainable performance of FMCGs in Nairobi County. Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements. The respondents will be guided by following key: **1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5- strongly Agree**.

No.	Statement	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- strongly Agree
	Digital integration capabilities					
	Human capabilities					
5.	The firm's employees are well-trained in using digital tools.					
6.	Digitalization of the operating environment is easily accepted by your employees.					
	Collaboration capabilities					
7.	Digital cooperation with other companies occurs.					
8.	Digital channels are used to share information with other companies.					
	Technical capabilities					

9.	Digitalization enables up-to-date, location-independent services for your customers.					
10.	Digitalization allows the firm to work across boundaries of time, place, or activities.					
	Innovation capabilities					
11.	Digitalization enables innovation and new ideas in your company.					
12.	Digitalization forces us to develop new solutions.					
	Digital platform capabilities					
	Digital platform integration					
13.	The firm's platform provides a seamless connection between our partners' IT systems and our IT systems.					
14.	The firm's platform has the capability to exchange real-time information with our partners					
15.	The firm's platform easily aggregates relevant information from our partners' databases					
	Digital platform reconstruction					
16.	The firm's platform can be easily extended to accommodate new IT applications or functions.					
17.	The firm's platform employs standards that are accepted by most current and potential partners					

Operational Resilience

This section is concerned with assessing the influence of Operational Resilience on sustainable performance of FMCGs in Nairobi County. Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements. The respondents will be guided by following key:**1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-strongly Agree**.

A reflection of the consistency at which a firm has exercised this capability over the past 3 years when disruptions occurred and not just to a reflection of the recovery speed but also recovery consistency/reliability over the past 3 years whenever operational breakdown due to a disruptive event occurred.						
No.	**Statement**	**1-Strongly Disagree**	**2-Disagree**	**3-Neutral**	**4-Agree**	**5-strongly Agree**
	Disruption absorption					
18.	The firm grants us much time to consider a reasonable response					
19.	without much deviation, the firm is able to meet normal operational and market needs					
20.	without adaptations being necessary, the firm performs well over a wide variety of possible scenarios					
	Recoverability					
21.	It does not take long for the firm to restore normal operation					
22.	The firm reliably recovers to its normal operating state.					
23.	The firm easily recovers to its normal operating state .					

24.	The firm effectively restores operations to normal quickly.					
	Slack resources					
25.	The firm often has uncommitted resources that can quickly be used to fund new strategic initiatives					
26.	The firm often is able to obtain resources at short notice to support new strategic initiatives					
27.	The firm has substantial resources at the discretion of management for funding strategic initiatives					
28.	The firm usually has a reasonable amount of resources in reserve					

Sustainable Performance

This section is concerned with assessing sustainable performance of FMCGs in Nairobi County. Please mark (x) in the box which best describes your agreement or disagreement on each of the following statements. The respondents will be guided by following key:**1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-strongly Agree**

Evaluation of sustainable performance

No.	**Statement**	**1-Strongly Disagree**	**2-Disagree**	**3-Neutral**	**4-Agree**	**5-strongly Agree**
	Environmental					
29.	The firm has high efficiency in the use of materials (raw materials packaging, etc.					

30.	The firm has high efficiency in energy consumption.					
31.	The firm has high percentage of investment in reducing atmospheric emissions (greenhouse gases (GHGs), ozone-depleting substances, and other major atmospheric emissions)					
	Social					
32.	The employees in the firm have accepted and adopted the cultural change.					
33.	The firm guarantees respect for human rights.					
34.	The firm highly encourages and participates in social initiatives.					

Thank you for your time

APPENDIX IV: PARTICIPANT INFORMATION AND CONSENT FORM

I would like to invite you to take part in my research study. Before you decide, it is important that you understand why the research is being done and what it would involve for you. Please take time to read this information, and discuss it with others if you wish. If there is anything that is not clear, or if you would like more information, please ask.

RESEARCH TITLE

The Mediating effect of Operational Resilience in the relationship between Digitalization and Sustainable Performance of FMCGs firms in Nairobi County

SECTION 1: INFORMATION SHEET

1.1 Researcher: Georginah Ngina

1.2 Institutional affiliation: Strathmore University Business School

SECTION 2: INFORMATION SHEET–THE STUDY

2.1: Why is this study being carried out?

This study is being conducted in partial fulfillment of the requirement for an award of the degree of Master of Commerce at Strathmore University Business School. The study seeks to examine the mediating effect of operational resilience in the relationship between digitalization and sustainable performance of FMCGs firms in Nairobi county

2.2: Do I have to take part?

No. Taking part in this study is entirely optional and the decision rests only with you. If you decide to take part, you will be asked to complete a questionnaire to get information on **the mediating effect of operational resilience on the relationship between digitalization and sustainable performance of FMCGs in Nairobi County.** You are free to decline to take part in the study at any time without giving any reasons.

2.3: Who is eligible to take part in this study?

Supply chain personnel

2.4: Who is not eligible to take part in this study?

Any members of the organization who are not involved in the supply chain management decisions/strategy committee and have little or no information on Supply chain strategies and team members who are not allowed by the organization to participate in such studies.

2.5: What will taking part in this study involve for me?

You will be contacted by the researcher and requested to take part in the study. If you are satisfied that you fully understand the goals behind this study, you will be asked to sign the informed consent form (this form) and then taken through a questionnaire to complete.

2.6: Are there any risks or dangers in taking part in this study?

There are no known risks in taking part in this study. All the information you provide will be treated as confidential and will not be used in any way without your express permission.

2.7: Are there any benefits of taking part in this study?

The information will be used to improve the body of knowledge in regard to the operational resilience, digitalization and sustainable performance of FMCGs in Nairobi County.

2.8: What will happen to me if I refuse to take part in this study?

Participation in this study is entirely voluntary. Even if you decide to take part at first but later change your mind, you are free to withdraw at any time without explanation.

2.9: Who will have access to my information during this research?

All research records will be stored in securely locked cabinets. Only the people who are closely concerned with this study will have access to your information. All your information will be kept confidential.

2.10: Whom can I contact in case I have further questions?

You can contact me, Georginah Ngina, at Strathmore Business School, or by e-mail at Georginah.Wambua@strathmore.edu or by phone at +254 707461519. You can also contact my

supervisor, Prof. Jonathan Annan, at the Strathmore Business School, Nairobi, or by e-mail jannan@strathmore.edu

If you want to ask someone independent anything about this research please contact:

The Secretary–Strathmore University Institutional Ethics Review Board, P. O. BOX 59857, 00200, Nairobi, email ethicsreview@strathmore.edu Tel number: +254 703 034 375

I, _____, have understood all that I have read and have had any of my questions answered satisfactorily. I understand that I can change my mind at any stage.

Please tick the boxes that apply to you.

Participation in the research study

□ I AGREE to take part in this research

□ I DO NOT AGREE to take part in this research

Storage of information on the completed questionnaire

□ I AGREE to have my completed questionnaire stored for future data analysis

□ I DO NOT AGREE to have my completed questionnaire stored for future data analysis

Participant's Name/Signature/Initials:

_____Date: ____/____/_____ DD/MM/YEAR

I, _____certify that I have followed the SOP for this study and have explained the study information to the study participant named above, and that s/he has understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

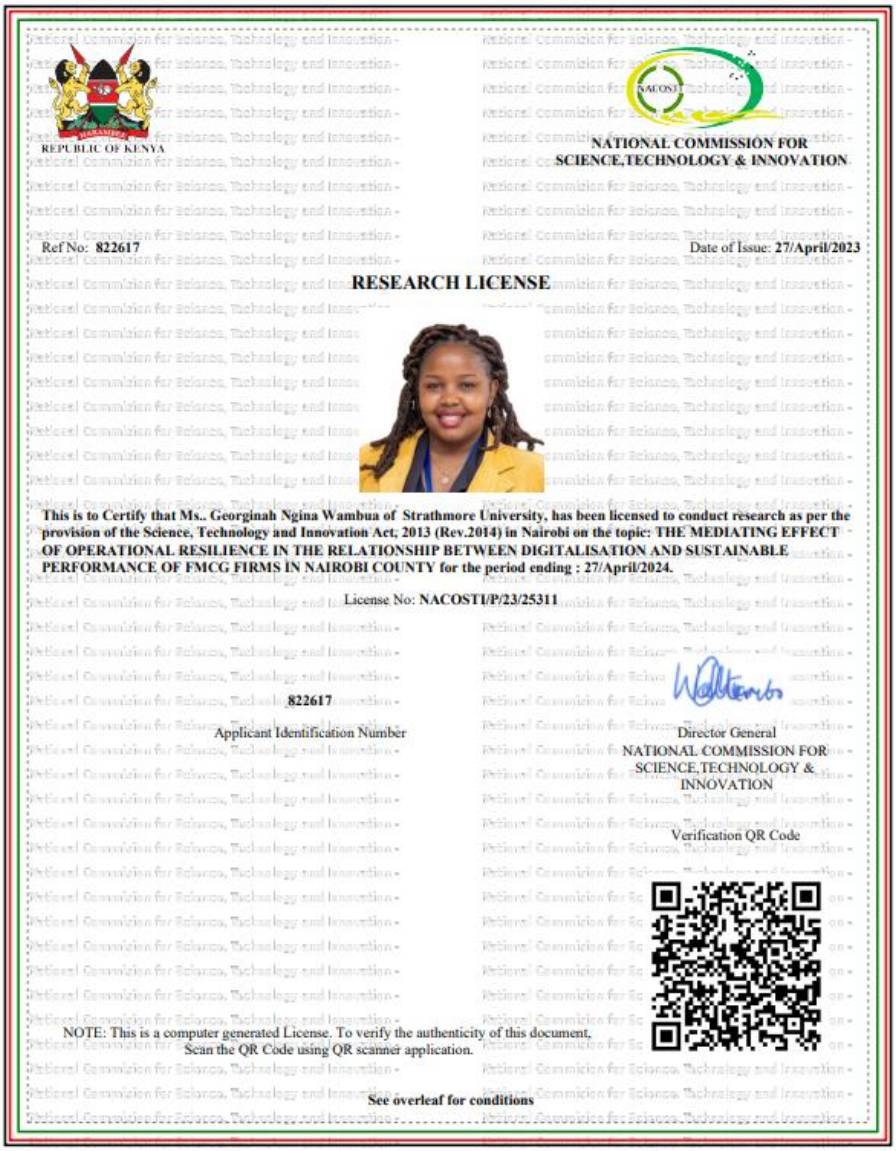
Researcher's Signature:

_____Date: _____/_____/_____ DD/MM /YEAR

APPENDIX V: STUDY BUDGET

Items	**Details**	**Cost**
Stationery	Printing papers Binders	1,000 1,000
Airtime		2,000
Data collection	Internet	5,000
Production of the documents	Printing Photocopying Binding	1,000 2,000 1,000
Transport		5,000
Data analysis		10,000
Research	KAM Directory	2,500
TOTAL		**28,000**

Appendix VI: Research Permit



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **822617**

Date of Issue: **27/April/2023**

RESEARCH LICENSE

This is to Certify that Ms.. Georginah Ngina Wambua of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: THE MEDIATING EFFECT OF OPERATIONAL RESILIENCE IN THE RELATIONSHIP BETWEEN DIGITALISATION AND SUSTAINABLE PERFORMANCE OF FMCG FIRMS IN NAIROBI COUNTY for the period ending : 27/April/2024.

License No: **NACOSTI/P/23/25311**

822617

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix VII: University Approval

Strathmore University Institutional Scientific and Ethical Review Committee (SU-ISERC)

Strathmore UNIVERSITY

Final Decision

This is to certify that the application for ethics clearance submitted by:
Principal Investigator: Ms. Wambua, Georginah Ngina
Reference number: SU-ISERC1672/23
For Study: "Operational resilience as a mediating effect on Digitalization and Sustainable Performance in FMCGs in Nairobi County"
Was reviewed and received the following status: "done"
Reviewer Comments
Final decision: **approved**
Comments sent:

Reviewer #1:
'None
'

The SU-ISERC wishes you all the best with this research undertaking.
11 April 2023 10:26:02