SUPPLY CHAIN COMPLEXITIES AND PERFORMANCE OF FLOWERS EXPORTING FIRMS IN NAKURU COUNTY, KENYA

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ABSTRACT

Managing the supply chain (SC) is a critical issue in any kind of business domain, as the success or failure of an organization is highly dependent on the capacity and capability to manage its SC network. In the era of technological revolution, global companies are working in a distributed business environment, where they need to keep an eye on every aspect of their supply networks. Despite the significance of the floriculture sector in the economic growth, the sector performance has been declining. The general objective of the study was to assess effect of supply chain complexities on performance of flowers exporting firms in Nakuru County, Kenya. The specific objectives were to examine effect of operational complexities, and external complexities on performance of flowers exporting firms in Nakuru County, Kenya. The study was guided by four theories; Resource-based theory and prospect theory. This adopted a descriptive research design. The targeted 76 flower firms in Nakuru County. The unit of observation was 76 supply chain, 76 finance, 76 administration and 76 operations managers hence a target of 304 respondents. Taro Yamane's 1967 sampling formula was used to sample 172 respondents. Stratified sampling technique was used to sample the respondents. The study used close ended questionnaires to collect data. A pilot test was conducted with 17 managers. The study used content and construct validity. Reliability was measured using Cronbach alpha. Data was coded and keyed into SPSS version 28. Results were tabulated. The study investigated the influence of operational complexities on firm performance. The findings show that respondents recognized the challenges posed by factors such as managing multiple plants, diverse product ranges, and quality management. The study finally investigated the influence of external complexities on firm performance. The findings reveal that respondents recognized the challenges posed by economic downturns, market uncertainties, and export regulations. In light of the findings on operational complexities, it is recommended that flowers exporting firms in Nakuru County, Kenya, streamline their operational processes to improve efficiency and scalability. In response to the findings on external complexities, it is recommended that flowers exporting firms in Nakuru County, Kenya, adopt a proactive approach to managing external risks and uncertainties.

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Background of the Study

Managing the supply chain (SC) is a critical issue in any kind of business domain, as the success or failure of an organization is highly dependent on the capacity and capability to manage its SC network. In the era of technological revolution, global companies are working in a distributed business environment, where they need to keep an eye on every aspect of their supply networks. To be successful in today's competitive business environment, firms always need to monitor their supply networks on real-time basis (Khadem et al., 2017). Vachon and Klessen (2015) defined supply chain complexities as the number of constituents and complicatedness associated with the interaction among constituents after boiling their initial proposition comprised of numerousness, interconnectivity, and unpredictability. Supply base size, differentiation between suppliers, and interaction between suppliers represent detail complexities dimensions whereas long/unreliable supplier lead time and instability of suppliers represent dynamic complexities dimensions. Due to its multidimensional nature, supply base complexities is predicted to have varying effects on firm performance.

According to Piya Shamsuzzoha, and Khadem (2019), today's greater product variety, shorter product life cycle, and lower production costs are pushing companies to look beyond their own boundaries, thereby, creating complexities in the management of the supply chain. To manage such complexities, it is imperative that the management understand the associated complexities drivers and their interrelationships. Drivers such as customer need, competitor action, and government regulation are beyond the control of supply chain partners, and have found the highest dominance with respect to supply chain complexities. Conversely, drivers related to tactical issues such as production planning and control, logistics and transportation, forecasting error, and marketing and sales are dependent drivers.

Sharma and Pathak (2019) proposed three complexities in supply chain: internal manufacturing complexities, downstream complexities and upstream complexities. They explicitly stated that each of their complexities dimensions can be characterized as both structural and behavioral. Upstream complexities represents the complexities, which arises from the first or lower-level suppliers. Internal manufacturing complexities is associated with the products and processes through the internal manufacturing phase. Downstream complexities represents the complexities that stems from the customer-side like demand fluctuation and unpredictable customer needs (Bozarth et al.,2019). Bode and Wagner (2015) noted that upstream complexities increases the probability that disruptive events will emerge along with the need for managers to control for, or prevent, disruptions. A more complex supply base is likely associated with more frequent and less manageable disruptions, due simply to the sheer numbers of suppliers. In addition to detail complexities, dynamic complexities also negatively affects operational performance. Volatility in supplier lead times causes higher operational costs due to the focal firm frequently adjusting its production plans and keeping extra safety stock. Retailers or warehouses are the actors that supply the products of the focal company in and provide for the customers. They also balance the consumption and productions in the supply chain (Dong et al., 2020).

According to Pushpendu, Jitesh , and Thakka (2018), Supply Chain Complexities (SCC) is one of the most difficult problems in today's global supply chains and assumed as the key impediment to business performance. SCC has the significant adverse impact on competitiveness, cost efficiency, customer satisfaction, product innovation and market share. It is imperative for the focal firm and its supply chain managers to know SCC drivers causing supply chain complexities. Identification and prioritizing of SCC drivers are required for effective monitoring and controlling of supply chain management. SCC drivers can be categorized based on the origin of their generation as upstream, operational, downstream and external.

Supply chain disruptions can be very severe to the productivity of firms. This complicates working business environment and hence calling for lean and flexible global operations in any firms. The growing complexities of managing supply chains and meeting exacerbating customer requirements has made organizations more aware of their operational and economic vulnerability to threats from the macro environment. Supply chain resilience can help to reduce and overcome exposure to risks through developing strategies that enable the supply chain to recover to its original functional state following a disruption (Arani, Mukulu, &Waiganjo, 2016).

According to Hinson (2016), organizational performance refers to the actual output or the results of the organization as measured against the intended outputs and the outputs. Bonaglia and Goldstein (2016) explained organization as the organization's effectiveness and how it achieves its objectives and strategies. It is also how organizations employ various strategies towards ensuring that it has a good market share within the industry. Organization performance encompasses three basic elements in the organization. The elements include the market performance, financial performance and the shareholder return. Good organization performance means that the various strategies adopted are working in the right way for the company. Performance measurement for commercial banks can be done by calculating ratios such as Return on Assets (ROA) and Return on Equity (ROE). Return on Assets evaluates the efficiency of an investment as is calculated as net income divided by total asset while return on equity is the amount of net income returned as a percentage of shareholders equity. The higher the return on equity ratios, the higher the financial performance of commercial banks while the higher the ROA values, commercial banks appear to be more effective in resource utilization (Richard, 2019).

Statement of the Problem

The floriculture sector greatly contributes to economic development in Kenya. The flower exports contribute 1.5% to the GDP and it is estimated that the sector employs about 150,000 people directly and 2,000,000 indirectly. The floriculture industry has contributed significantly to employment especially of the youth and women in the semi-arid areas where many flower farms are located. Further, more people are employed by the supporting and linkage industries such as transport and logistics, freight forwarding, input manufacture, distribution. Other people are employed by the mushrooming small-scale businesses around the horticulture centers which include provision of amenities and housing needed by the working populations (Kenya Flower Council, 2018). Kenya is the lead exporter of rose flowers to the European Union (EU) with a market share of 38% (FAO, 2019). In 2021, floriculture earned Kenya KSh110 billion (USD 809 million) affirming its great contribution to the country's GDP. The Netherlands, the United Kingdom, and Saudi Arabia were Kenya's leading destinations for flowers during this duration between 2020 and 2021.

Despite the significance of the floriculture sector in the economic growth, the sector performance has been declining. According to the survey done by HCDA (2022), 60% of the floricultural firm's performance is not up to the international level. The Kenya flowers sector is facing challenges and some firms have expanded their operations to the neighboring countries where cost of doing business makes them competitive in the global market. Consumers' power to spend on flowers is also diminishing thereby affecting the demand. The volume of the exports has been declining. In September 2022, Kenya exported flowers worth roughly 3.3 billion Kenyan shillings (KSh), about 26 million U.S. dollars, which is significantly less compared in comparison to the previous month. The export value of flowers has been fluctuating, peaking at approximately 14 billion KSh (129 million U.S. dollars) in January that year (Cowling, 2023)

A number of studies have been done on supply chain complexities; Memiş (2019) on the impact of supply base complexities on firm performance found that supply base complexities drivers

enhance firm performance. Tarei, and Chand (2020) found that increasing supply chain complexities results in SC disruption, rising SC cost, inferior customer service and reduced capital utilization. Ateş, Suurmond, and Luzzini (2021) on the link between supply chain complexities and firm performance found that upstream, downstream, and internal complexities have a negative effect on operational performance, a positive effect on innovation performance and financial performance. Malina (2019) found that supply chain complexities help to improve organizational productivity and profitability. There is study limitation on supply chain complexities in African region and Kenya to be specific. The current study hence sought to fill the knowledge gap by assessing effect of supply chain complexities on performance of flowers exporting firms in Nakuru County, Kenya.

General Objective
The general objective was to assess the relationship between supply chain complexities and performance of flowers exporting firms in Nakuru County, Kenya.
Specific Objectives
   i.   To determine the effect of operational complexities on performance of flowers exporting firms in Nakuru County, Kenya.
   ii. To examine the effect of external complexities on performance of flowers exporting firms in Nakuru County, Kenya.

Theoretical Literature Review

Resource Based Theory
The resource-based view theory was developed by Barney (1991). Firm resources are the key primary determinants of its performance, and these may contribute to a sustainable competitive advantage of the firm. The Resource Based Theory is a method of analyzing and identifying a firm's strategic advantages based on examining its distinct combination of assets, skills, capabilities and intangibles as an organization. The RBV's underlying premise is that a firm differs in fundamental ways because each firm possesses a "unique" bundle of resources-tangible and intangible assets and organizational capabilities to make use of those assets. A strategic resource is an asset that is valuable, rare, difficult to imitate, and non-substitutable.

Strategic resources that are valuable or rare are valuable because of the relatively high cost of acquiring them. Competitors have a hard time replicating resources that are hard to imitate. A resource is non-substitutable when competitors cannot find alternative ways to gain the benefits that a resource provides (Barney, 1991). Each organization develops competencies from the resources, and when developed effectively, the source of organizations competitive advantage (Pearce & Robinson, 2017). Orina (2015) noted that the capability of an organization is demonstrated in its potential and ability to compete. Every organization has actual and potential strengths and weaknesses and it is important to try to determine what they are and to distinguish one from the other. Therefore, what a firm can do is not just a function of the opportunities it confronts but it also depends on what resources the organization can master. According to Tangus (2015), resource-based theory perceives the firm as a collection of assets or capabilities. In the modern economy, most of these assets and capabilities are intangible. The firms must therefore ensure that the they have adequate resources such as the plants for effective production. Quality should also be enhanced to meet the requirements of the market.

Prospect Theory
The prospect theory was developed by Prospect Theory Kahneman and Tversky, (1979). The theory has emerged as a leading alternative to expected utility as a theory of decision under risk. Prospect theory posits that individuals evaluate outcomes with respect to deviations from a reference point rather than with respect to net asset levels, that their identification of this

reference point is a critical variable, that they give more weight to losses than to comparable gains, and that they are generally risk averse with respect to gains and risk-acceptant with respect to losses. Decisions taken involve internal conflicts over trade-off values, which are difficult choices when there are conflicting values and objectives. Prospect theory directly addresses how these choices are formed and evaluated in the decision-making process (Levy, 1992). Prospect theory holds that the tendency of people to make decisions is a function of the decision weight. The weight of this decision is not too related to the size of the opportunity or frequency of events. Events that have a low chance tend to be given a high value weight (overweight). In addition, events that have a moderate or high chance are given a low weight (underweight). This phenomenon applies mainly to events that cause large-scale losses, such as natural disasters, disease outbreaks, population starvation, and leakage disasters at nuclear reactor centers.

According to Prospect Theory, consumers will edit options before evaluating (Kahneman & Tversky, 1979). In the editing phase, consumers encode alternatives into profits or losses based on references from reference points. Then when faced with a purchasing decision, there is evidence that the loss has a greater impact than the choice of profit (Novemsky & Kahneman 2005 a, 1991). To predict consumer choice, the position of the reference point needs to be known. The issue of the location of the reference point must be considered first in research on prices (Liu, 1998). Customers do not judge prices themselves but compare them with their internal reference points (Zuzana, 2012). This theory is related to external complexities. The external risks may disrupt the supply chain and affect performance o floriculture firms.

Conceptual Framework

Kothari (2014) defines a conceptual framework as a hypothesized model that describes the model being studied and the relation between dependent and independent variables. The purpose of a conceptual framework is to categorize and explain concepts that are central to the relationships between them in the analysis. Conceptual framework is shown in Figure 2.1.

Independent Variables   **Dependent Variable**
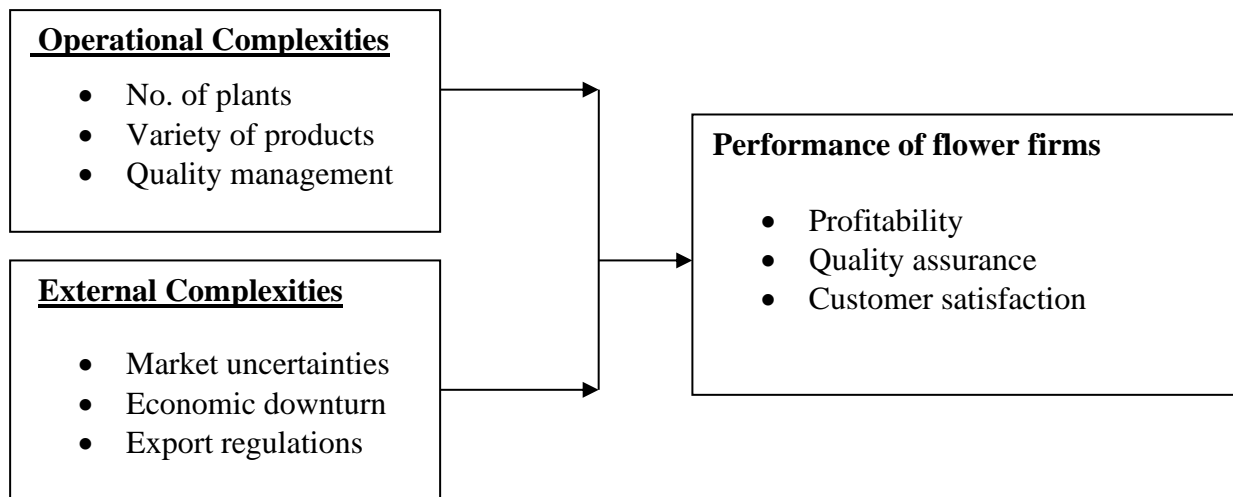
Figure 2.1: Conceptual Framework

Operational Complexities

Operational complexities are a result of internal and external factors impacting company's ways to manage operations to produce products and services. Complexities can stem from the following, for example: Product life cycles are becoming shorter and companies need to launch new products at a faster pace (Beyer, 2022). Some of the complexities drivers are related to operational or tactical issues, while others are related to strategic issues (Piya et al., 2017). Such

categorization of complexities drivers helps to focus attention or action from a specific level of management hierarchy to accommodate complexities that may be introduced by the drivers.

In product development cycle, the selection of product architecture greatly affects supply chain configuration and complexities. Product variety is another driver of supply chain complexities as an optimal supply chain design for one type of product may not be optimal for another. For example, a large volume of low-value products requires an efficient supply chain design to achieve economies of scale. In contrast, small volume of high-value products may require a responsive supply chain to provide flexibility to meet customer needs. As such, a one-size-fits all design is inadequate and a hybrid or parallel design would be necessary when the product variety increases. Brun and Pero (2016) state that supply chain choices should be aligned to product variety and higher supply chain coordination is needed when there is high product variety. In other words, the higher the product variety, the greater the supply chain complexities (Alkan, 2018). Product design is essentially the process of designing new products from the generation and development of ideas through a product development stage. It involves the process of specifying materials, configurations, tolerances, modularity and the like. Product design and development have a significant impact on supply chain configuration and complexities. More product variety results into more supply chain partners, as well as, inventory and other logistics support for multiple products thus making the chain more complex to manage (Lampoon et al., 2017).

External Complexities
External complexities lie outside of the organization boundary. This type of complexities is directly affected by environmental factors, such as technology change and the action of competitor upon which company do not have control over it. The competitor can have a dominant effect on the external complexities, since they can develop the product or service faster and more efficiently by implementing advanced technologies at which the company is not aware off. The external complexities driver can lead to increased operational costs, delay and difficulty in the management of cooperation between partners (Nguyen, Huy, & Pham 2020).

 Market risks are risks that arise from price variations in the financial market resulting in fluctuations in interest rates, foreign exchange rates, equity and commodity prices. Accordingly, Market risks are classified to include foreign exchange risk, interest rate risk, commodity price risk and stock price risk (Kassi, Rathnayake, Louembe, &Ding, 2019). Ekinci (2016) upholds that market risk is the risk of losses in liquid portfolio arising from the movements in market prices and consisting of interest rate, foreign currency, equity and commodity price risks. Market risk exposure is more volatile than credit risk exposure because of rapid changes in market condition that can cause severe financial losses and possible collapse. Namasake and Karanja (2016) observed that market risk can cause very severe losses to firms within a short period when operating in volatile market conditions. The losses to the income may cause the organization to collapse if the harsh situations persist for a longer period. It is a peril within the organization occurring out of activities within market prices; for instance, variations originate from interest rates, foreign exchange rates and product prices. Market risk causes losses of the expected income and thus it influences financial performance negatively.

The exchange rate is the price of one country's currency expressed in terms of another country's currency. Exchange rate has been noted to be the product of interaction between the demand for and supply of foreign exchange. Exchange rate movements have ripple effects on the economic activities of a nation. Inevitably, exchange rate serves as the lubricating oil in the international transactions and in that case companies as well as nations get affected either favourably or unfavourably by the swings or fluctuations in exchange rate (Agubata & Odubuasi, 2018). Lack of coordination between marketing and sales processes influence the supply chain efficiency and

triggers to organizational profitability. Improper management of this driver generates complexities within the SC network. According to Wong et al. (2015), firms are exposed to various laws related to health, safety, environment, import/ export and so on. Having fewer legal hurdles and regulations to follow in different jurisdictions is better for the entire supply chain. Satisfying legal issues of all the jurisdiction where organization works creates complexities.

Empirical Review
Operational Complexities and Firm Performance
Blome et al. (2016) found evidence of positive and negative impacts of product complexities on the relations between internal and external knowledge transfer and supply chain flexibility, indicating unique dynamics arising from complexities. Larsen,Manning, and Pedersen (2018) used prior literature to determine whether organizational complexities has positive or negative effects on firm performance. Results showed that complexities arising from the coordination of different services and operations negatively influences profit margins through increased coordination costs, whereas complexities coming from the sophistication of particular services may positively influence margins through informational advantages.

Hakami (2016) sought to understand the factors that create complexities on the upstream side of the supply chain as well as the firm competencies that can help to reduce complexities. The interaction of upstream complexities and purchasing competences on supply chain performance was measured with appropriate metric scale measuring reliability, responsiveness, agility, cost and asset management. The research was conducted using a mixed methods approach. This was followed by a questionnaire sent to 1600 companies from different manufacturing sectors. The analysis of survey data with structural equation modelling validated the study hypotheses of significant causal relationships between purchasing competences, upstream supply complexities and supply chain performance. The findings further highlighted a set of relationships between the upstream supply chain configuration elements and purchasing competences. The study showed how firms can continually seek integration across both inter firm and intra-firm level elements and promote specific purchasing competences in reducing upstream complexities to achieve improved supply chain performance.

Adegboyega (2021) investigated the impact of product innovation on organizational performance. The study sample was 340 respondents. Data was collected using questionnaires. Findings showed that impact of product innovation on organizational performance was higher in the company when consumers perceive product innovation as stronger, more favorable and more unique. Creativity/quality of the innovation process exerts a positive influence on product and organizational performance. Mukiibi (2019) examined effect of product development on growth of microfinance institutions in Uganda. This study used both primary and secondary data. Data was collected from the institutions financial reports and using questionnaires. Results showed that product development was a significant factor contributing to growth of the microfinance institutions.

Njagi (2016) sought determine the effect of product innovation on the profitability of private manufacturing companies in Nairobi County. The study employed a descriptive research design. The sample was 32 respondents. Data was collected using questionnaires. The study concluded that product innovation has positive effects on profitability. Hence, recommended that manufacturing companies should invest more on product innovation practices as it improves financial performance and also improve their competitive advantage. Wanyoike (2016) studied relationship between new product creation and performance of logistics firms in Mombasa County. The study target was 59 firms and the senior managements staff were sampled purposively. Questionnaires were used to collect data. The study concluded that product development strategy strategies affect performance. The most effective strategy was product

innovation. Kipngetich (2016) conducted an empirical study on the influence of operational strategy and organizational performance of Ailing Firms in Kenya. The study used a descriptive survey design and a sample of 100 out of 331 respondents was selected using simple random selection method. The study found that though the ailing firms adopt the operations strategy practices, the practices might not be competitive for their market environments thus explaining their poor performance. The operations strategy practices used by the firms were superior customer responsiveness and technological innovations hence they should give priority to operational efficiency.

External Complexities and Firm Performance

Ihsan, Rashid and Naz (2018) made an assessment on the relationship between exchange rate exposure and firm value on domestic firms comparatively with multinational firms (all nonfinancial firms) listed on the Pakistan Stock Exchange (PSE). The sample of the unbalanced Panel data of the 232 selected nonfinancial firms were collected, from Pakistan Stock Exchange and the State Bank of Pakistan Statistical Bulletin, for fifteen years covering 2000 to 2014. Their results show that exchange rate variations have a significant effect on the firm value and firms are exposed significantly to one-period lagged variation in the exchange rate. More so, the findings disclose that multinational firms experience greater exchange exposure in comparison with domestic firms.

Ekinci (2016) investigated the effect of credit and market risk on the bank performance in Turkey for fourteen years using weekly data. In a view to unravel a better understanding on the forces of interest rate, foreign exchange rate and credit risk on bank performance, they employed time series data. The result indicated that credit risk and foreign exchange rate have positive and significant effect whereas interest rate has positive and no significant effect on the performance of banking sector in Turkey. Additionally, they found that credit risk, foreign exchange rate, interest rate risks have a positive and significant effect on the conditional bank stock return volatility. Odubuasi, and Uduak (2020) investigated one of the components of the risks (market risk) and to ascertain how the risks affect the activities of firms in Nigeria. The study employed causal research design and used secondary data. The research covers the twelve (12) firms listed under Oil and Gas sector on the Nigerian Stock Exchange. Secondary data were collected from Central Bank of Nigeria Statistical Bulletin and the financial statements of the firms which spanned from 2014 to 2018. The results therefrom indicate that exchange rate has significant effect on both ROA and ROE of Oil and Gas firms. Additionally, interest rate has significant effect on ROE and insignificant effect on ROA. More results show that commodity price change has no significant effect on both ROA and ROE, also equity price change has no significant effect on ROA and ROE of firms in Oil and Gas sector in Nigeria

Kimuru (2018) study sought to investigate the determinants of growth in youth owned Micro and Small Enterprises in Kenya. The research employed a descriptive survey research design. The study sample size of 127 MSEs. Both primary and secondary data were used in this study. Primary data was collected using questionnaires while secondary data was collected from business records. The study found that legal and regulatory, access to the market, adoption of technology and entrepreneurial characteristics have a great positive influence on the growth of youth owned MSEs. The study also noted that high taxation was a major reason as to why some MSEs failed to comply with the requirement of the tax requirements. Mwasiaji (2019) researched on effect of regulatory policies on manufacturing firms' performance. The study sample included the staff and senior management staff of the firms. Study results showed that performance of manufacturing firms was negatively affected by the regulatory frame work including high taxation, export and importing policies, trade regulations, licensing, credit policies, labor laws and regulations. Conclusions were that government policies are essential in creating a conducive environment for doing business.

Muriithi, Muturi and Waweru (2016) examined the challenges posed by market risks on financial performance of commercial banks in Kenya for the periods covering 2005 to 2014 financial year. They used financial leverage, interest rate risk and foreign exchange exposure as the parameter for measuring exogenous variable. Time series cross sectional research design was employed and secondary data was for the forty-three (43) registered commercial banks in Kenya, descriptive statistics, correlation analysis and regression of ordinary least square (OLS) were used for analysing the data. The result shows that financial leverage, interest rate and foreign exchange exposure have significant and inverse relationship with bank profitability.

RESEARCH METHODOLOGY

This adopted a descriptive research design. The study targeted the flower exporting firms in Kenya. According to the Kenya Flower Council (2022), there are 76 flower firms in Nakuru who fully subscribe to the association. The unit of analysis was 76 flower firms. The unit of observation was the managers in four key departments of the firms which included; 76 Supply chain, 76 Finance, 76 Administration and 76 Operations managers hence a target of 304 respondents. The sampling frame for the study was 76 flower firms. Taro Yamane's 1967 sampling formula was used to calculate the sample size of 152.
The study used stratified sampling technique. The managers were stratified according to their department. This ensured that all the targeted managers were well represented in the study. The sample was divided into three strata (Supply Chain, Finance, Administration and Operations managers) using stratified sampling.
The study used close ended questionnaires to collect data. The researcher acquired all permits which included an authorization letter from the university and NACOSTI. The questionnaires were administered through drop and pick method. This method improves response rate as the respondents are allowed sometime to fill the questionnaire before they are collected in readiness for analysis. All ethical considerations (anonymity, confidentiality, and voluntary participation) were adhered to strictly.

A pilot study was done to check for weakness and correct the instrument so as to provide valid and reliable answers to the research questionnaires. According to Bowling (2014) a pilot should consist of 10% of the sample size. Therefore, 17 managers took part in the pilot. Piloting helps the researcher to know whether the questions would help to achieve the study objectives and answer the research questions. Data was analyzed to generate the validity and reliability results with the help of Statistical Package for Social Science (SPSS) version 28. Descriptive statistics included frequency, percentage, and mean. Inferential statistics on the hand included correlation and regression. The regression equation was used.

RESEARCH FINDINGS AND DISCUSSION

Descriptive Analysis

In this section the study presents findings on Likert scale questions where respondents were asked to indicate their level of agreement with various statements to assess the relationship between supply chain complexities and performance of flowers exporting firms in Nakuru County, Kenya. They used a 5-point Likert scale where 1-strongly disagree, 2-disagree, 3-moderate, 4-agree, 5-strongly agree.

Operational Complexities

The study's first objective was to determine the effect of operational complexities on performance of flowers exporting firms in Nakuru County, Kenya. Respondents were therefore asked to indicate the degree of agreement on the listed statements on operational complexities. Table 1 presents summary of findings obtained.

Table 1: Descriptive Statistics for Operational Complexities
Key: 1-Strongly disagree, 2-Disagree, 3-Not sure, 4-Agree, 5-Strongly Agree.

Statement	Mean	Std. Dev.
Operating multiple plants increases operational complexity	3.923	0.857
A diverse product range requires effective production management	3.915	0.737
Implementing quality management systems enhances product consistency	3.759	0.816
Managing operations across multiple plants demands efficient coordination	3.749	1.024
A wide variety of products necessitates robust quality control	3.708	0.921
Increasing the number of plants improves production scalability	3.688	0.264
Product innovation is part of the firm's vision and mission	3.683	0.545
Aggregate Score	**3.775**	**0.738**

The findings show that the respondents agreed on average that operating multiple plants increases operational complexity (M= 3.923, SD= 0.857); that a diverse product range requires effective production management (M= 3.915, SD= 0.737); and that implementing quality management systems enhances product consistency (M= 3.759, SD= 0.816). They further agreed that managing operations across multiple plants demands efficient coordination (M= 3.749, SD= 1.024); that a wide variety of products necessitates robust quality control (M= 3.708, SD= 0.921); that increasing the number of plants improves production scalability (M= 3.688, SD= 0.264); and that product innovation is part of the firm's vision and mission (M= 3.683, SD= 0.545).

The findings, supported by an aggregate mean of 3.775 (SD= 0.738), indicate a consensus among respondents regarding the influence of operational complexities on the performance of flower exporting firms in Nakuru County, Kenya. This aligns with the research conducted by Blome et al. (2016), which identified both positive and negative impacts of product complexities on supply chain flexibility, emphasizing the nuanced dynamics arising from operational intricacies. Furthermore, Larsen, Manning, and Pedersen (2018) found that operational complexities arising from the coordination of different services and operations can negatively influence profit margins through increased coordination costs, underscoring the multifaceted nature of operational challenges. These studies provide valuable insights into the complex relationship between operational complexities and firm performance, shedding light on the unique dynamics faced by flower exporting firms in Nakuru County and emphasizing the importance of effectively managing operational complexities to enhance overall performance.

External Complexities

The second objective of the study was to examine the effect of external complexities on performance of flowers exporting firms in Nakuru County, Kenya. Respondents were requested to indicate their degree of agreement on the listed statements on External complexities. Table 4.8 presents summary of findings obtained.

Table 2: Descriptive Statistics for External Complexities
Key: 1-Strongly disagree, 2-Disagree, 3-Not sure, 4-Agree, 5-Strongly Agree.

Statement	Mean	Std. Dev.
Economic downturns impact the financial stability of flower exporting firms	3.953	0.666
Compliance with export regulations enhances market access	3.915	0.398
Market uncertainties pose significant challenges to business planning	3.906	1.02
Adapting to market uncertainties requires agile business strategies	3.879	0.619
Export regulations create complexities in international trade	3.874	0.435
Market uncertainties create volatility in demand and pricing	3.850	0.785
Economic downturns necessitate cost-cutting measures	3.800	0.592
Aggregate Score	**3.882**	**0.645**

The findings in Table 2 show that respondent agreed on average that economic downturns impact the financial stability of flower exporting firms (M= 3.953, SD= 0.666); that compliance with export regulations enhances market access (M= 3.915, SD= 0.398); and that market uncertainties pose significant challenges to business planning (M= 3.906, SD= 1.02). Respondent were further in agreement that adapting to market uncertainties requires agile business strategies (M= 3.879, SD= 0.619); that export regulations create complexities in international trade (M= 3.874, SD= 0.435); that market uncertainties create volatility in demand and pricing (M= 3.850, SD= 0.785); and that economic downturns necessitate cost-cutting measures (M= 3.8, SD= 0.592).

The findings, supported by an aggregate mean of 3.882 (SD= 0.645), reveal a consensus among respondents regarding the influence of external complexities on the performance of flower exporting firms in Nakuru County, Kenya. This aligns with the research conducted by Ihsan, Rashid, and Naz (2018), who assessed the relationship between exchange rate exposure and firm value in domestic and multinational firms listed on the Pakistan Stock Exchange. Their study found that exchange rate variations significantly affect firm value, highlighting the impact of external factors on financial performance. Similarly, Muriithi, Muturi, and Waweru (2016) examined the challenges posed by market risks on the financial performance of commercial banks in Kenya. Their research demonstrated that market risks, influenced by external factors such as economic conditions and regulatory policies, have a significant inverse relationship with bank profitability. Both studies underscore the importance of considering external complexities in understanding firm performance, providing valuable insights into the dynamics of the flower exporting industry in Nakuru County.

Firm Performance
The general objective was to assess the relationship between supply chain complexities and performance of flowers exporting firms in Nakuru County, Kenya. Respondents were requested to rate hotel performance based on the listed parameters. Table 4.3 presents summary of findings obtained.

Table 3: Descriptive Statistics for Firm Performance
Tick (VL) if Very Low, (L) if Low, (F) if Fair, (H) if High and (VH) if Very High

Statement	VL	L	F	H	VH
Profitability	10.3%	20.6%	30.9%	22.7%	15.5%
Customer satisfaction	4.6%	13.9%	35.2%	27.8%	18.5%
Quality assurance	13.9%	18.5%	23.1%	15.7%	13.9%

The findings on firm performance indicate varying degrees of ratings across different parameters. Profitability has the highest percentage of respondents rating it as Fair (30.9%), followed by High (22.7%), while the lowest percentage rated it as Very Low (10.3%). Customer satisfaction shows a relatively balanced distribution, with the highest percentage of respondents rating it as Fair (35.2%), followed by High (27.8%), and the lowest percentage rating it as Very Low (4.6%). Quality assurance has the highest percentage of respondents rating it as Fair (23.1%), with a relatively lower percentage rating it as High (15.7%) and the lowest percentage rating it as Very Low (13.9%). These findings suggest that while profitability and quality assurance are perceived more positively overall, customer satisfaction presents a more diverse range of opinions among respondents.

The findings on firm performance align with the research conducted by Ekinci (2016) and Muriithi, Muturi, and Waweru (2016). Ekinci investigated the effect of credit and market risk on bank performance in Turkey and found that quality assurance played a crucial role in determining the performance of banking sectors. Similarly, Muriithi et al. examined the challenges posed by market risks on the financial performance of commercial banks in Kenya and emphasized the importance of profitability in driving firm success. These studies underscore

the significance of quality assurance and profitability in determining firm performance, providing valuable insights that resonate with the findings in the current study.

Correlation Analysis
Correlation analysis measures the strength and direction of the linear relationship between two variables. By computing correlations, the study can determine whether there is a significant relationship between the variables and the direction of the relationship (positive or negative). If the correlation values are $r = \pm0.1$ to ±0.29 then the relationship between the two variables is small, if it is $r = \pm0.3$ to ±0.49 the relationship is medium, and when $r = \pm0.5$ and above there is a strong relationship between the two variables under consideration. Table 4 presents the findings obtained.

Table 4: Correlation Analysis

		Firm performance	Operational complexities	External complexities
Firm performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	156		
Operational complexities	Pearson Correlation	.760[**]	1	
	Sig. (2-tailed)	.000		
	N	156	156	
External complexities	Pearson Correlation	.801[**]	.156	1
	Sig. (2-tailed)	.000	.052	
	N	156	156	156

Operational complexities demonstrate a robust positive correlation with firm performance ($r = 0.760$, $p < 0.05$). This suggests that factors such as the number of plants, variety of products, and quality management practices significantly impact firm performance in the flower exporting industry. Research by Larsen, Manning, and Pedersen (2018) supports this notion, as they found that operational complexities, such as the coordination of different services and operations, can influence profit margins and overall firm performance. Thus, effective management of operational complexities is crucial for enhancing the performance of flower exporting firms.

External complexities , encompassing various external factors such as market uncertainties, economic downturns, and export regulations, show a robust positive correlation with firm performance ($r = 0.801$, $p < 0.05$). This indicates that external factors significantly influence the performance of flower exporting firms in Nakuru County, Kenya. Research by Ihsan, Rashid, and Naz (2018) supports this finding, as they found that exchange rate variations have a significant effect on firm value, highlighting the impact of external complexities on financial performance. Thus, managing and adapting to external complexities are essential for enhancing the overall performance of flower exporting firms.

Multiple Regression Analysis
This study sought to assess the relationship between supply chain complexities and performance of flowers exporting firms in Nakuru County, Kenya. Therefore, using multiple regression analysis, the study examined the combined effect of supply chain complexities (operational complexities and external complexities) on performance of flowers exporting firms in Nakuru County, Kenya. The findings were presented in three tables discussed in sub-sections below.

Model Summary
The Model Summary indicates the effectiveness of the regression model in explaining the variation in the dependent variable. The study used model summary to test the amount of

variation in performance of flowers exporting firms in Nakuru County, Kenya as a result of changes in operational complexities and external complexities. Table 4.5 presents findings obtained.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.874[a]	.764	.760	.46838
a. Predictors: (Constant), External complexities , Operational complexities				

The coefficient of determination (R Square) is 0.764, indicating that approximately 76.4% of the variance in firm performance can be explained by the independent variables included in the model. The adjusted R Square, which accounts for the number of predictors in the model, is 0.760, suggesting that the model's explanatory power remains robust even after adjusting for the number of predictors. Therefore, the high R Square value suggests that the independent variables—External complexities and operational complexities—are collectively strong predictors of firm performance. This indicates that the model provides a good fit to the data and offers valuable insights into the factors influencing firm performance in the flower exporting industry.

Analysis of Variance
The ANOVA table provides insight into the overall significance of the regression model in predicting firm performance based on the included independent variables: External complexities , and Operational complexities. The study used analysis of variance to test the significance of the model Significance was tested at 95% confidence interval.

Table 6: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	18.915	2	9.46	43	.000[b]
1	Residual	33.945	154	.220		
	Total	52.86	156			
a. Dependent Variable: Firm performance						
b. Predictors: (Constant), External complexities and Operational complexities						

The table indicates that the regression model is statistically significant (F = 43, $p < 0.05$), suggesting that at least one of the independent variables significantly predicts firm performance. The regression model accounts for a substantial portion of the variance in firm performance. This indicates that the variation in firm performance can be largely attributed to the independent variables included in the model. The results of the ANOVA test support the notion that the collective influence of extreme complexities and operational complexities significantly impacts firm performance in the flower exporting industry.

Coefficients of Study Variables
The regression coefficients provide insight into the relationship between each independent variable—operational complexities and extreme complexities—and the dependent variable, Firm performance. The beta coefficient represents the change in the dependent variable for a one-unit change in the independent variable, holding other variables constant.

Table 7: Beta Coefficients of Study Variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.353	.220		-6.150	.000
1 Operational complexities	.325	.084	.290	3.869	.001
External complexities	.422	.074	.475	5.703	.000
a. Dependent Variable: Firm performance					

From the coefficients in Table 4.7, the following regression model was fitted;

$$Y = -1.353 + 0.325 X_1 + 0.422 X_2$$

Operational complexities also show a positive beta coefficient of 0.325 (p = 0.001), indicating that an increase in Operational complexities corresponds to a positive change in Firm performance. This suggests that managing factors such as the number of plants, variety of products, and quality management practices effectively can contribute to improved firm performance. Research by Damanpour and Wischnevsky (2006) supports this notion, highlighting the importance of operational capabilities in enhancing organizational performance and competitiveness.

External complexities exhibit the highest beta coefficient of 0.422 (p < 0.05) among all variables, indicating a strong positive relationship with Firm performance. This implies that external factors such as market uncertainties, economic downturns, and export regulations significantly impact firm performance in the flower exporting industry. Research by Li, Xue, and Hu (2020) supports this finding, highlighting the significant influence of external environmental factors on firm performance and the need for organizations to adapt to and effectively manage external complexities for sustainable growth and competitiveness.

Conclusions
The study investigated the influence of operational complexities on firm performance. The findings show that respondents recognized the challenges posed by factors such as managing multiple plants, diverse product ranges, and quality management. Moreover, both correlation and regression analyses revealed a significant positive relationship between operational complexities and firm performance, suggesting that higher levels of operational complexities are associated with better firm performance. Thus, it is concluded that operational complexities play a crucial role in shaping the performance of flowers exporting firms in Nakuru County, Kenya.

The study finally investigated the influence of external complexities on firm performance. The findings reveal that respondents recognized the challenges posed by economic downturns, market uncertainties, and export regulations. Both correlation and regression analyses showed a significant positive relationship between external complexities and firm performance, indicating that higher levels of external complexities are associated with better firm performance. Therefore, it is concluded that external complexities have a substantial impact on the performance of flowers exporting firms in Nakuru County, Kenya.

Recommendations
In light of the findings on operational complexities, it is recommended that flowers exporting firms in Nakuru County, Kenya, streamline their operational processes to improve efficiency and scalability. This can involve consolidating operations across multiple plants to minimize complexity, implementing robust quality management systems to ensure product consistency, and fostering a culture of innovation to drive continuous improvement. Moreover, investing in

technologies that facilitate coordination and communication among different operational units can help mitigate the challenges posed by managing diverse product ranges and multiple plants. By addressing these operational complexities proactively, firms can position themselves for sustainable growth and improved performance in the competitive market landscape.

In response to the findings on external complexities, it is recommended that flowers exporting firms in Nakuru County, Kenya, adopt a proactive approach to managing external risks and uncertainties. This involves closely monitoring economic indicators and regulatory developments to anticipate potential challenges and identify opportunities for strategic adaptation. Additionally, diversifying market segments and exploring alternative export markets can help mitigate the impact of economic downturns and regulatory changes. Moreover, investing in agile business strategies and contingency plans can enhance the firm's resilience in the face of market uncertainties. By addressing these external complexities systematically, firms can navigate volatile market conditions more effectively and sustain their performance over the long term.

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