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POSTPONEMENT SUPPLY CHAIN STRATEGY AND PERFORMANCE OF MANUFACTURING FIRMS IN KENYA

[*]DR. NOOR ISMAIL SHALE

[*] Senior Lecturer in Procurement and Supply Chain Management, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

The objective of this study was to establish the moderating effect of environmental uncertainties on the relationship between performance of manufacturing firms in Kenya and postponement supply chain strategy. The study used a descriptive research survey and further used both qualitative and quantitative approaches. The target population was 829 respondents from manufacturing firms around the country. The study used stratified random sampling in data collection. A sample of 270 respondents was randomly selected to participate in this study. Primary data was used for the study. The data was collected open and close ended questionnaires. A pilot test of 10% was done to test reliability and validity of the research instrument. Multiple regression model and correlation analysis was applied to examine the relationship between the study variables. Data analysis methods consisted of qualitative and quantitative techniques. The findings indicated that postponement supply chain strategy had a positive and significant effect on performance of manufacturing firms. Further, the results indicated that environmental uncertainties have a significantly negative moderating effect on the relationship between postponement supply chain strategy and performance of manufacturing firms. The study concluded that postponement supply chain strategy are significant contributors of manufacturing firms' performance. The study recommends that manufacturing firms should delay buying, manufacturing and delivery in order to take advantage of economies of scale in consolidation.

Key Words: Environmental Uncertainties, Performance, Manufacturing firms, Postponement Supply Chain Strategy

Background of the study

Agility in supply chains is key to an organization's performance. The volatility of end customers demand, shortened product life cycles, price and quality fluctuations in marketplace, continuous improvement by competitors, alongside market dynamics, mean that supply chains are having challenges in maintaining their stability. To this end, companies are searching for ways to overcome uncertainties (Colicchia & Strozzi, 2012). Through contingency theory, Hult, Ketchen and Slater (2004) have established some synchronized energies between uncertainties in the SC and supply chain strategy (SCS).

During the last decades, there has been an increasing awareness and interest among practitioners and academicians in the field of SC risk management (Colicchia & Strozzi, 2012). Despite this, the research is far from being complete particularly in understanding, reducing, managing, and mitigating uncertainty and risk in supply chains (SCs) (Tang, 2016). Lee (2014) suggested Tripartite principle for formulating robust SC strategies to caution against disruptions in the chain. This is fostering common interests across SC partners, adapting to volatile demands and supply and agility to be able to respond to the effects of short-term fluctuations in the equilibrium of demand and supply.

Volatility across the supply chain has been a core interest for many researchers that have even focused to study the relationship between a company and its immediate environment (Smircich and Stubbard, 2015). The dynamics and complexities on environmental matters present an unprecedented challenge to operating businesses. It is therefore the responsibility of the management to mitigate the various SC risks (Jauch and Kraft, 2016). Ansoff demensionalizes environmental turbulence in five strata's; dynamic, repetitive, escalating, intermittent and astounding. Therefore, these five categories of environmental turbulence should be matched with the organization's behavior, responses and capabilities, in order to increase the performance of the organization. An astonishing level of environmental turbulence could be a substantial change in technological turbulence (Ansoff, 2017) which refers to the technological change and development of the organization's product portfolio and processes (Jaworski and Kohli, 2013). Organizations then need to be as flexible as possible in order to adapt to the changes, in order to keep abreast with market competition (Ansoff, 2017). Many firms are seeking to find out the role of environmental uncertainty in firm's performance. Uncertain factors in supply chain includes demand, process uncertainty, supply, competitor uncertainty, control and planning uncertainty and transportation uncertainty which affects the supply chain performance negatively (Wilson, 2017; Paulraj and Chen, 2017). Consequently, customer, supplier and technology uncertainty do not affect supply chain management practices (Li, 2012).

Key source of environmental risks are customers (request), providers (supply), innovation and contenders (Fynes, de Búrca, and Marshall, 2014 and Sun, 2010), while other prior research have distinguished a few sources of vulnerability, for example, request, producing procedure, supply and control vulnerability. Minimal scholarly research has been done to decide both internal and external factors that influence production network execution which principally comprises of environmental risks (Merschmann and Thonemann, 2011).

A SC strategy indicates how a firm can achieve competitive edge through its SC abilities, for example, cost productivity, reaction speed and adaptability (Ismail and Sharifi, 2016). A SC strategy likewise indicates how the production, purchasing, marketing and sales, and logistics units cooperate to accomplish the ideal competitive strategy (Qi, Zhao and Sheu, 2011). It is subsequently basic for SC managers and staff to comprehend customers' needs, and to pick and actualize an ideal SC strategy technique to fulfill customer needs.

Statement of the Problem

Manufacturing sector is one of big four government's agenda focusing on manufacturing, affordable housing, universal health care and food security as the key pillars for economic growth. The expected growth of manufacturing sector is 15% of the GDP. Manufacturing sector is an important stimulus to the economy and a key pillar of the vision 2030 (KIPPRA, 2018). According to KAM (2018) one of the key drivers of manufacturing sector performance is effective supply chain management and adoption of the right supply chain strategies. A total of 600,000 jobs in textile subsector were expected to be created by 2019 (Kippra, 2021).

Kenya's manufacturing sector accounts for 9.2% of GDP, 11.7% of total employment in the formal sector, and 20.4% of informal employment. The manufacturing sector is lagging in growth at an average growth of 7.7 for 2018, 2019 and 2020. The sector has also contributed an average of 8.4% to the GDP for 2016, 2017, 2018, 2019, 2020 versus an expected contribution of 15% (KIPPRA, 2021). The number of people employed in the formal manufacturing sector accounted for 12.1% of the total number of persons engaged in the formal sector in 2019 (KNBS, 2020). As a result, it can be argued that Kenya is going through premature deindustrialization in a context where manufacturing industry is still relatively under-developed. This slow growth in manufacturing sector performance can be attributed to several factors such as the high production costs, supply disruptions, unavailability of raw materials or demand fluctuations, technological changes, employees' strikes, risk, terrorism and competition from imported goods (KNBS, 2020). It is on this basis that the current study sought to create new knowledge and bridge the existing gap by establishing the moderating effect of environmental uncertainties on the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya.

Objectives of the Study

1. To determine the moderating effect of environmental uncertainties on the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya.

Hypothesis

$H_{01:}$ Environmental uncertainties do not moderate the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya

LITERATURE REVIEW

Theoretical Framework

Contingency Theory

The theory of contingency indicates that the structure of an organization depends on contextual variables such as setting, approach, and size. Prior study identifies variables of contingency (institutional and external environment) that influence the implementation of performance measurement technologies and the selection of instruments and procedures for performance measurement in the government, private and third industries. Size, organizational structure, strategy, technology, culture and leadership are the multiple organizational variables that affect the implementation of performance management schemes in organizations.

External environment is an important contingent variable that involves a degree of environmental unpredictability or uncertainty, the degree of rivalry or hostility displayed, and the organization's environmental dynamism or turbulence (Gerdin and Greve, 2004). Building on the claim of contingency theory that the procedures of an organization should align with their setting, we examine inclusion of the supply chain (SCI) as a reaction to uncertainty. Both inter-organizational data flows and wealthy casual data sharing processes characterize SCI,

which assist supply chain members deal with uncertainty. Specifying that the performance of an organization depends on the fit of its structure, procedu res and atmosphere (Lawrence & Lorsch, 2007). Its task environment includes components a ppropriate to the achievement of the objective, including clients, vendors, rivals and regulator y authorities.

A main contingency for supply chain strategies has long been environmental uncertainty (Cao, Vonderembse, Zhang, and Ragu-Nathan, 2010). The theory of contingency has two fundamental hypotheses: First, there is no best way to organize. Second-There is no similarly efficient way of organizing. Researchers have long postulated in contingency theory research that performance depends on the fit between a company's policy and the company environment, and it is this congruence that determines company performance rather than just the strategy itself (Gresov, 2009).

The theory of contingency highlights the significance of situational factors on organizational management and questions the existence of a single, best manner of managing or organizing a company (Donaldson, 2001). Higher company efficiency is accomplished when strategies match environmental environments properly (Hambrick, 2003). Studies constantly show that in supply chain situations, inferior organizational performance is associated with discrepancies between strategic strategies and environmental features (Lee, 2002). The fundamental assumption of the theory of contingency is that companies deliver the highest output when their structures are applicable to the contingencies imposed by their size, their technology and their environment. The theory of contingency is intended to k now how companies align their anticipated performance with the inner and external company setting.

Contingency theory is a suitable method to investigate supply chain risk mitigation decisions as there is no one correct strategy to manage and prevent supply chain risk. Therefore, according to contingency theory, the selection of supply chain approach in relation to a particular organization will depend on the environmental hazards and uncertainties. This theory considers the external environment to be a main determinant of a company's performance (Johannesson & Palona, 2010).

Conceptual Framework

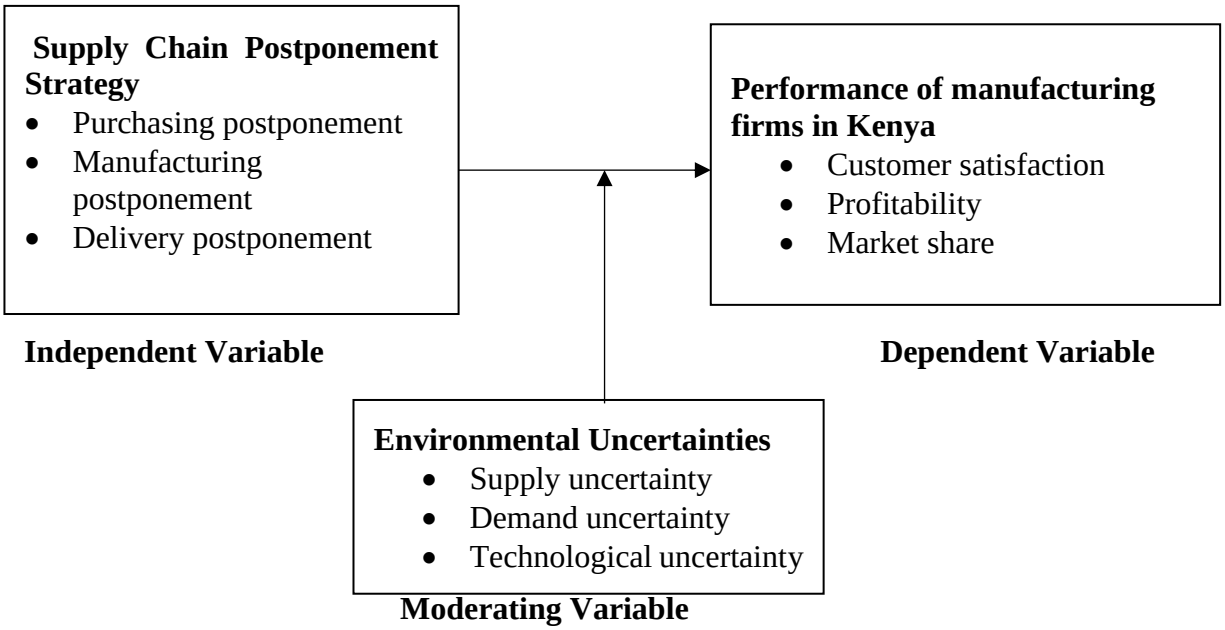

Figure 1: Conceptual Framework

Postponement Supply Chain Strategy

Each business wants to create precisely what clients want to eat at the right location and moment (Ballou, 2009). Ideally, they only activate the entire design-make-ship cycle when there is a clear demand signal. This can be categorized as the greatest delay stage, allowing businesses to maximize their earnings by completely understanding actual client demands. The potential of e-business is thought to be wide-ranging (e.g. in the new cyber retailer Amazon.com and the internet business-to-business procurement network General Electric Global eXchange Services) and thus possibilities exist to reengineer current supply chains or to design new supply chains or use postponement approaches to develop fresh supply chains (Lee & Whang, 2011).

Postponing can improve a company's flexibility to satisfy the increasing product range and rapid response requirements efficiently (Lee et al., 2014). The quantity of study addressing postponement has risen significantly in latest times. At the same moment, businesses as varied as Hewlett-Packard (HP) Company, Dell Computer, Motorola, Japan's National Bicycle Industry Company (NBIC), Toyota Motor Corporation, Gillette Company, and Benneton clothing manufacturer are using this idea. Despite increasing attention to postponement, its apps are far less than anticipated at the moment (Battezzati and Magnani, 2010). For instance, in the food sector, a forecast is that by 2010, over 50% of all inventories will be stored in a semi-finished state, and final processing and delivery will be processed against a particular client order.

In the moment postponement category of Zinn and Bowersox (2018), it is suggested that an anticipatory inventory be maintained at one or several strategic places. They also provide insight into how four kinds of postponement (labeling, packaging, installation and production) can be applied to enhance the physical distribution system's productivity. In latest literature, further postponement calls for the strategically centralized storage of differentiated Achieving a balance between price and responsiveness of the inventory. In the distribution channel, the repositioning of manufacturing operations also involves postponement, not restricted to relocating inventories. This thinking is not surprising when it is regarded that the achievement of postponement policies depends in part on where particular end products should take shape in the process. Postponement may move the final setup from manufacturer plants closer to the end-use client, enabling fast delivery of tailored products and rapid response to modifications in display mixes (Bowersox and Closs, 2016).

The nature of product flow and the routing of manufacturing may also have consequences for postponement implementation (Yang and Burns, 2013). Postponing implies prolonging some stage, generally preceding the point of differentiation. Companies may tend to apply upstream postponement in terms of inventory expenses, as inventories of raw materials are generally cheaper than inventories of end items. The best location for postponement in other contexts could be the convergence of the bill of materials in that it is the place in the supply chain where the quantity of parts, components, sub-assemblies or assemblies is the lowest. Taking this into account, it can be delayed. The variety, value, quantity and weight of a product rises by postponing the cost of saving on stock carrying and keeping, assortment, storage and obsolescence. Postponing is useful when capacity is non-responsive (i.e., supplier lead times are long, production schedules are inflexible, or production amounts are restricted) (Zinn and Bowersox, 2008).

Postponing is one of the most useful strategic processes for managing product range and uncertain sales hazards (Aviv and Federgruen, 2011). Furthermore, since the postponement of manufacturing enables businesses to function without a completed inventory, businesses can profit from keeping the bulk by delaying costly activities and point of product differentiation of their inventories in the cheaper and/or pre-customized form. Using commonality in

components can also allow postponement of purchases. Following this approach, until client order has been placed, Dell will not purchase monitors for its PCs. In reality, it is not necessary to ship monitors first to Dell. Instead, Dell receives an e-mail from United Parcel Service (UPS) and draws a monitor directly from provider stocks and coordinates it with the PC to reach the client. This postponement strategy is estimated to save $30 in freight costs per display unit (McWilliams, 2007).

Apparently, the manufacturing method must allow a stream of discrete measures to take place to postpone. In this regard, modularity in production (decoupling the process in at least two sub-processes, separated in time and/or place) is a prerequisite for postponement of production. Since postponement of manufacturing means that customer orders are fulfilled through production rather than through the holding of finished products, a reliable supplier network capable of supplying parts and services plays a key role in its application (Feitzinger and Lee, 2017). The selection of distinct approaches for postponement relies on the extent to which a business can modularize its goods and procedures (Yang et al., 2013). In the event of SmartCar, the comprehensive use of manufacturing postponement causes vendors to take over portion of the assembly plant where they deliver parts from their workshop adjacent to the plant straight into the final assembly line (Van Hoek, 2018).

Yang et al. (2014) further expanded and refined the postponement idea to include postponement of product development, postponement of purchases, postponement of manufacturing and postponement of logistics. Postponement of production and postponement of logistics are comparable to previously deliberated impressions of postponement. Purchasing postponement concerns the notion of risk shift by delaying the acquisition of raw materials to the point of manufacturing. However, postponement of product growth expands the concept of postponement to the earliest phases of the supply chain. The postponement of product development offers a chance to decrease lead times in design and expensive redesigns. By concentrating originally on product specification choices that are likely to stay stable, design choices can be delayed until better data is accessible about less stable parts of the product. Toyota technicians and executives, for instance, delay certain choices and provide vendors with partial data while exploring many prototypes (Ward et al., 2015).

Postponement fosters a fresh approach to the supply chain (Yang and Burns, 2013) and has been recognized as a significant feature of contemporary and competitive supply chains (Van Hoek, 2009). Considering, for instance, the potential for postponement in saving stock holding and cost sharing, the longer and broader the supply chain, the higher the potential advantages of postponement. To enhance its responsiveness to client requirements, Benetton used postponement. Benetton is better placed to react to common colored clothing requirements by postponing the dyeing of its clothes and reducing surplus inventory of less common colors (Dapiran, 2012). By postponing the shipment of appliances to Sears until a customer order is received, Whirlpool was able to achieve a significant reduction in the cost of inventory and transport. The final assembly of its DeskJet printers was delayed by Hewlett Packard until the very early phases of the supply chain. This postponement of final assembly, coupled with shifting assembly sites closer to clients, led in a more cost-effective manufacturing method while lowering transport and logistics expenses (Feitzinger and Lee, 2007).

Environmental uncertainty

Environmental uncertainty includes those occurrences and variables that vary randomly and unpredictably, affecting a company' very life (Turner, 2013). As a consequence of progressively demanding clients, today's markets are becoming hyper-competitive (Thomas and Griffin, 2016), and environmental uncertainty has become a major force affecting the competitiveness of the supply chain. Uncertainty influencing supply chain activities is a significant barrier to delivering superior value to customers (Mason-Jones and Towill, 2018).

In the face of such uncertainty, the supply network of manufacturing firms will either strive to monitor the differences, thereby increasing On-cost or otherwise buffer up inventory against such differences, risking extra stock holding expenses and obsolescence. Uncertainty is a strategic issue in supply chains, suggesting that it comes from four main sources: supply side, production process, control systems, and demand side.

Environmental turbulence includes uncertainty or unpredictability and has a significant effect on key supply chain integration choices, especially on risk assessment and the need for more flexibility. Turbulence is traditionally linked to transaction costs, including finding, selling, negotiating, tracking and dispute resolution expenses. In open market transactions with other companies (Coase, 2017). Furthermore, theorists of organizations (Dess & Beard, 2014) emphasize the need for organizations to adapt flexibly or protect themselves from progressively turbulent and complicated environmental circumstances. On the one side, businesses would tend to have a more flexible and easy structural arrangement when faced with an extremely complicated setting by concentrating on a few main operations in a value chain and outsourcing other less core operations. On the other side, companies are more likely to try to minimize the uncertainties of coping with internal providers by tightly monitoring these operations at different phases of the supply chain. Greater environmental uncertainty calls for higher integration of the supply chain to capture the advantages of organizational hierarchy-derived coordinated operations (Williamson, 2015). Costs connected with manufacturing decoupling, inventory scheduling and R&D coordination across various sides are significantly improved under turbulent environmental circumstances.

According to van der Vorst and Beulens (2012) Supply chain uncertainty relates to decision-making circumstances in the supply chain where the decision-maker certainly does not know what to decide because he is indifferent to the goals; lacks environmental or supply chain data; lacks information processing ability; is unable to predict correctly the effect of potential control actions on supply chain behaviour; or lacks efficient control activities. Donk and van der Vaart's (2015) regard uncertainties of technology and demand as an exogenous factor experienced by a supply chain company. This implies the supply chain's primary function is not to minimize uncertainty about technology or demand, but to mitigate the adverse impact on delivery performance of technological and demand uncertainties. Therefore, it is asserted that companies that have been able to incorporate particular supply chain strategies they outperformed those businesses that did not (Mason-Jones and Towill, 2017), as required by their competitive setting.

Fisher (2017) shows that technological uncertainty varies depending on the product or industry sector. Technological uncertainty can be caused by the enhanced complexity of components or the novelty of part features in the automotive industry. When this happens, the probability of delay in shipment and issues with product quality will increase (Oh and Rhee, 2008). When such technological uncertainty is experienced concurrently by several sides in a supply chain, an integrated supply chain with a higher capacity for collaboration has aligned goals and shares information will be able to mitigate its adverse effect on delivery performance can be mitigated. Demand uncertainty is the extent to which a customer's needs and demands change and are unpredictable (Chang et al., 2012). Geary et al. (2012) states that uncertainty of supply can be seen as the distinction between its customers ' real demand for the end-marketplace and the orders placed with an organization. Customers today also want quicker and more reliable delivery while requiring more range, greater quality, and better product. This does not imply that clients can continuously pass on to their upstream providers a predictable demand. Typically, products with high demand variability, uneven purchasing, elevated innovation rate, and brief product life cycle will produce a greater level of demand uncertainty for upstream providers (Chang et al., 2012).

The globalization of supply chains implies that a range of infrastructures, environments and cultures and the relationships between them are now affecting the manufacturing of many products and services. As a consequence, there is potential for enhanced uncertainty, risk and complexity in the supply chain (Bhatnagar and Sohal, 2015; Merschmann and Thonemann, 2011). Therefore, identifying the main sources of uncertainty within supply chains and developing strategies for managing them is a significant business task. Delivery uncertainties impose serious operational problems, making it hard for businesses to reliably satisfy client demand. Hendricks and Singhal (2013) discovered component shortage to be the major cause of crashes in the supply chain. Other sources of manufacturing delay include quality issues and lengthy lead times in supplying the vendors with the correct components at the correct moment. Therefore, businesses have to adapt to supply differences to be responsive. Effectively managing supply uncertainties enables a business to reliably procure supplies (Handfield and Pannesi, 2015) and mitigate the adverse effect of supply uncertainties on the capacity of a business to pursue mass customization because it can more efficiently match supply with demand.

Environmental uncertainty is often encountered by the growth of a data sharing scheme between supply chain partners by management and by enhancing powerful cooperative trust-based partnerships (McNamara et al., 2012). In research covering UK, New Zealand and Thailand supply chains, Childerhouse et al. (2011) established that most companies around the world are facing elevated rates of uncertainty, yet they still need to effectively streamline and integrate their supply chain procedures to their and their partners ' detriment. However, internal resources and capacities appear to be less efficient in addressing environmental uncertainty than concentrating on external resources. Increasing Total Quality Management (TQM) methods under environmental uncertainty have been suggested to impact organizational efficiency. Only under low environmental uncertainty, quality practices affect company efficiency. It was found that management could give more significance to other dimensions under uncertain circumstances like marketing orientation and supply strategies than quality practices (Carter et al., 2010).

It has long been acknowledged that the fit between environmental uncertainty and flexibility policy, including flexibility in the supply chain, is essential to organizational efficiency (Wagner et al., 2012). Flexibility approach has its own advantages and expenses for the organization, the weights of which differ across levels of environmental uncertainty such as improving product range and diversity (Anand and Ward, 2014), decreasing reaction times to client requirements, assisting companies to customize and improving customer loyalty (Hartmann and De Grahl, 2011). An extremely evolving environment, while challenging the current supply chain strategy and business activities, also provides higher possibilities. Therefore, the advantage of a less flexible supply chain approach that suits the stable environment is not as great as the advantage of the flexible approach that suits the evolving environment. In other words, the result of a policy that suits a greater atmosphere is a marginal efficiency rise (Barreto, 2012).

Performance of Manufacturing Firms in Kenya

Martin and Patterson (2009) regard efficiency as one of the performance aspects to include inventory, cycle time and economic, including the use of assets. Lai, Ngai, and Cheng (2012) split performance into two categories, customer-facing and internal-facing performance, concluding that measures such as reliability of the supply chain, flexibility and responsiveness can be regarded as customer-facing, while expenses and usage of assets are internal. Lorentz et al. (2012) evaluated intra-company supply chain performance and economic performance, including cost efficiency, service quality and asset usage as performance dimensions of the intra-company supply chain Performance and economic performance, including price

performance, service performance and use of assets as aspects of intra-company supply chain performance, and economic performance measurement such as Return on Assets (ROA), Return on Employed Capital (ROCE) and Earnings Before Interest.

Return on sales and return on investment can be evaluated by market share, profit margin, sales development, overall product quality, overall competitive position, average selling price. The measurement of firm performance can be split into two categories that are economic and non-financial measures. Non-financial measures include elements such as satisfaction of customers, environmental performance, Satisfaction of employees, social performance, significance, effectiveness and effectiveness (Ganeshkumar and Nambirajan, 2013). Empirically, Hudaib and Haniffa (2016) documents important adverse link between firm size and firm efficiency. On the other side, big companies are reported to have a direct impact on company performance (Aljifri & Moustafa, 2017). Kumar (2014) reports that, due to economies of scale, big companies are more effective than small companies and market power. Because of their capacity to diversify their risks, larger companies are better performers than smaller companies. Haniffa and Hudaib (2016) report that big companies have more analysts who are concerned about the results of companies and as such will be under greater pressure to perform well.

When defining achievement, there are certain elements that must be regarded. They include the time frame and its point of reference. Past and future performance may differ as a better previous does not ensure superior future efficiency (Carneiro, 2015). Output can also be short, medium, and long-term. Performance can also be evaluated against the average sector, rivals, goal or previous performance (Carneiro, Silva, Rocha, & Dib, 2017). To enhance the efficiency of the company through supply chain management, organizations need to plan to incorporate cross-functional operations within the company and to link them internally efficiently with the procedures of their supply chain company partners, vendors and clients (Narasimhan, 2017). The inclusion approach of the supply chain generates value for the clients of a company and brings providers and clients into the process of value development (Vickery et al., 2013). Gregory and Platts (2015) concluded that performance could be split into four aspects of quality, time, price and flexibility. These dimensions have been altered from the supply chain view by Beamon (2009), dividing supply chain efficiency into three classifications: resource-related, output-related and flexibility-related.

Empirical Review

In China, Yeung, Selen, Deming and Min (2007) did a study on postponement strategy from a supply chain perspective. This research widens the scope of the use of postponement by addressing how the generic supply chain structure and information sharing/relationship among supply chain actors affects the postponement decision, based on empirical data of Chinese manufacturers in the Pearl River Delta. This study was exploratory in nature. The research design that was used was a Case analysis, cross-case comparisons, semi-structured interviews. The study found that a cross-case analysis including study of the downstream structure, downstream relationship, upstream structure, upstream relationship, production method and inventory position produced a postponement classification into five categories: balanced structure without customer information; customer dominated; manufacturer dominated; balanced structure with loose suppliers, and finally virtual supply chain. Based on this classification, two propositions are postulated: when a supply chain has a balanced structure, it should use speculation or production postponement. When the supply chain has an unbalanced structure, it should use purchasing postponement or product development postponement. The study was done in China thus presenting a scope gap. The current study will be done in Kenya.

Boone, Craighead and Hanna (2017) did a study postponement: an evolving supply chain concept. The specific objective of the study was to assess and document the progress of

postponement research, identify current gaps, and provide direction for future research efforts. The study used a desktop research design. Postponement literature published from 1999 to 2006 was reviewed. The review revealed a significant increase in the number of postponement research efforts, many of which at least partially addressed past challenges noted in previous research. Several opportunities to continue addressing these past challenges were identified. The study adopted a desktop research design thus presenting a methodological gap. The current study will be descriptive in nature.

Ivanov and Sokolov (2009) did a study on adaptive supply chain management. The objective of the study were to examine the key drivers and enablers that have transformed postponement into a viable supply chain strategy over the past five years and to identify the critical success factors and benefits resulting from successful postponement implementations. Two streams of primary research were executed for this study. The results from these surveys, in combination with secondary research, formed the basis for the findings highlighted in this report. The study found that the primary reason companies have not considered a postponement strategy is a general lack of understanding of postponement. In addition, key inhibitors of postponement are the perception of risks associated with uncertainty of value realization and technology limitations to support implementation. In addition, increased difficulty to forecast demand and customers demanding higher levels of customization are the primary drivers for implementing postponement. The study also found that key challenges for successfully implementing postponement are organizational alignment and implementation complexity. Postponement often involves the changing of decade-old manufacturing processes. Without consistent top-down sponsorship and support, from design through implementation, a postponement implementation is destined for failure. The study adopted a secondary data thus presenting a methodological gap. The current study will use primary data.

Case studies of postponement in the supply chain were done by Rietze (2016). The thesis addressed the growing trend in business to offer a wide variety of products while maintaining customer order fulfillment expectations. This trend was happening at the same time the US is losing manufacturing jobs to overseas labor markets, namely China, India, and Central America. While it may not be possible for the US to compete with these countries on the basis of labor costs or even quality in manufacturing, it can compete in the area of faster delivery times and product-service interaction which must inherently take place onshore. Postponement is a strategy that allows businesses to take advantage of the offshore capacity and labor for manufacturing in addition to local finishing centers for final assembly, packaging, and distribution. Postponement is widely used in the automotive, apparel, and consumer electronics industries. Many companies produce products that are candidates for postponement but are unlikely to undergo the implementation changes necessary to support it. This thesis highlights some of the leading companies who are pioneers of postponement and includes case studies of additional companies who have followed their lead. They have seen the tangible benefits of lower inventory costs, quicker response time, better forecasts, and more variety as well as the intangible benefits of better customer service and the coordination and integration of manufacturing, sales, and marketing functions. The assortment and range of case studies suggest that postponement is used across a breadth of industries and not only profitable as a business strategy but also as a means for creating local jobs because of the inherent product-customer interaction. The study therefore adopted a case study research design thus presenting a methodological gap. The current study will be descriptive in nature.

Yang and Yang (2010) did a study on postponement in supply chain risk management: a complexity perspective. This study attempted to explore the role of postponement in supply chain risk management from a complexity perspective. After a review of the relevant literature, it first draws insights emerging from normal accident theory that addresses the system

characteristics of catastrophic accidents and applies them to supply chain disruptions. This is followed by the utilization of normal accident theory to explain the role of postponement in supply chain risk management. The study also investigated the complexity implications of some commonly recommended measures to mitigate supply chain disruptions. In certain circumstances, the introduction of those measures may add to the complexity of a system and thus become inherently infeasible. The study concluded that companies are encouraged to simplify their systems to protect them against disruptions. The study also suggests that companies should examine the complexity of their supply chains prior to adopting commonly recommended supply chain risk mitigation strategies. In certain circumstances, the introduction of those strategies may add to the complexity of a system and thus become inherently infeasible. The study was informed by normal accident theory thus presenting a theoretical gap. The current study will be informed by Resource Based View Theory, contingency theory, dynamic capability theory, and technological acceptance model as well as transaction cost economics theory.

An approach to assess logistics and ecological supply chain performance using postponement strategies was done by Simão, Gonçalves and Rodriguez (2016). The study presented a methodology that helps managers evaluate how to assess the impact of postponement on supply chain performance considering logistics and ecological criteria. The study considered a green supply chain design that considers CO2 transport emissions under different postponement strategy scenarios using a simulation tool. It also focused on a relevant extension of postponement theory by including green considerations into the evaluation of postponement strategies in green supply chain design. Moreover, it provides some insight on how to measure and evaluate the impact of postponement regarding supply chain transport performance, considering different transport mode (container ocean ship and truck) using the European Platform on Life-Cycle Assessment (EPLCA) of ELCD European Life-Cycle Database. The study found that logistics and packing postponement strategies can improve the performance of logistics (total inventory and order lead-time) and, at the same time contribute to reducing the environmental impact of CO2 emissions from transportation process. The study was informed by postponement theory thus presenting a theoretical gap. The current study will be informed by Resource Based View Theory, contingency theory, dynamic capability theory, technological acceptance model as well as transaction cost economics theory.

Ferreira, Tomas and Alcântara (2015) did a study on theoretical framework for postponement concept in a supply chain. The aim of this paper was to propose a model approach to the postponement concept based on drivers, steps for implementation, and performance measures. This study used a qualitative approach and the theoretical-conceptual method focused on the literature review and the development of new theories on the adoption of the postponement strategy. The time frame of the study included articles on the subject between 1950 and 2012. The study indicated that postponement can be understood as a way to change the form, identity, or location of products at the latest possible point in time and can be applied at different levels in the supply chain. The study used past studies to draw its findings and conclusion thus presenting a methodological gap. The current study will use actual data which will be descriptive in nature.

Zhou, Huang and Zhang (2014) did a study on a two-stage queuing network on form postponement supply chain with correlated demands. The study developed a two-stage tandem queuing network with MAP arrival to address this issue. Particularly, it introduced a Markov Arrival Process (MAP) to characterize the correlation of the demand. By using of matrix geometric method, it derived several performance measures of the supply chain, such as inventory level and unfill rate. The study established that to ease the conflict between quick response and product variety, more and more business models are developed in supply chains.

Among these, the Form Postponement (FP) strategy is an efficient tool and has been widely adopted. To the supply chain with FP strategy, the design mostly involves two problems: determination of Customer Order Decoupling Point (CODP) position and semi-finished product inventory control. The numerical examples show that both the variance and the correlation coefficient of the demand lead to more delayed CODP position and more total cost. The study adopted a matrix geometric method while the current study will be descriptive.

Seth and Panigrahi (2015) did a study on application and evaluation of packaging postponement strategy to boost supply chain responsiveness: a case study. The purpose of this study was to demonstrate how packaging postponement can be effectively leveraged in a dynamically changing diverse retail market where responsiveness is key. The study also guided about the empirical evaluation of how packaging postponement affects the performance in the sanitary pads supply chain by considering operating measures. The focal company belongs to the Indian Fast Moving Consumer Goods sector, hygiene products category. It also examined the measures that are critical to a responsive supply chain and presents a comparative analysis of selected measures before and after implementation. The findings illustrated that the packaging postponement not only improves competitive advantage but also significantly contributes to improving product proliferation and supply chain responsiveness. The study provided understanding of drivers and obstacles for packaging postponement strategy with operational insights about 'how-to' implement. The study used a case study research design thus presenting a methodological gap. The current study will adopt a descriptive research design.

Budiman and Rau (2019) did a study on a mixed-integer model for the implementation of postponement strategies in the globalized green supply chain network. The study proposed a mixed-integer model of an integrated Green Supply Chain Network (GSCN) for both single and multi-period planning horizons that incorporate postponement concept, and modularized products and processes. Using these models, various speculation strategies coupled with postponement strategies were analyzed in configuring green supply chain system with mass customization principle subjected to various carbon tax and carbon cap policies under a global supply chain environment. Computational examples of a mass customization notebook computer supply chain showed that postponing product differentiation reduces excessive production processes. As a result, the configured supply chain is able to comply with strict environmental policies with just a slight cost increase. This justifies postponement strategies application in configuring eco-efficient supply chain operations. The study was informed by selling to the vendor model thus presenting a theoretical gap. The current study will be informed by mixed-integer model of an integrated green supply chain network, contingency theory, dynamic capability theory, technological acceptance model as well as transaction cost economics theory.

RESEARCH METHODOLOGY

A cross-sectional survey and descriptive design were adopted in this research. This study embraced a positivism strategy where it argues that the investigator is external to the method of studies whereby not much can be accomplished to change the content of the gathered information. All manufacturing companies in Kenya were the target population as listed by KAM (2018). For this research, the target population was 829 companies in Kenya's manufacturing sector categorized into 12 main industrial sub-sectors in processing and adding value. The two non-included sub-sectors are consultancy and new products and services that provide support services to the other sub-sectors. The sub-sectors are described by import businesses of the sort of raw materials or the products they produce. The research picked from each of the companies that engage in the research the supply chain managers, supply chain executives or procurement. Proportionate stratified random sampling was used to select the

sample size participants. Each of the 12 sub-sectors recognized formed a stratum from the sampling frame. The Yamane formula was used to arrive at a sample size of 270 manufacturing firms. The study selected the supply chain managers or directors from each of the firms who participated in the study. The study used primary data collection methods collected using a semi-structured questionnaire. Using the social science statistical package (SPSS) version 24, quantitative data was analyzed using descriptive statistics and inferential analysis.

RESEARCH FINDINGS AND DISCUSSION

Out of the 270 questionnaires, 202 were properly filled and returned. This represented 75 percent response rate. The high return rate could be attributed to use of research assistants as well as follow ups. A response rate above 50 percent is considered adequate for analysis (Saunders et al., 2009).

Descriptive Statistics on Postponement Supply Chain Strategy

The respondents were asked to indicate their agreement or disagreement with the statements on postponement supply chain strategy using a five level likert scale (1- strongly disagree, 2-disagree, 3-neutral, 4- agree, and 5- strongly agree). The results are shown in Table 1.

The findings show that majority of the respondents agreed with the statement that they only buy raw materials or supplies when demand requirements are known (66.3%), they delay final product manufacture or assembly activities until customer orders have been received (67.4%), they delay final product manufacture or assembly activities until the last possible time (70.3%), they delay deliveries until customer orders are received (71.3%), and they store parts/products at distribution points closer to the customer (62.9%). Further, 45.5% of the respondents noted that they delay purchase of materials or supplies until the last possible time.

The aggregate mean of 3.7 indicated that majority of the respondents agreed with the statements about postponement supply chain strategy. This means that most of the manufacturing firms have adopted the use of postponement supply chain strategy. The particular strategies include purchasing postponement, manufacturing postponement and delivery postponement. Additionally, the overall standard deviation of 1.2 implied that the data was distributed around the mean. This denoted that majority of the respondents' shared similar views in regard to most of the statements on postponement supply chain strategy. The study findings were consistent with Nyaoga, Magutu and Aduda (2015) assertion that postponement supply chain strategy significantly influenced firm performance.

Table 1: Descriptive Statistics on Postponement Supply Chain Strategy

Statements	SD	D	N	A	SA	M	STD. DEV
We only buy raw materials or supplies when demand requirements are known	5.90%	16.80 %	10.90%	35.60 %	30.70 %	3.7	1.2
We delay purchase of materials or supplies until the last possible time	16.80%	22.80 %	14.90%	27.20 %	18.30 %	3.1	1.4
We delay final product manufacture or assembly activities until customer orders have been received	6.40%	15.30 %	10.90%	34.70 %	32.70 %	3.7	1.2
We delay final product manufacture or assembly activities until the last possible time	2.50%	12.90 %	14.40%	33.20 %	37.10 %	3.9	1.1
We delay deliveries until customer orders are received	4.50%	13.40 %	12.40%	31.70 %	38.10 %	3.9	1.2
We store our parts/products at distribution points closer to the customer	1.50%	9.40%	26.20%	33.20 %	29.70 %	3.8	1.0
Aggregate mean						3.7	1.2

The respondents were asked to suggest other factors that affect postponement supply chain strategy in their firms. The respondents observed that postponement depends mostly on managerial decisions about the goals of firm and the level of acceptance of postponement strategy on the market. Full postponement strategy is dictated mainly by the level of product customization and capacities of manufacturing and logistics systems. Production postponement depends on the market and forecasting techniques.

Descriptive Statistics on Environment Uncertainties

The respondents were asked to state their agreement or disagreement with the statements on environment uncertainties using a five level likert scale (1- strongly disagree, 2-disagree, 3-neutral, 4- agree, and 5- strongly agree). The outcomes are indicated in Table 2.

The results reveal that majority of the respondents agreed with the statement that suppliers' delivery timelines are unpredictable sometimes (76.2%), they experience unexpected raw material shortages (70.3%), there are new products entering the market from competitors (64.9%), and there are changes in customers tastes and preferences, 71.8%. Further, 71.3% of the respondents noted that there are changes in technology regularly, they experience high rate of product innovations from competitors (64.8%), and there is uncertainty on accessibility of the latest technology (66.3%).

The aggregate mean of 3.8 revealed that majority of the respondents agreed with most of the statements about environment uncertainties. This implies that the manufacturing firms experience environmental uncertainties related to demand, supply and technology. Additionally, the overall standard deviation of 1.3 implied that the data was distributed around the mean. This denoted that majority of the respondents' shared similar views in regard to most of the statements on environment uncertainties. The findings supported Farooquie, Suhail and Faisal (2017) establishment that uncertainties in supply chains interfere with their performance and managing uncertainties and risks to reduce this interference is a costly affair. Additionally, the findings concurred with Singh (2020) observation that environmental uncertainty has a negative impact on firm financial performance.

Table 2: Descriptive Statistics on Environment Uncertainties

Statements	SD	D	N	A	SA	M	STD. DEV
Suppliers' delivery timelines are unpredictable sometimes	3.00%	15.30%	5.40%	36.60 %	39.60 %	4.3	1.1
We experience unexpected raw material shortages	5.90%	14.90%	8.90%	30.70 %	39.60 %	3.8	1.3
There are new products entering the market from competitors	6.40%	19.80%	8.90%	34.20 %	30.70 %	3.6	1.3
There are changes in customers tastes and preferences	5.40%	17.80%	5.00%	34.70 %	37.10 %	3.8	1.3
There are changes in technology regularly	5.90%	15.30%	7.40%	37.60 %	33.70 %	3.8	1.2
We experience high rate of product innovations from competitors	12.90 %	17.30%	5.00%	29.70 %	35.10 %	3.6	1.4
There is uncertainty on accessibility of the latest technology	8.40%	14.90%	10.40 %	26.20 %	40.10 %	3.8	1.3
Aggregate mean						3.8	1.3

Descriptive Statistics on Performance of the Firm

The respondents were asked to state their agreement or disagreement with the statements on performance of the firm using a five level likert scale (1- strongly disagree, 2-disagree, 3-neutral, 4- agree, and 5- strongly agree). The outcomes are indicated in Table 3.

The results reveal that majority of the respondents agreed with the statement that they get regular compliments from our customers (77.3%), they effectively fulfill the requirements of the customers (83.2%), they respond to customer enquiries timely (80.7%), and their customers have been increasing over time (84.6%). Further, 51% of the respondents cited that their firm is profitable, 67.3% noted that profit margin for the firm has increased over the years, while 50% indicated that profit margins have stagnated. In addition, 61.4% of the respondents agreed that their products are available in the market, 73.3% stated that distributors are ordering more items, and 61.4% opined that their products are highly competitive in the market. On the other hand, 66.3% of the respondents disagreed with the statement that they get regular complaints from customers.

The aggregate mean of 3.7 revealed that majority of the respondents agreed with most of the statements about performance of the firm. This means that the manufacturing firms have been experience growth in performance based on the level of customer satisfaction, profitability and market share. Furthermore, the overall standard deviation of 1.1 implied that the data was distributed around the mean. This denoted that majority of the respondents' shared similar views in regard to most of the statements on firm performance.

Table 3: Descriptive Statistics on Performance of the Firm

Statements	SD	D	N	A	SA	M	STD. DEV
We get regular complains from our customers.	39.60%	26.70 %	6.40%	25.20%	2.00%	2.2	1.3
We get regular compliments from our customers.	4.50%	11.90 %	6.40%	42.60%	34.70%	3.9	1.1
We effectively fulfill the requirements of the customers.	2.00%	7.40%	7.40%	41.10%	42.10%	4.1	1.0
We respond to customer enquiries timely.	5.90%	7.90%	5.40%	38.60%	42.10%	4.0	1.2
Our customers have been increasing over time.	4.50%	7.40%	3.50%	38.10%	46.50%	4.2	1.1
Our firm is profitable.	10.40%	29.70 %	9.40%	28.20%	22.30%	3.1	1.2
Profit margin for the firm has increased over the years.	5.40%	15.80 %	11.40 %	48.50%	18.80%	4.1	1.2
Profit margins have stagnated.	3.00%	29.70 %	17.30 %	23.80%	26.20%	3.6	1.1
Our products are available in the market.	7.90%	18.30 %	12.40 %	29.70%	31.70%	3.3	1.1
Distributors are ordering more items.	5.90%	13.40 %	7.40%	31.20%	42.10%	4.1	1.0
Our products are highly competitive in the market.	5.90%	17.30 %	15.30 %	24.80%	36.60%	3.7	1.3
Aggregate mean						3.7	1.1

Effect of Postponement Supply Chain Strategy on Performance of Manufacturing Firms

The regressions results are presented in Table 4. The model summary results indicate that separately, postponement supply chain strategy explains 56.4% (R2= .564) of the total variations in the performance of manufacturing firms. The ANOVA results reveal an F statistic of 258.594 and reported P value of 0.000. The P value being less than the alpha value ($P < .05$), the proposed model is therefore statistically significant (good fit) in predicting the dependent variable.

Further, the regression of coefficient findings indicate that postponement supply chain strategy had a positive and significant effect on firm performance ($\beta=0.562$ $P < .000$). This implied that a change in postponement supply chain strategy by one unit would result to a change in performance of manufacturing firms by 0.562 units. The study findings were consistent with Nyaoga, Magutu and Aduda (2015) assertion that postponement supply chain strategy significantly influenced firm performance. Świerczek (2010) also found that postponement strategies influenced manufacturing performance in supply. Further, Boone, Craighead and Hanna (2017) revealed a significant increase in the number of postponement research efforts, many of which at least partially addressed past challenges noted in previous research.

Model;

Firm Performance = 1.044+ 0.562 Postponement Supply Chain Strategy

Table 4: Regression Model: Postponement Supply Chain Strategy and Firm Performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	1.044	.084		12.361	.000
	X3	.572	.036	.751	16.081	.000
	R Squared	.564				
	Adjusted R Squared	.562				
	F statistic	258.594				
	P value	.000				

a Dependent Variable: Y

Following the introduction of moderating variable (environmental uncertainties); the results in 5 indicate that postponement supply chain strategy when interacted with environmental uncertainties explains 30% of the total variations in performance of manufacturing firms. A comparison between the R square without moderation and R square with moderation reveal that the R square declined from 56.4% to 30%, implying that environmental uncertainties had a negative moderating effect on the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya. This means that environmental uncertainties significantly lower the effect of postponement supply chain strategy on firm performance.

Model;

*Firm Performance = 1.710 + 0.128 Postponement Supply Chain Strategy*Environmental Uncertainties*

Table 5: Regression Model with Moderation

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	1.710	.075		22.696	.000
X3.M	.128	.014	.546	9.222	.000
R Square	0.298				
Adj. R Square	0.295				
F statistic	85.049				
P value	0.000				

Hypotheses Testing Results

The third null hypothesis (H_{01}) predicted that environmental uncertainties do not moderate the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya. The computed *P*-value as shown in Table 4.32 was 0.000 at 95% confidence level implying that environmental uncertainties had a significant moderating effect on the relationship between postponement supply chain strategy and performance of manufacturing firms. The null hypothesis was therefore rejected.

Conclusion

In reference to the findings for objective three, the study concluded that postponement supply chain strategy had a positive and statistically significant effect on performance of manufacturing firms in Kenya. The study established purchasing postponement, manufacturing

postponement and delivery postponement as critical strategies expected to improve firm performance. The study further concluded that environmental uncertainties moderate the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya. In particular, environmental uncertainties lower the effect of postponement supply chain strategy on firm performance.

Recommendations

The study established that postponement supply chain strategy had a positive and significant effect on performance of manufacturing firms in Kenya. The study recommends that manufacturing firms should delay buying, manufacturing and delivery in order to take advantage of economies of scale in consolidation. Manufacturing firms should implement a policy on aggregation or consoildation in buying, manufacturing and delivery.

The findings established those environmental uncertainties had a significantly negative moderating effect on the relationship between postponement supply chain strategy and performance of manufacturing firms in Kenya. This study therefore recommends that manufacturing firms should regularly scan the environment for possible threats and uncertainties. The management should implement a policy on continuous environmental scanning for possible threats and opportunities and mitigation measures to take.

Contribution to Theory, Policy and Practice

This study is expected to make significant contribution to theory, policy and practice in the field of supply chain management. On theory, the study builds to the body of knowledge on the relationship between relationship postponement supply chain strategy and performance of manufacturing firms as moderated by environmental uncertainties. Further, the study affirms the theoretical framework, and strengthens the various theories used to underpin the variables. On policy, the study guides policy makers such as the government of Kenya and manufacturing firms' management on what to improve in the supply chain policy. In particular, the focus should be on postponement supply chain strategy. On practice, the study informs manufacturing firms' management on how best to enhance performance using postponement supply chain strategy factoring in environmental uncertainties.

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