

# The impact of supply chain integration practices on competitive advantage: A study of food and beverage manufacturing firms in Kenya

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**Abstract:** *Purpose:* This study aims to establish the relationship between supply chain integration practices and competitive advantage in Kenyan food and beverage manufacturing firms. *Methodology:* A cross-sectional survey design was employed. Data was collected from 146 respondents across 73 firms using structured and unstructured questionnaires. Linear regression analysis was conducted using SPSS version 28. *Results:* The study found positive significant correlations between functional integration, supplier integration, customer integration, and technology integration with competitive advantage of the sampled firms. *Theoretical contribution:* This research extends the application of systems theory, resource-based view, social exchange theory, and relational exchange theory to supply chain integration in an emerging market context. *Practical implications:* Food and beverage manufacturers in Kenya can enhance their competitive advantage by strategically implementing supply chain integration practices across functional, supplier, customer, and technological domains.

**Keywords:** functional integration, supplier integration, customer integration, technology integration, competitive advantage

**Sustainable Development Goals (SDGs):** **SDG 8:** Decent Work and Economic Growth; **SDG 9:** Industry, Innovation and Infrastructure; **SDG 12:** Responsible Consumption and Production; **SDG 17:** Partnerships for the Goals

## 1. Introduction

The evolving global economy is eminently complex, according to the World Bank (2009), and significant attempts have previously been made to promote an increasingly decentralized global integration of production, or manufacturing, distribution, and consumption. High fragmentation rates require a higher degree of freight transport volume, e.g., ton-kilometers. The USA has an excellently developed and integrated supply chain network with significant insufficiencies and deteriorating

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infrastructure and seems to be slow to respond to changing demand and consumption trends (Guerrero, Lucenti & Galarza, 2010). The U.S.'s fully integrated supply chain network, on the other hand, connects manufacturers and customers through many different types of transportation, such as air, express distribution systems, truck transportation, freight rail, and maritime transport (Spillan, McGinnis, Kara & Yi, 2013). Throughout Asia, China's supply chain infrastructure has so far been inadequate, although recent innovations and policy efforts to promote investment in the manufacturing industry have resulted in major changes (Abdulrahman, Gunasekaran, & Subramanian, 2014). China is currently poised for significant growth in the logistics and supply chain sector throughout the next several years. This is because multiple firms have begun to develop more revolutionary strategies that will provide growth opportunities and a competitive edge for the dynamic Chinese economy (Kearney, 2010). This demonstrates that China's supply chain network is improving and adapting to developments in the integration of the supply chain (Spillan, McGinnis, Kara & Yi, 2013).

Africa is divided into five economic zones, all with different objectives for growth and development of the respective economies, together with unique requirements for infrastructure building that are essential for the creation of a supply chain system that is competitive (Chinomona, 2013). Due to this new imbalance, we don't see the African Continent as an assorted market, because there are customers with different requirements in each of these 54 member states. This has generated an increasing demand for logistics services among producers and consumers with the sole objective of expanding their operations and improving their transport networks and supply chains (Chinomona & Pooe, 2013). Also, over the last ten years, globalization and technology have made it easier to work together, improve supply chains, and increase competition in Africa. Since Africa is a developing continent, it offers untapped opportunities for multinational companies that want to grow into new markets (Lowitt, 2017). The much more important logistics and supply chain countries are currently Algeria, the Democratic Republic of Congo, Angola, Egypt, Kenya, Ghana, Nigeria, Mozambique, Tanzania, and South Africa. Some of them own the largest ports on the continent: Barra do Dande and Lobito in Angola, Lamu in Kenya, Musoma in Tanzania, and Lekki in Nigeria (Business Daily, 2018). Africa is rich in natural resources such as gas, oil, agricultural products, and minerals. However, infrastructure development on the African continent lags behind that of all other continents, and there are gaps between its various regions: on the one hand, despite having the lowest annual rate of growth, South Africa has a modern infrastructure; on the other hand, Kenya and Nigeria have recorded some of the strongest growth rates in recent years (Swardton, 2011).

In order to boost sustainability and gain competitive advantages across supply chain networks, the basic metal sector in East Africa can be realistic and depend on the potential of regional integration and partnerships (Lisanza, 2013). Regional integration has since played an important role in enhancing intra-East African trade while expanding access to foreign economies in the EAC region (Francis & Waiganjo, 2014). Although regional integration gives a basic consensus that perhaps the sector has an enormous, unlimited market to strengthen the region's sustainable development, with the right business climate, including improved access to markets, facilitating infrastructure, enhancing science and technology sharing and development, technology, resource utilization, and skills development (Uwamahoro, 2018). Sustainable and comprehensive development in the basic metals industry could thus be enhanced through the incorporation of the supply chain sectors at the regional level (Georgise, Thoben & Seifert, 2014). The performance and competitiveness of manufacturing companies in developing countries in terms of supply chain relationship capabilities, manufacturing company capabilities, information and communication technology capabilities and operational capabilities, along with the desire of the final customer to produce and accumulate the supply chain value, was very low and limited (Georgise, Thoben & Seifert, 2014). In conjunction, the Ethiopian leather footwear manufacturing industries, implementing the activities of customer service, managing inventory, raw material sourcing, transport including WMS were examined as a case business.

As per the study, the company's supply chain and logistics processes have begun, but issues such as shortages of foreign currency, planned taxes, poor logistics coordination, and inadequate and non-integration structures are the key challenges facing the industry, decreasing efficiency and reducing competitive advantages (Getahun, 2012). Until then, due to power disruptions, due to poor electricity facilities, transportation problems due to poor road infrastructure, due to inadequate resources and currency issues raising raw material costs, due to lack of skilled manpower, obsolete technology, inappropriate planning of production, and control mechanisms, performance and efficiency issues have

occurred in Ethiopia's soap and detergent industries (Gelagay, 2018). Mbaisi (2016) analyzed the factors effecting the integration of the supply chain in Kenya's major manufacturing companies. In the research, among many vendor-managed inventory practices, customer relationship management practices, and joint planning, forecasting, and replenishment practices, the supply chain integration practices most practiced by multinational corporations in Kenya were highly ranked. Mideva and Moronge (2019) claim that the integrated supply chain increases the efficiency of Kenya's food and beverage production companies. Njagi and Muli (2020), however, studied the Kenya Breweries Limited case while investigating the effect of supply chain integration practices on the performance of manufacturing firms in Kenya. It has been identified that organizational success is not contingent on the integration of suppliers. The study further concluded that excellence in customer support and business practice should be generated by a well-integrated internal supply chain. The highest level of market share and profit is also reached when there is the most integration.

Manufacturing firms in Kenya have tried to follow improved supply chain practices in order to substantially enhance the management of the entire supply chain. It is on this basis that these organizations have considered the implementation of supply chain and logistics integration as a means of achieving superior supply chain process efficiency (Katua, 2014). The implementation of logistics and supply chain integration by the manufacturing companies in Kenya has spurred the achievement of the strategic objectives of the organizations, the decrease of risks, and the enhancement of internal and external management process synchronization. Integration of the supply chain and logistics between commercial banks in Kenya has seen the adoption of practices such as knowledge sharing in order to respond to customer demands, improve product quality, and manage processes efficiently in order to reduce costs, provide better customer service, increase revenue, and have properly driven capacity plans (Owino, 2015). Manufacturing food and beverage requires several value chains, starting with agricultural production and entering domestic, national, and global markets. Beverage or drink manufacturing companies deal with products ranging from drinking liquid alcohol to non-alcoholic beverage, bottled water, fruit or vegetable juices, and soft drinks. Kenya's food and beverage manufacturing industry is a key competitive sub-sector highlighted for the growth and expansion of the economy and therefore has tremendous potential for job creation, poverty reduction or eradication, and wealth creation (Mideva & Moronge, 2019). The sub-sector continues to contribute positively in the intermediate and far-reaching term to the achievement of the Millennium Development Goals, especially the goal of eradicating hunger and extreme poverty and the goal of Growth and Global Partnership (Mideva & Moronge, 2019). Food and beverage manufacturers integrate the supply function, which includes supplier selection and management, procurement planning, the production function, which is responsible for managing manufacturing operations, optimizing stock flows, and material handling, and the marketing function (Mwaura, Letting, Nicholas, Ithinji, & Orwa, 2016). Integration of the supply chain hasn't been used much in the Kenyan economy, especially in the manufacturing sector (Nzioka, 2010).

## **2. Literature review**

### **2.1. Systems theory**

General System Theory was initially developed in 1972 by the Hungarian biologist Ludwig Von Bertalanffy. From such a sociological viewpoint, the theory of systems is an institution's cross-disciplinary strategy (Von Bertalanffy, 1972). There are four elements in a sociological system, notably: attributes, objects, and internal object-environment interactions (Osifo & Omoregbe, 2011). Components are regarded to be pieces, components, or variables within the system (Zenko *et al.*, 2013). Characteristics are the features, aspects, and qualities of a device as well as its components. Each system contains internal connections between its components that exist. When referring to a system or organization, "functional integration" relates to the collaboration, coordination and integration of several functions or processes that are housed within it (Bueno, De Toledo & Da Silva, 2020). Systems theory is a type of theoretical framework that places an emphasis on the interconnectivity and interdependence of various parts of a system, as well as the manner in which these parts interact with and influence one another. The approach of systems theory in the perspective of integrating functionally within entities is going to be investigated as part of this research (Fatorachian & Kazemi, 2018).

Functional integration describes the degree to which divisions are interrelated and therefore are able to react rapidly to changes, and this principle has been important to understanding how departments or functions in food and beverage manufacturing companies are integrated (Nilsson & Gammelgaard, 2012). The theory also shows how important it is to reduce the chance of conflicts between roles and processes by getting all parts of the system to work together well. Contact is an important part of this (Jaradat *et al.*, 2017). In addition, the system specifies the distribution of resources, establishes priorities, and gives corresponding accountability to the unit while defining possible synergies because it exerts control throughout operational excellence (Defee *et al.*, 2010). Perhaps every system can be characterized with inventiveness, which is the system's ability to recognize and correctly implement changes in its global environment. As the new system gets more complicated, companies are more likely to combine their external and internal processes to help them reach the goal of their supply chain (Langevin & Riopel, 2005).

One more way that systems theory could be attributed to functional integration is by utilizing it to design and put into action organizational structural elements and procedures that are more efficient (Bueno, De Toledo & Da Silva, 2020). For instance, systems theory can be utilized to identify as well as address impediments or inadequacies in the movement of information or capabilities within an entity, or it can be utilized to design or configure organizational structures that are probably more suited to the requirements and objectives of the organization. Both of these applications are possible thanks to the application of systems theory. In conclusion, systems theory is an important theoretical framework that can be used to comprehend and investigate the functional integration that occurs within organizations. When the concept of systems thinking or theory is applied to the research of functional integration, researchers are able to acquire a more in-depth comprehension of the intricate interrelationships as well as interdependencies that exist within organizations, as well as discover ways to enhance the efficiency and productivity of these underlying structures. Supply chain integration confounds the idea that competitiveness, based on external integration systems and the internal integration systems in place, can only result in improved firm efficiency. This highlights the importance of integrating logistics to improve communication with customers and suppliers within the business.

## 2.2. Resource based view theory

As shown by Birger Wernerfelt and Barney, who formulated this theory in 1984, when rivals do not find alternate ways to obtain the benefits provided by a resource, the resource is defined as not substitutable. Resources, skills, and strategic assets are the main topics addressed by resource-based theory (Wernerfelt, 2014). Companies that pool their resources in a specific way will gain an advantage over their rival companies that are unable to do so, according to Dyer and Singh (1998). Companies can achieve a market edge and gain a sustainable competitive advantage by owning limited capital and properties and excelling in their core competencies and capabilities. The Resource-Based View (RBV) Theory is a theoretical framework that places primary emphasis on the capabilities and resources that are already present within an organization as the most important factors influencing that organization's level of success (Wang *et al.*, 2016). The RBV Theory proposes that an organization's one-of-a-kind resources, assets and capabilities, including its patent rights, brand recognition, and corporate culture, can be capitalized on to establish a competitive edge and maximize superior performance (Xu, Huo & Sun, 2014). This theory notes that, since they have access to strategic capital, businesses achieve a continuous competitive advantage. Such assets have distinctive features that are unusual, important, cannot be imitated, and do not have a near replacement (Wong *et al.*, 2012).

Suppliers were identified by Kozlenkova, Samaha, and Palmatier (2014) as a special type of resource, specifically an organizationally non-transferable resource whose function was to increase the efficiency of the organization's other resources. Companies should make sure that their capital, which includes tangible, intangible, and capability properties, can still give them a long-term strategic advantage. Resources can be regarded as inputs that allow firms to undertake their activities. Enterprises' strategic decisions in the external market climate are influenced by internal resources and skills. As per RBV, not all of a company's capital would be strategic. Madhani (2010) says that there will only be a competitive advantage if there is an extrusion method (different skills among businesses) and resources that can't move. The resource-based view asserts that a company's drivers of sustainable competitive advantage are both internal and external, i.e., firms have unique and valuable resources and

skills that are exceptional, difficult to replicate, abstractly substitutable, and portable, and that they can achieve and maintain competitiveness (Solesvik, 2018). Resource-based incentives are often important in a company's decision to support cooperative partnerships. The RBV Theory has found some applications in the research area of vendor integration, that also encompasses the linkages of a firm's supply chain as well as the establishment, and development of closer relationships with its vendors (Wong *et al.*, 2012). The application and relevance of the RBV Theory can be found in this area. This goal can be accomplished in a variety of ways, including through the formation of partnerships as well as joint ventures, the exchange of resources and information, among others (Yuen *et al.*, 2019). In accordance with the RBV Theory, the alignment and integration of suppliers can provide organizations with a significant source of valuable competitive advantage.

From an enlarged view of the RBV, theoretical support for the definition of supplier integration is given. Although the company's RBV suggests it is the resources and capabilities within the company that are a source of competitive advantage, it also suggests that cooperation with external entities can increase resources and capabilities. Capron, Dussauge, and Mitchell (1998) say that a business can learn and come up with new ideas either by growing on its own or by working with other businesses. Although internal expertise is created by the activities of companies in various fields such as manufacturing, R&D, and marketing, among others, external information sources include other companies, suppliers, consumers, and scientific and technological developments (Wiengarten *et al.*, 2013). The broader perspective that indicates that essential resources are not inherently located inside the particular firm but can cross organizational boundaries (Das, Narasimhan, & Talluri, 2006) provides the idea of supplier integration with additional theoretical help. The main reason for more supplier integration is the realization that the source of a business's competitive advantage may lie in the resources and relationships it has with other businesses. The participation of suppliers in operations such as product design, continuous improvement, and other joint activities has a positive effect on efficiency (Mesquita, Anand & Brush, 2008) and provides a strategic and the competitive advantage for all supply chain participants.

### 2.3. Social exchange theory

The theory of social exchange dates back to 1958, when George Homans, the American sociologist, published a paper entitled "Social Behavior as Exchange." By tradition, two separate mechanisms have been suggested in the theory of social exchange by which individual actors assess results in relation to some internal standard (Blau, 1964): first, a cognitive assessment in which actors equate actual results with anticipated results (Cook *et al.*, 2013); second, a normative or moral appraisal in which actors equate real effects with justice based on a certain normative concept such as fairness, success, or need (Muldoon, Liguori, & Bendickson, 2013). With the exception of economic exchanges, people who engage in social exchanges shouldn't expect to get something right away. Instead, they should rely on the goodwill of the other person, which will pay off in the long run (Cropanzano *et al.*, 2017). The Social Exchange Theory is a social psychologist theory that describes how social relations are established, sustained, as well as rescinded according to the implied costs and advantages of the association for each person (Chou & Hsu, 2016). Individuals are said to start engaging in social exchange with other people when they have the belief that the potential advantages of the exchange will exceed the total cost of participating in the exchange (Yang *et al.*, 2023). The establishment of closer relationships with consumers and the incorporation of consumer feedback as well as preferences and tastes into the composition, design and the delivery of goods and provision of services is an example of an application of the Social Exchange Theory that can be found in the field of consumer integration, which is also known as customer integration (Cortez & Johnston, 2020).

In line with the Social Exchange Theory, integrating customers into business processes can be an efficient way for companies to generate value not only for themselves but also for the people they serve (Shiau & Luo, 2012). By integrating and aligning with customers, businesses can gain a more thorough understanding of the needs and preferences of those customers, which can then lead to the creation of goods and offering services which are more intricately aligned with both the requirements of those consumers (Shi, Feng & Li, 2022). This can contribute to increased satisfaction among customers and loyalty, which in turn can lead to increased levels of customer retention and subsequent business. Furthermore, customer integration could indeed assist organizations in recognizing and responding to

any difficulties or issues that customers may be going through, thereby contributing to an overall improvement in the quality of the experience they have with the company (Busser, Shulga & Kang, 2019). Entities can affirm their dedication to guaranteeing the satisfaction of their customers and create stronger, perhaps more beneficial relationships with those consumers if they effectively seek out and respond to the feedback provided by their customer base (Cropanzano *et al.*, 2017).

To conclude, the Social Exchange Theory proposes that improving customer satisfaction, delight and loyalty, as well as gaining a superior awareness of consumer needs and preferences, can be an effective way for businesses to generate value for both their customers and the firms (Zeglat & Shrafat, 2022). This can be accomplished through the use of customer integration, which can be an effective way for businesses to create value. But even so, in order to minimize the risks and make the most of the opportunities presented by this approach, prudent strategic planning as well as management are vitally important (Davis-Sramek *et al.*, 2020). Customers are often regarded as secondary customers or co-producers, and therefore, high customer participation, such as customer engagement, ensures that during a service meeting, customers present themselves mentally, cognitively, as well as emotionally. A customer is delighted by the organization they support and is positive and optimistic about the role they play. He or she is also influenced by the clients of the service, the business, the brand, or the other clients. Absorption means that the client is completely focused, happy, and deeply involved in what he is doing.

## 2.4. Relational exchange theory

In 1994, Morgan and Hunt introduced the theory of relational exchange extensively to model long-term customer-bank relationship drivers and describe the personal and social exchange of benefits and costs. Though critical to supply chain production activities, technological systems do not function in isolation. Various technical processes frequently interact in unexpected ways, necessitating imagination and creativity (Gottschalk & SolliSther, 2005). Consequently, logistics information systems are better understood from the viewpoint of relational theory. As stated by Palvia (2009), the theory attempts to clarify competitive advantage and superior efficiency by concentrating as units of study on dyads and networks of businesses. Patnayakuni, Rai, and Seth (2006) say that relational rents are more likely to happen when partners are more committed to routines for sharing information between companies and to relationship-specific properties. There is no question that knowledge sharing is a feature of information systems implemented by organizations. Consequently, as organizations implement uniform standards for particular structures, they establish relational standards as partners that enable the principle of relational exchange to be implemented (Kern & Willcocks, 2000). Furthermore, relationships foster the technological communication of creativity and innovation (Han, Wang & Naim, 2015), allowing a variety of information systems to be incorporated by extension. Blackhurst, Dunn, and Craighead (2011) found that relationship skills like having established contact networks, tried-and-true supplier management systems, and monitoring systems are all linked to a stable supply chain. In this study, this relational view was used to figure out how advanced relational competencies could improve organizational efficiency.

Integration of supply chain information systems into an organization has a big effect on how well it works (Qrunfleh & Tarafdar, 2014). The main benefit is that it makes it easier for stakeholders to work together, improves the flow of information, and makes the supply chain more efficient as a whole. In every sector, however, the use of information systems needs some innovativeness. For companies, there's been a growing trend to create external connections based on knowledge sharing (Barratt & Oke, 2007). This is the contact domain. The flow of explicit information refers to communication, which can be seen as a transmission mechanism (Modi & Mabert, 2007). This means exchanging meaningful and relevant knowledge formally as well as informally. Another area where the Relational Exchange Theory can be put to use is in the context of technology integration. This is the process of combining different kinds of technology and different kinds of system applications within an organization in order to make it more efficient and effective (Safari & Albaum, 2019). Integration can refer to the process of combining different types of technologies, such as those involving hardware, software, and networking, as well as information and data systems (Yu, 2015). In line with the Relational Exchange Theory, the linkage or integration of new technologies can be an efficient method for businesses to generate value not only for themselves but also for their stockholders, including their employees, consumers, and partner organizations (Palvia, 2009). Additionally, it has the potential to enhance the precision and speed of

information flow, making it possible for the organization to react more quickly to shifting market trends or conditions and the dynamic requirements of its customers (Aris, Arshad & Mohamed, 2009). Although, there are challenges and risks correlated with the integration of technology, such as the possibility of becoming dependent on a single technology and maybe a provider and the danger of losing control over essential resources (Chin, Hamid, Raslic & Heng, 2013). Companies should meticulously evaluate their core competencies and then identify possible partners who can complement, augment and help boost these resources in order to mitigate these hazards, risks and optimize the benefits of integrating technology (Chen, Wang, & Chan, 2017). Only then can organizations hope to fully mitigate risks and realize the full potential of this integration.

## 2.5. Competitive advantage theory

The two kinds of competitive advantage that a company can obtain compared to its rivals were identified by Michael Porter: lower cost or distinction (differentiation). The aforementioned gain stems from capabilities that enable a company to outperform its competition, such as dominant market position, expertise, or capital (Porter, 1996). Strategic management, in Porter's opinion, must be correlated with gaining and maintaining a competitive advantage. Competitive advantage attempts to counter some of the critiques of comparative advantage for this reason. The theory was suggested by Porter in 1985. Porter emphasizes productivity development as a policy objective. According to the theory of competitive advantage, businesses can gain a long-lasting advantage over their competitors by providing distinctive goods or services that clients value (Wang, Lin & Chu, 2011). Cost, quality, innovative thinking, or other distinguishing characteristics that set the company apart from its rivals can all contribute to this advantage (Wang, 2014). To comprehend the streams of the competitive advantage, numerous different frameworks have been developed. Porter's Five Forces model, that also contends that companies can gain an edge by either cutting costs or trying to differentiate their product lines in ways that benefit customers, is one of the most popular (Peranginangin, 2015).

The concept of a "value chain" is a crucial one in the theory of competitive advantage. This makes reference to the sequence of actions that businesses take in order to produce and provide clients with goods or services (Davicik & Sharma, 2016). Businesses can develop a distinct and effective workflow that provides them with a competitive advantage by recognizing and maximizing each phase in the value chain (Huo, Qi, Wang & Zhao, 2014). Companies can employ a variety of tactics to gain a competitive edge. One is cost leadership, which entails looking for ways to cut expenses so that customers can pay less (Mellat-Parast & Spillan, 2014). Another strategy is differentiation, which entails providing special goods or services that clients value and are prepared to pay more for (Otchere, Annan & Anin, 2013).

Innovation can also help businesses gain a competitive edge because they can outsmart rivals by consistently launching new, improved goods and services (Munizu, Pono & Alam, 2019). It is crucial to remember that a competitiveness can be eroded over time and is not always present. To stay competitive, businesses must constantly look for new ways to add value and set themselves apart (Koçoğlu *et al.*, 2011). In the quickly evolving business environment of today, where technological advances and market trends can quickly emerge and disrupt firmly established industries, this can be especially difficult (Hosseini, Azizi & Sheikhi, 2012). In other terms, a competitive advantage is discovered when the operations of a given company are more profitable than those of its competitors in the market or when they are more profitable than those of its competitors in terms of other important outcomes (Vargas, Mantilla & de Sousa Jabbour, 2018), like, for example, market share, product quality, or technical development. Many companies are necessarily unable to reach those specified requirements (Marinagi, Trivellas & Sakas, 2014). This means ascribing attributes of differentiation and inherent superiority to competitive benefits. They can therefore be viewed as, for now, not allowing for the accomplishment of objectives, i.e., the achievement of defined strategic goals.

## 2.6. Functional integration

Positive effects of integration have been observed across functional areas on both delivery reliability as well as speed, considering the value of internal integration (Schoenherr & Swink, 2012). Internal integration breaks down functional barriers and engenders collaboration, which forms the basis for organizing the flow of information through functions (Jonsson, Andersson, Boon-itt, & Wong,

2011). An organization with a high degree of internal integration would also be able to guarantee on-time output. Rather, empirical surveys found that a failure to combine operational and logistic functions would result in poor delivery efficiency (He *et al.*, 2014). In addition, the product design and development literature found that to achieve desirable time-to-market and cycle time efficiency, internal integration is necessary. According to Cheruiyot (2018), attaining supply chain integration is largely dependent on internal integration, which in turn improves performance for the business. According to their argument, a company with high degrees of internal integration includes well-established policies, practices, and strong bonds amongst its departments. These procedures assist the company's staff in making greater use of outside information acquired through external integration. According to Muricho and Muli (2021), a significant barrier to completely integrating information along with material flows throughout the supply chain network is the organization's inadequate internal management systems. For instance, the absence of established operational procedures, disjointed information flows, along with a lack of system integration among the many information systems employed by the company.

Functional integration offers quick access to key operating data from the centralized database, a highly integrated information system connected to various internal departments of an enterprise, access to inventory information across the supply chain (Liu, Shah, & Schroeder, 2012), real-time retrieval of inventory status, use of a computer-based marketing and manufacturing planning system, and a high degree of integration of information systems for manufacturing processes (Turkulainen & Ketokivi, 2012). Internal integration is defined as organizational practices that integrate and improve internal resources and information in order to foster knowledge sharing outside of individual roles or divisions, to support external integration initiatives, and to achieve organizational goals (Foerstl *et al.*, 2013). In fact, internal performance is the degree to which the producer collaboratively builds its systems, facilities, and strategies to collaborate successfully with suppliers and meet consumer needs (Kim & Schoenherr, 2018). The efficiency and internal integration of an organization can be improved by joint planning, functional collaboration, and knowledge sharing, including teamwork to improve consistency of deliveries on schedule and also meet customer requirements (Thun, 2010). In addition, internal integration involves how a manufacturing organization forms its policies, strategies, and long-term plans into structured and continuous processes to meet consumer needs and negotiate effectively with suppliers (Flynn, Huo, & Zhao, 2010). The goal of internal integration is to promote the movement of goods, resources, capital, and knowledge in order to provide fast and low-cost customers with the most value.

Hypothesis: **H<sub>01</sub>**: *Functional integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

## 2.7. Supplier integration

Supplier integration will benefit producers by reducing business risks through joint R&D or joint technology investment; reducing inventories through the sharing of sales estimates or production schedules (So & Sun, 2010); improving product quality and expertise through co-designing goods; and establishing long-term relationships that will lead to more reliable supply prices (Narasimhan, Swink, & Viswanathan, 2010). Integration of suppliers includes the integration of business processes between producers and suppliers through the use of IT applications, which are transactional with e-business systems-supported planning and operations (Danese & Romano, 2011), include knowledge sharing in decision synchronization achievement, and contractually cooperate with selected risk-sharing suppliers. In order to give the company insights into supplier operations, competence, along with challenges, supplier integration entails sharing data and coordinating of activities with key suppliers (Omondi, 2022). This allows for enhanced transaction scheduling, improved design of products and processes, and more effective planning and forecasting. Wambua (2021) asserts that integration-supporting techniques have made information exchange possible. Such technologies include web-based integration systems, supply chain optimization (SCO) software, ERP systems, and electronic data interchange (EDI) technology. The growth of supplier relationships, cross-functional participation, and collaborative problem resolution have made coordination possible. In accordance to the RBV theory, these mechanisms lead to capability development, which in turn generates organizational resources that offer the organization a competitive edge (Cheruiyot, 2018).

Creating partnerships involving suppliers helps them comprehend the company more thoroughly and be able to foresee its needs. The firm develops plans for manufacturing and produces items on schedule thanks to the interchange of knowledge about products, which improves the product's delivery efficiency (Njagi & Muli 2020). The organizational ability to adapt to changing surroundings is made possible by the relational linkages that knowledge-based integration creates. Due to better communication and coordination, supplier integration generally lowers transaction costs. As more information becomes available, it also facilitates quick decision-making (Mideva & Moronge, 2019). The establishment of cross-functional teams, in accordance with the RBV theory, encourages knowledge transmission between firms that could not otherwise be easily communicated, thereby boosting collaborative problem-solving abilities (Wambua, 2021). Based on the relationships fostered by resource integration, this enables the company to develop goods and services of greater quality and that are more flexible and responsive to consumer needs. As such, the critical role of supplier integration in differentiating businesses, creating competitive advantage, and enhancing overall SC efficiency has been empirically demonstrated by several researchers (Amin & Zhang, 2012). Therefore, there is a strong positive link between membership in the Toyota supplier association and the efficiency of suppliers. Honda, a Japanese automaker, requires that suppliers be examined firsthand by managers at all levels, all the way up to their presidents, to better understand them (Lee, Kwon, & Severance, 2007).

Hypothesis: **H<sub>02</sub>**: *Supplier integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

## 2.8. Customer integration

The linkage of the consumer to the supply chain is a subject matter that is gaining traction among practitioners and academics alike (Stevens & Johnson, 2016). These supply chains must restructure themselves in much more adaptable and tightly integrated structures as the accelerated rate of change keeps increasing and greater tiers of volatility, global economic integration, new competition, and much more demanding consumers challenge a company's positional play (Christopher, 2016). Throughout the 2000s, numerous researchers began to consciously embrace the core idea of consumer integration into supply chains, so by the early 21st century, both academics and professionals recognized customers' active role in supply chain processes (Martinelli & Tunisini, 2018). As a consequence, the customer-centric model was unavoidable. Consumers were viewed as both the activators and the quintessential end point of the SC's systems (Potter, Towill, & Christopher, 2015). As a result, investigators in the 2010s emphasized the importance of CDSC competing globally. Because of today's incredible variety as well as variability, specialists emphasized the requirement for a truly innovative supply chain framework that could incorporate consumer integration: the Customer Centric SC (Potter, Towill, & Christopher, 2015). This evolving approach is thought to be more capable of dealing with the altered business setting as well as actively involving the consumer in the supply chains. The framework is inextricably linked to the current services marketing operation (Grönroos & Voima, 2013), as well as the customer is acknowledged as an active participant in these supply chains (Mihardjo, Sasmoko, Alamsyah & Elidjen, 2020). The consumer has control over when, how, and where he or she accesses the product or service (Fattahi, Govindan, & Keyvanshokoo, 2017).

The company's increasing client interaction gives it the ability to improve items and alter them to meet customer needs. The enhancement of communication and trust between businesses and their clients is made possible by the long-term partnerships that TCE and SET support. By improving governance and lowering opportunism, the organization is able to lower the cost of transactions (Cheruiyot, 2021). Coordination, workflow synchronization, and information exchange are essential components of customer integration (Wambua, 2021). These activities boost supply chain performance, enable timely delivery of services, and enhance satisfaction among consumers. Due to fast information interchange, which enables the business to adapt to changes in consumer needs, flexibility is also improved (Njagi & Muli, 2020). First, it can help manufacturing firms, especially in markets with increased uncertainties, secure the distribution channels of their goods (Ashenbaum & Maltz, 2017). Second, in the supply chain, it can provide a way to manage productivity gains and cost savings (Ashenbaum & Maltz, 2017). Third, in relation to broad new revenue streams, downstream markets can deliver major advantages (Ashenbaum & Maltz, 2017). Manufacturers have to broaden their concentration from continuous improvement to consumer allegiance and reconsider the significance of

vertical integration in order to capture the value downstream (Guan & Rehme, 2012). An unintegrated business is one in which the divisions or departments are not integrated and each has its own information system separate from the others (Misund, 2016). As a prerequisite for external integration, internal or functional integration has also been postulated.

Hypothesis: **H<sub>03</sub>**: *Customer integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

## 2.9. Technology integration

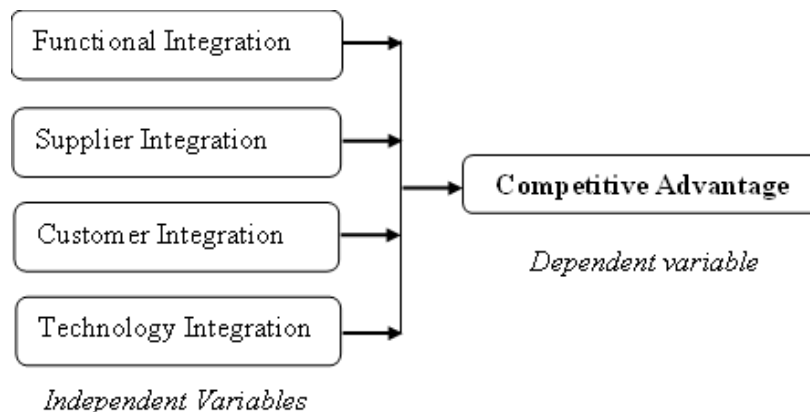
Different types of innovations have been implemented by various members of the supply chain over the years (Domański, & Gwosdz, 2009). When matched with the strategic objectives of the business, each technology offers the greatest potential for enhancing organizational efficiency and overall company performance (Naway & Rahmat, 2019). Simply put, logistics technology can be described as technology used to enhance the supply chain channel's efficiency, routine operations, and logistical activities (Prajogo & Olhager, 2012). Routine operations handle inventory and ability control, while productivity requires optimization. Although technologies are usually designed to save labor and inventory costs, in incorporating supply chain operations technology, there is a clear reliance on supply chain management techniques (Yee & Oh, 2012). ERP system capabilities have expanded in recent years to include marketing automation, e-commerce, distribution, and supply chain systems (Georgise, Thoben & Seifert, 2014). Currently, the main ERP system applications include financial applications, human resources applications, and manufacturing applications that have various functionalities (Birasnav & Bienstock, 2019). The ERP framework can handle various functional fields, such as sales, receivable accounts, payable accounts, engineering, inventory control, manufacturing, procurement, quality management, human resources, manufacturing, and logistics planning (Francisco & Swanson, 2018). Basically, from the above-mentioned functional area as well as within the entire supply chain of the organization, the ERP system is capable of integrating, optimizing, and organizing the physical, cash, and information flows (Farooq & O'Brien, 2012). Several ERP system modules have various features and support various company functions such as production, inventory management, staff management, storage management, financial management system, marketing, as well as order processing (Chan & Chong, 2013).

Companies should integrate all diverse functions into the ERP framework, standardize and manage the exchange of knowledge across their entire departments, and then expand it to suppliers and customers in order for suppliers to speed up the distribution of required raw materials and for customers to place orders faster and easier (Shatat & Udin, 2012). Consequently, there are many success stories suggesting that logistics and supply chain integration will boost and enhance the supply chain's efficiency to be successful and competitive in the global business climate (Banerjee, 2018). In addition, Oghazi *et al.*, (2018) found out that ERP device investment increases efficiency and organizational performance and competitiveness. Forslund and Jonsson (2010), found that, within the supply chain, the ERP system is able to enhance operational efficiency. Kandananond (2014), concluded that SCM has long been supported by the ERP method.

Hypothesis: **H<sub>04</sub>**: *Technology integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

## 2.10. Conceptual framework

Figure 1: Conceptual framework



## 3. Methodology

The research followed a cross-section survey design. Kothari (2017) noted that a cross-sectional survey design assists in formulating hypotheses and testing the relationship analysis among study variables. The choice of this design is suitable for this study since it makes use of a questionnaire as a data collection tool. The population of this study was 270 food and beverage manufacturing firms in Kenya (KAM, 2020). The sampling frame for this study was a list of managers working in operations, logistics and supply chain functions. Two-stage sampling was used by the study. In the first stage, cluster random sampling was used to select 73 food and beverages manufacturing firms from a list of 270 companies with the aid of the Nassiuma formula (2000). In the second stage, purposive sampling was used to select two participants from each of the participating organization. Thus, the sample size of the study was 146 respondents from 73 food and beverage manufacturing firms in Kenya. Primary data was obtained by means of research questionnaires. For secondary data collection, the study utilized document analysis. Data collection was carried out using the drop and pick method as well as mailing questionnaires. Inferential analysis focusing on correlation analysis, and regression analysis were done. The results were summarized in this analysis using tables.

## 4. Results

### 4.1. Correlation analysis findings

The correlation between supply chain integration and the competitive advantage of food and beverage manufacturing firms in Kenya, was examined using the Pearson product-moment correlation coefficient. There was positive correlation between the dependent and the set of independent and moderating variables ( $r > .3$ ,  $p < .001$  in all cases). The strength of the relationship between the independent variables [supply chain integration elements of functional integration, supplier integration, customer integration, and technology integration], and the dependent variable (competitive advantage of food and beverage manufacturing firms) was strong. This was shown by functional integration ( $r = 0.991$ , large), supplier integration ( $r = 0.541$ , large), customer integration ( $r = 0.363$ , moderate), and technology integration ( $r = 0.647$ , large). These findings are presented in Table 1.

**Table 1: Supply chain integration and competitive advantage Pearson product-moment correlations**

Study Variables		Competitive Advantage	Functional Integration	Supplier Integration	Customer Integration	Technology Integration
<b>Competitive Advantage</b>	Pearson Correlation	1				
	Sig. (2-tailed)					
	N					
<b>Functional Integration</b>	Pearson Correlation	.991**	1			
	Sig. (2-tailed)	.000				
	N	139				
<b>Supplier Integration</b>	Pearson Correlation	.541**	.469**	1		
	Sig. (2-tailed)	.000	.000			
	N	139	139			
<b>Customer Integration</b>	Pearson Correlation	.363**	.338**	.346**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	139	139	139		
<b>Technology Integration</b>	Pearson Correlation	.647**	.217**	.410**	.498**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	139	139	139	139	

\*\* . Correlation is significant at the 0.01 level (2-tailed)

*Hypothesis: H<sub>01</sub>: Functional integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

The results presented in table 2 reveal a strong positive relationship between functional integration and competitive advantage ( $R = 0.991$ ,  $R^2 = 0.981$ ). This implies that functional integration could partially account for 98.1 percent of the variation in the competitive advantage of food and beverage manufacturing firms in Kenya, as indicated by a  $R^2$  of .981.

**Table 2: Functional integration model summary**

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.991 <sup>a</sup>	.981	.981	.12288

a. Predictor (Constant), Functional Integration

The results presented in Table 3 indicate an F-ratio of 7203.647, accompanied by a P value of 0.000, which is less than 0.05 in Model 1. The regression model employed in the study demonstrates a high degree of goodness of fit.

**Table 3: Functional integration ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	108.775	1	108.775	7203.647	.000 <sup>a</sup>
	Residual	2.069	137	.015		
	Total	110.843	138			

a. Predictors: (Constant), Functional Integration

b. Dependent Variable: Competitive Advantage

Table 4 below presents the significance of test results with respect to functional integration and competitive advantage. The findings from Model 1 indicated a significant positive relationship between functional integration and competitive advantage ( $b_1 = 1.042$ ,  $p = .000$ ,  $\beta = 0.991$ ). It is predicted that for every unit improvement in functional integration, competitive advantage will increase by 1.042. This suggests that food and beverage manufacturing companies build a competitive edge when functional integration is increased. The null hypothesis that functional integration did not have a significant effect

on the competitive advantage of Kenyan food and beverage manufacturing firms was rejected at the 95 percent significance level.

$$\text{Competitive Advantage} = -0.014 + 1.042\text{Functional Integration} + 0.012 \quad (\text{i})$$

**Table 4: Functional integration significance of test results**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.014	.044		-.308	.758
	Functional Integration	1.042	.012	.991	84.874	.000

a. Dependent Variable: Competitive Advantage

b. Predictor Variable: Functional Integration

*Hypothesis: H<sub>02</sub>: Supplier integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

In table 5, the results of Model 1 indicated a positive significant relationship between supplier integration and competitive advantage ( $R = 0.541$ ,  $R^2 = 0.293$ ). The study implies that supplier integration accounts for 29.3 percent of the variation in the competitive advantage of Kenyan food and beverage manufacturing firms, as shown by an  $R^2$  of 0.293.

**Table 5: Supplier integration model summary**

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.541 <sup>a</sup>	.293	.288	.75620

a. Predictor (Constant), Supplier Integration

The findings presented in table 6 indicate that the F-ratio for Model 1 was 56.836, along with a P value of 0.000, which is less than 0.05. This suggests that the regression model utilized in the study demonstrates a strong goodness of fit.

**Table 6: Supplier integration ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	32.501	1	32.501	56.836	.000 <sup>a</sup>
	Residual	78.342	137	.572		
	Total	110.843	138			

a. Predictors: (Constant), Supplier Integration

b. Dependent Variable: Competitive Advantage

Table 7 presents the significance of test results about supplier integration and competitive advantage. Model 1 results indicated a significant and positive relationship between supplier integration and competitive advantage ( $b_1 = 0.730$ ,  $p = 0.000$ ,  $\beta = .541$ ). The competitive advantage is expected to increase by 0.541 for each unit increase in supplier integration. This suggested that as supplier integration improved, food and beverage manufacturers would gain a competitive edge. At the 95% level of significance, the null hypothesis that supplier integration had no significant effect on the competitive advantage of Kenyan food and beverage manufacturing firms was rejected.

$$\text{Competitive Advantage} = 1.290 + 0.730\text{Supplier Integration} + 0.097 \quad (\text{ii})$$

**Table 7: Supplier integration significance of test results**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.290	.317		4.074	.000
	Supplier Integration	.730	.097	.541	7.539	.000

a. Dependent Variable: Competitive Advantage

b. Predictor Variable: Supplier Integration

*Hypothesis: H<sub>03</sub>: Customer integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

In table 8, the findings from Model 1 indicate a significant positive relationship between customer integration and competitive advantage ( $R = 0.363$ ,  $R^2 = 0.132$ ). Customer integration contributed 13.2% to the variation in competitive advantage among Kenyan food and beverage manufacturing firms, as indicated by a  $R^2$  coefficient of 0.132.

**Table 8: Customer integration model summary**

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.363 <sup>a</sup>	.132	.125	.83825

a. Predictor (Constant), Customer Integration

The findings presented in table 9 indicate that the F-ratio for Model 1 was 110.233, along with a P value of 0.000, which is less than 0.05. This suggests that the regression model utilized in the study reveals a strong goodness of fit.

**Table 9: Customer integration ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14.578	1	14.578	110.233	.000 <sup>a</sup>
	Residual	96.265	137	.703		
	<b>Total</b>	<b>110.843</b>	<b>138</b>			

a. Predictor: (Constant), Customer Integration

b. Dependent Variable: Competitive Advantage

Table 10 presents the significance of the results pertaining to customer integration and competitive advantage. Model 1 demonstrated a positive and statistically significant relationship between customer integration and competitive advantage ( $b_1 = 0.359$ ,  $p = 0.000$ ,  $\beta = 0.363$ ). Equation *iii* illustrates the regression equation for model 1, indicating a 0.359 increase in competitive advantage for each unit rise in customer integration. This suggests that enhanced customer integration will give food and beverage manufacturing firms with a competitive edge. The null hypothesis, which states that there is no significant effect of customer integration on the competitive advantage of food and beverage manufacturing enterprises in Kenya, was rejected at the 95 percent significance level.

$$\text{Competitive Advantage} = 2.352 + 0.359\text{Customer Integration} + 0.079 \quad (\text{iii})$$

**Table 10: Customer integration significance of test results**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.352	.289		8.144	.000
	Customer Integration	.359	.079	.363	4.555	.000

a. Dependent Variable: Competitive Advantage

b. Predictor Variable: Customer Integration

*Hypothesis: H<sub>04</sub>: Technology integration has no positive significant effect on competitive advantage of Kenyan food and beverage manufacturing firms in Kenya.*

The findings of Model 1 of table 11 indicate a significant positive relationship between technology integration and competitive advantage ( $R = 0.647$ ,  $R^2 = 0.419$ ). Technology integration accounts for 41.9% of the variation in the competitive advantage of Kenyan food and beverage manufacturing firms, as indicated by an  $R^2$  value of 0.419.

**Table 11: Technology integration model summary**

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.647 <sup>a</sup>	.419	.415	.89844

a. Predictor (Constant), Technology Integration (TI)

The findings presented in table 12 indicate an F-ratio of 18.800, accompanied by a P value of 0.000, which is less than 0.05 in Model 1. This suggests that the regression model utilized in the study demonstrates a strong goodness of fit.

**Table 12: Technology integration ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.258	1	.258	18.800	.000 <sup>a</sup>
	Residual	119.585	137	.807		
	Total	110.843	138			

a. Predictors: (Constant), Technology Integration

b. Dependent Variable: Competitive Advantage

Table 13 illustrates the significance of test findings for technology integration and competitive advantage. Model 1 found a significant and positive relationship between technology integration and competitive advantage ( $b_1 = 0.580$ ,  $p = 0.000$ ,  $\beta = 0.647$ ). Equation *iv* depicts the regression equation for model 1, which forecasts a 0.580 increase in competitive advantage for each unit associated with technology integration. The argument holds that when technological integration improves, food and beverage manufacturers acquire a competitive edge. At the 95% confidence level, the null hypothesis that technology integration has no significant effect on competitive advantage was rejected.

$$\text{Competitive Advantage} = 2.432 + 0.580\text{Technology Integration} + 0.062 \quad (\text{iv})$$

**Table 13: Technology integration significance of test results**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	3.478	.274		12.687	.000
	Technology Integration	.580	.062	.647	8.848	.000

a. Dependent Variable: Competitive Advantage

b. Predictor Variable: Technology Integration

## 4.2. Overall regression findings

*Hypotheses H<sub>05</sub>: Supply chain integration has no positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya.*

Model 1 revealed that supply chain integration and competitive advantage have a positive significant association ( $R = 0.658$ ,  $R^2 = 0.433$ ). As the outcome, model 1's coefficient of determination ( $R^2$ ) was 0.433, suggesting that the independent variables [supply chain integration components of functional integration, supplier integration, customer integration, and technology integration] are able to account for 43.3% of the variability in competitive advantage in Kenyan food and beverages manufacturing firms. Consequently, supply chain integration explains 44.3 percent of the

variation in competitive advantage in addition to the variances explained by the other independent variables, with an  $R^2$  change of 0.443.

**Table 14: Overall model summary**

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.658 <sup>a</sup>	.433	.429	.07867

a. Predictor (Constant), Functional Integration, Supplier Integration, Customer Integration and Technology Integration

With a P value of .000 = .05 in Model 1, the F-ratio revealed in Table 15 to be 4443.654. This suggests that the degree of goodness of fit of the examined regression model was quite satisfactory.

**Table 15: Overall ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	110.014	4	27.503	4443.754	.000 <sup>a</sup>
	Residual	.829	134	.006		
	Total	110.843	138			

a. Predictors: (Constant), Functional Integration, Supplier Integration, Customer Integration, Technology Integration

b. Dependent Variable: Competitive Advantage

Table 16 shows the overall significance of test results featuring the independent (supply chain integration) variables and dependent (competitive advantage) variable. At the 95 percent level of significance, the relationship between all explanatory factors was positive and statistically significant. The results were validated by standard p-values of less than 0.05.

**Table 16: Overall significance of test results**

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	T	
1	(Constant)	.179	.035		5.106	.000
	Functional Integration	1.010	.012	.960	85.201	.000
	Supplier Integration	.472	.021	.372	2.470	.003
	Customer Integration	.132	.014	.133	9.336	.000
	Technology Integration	.189	.016	.183	11.713	.000

a. Dependent Variable: Competitive Advantage CA

#### 4.3. Findings on testing of hypotheses

The findings on testing of hypotheses are as shown in table 17.

**Table 17: Hypotheses testing results**

Hypotheses	Decision Rule	P - Value	Deduction
<b>H<sub>01</sub></b> : Functional integration has no positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya. <b>H<sub>a1</sub></b> : Functional integration has a positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya.	If the $P \leq 0.05$ , we reject $H_{01}$ and accept $H_{a1}$	0.000	Reject $H_{01}$ <b>Accept <math>H_{a1}</math></b>
<b>H<sub>02</sub></b> : Supplier integration has no positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya. <b>H<sub>a2</sub></b> : Supplier integration has a positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya.	If the $P \leq 0.05$ , we reject $H_{02}$ and accept $H_{a2}$	0.003	Reject $H_{02}$ <b>Accept <math>H_{a2}</math></b>
<b>H<sub>03</sub></b> : Customer integration has no positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya. <b>H<sub>a3</sub></b> : Customer integration has a positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya.	If the $P \leq 0.05$ , we reject $H_{03}$ and accept $H_{a3}$	0.000	Reject $H_{03}$ <b>Accept <math>H_{a3}</math></b>
<b>H<sub>04</sub></b> : Technology integration has no positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya. <b>H<sub>a4</sub></b> : Technology integration has a positive significant effect on the competitive advantage of food and beverage manufacturing firms in Kenya.	If the $P \leq 0.05$ , we reject $H_{04}$ and accept $H_{a4}$	0.000	Reject $H_{04}$ <b>Accept <math>H_{a4}</math></b>

## 5. Conclusion

This study investigated the relationship between supply chain integration practices and competitive advantage in Kenyan food and beverage manufacturing firms. The research findings indicate positive significant correlations between functional integration, supplier integration, customer integration, and technology integration with the competitive advantage of the sampled firms.

From a practical perspective, these results suggest that food and beverage manufacturers in Kenya can enhance their competitive advantage by strategically implementing supply chain integration practices. Managers should focus on improving internal functional integration, strengthening relationships with suppliers and customers, and leveraging technology to streamline supply chain processes.

From a scientific standpoint, this study contributes to the growing body of literature on supply chain integration in emerging markets. It extends the application of systems theory, resource-based view, social exchange theory, and relational exchange theory to the Kenyan context, providing empirical evidence of their relevance in understanding supply chain dynamics in developing economies.

The research addresses the initial hypotheses by demonstrating the positive impact of various integration practices on competitive advantage. However, it's important to acknowledge the study's limitations, including its focus on a single industry in one country, which may limit generalizability. Future research could explore these relationships in other sectors or countries, or investigate the long-term effects of supply chain integration on firm performance.

In conclusion, this study underscores the importance of supply chain integration for competitive advantage in the Kenyan food and beverage manufacturing sector. As firms in emerging markets continue to face intense competition, embracing comprehensive supply chain integration strategies may be crucial for sustainable success.

## 6. Recommendations

The study recommends the implementation of the facets of supply chain integration in the order of functional integration, supplier integration, customer integration, and technology integration to the food and beverage manufacturing firm in Kenya, which might not have implemented fully. Further, the study recommends that the food and beverage industry regulators devise policies that would allow food and beverage manufacturers to integrate supply chains and thus help avoid losses that impact the efficiency of these businesses and eventually the economy as a whole. The study suggests that the government takes a more systematic approach to ensuring the growth and development of supply chain integration in Kenyan food and beverage manufacturing firms in order to maintain a competitive edge with the support of supply chain adaptability. Although the findings of the study bring us closer to the reality of supply chain integration, supply chain adaptability, and the competitive advantage of food and beverage manufacturing firms in Kenya, the complexity of their implementation remains ambiguous. The study narrowed to a literature review exclusively suggesting functional integration, supplier integration, customer integration, and technology integration, plus the constructs and theories supporting these variables. As a result, empirical research that essentially validates the complete integration of a supply chain goes beyond the reach of each of the four constructs defined in the study. For this reason, there is a need for a deeper dissection to help obtain more information to help comprehend the rationale of supply chain integration facets beyond the four constructs reviewed in the literature, including relationship integration, measurement integration, material integration, and service integration.

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## Conflicts of Interest

The author declares no conflict of interest.

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## References

- Abdulrahman, M. D., Gunasekaran, A., & Subramanian, N. (2014). Critical barriers in implementing reverse logistics in the Chinese manufacturing sectors. *International Journal of Production Economics*, 147, 460-471. <https://doi.org/10.1016/j.ijpe.2012.08.003>
- Amin, S. H., & Zhang, G. (2012). An integrated model for closed-loop supply chain configuration and supplier selection: multi-objective approach. *Expert Systems with Applications*, 39(8), 6782-6791. <https://doi.org/10.1016/j.eswa.2011.12.056>
- Aris, S. R. S., Arshad, N. H., & Mohamed, A. (2009). IT Outsourcing: An Exploratory Study Based on Transaction Cost Theory, Relational Exchange Theory and Agent Theory. *WSEAS Transactions on Information Science and Applications*, 6(6), 895-905.
- Ashenbaum, B., & Maltz, A. (2017). Purchasing-logistics integration and supplier performance: An information-processing view. *The International Journal of Logistics Management*. 28(2), 379-397. <https://doi.org/10.1108/IJLM-07-2014-0113>
- Banerjee, A. (2018). Blockchain technology: supply chain insights from ERP. In *Advances in computers* (Vol. 111, pp. 69-98). Elsevier. <https://doi.org/10.1016/bs.adcom.2018.03.007>
- Barratt, M., & Oke, A. (2007). Antecedents of supply chain visibility in retail supply chains: a resource-based theory perspective. *Journal of operations management*, 25(6), 1217-1233. <https://doi.org/10.1016/j.jom.2007.01.003>
- Birasnav, M., & Bienstock, J. (2019). Supply chain integration, advanced manufacturing technology, and strategic leadership: An empirical study. *Computers & Industrial Engineering*, 130, 142-157. <https://doi.org/10.1016/j.cie.2019.01.021>
- Blackhurst, J., Dunn, K. S., & Craighead, C. W. (2011). An empirically derived framework of global supply resiliency. *Journal of business logistics*, 32(4), 374-391. <https://doi.org/10.1111/j.0000-0000.2011.01032.x>
- Blau, P. M. (1964). Social exchange theory. Retrieved September, 3(2007), 62.
- Bueno, F. C., de Toledo, J. C., & da Silva, S. L. (2020). The role of DFMEA in the integration between product development and quality engineering: cases in large companies. *Product: Management and Development*, 17(2), 85-95. <https://doi.org/10.4322/pmd.2019.009>
- Busser, J. A., Shulga, L. V., & Kang, H. J. A. (2019). Customer disposition to social exchange in Co-innovation. *International Journal of Hospitality Management*, 76, 299-307. <https://doi.org/10.1016/j.ijhm.2018.05.018>
- Capron, L., Dussauge, P., & Mitchell, W. (1998). Resource redeployment following horizontal acquisitions in Europe and North America, 1988-1992. *Strategic management journal*, 19(7), 631-661. <https://doi.org/10.1016/j.ijhm.2018.05.018>
- Chan, F. T., & Chong, A. Y. L. (2013). Determinants of mobile supply chain management system diffusion: a structural equation analysis of manufacturing firms. *International Journal of Production Research*, 51(4), 1196-1213. <https://doi.org/10.1016/j.ijhm.2018.05.018>
- Chen, X., Wang, X., & Chan, H. K. (2017). Manufacturer and retailer coordination for environmental and economic competitiveness: A power perspective. *Transportation Research Part E: Logistics and Transportation Review*, 97, 268-281. <https://doi.org/10.1016/j.tre.2016.11.007>

- Cheruiyot, F. (2021). *Supply Chain Integration and Operational Performance of Pharmaceutical Manufacturers in Nairobi* (Doctoral dissertation, University of Nairobi).
- Cheruiyot, F. C. (2018). *The Effect of supply chain integration on operational performance of manufacturing organizations in Kenya* (Doctoral dissertation, Strathmore University).
- Chin, T. A., Hamid, A. B. A., Raslic, A., & Heng, L. H. (2014). The impact of supply chain integration on operational capability in Malaysian manufacturers. *Procedia-Social and Behavioral Sciences*, 130, 257-265. <https://doi.org/10.1016/j.sbspro.2014.04.030>
- Chinomona, R. (2013). The fostering role of information technology on SMEs' strategic purchasing, logistics integration and business performance. *Southern African Business Review*, 17(1), 76-97.
- Chinomona, R., & Poee, R. I. (2013). The influence of logistics integration on information sharing and business performance: The case of small and medium enterprises in South Africa. *Journal of Transport and Supply Chain Management*, 7(1), 1-9. <https://doi.org/10.4102/jtscm.v7i1.92>
- Chou, S. W., & Hsu, C. S. (2016). Understanding online repurchase intention: social exchange theory and shopping habit. *Information Systems and e-Business Management*, 14, 19-45. <https://doi.org/10.1007/s10257-015-0272-9>
- Christopher, M. (2016). *Logistics & supply chain management*. Pearson Uk.
- Cook, K. S., Cheshire, C., Rice, E. R., & Nakagawa, S. (2013). Social exchange theory. In *Handbook of social psychology*. Springer, Dordrecht. [https://doi.org/10.1007/978-94-007-6772-0\\_3](https://doi.org/10.1007/978-94-007-6772-0_3)
- Cortez, R. M., & Johnston, W. J. (2020). The Coronavirus crisis in B2B settings: Crisis uniqueness and managerial implications based on social exchange theory. *Industrial Marketing Management*, 88, 125-135. <https://doi.org/10.1016/j.indmarman.2020.05.004>
- Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals*, 11(1), 479-516. <https://doi.org/10.1016/j.indmarman.2020.05.004>
- Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of management annals*, 11(1), 479-516. <https://doi.org/10.5465/annals.2015.0099>
- Danese, P., & Romano, P. (2011). Supply chain integration and efficiency performance: a study on the interactions between customer and supplier integration. *Supply Chain Management: An International Journal*. 16(4), 220-230. <https://doi.org/10.1108/13598541111139044>
- Das, A., Narasimhan, R., & Talluri, S. (2006). Supplier integration—finding an optimal configuration. *Journal of Operations Management*, 24(5), 563-582. <https://doi.org/10.1016/j.jom.2005.09.003>
- Davcik, N. S., & Sharma, P. (2016). Marketing resources, performance, and competitive advantage: A review and future research directions. *Journal of Business Research*, 69(12), 5547-5552. <https://doi.org/10.1016/j.jbusres.2016.04.169>
- Davis-Sramek, B., Hopkins, C. D., Richey, R. G., & Morgan, T. R. (2020). Leveraging supplier relationships for sustainable supply chain management: insights from social exchange theory. *International Journal of Logistics Research and Applications*, 1-18. <https://doi.org/10.1080/13675567.2020.1797654>
- Defee, C. C., Williams, B., Randall, W. S., & Thomas, R. (2010). An inventory of theory in logistics and SCM research. *The International Journal of Logistics Management*. 21(3), 404-489. <https://doi.org/10.1108/09574091011089817>
- Domański, B., & Gwosdz, K. (2009). Toward a more embedded production system? Automotive supply networks and localized capabilities in Poland. *Growth and Change*, 40(3), 452-482. <https://doi.org/10.1111/j.1468-2257.2009.00490.x>
- Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of management review*, 23(4), 660-679. <https://doi.org/10.2307/259056>

- Farooq, S., & O'Brien, C. (2012). A technology selection framework for integrating manufacturing within a supply chain. *International Journal of Production Research*, 50(11), 2987-3010. <https://doi.org/10.1080/00207543.2011.588265>
- Fatorachian, H., & Kazemi, H. (2018). A critical investigation of Industry 4.0 in manufacturing: theoretical operationalisation framework. *Production Planning & Control*, 29(8), 633-644.
- Nilsson, F., & Gammelgaard, B. (2012). Moving beyond the systems approach in SCM and logistics research. *International Journal of Physical Distribution & Logistics Management*. 42(8/9), 764-783. <https://doi.org/10.1108/09600031211269749>
- Fattahi, M., Govindan, K., & Keyvanshokoo, E. (2017). Responsive and resilient supply chain network design under operational and disruption risks with delivery lead-time sensitive customers. *Transportation research part E: Logistics and transportation review*, 101, 176-200. <https://doi.org/10.1016/j.tre.2017.02.004>
- Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of operations management*, 28(1), 58-71. <https://doi.org/10.1016/j.tre.2017.02.004>
- Foerstl, K., Hartmann, E., Wynstra, F., & Moser, R. (2013). Cross-functional integration and functional coordination in purchasing and supply management. *International Journal of Operations & Production Management*. 33(6), 689-721. <https://doi.org/10.1108/IJOPM-09-2011-0349>
- Forslund, H., & Jonsson, P. (2010). Selection, implementation and use of ERP systems for supply chain performance management. *Industrial Management & Data Systems*, 110(8), 1159-1175. <https://doi.org/10.1108/02635571011077816>
- Francis, G. H., & Waiganjo, E. (2014). Role of supply chain practices on customer satisfaction in the printing industry in Kenya: A case study of Morven Kester East Africa limited. *International Journal of Academic Research in Business and Social Sciences*, 4(10), 128. <https://doi.org/10.6007/IJARBSS/v4-i10/1213>
- Francisco, K., & Swanson, D. (2018). The supply chain has no clothes: Technology adoption of blockchain for supply chain transparency. *Logistics*, 2(1), 2. <https://doi.org/10.6007/IJARBSS/v4-i10/1213>
- Gelagay, D. A. (2018). Challenges of Supply Chain Integration: The Case of Soap and Detergent Manufacturing Companies in Ethiopia. *Global Journal of Management and Business Research*.
- Georgise, F. B., Klause-Dieter, T., & Seifert, M. (2014). Integrating developing country manufacturing industries into global supply chain. *Journal of Industrial Engineering and Management*, 7(1). <https://doi.org/10.1155/2014/251982>
- Georgise, F. B., Thoben, K. D., & Seifert, M. (2014). Supply chain integration in the manufacturing firms in developing country: An Ethiopian case study. *Journal of Industrial Engineering*, 2014. <https://doi.org/10.1155/2014/251982>
- Getahun, S. S. (2012). Investigation on the Effect of Supply Chain Integration on Ethiopian Garment Industry" s Performance. *Addis Ababa: Addis Ababa University*.
- Gottschalk, P., & Solli-Sæther, H. (2005). Critical success factors from IT outsourcing theories: an empirical study. *Industrial Management & Data Systems*. 105(6), 685-702. <https://doi.org/10.1108/02635570510606941>
- Grönroos, C., & Voima, P. (2013). Critical service logic: making sense of value creation and co-creation. *Journal of the academy of marketing science*, 41(2), 133-150. <https://doi.org/10.1108/02635570510606941>
- Guan, W., & Rehme, J. (2012). Vertical integration in supply chains: driving forces and consequences for a manufacturer's downstream integration. *Supply chain management: An international Journal*. 17(2), 187-201. <https://doi.org/10.1108/02635570510606941>
- Guerrero, P., K. Lucenti, and S. Galarza. (2010). *Trade Logistics and Regional Integration in Latin America and the Caribbean*. ADBI Working Paper 233. Tokyo: Asian Development Bank Institute. <https://doi.org/10.2139/ssrn.1654307>

- Han, J. H., Wang, Y., & Naim, M. (2017). Reconceptualization of information technology flexibility for supply chain management: An empirical study. *International Journal of Production Economics*, 187, 196-215. <https://doi.org/10.1016/j.ijpe.2017.02.018>
- He, Y., Lai, K. K., Sun, H., & Chen, Y. (2014). The impact of supplier integration on customer integration and new product performance: the mediating role of manufacturing flexibility under trust theory. *International Journal of Production Economics*, 147, 260-270. <https://doi.org/10.1016/j.ijpe.2017.02.018>
- Hosseini, S. M., Azizi, S., & Sheikhi, N. (2012). An investigation on the effect of supply chain integration on competitive capability: an empirical analysis of Iranian food industry. *International Journal of Business and management*, 7(5), 73. <https://doi.org/10.1016/j.ijpe.2017.02.018>
- Huo, B., Qi, Y., Wang, Z., & Zhao, X. (2014). The impact of supply chain integration on firm performance. *Supply Chain Management: An International Journal*. 19(4), 369-384. <https://doi.org/10.1108/SCM-03-2013-0096>
- Jaradat, R., Adams, F., Abutabenjeh, S., & Keating, C. (2017). The complementary perspective of system of systems in collaboration, integration, and logistics: a value-chain based paradigm of supply chain management. *Systems*, 5(4), 50. <https://doi.org/10.3390/systems5040050>
- Jonsson, P., Andersson, D., Boon-itt, S., & Wong, C. Y. (2011). The moderating effects of technological and demand uncertainties on the relationship between supply chain integration and customer delivery performance. *International Journal of Physical Distribution & Logistics Management*. 41(3), 253-276. <https://doi.org/10.1108/09600031111123787>
- Kandanand, K. (2014). A roadmap to green supply chain system through enterprise resource planning (ERP) implementation. *Procedia Engineering*, 69, 377-382. <https://doi.org/10.1016/j.proeng.2014.03.002>
- Katua, P. A. (2014). *The Impact of Supply Integration on the Supply Chain Performance in the Manufacturing Firms in Kenya* (Doctoral dissertation, School of Business, University of Nairobi).
- Kearney, A. T. (2010). China 2015: Transportation and logistics strategies. *Marketing and Communication Consultant, Chicago, IL*.
- Kim, Y. H., & Schoenherr, T. (2018). The effects of supply chain integration on the cost efficiency of contract manufacturing. *Journal of Supply Chain Management*, 54(3), 42-64. <https://doi.org/10.1111/jscm.12168>
- Koçoğlu, İ., İmamoğlu, S. Z., İnce, H., & Keskin, H. (2011). The effect of supply chain integration on information sharing: Enhancing the supply chain performance. *Procedia-social and behavioral sciences*, 24, 1630-1649. <https://doi.org/10.1016/j.sbspro.2011.09.016>
- Kothari, C. (2017). research methodology methods and techniques by CR Kothari. *Published by New Age International (P) Ltd., Publishers*, 91.
- Kozlenkova, I. V., Samaha, S. A., & Palmatier, R. W. (2014). Resource-based theory in marketing. *Journal of the Academy of Marketing Science*, 42(1), 1-21. <https://doi.org/10.1007/s11747-013-0336-7>
- Langevin, A., & Riopel, D. (Eds.). (2005). *Logistics systems: design and optimization*. Springer Science & Business Media. <https://doi.org/10.1007/s11747-013-0336-7>
- Lee, C. W., Kwon, I. W. G., & Severance, D. (2007). Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer. *Supply chain management: An International journal*. 12(6), 444-452. <https://doi.org/10.1108/13598540710826371>
- Lianza, K. S. (2013). *Supply chain management integration and the performance of international humanitarian organizations in East Africa* (Doctoral dissertation, University of Nairobi).
- Liu, G., Shah, R., & Schroeder, R. G. (2012). The relationships among functional integration, mass customization, and firm performance. *International Journal of Production Research*, 50(3), 677-690. <https://doi.org/10.1080/00207543.2010.537390>
- Lowitt, S. (2017). Cross-cutting logistics issues undermining regional integration across SADC. *TIPS, Trade & Industrial Policy Strategies*: Pretoria, South Africa.

- Madhani, P. M. (2010). Resource based view (RBV) of competitive advantage: an overview. *Resource Based View: Concepts and Practices*, Pankaj Madhani, ed, 3-22.
- Marinagi, C., Trivellas, P., & Sakas, D. P. (2014). The impact of information technology on the development of supply chain competitive advantage. *Procedia-Social and Behavioral Sciences*, 147, 586-591. <https://doi.org/10.1016/j.sbspro.2014.07.161>
- Martinelli, E. M., & Tunisini, A. (2019). Customer integration into supply chains: literature review and research propositions. *Journal of Business & Industrial Marketing*, 34(1), 24-38. <https://doi.org/10.1108/JBIM-07-2017-0162>
- Mbaisi, B. (2016). *Factors Affecting Supply Chain Integration in Large Manufacturing Firms in Kenya* (Doctoral dissertation, University of Nairobi).
- Mellat-Parast, M., & Spillan, J. E. (2014). Logistics and supply chain process integration as a source of competitive advantage. *The International Journal of Logistics Management*. 25(2), 289-314. <https://doi.org/10.1108/JBIM-07-2017-0162>
- Mesquita, L. F., Anand, J., & Brush, T. H. (2008). Comparing the resource-based and relational views: knowledge transfer and spillover in vertical alliances. *Strategic management journal*, 29(9), 913-941. <https://doi.org/10.1002/smj.699>
- Mideva, B., & Moronge, M. (2019). Influence of integrated supply chain on performance of food and beverage manufacturing firms in Kenya. *The Strategic Journal of Business & Change Management*, 6(1), 605-622. <https://doi.org/10.61426/sjbcm.v6i1.1084>
- Mihardjo, L., Sasmoko, S., Alamsyah, F., & Elidjen, E. (2020). Maximising co-creation strategy through integration of distinctive capabilities and customer experiences in supply chain management. *Uncertain Supply Chain Management*, 8(1), 187-196. <https://doi.org/10.61426/sjbcm.v6i1.1084>
- Misund, B. (2016). Vertical integration and value-relevance: Empirical evidence from oil and gas producers. *Cogent Economics & Finance*, 4(1), 1264107. <https://doi.org/10.1080/23322039.2016.1264107>
- Modi, S. B., & Mabert, V. A. (2007). Supplier development: Improving supplier performance through knowledge transfer. *Journal of operations management*, 25(1), 42-64. <https://doi.org/10.1080/23322039.2016.1264107>
- Muldoon, J., Liguori, E. W., & Bendickson, J. (2013). Sailing away: the influences on and motivations of George Caspar Homans. *Journal of Management History*, 19(2), 148-166. <https://doi.org/10.1108/17511341311307363>
- Munizu, M., Pono, M., & Alam, S. (2019). The Impact of Information Technology Application on Supply Chain Integration and Competitive Advantage: Indonesian Fishery Industry Context. *Quality-Access to Success*, 20(169).
- Muricho, M. W., Muli, S. (2021). Influence of Supply Chain Resilience Practices on the Performance of Food and Beverages Manufacturing Firms in Kenya: A Survey of Nairobi City County. *International Journal of Business and Social Research*, 11(1), 36-55.
- Mwaura, A. W., Letting, D., Nicholas, K., Ithinji, G., & Orwa, B. (2016). Reverse logistics practices and their effect on competitiveness of food manufacturing firms in Kenya. *International Journal of Economics, Finance and Management Sciences*, 3(6), 678-684. <https://doi.org/10.11648/j.ijefm.20150306.14>
- Narasimhan, R., Swink, M., & Viswanathan, S. (2010). On decisions for integration implementation: An examination of complementarities between product-Process technology integration and supply chain integration. *Decision Sciences*, 41(2), 355-372. <https://doi.org/10.1111/j.1540-5915.2010.00267.x>
- Nassiuma, D. K. (2000). Survey sampling. *Theory and methods*, 10(1), 59-63.
- Naway, F., & Rahmat, A. (2019). The mediating role of technology and logistic integration in the relationship between supply chain capability and supply chain operational performance. *Uncertain Supply Chain Management*, 7(3), 553-566. <https://doi.org/10.1111/j.1540-5915.2010.00267.x>

- Njagi, J. M., & Muli, S. M. (2020). Influence of Supply Chain Integration Practices on the Performance of Manufacturing Firms in Kenya a Case of Kenya Breweries Limited. *International Journal of Business and Social Research*, 10(1), 35-57.
- Nzioka, G. M. (2010). *The practice of supply chain management in public healthcare sector in Kenya: the case of Kenya Medical Supplies Agency* (Doctoral dissertation, University of Nairobi, Kenya).
- Oghazi, P., Fakhrai Rad, F., Karlsson, S., & Haftor, D. (2018). RFID and ERP systems in supply chain management. *European Journal of Management and Business Economics*, 27(2), 171-182. <https://doi.org/10.1108/EJMBE-02-2018-0031>
- Omondi, A. W. (2022). Effect of Supply Chain Integration on Performance of Metal and Allied Sector Manufacturing Firms in Nairobi City County, Kenya. *Journal of Procurement & Supply Chain*, 2(1), 1-10.
- Osifo, S. J., & Omoregbe, O. (2011). Organizational change with the system and complexity theories in mind. *Knowledge Review*, 22(2), 52-58.
- Otchere, A. F., Annan, J., & Anin, E. K. (2013). Achieving competitive advantage through supply chain integration in the cocoa industry: A case study of Olam Ghana limited and produce buying company limited. *International Journal of Business and Social Research (IJBSR)*, 3(2), 131-145.
- Owino, D. E. (2015). *Supply chain integration and organizational performance of commercial banks in Kenya* (Doctoral dissertation, University of Nairobi).
- Palvia, P. (2009). The role of trust in e-commerce relational exchange: A unified model. *Information & management*, 46(4), 213-220. <https://doi.org/10.1016/j.im.2009.02.003>
- Patnayakuni, R., Rai, A., & Seth, N. (2006). Relational antecedents of information flow integration for supply chain coordination. *Journal of Management Information Systems*, 23(1), 13-49. <https://doi.org/10.2753/MIS0742-1222230101>
- Peranganing, J. (2015). A conceptual mapping resource advantage theory, competitive advantage theory, and transient competitive advantage. *Expert Journal of Business and Management*, 3(2), 140-149.
- Porter, M. E. (1985). Competitive Advantage.
- Porter, M. E. (1996). Competitive advantage, agglomeration economies, and regional policy. *International regional science review*, 19(1-2), 85-90. <https://doi.org/10.1177/016001769601900208>
- Potter, A., Towill, D.R. & Christopher, M. (2015). "Evolution of the migratory supply chain model", Supply Chain Management: *An International Journal*, 20(6), 603-612. <https://doi.org/10.1108/SCM-06-2015-0231>
- Prajogo, D., & Olhager, J. (2012). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics*, 135(1), 514-522. <https://doi.org/10.1016/j.ijpe.2011.09.001>
- Qrunfleh, S., & Tarafdar, M. (2014). Supply chain information systems strategy: Impacts on supply chain performance and firm performance. *International Journal of Production Economics*, 147, 340-350. <https://doi.org/10.1016/j.ijpe.2012.09.018>
- Safari, A., & Albaum, G. (2019). Transactional or relational exchange theory in B2C marketing: An agenda for a different type of relational exchange theory. *Journal of customer behaviour*, 18(2), 87-100. <https://doi.org/10.1362/147539219X15633616548579>
- Schoenherr, T., & Swink, M. (2012). Revisiting the arcs of integration: Cross-validations and extensions. *Journal of Operations Management*, 30(1-2), 99-115. <https://doi.org/10.1016/j.jom.2011.09.001>
- Shatat, A. S., & Udin, Z. M. (2012). The relationship between ERP system and supply chain management performance in Malaysian manufacturing companies. *Journal of Enterprise Information Management*, 25(6), 576-604. <https://doi.org/10.1108/17410391211272847>

- Shi, H., Feng, T., & Li, Z. (2022). Too much is not always good: the inverted U-shaped link between green customer integration and opportunistic behavior. *Asia Pacific Journal of Marketing and Logistics*, 34(5), 987-1009. <https://doi.org/10.1108/APJML-01-2021-0062>
- Shiau, W. L., & Luo, M. M. (2012). Factors affecting online group buying intention and satisfaction: A social exchange theory perspective. *Computers in Human Behavior*, 28(6), 2431-2444. <https://doi.org/10.1016/j.chb.2012.07.030>
- So, S., & Sun, H. (2010). Supplier integration strategy for lean manufacturing adoption in electronic-enabled supply chains. *Supply Chain Management: An International Journal*. 15(6), 474-487. <https://doi.org/10.1108/13598541011080455>
- Solesvik, M. (2018). The rise and fall of the resource-based view: paradigm shift in strategic management. *Journal of new economy*, 19(4). <https://doi.org/10.29141/2073-1019-2018-19-4-1>
- Spillan, J. E., McGinnis, M. A., Kara, A., & Yi, G. L. (2013). A comparison of the effect of logistic strategy and logistics integration on firm competitiveness in the USA and China. *The International Journal of Logistics Management*. 24(2), 153-179. <https://doi.org/10.1108/IJLM-06-2012-0045>
- Stevens, G. C., & Johnson, M. (2016). Integrating the supply chain... 25 years on. *International Journal of Physical Distribution & Logistics Management*. 46(1), 19-42. <https://doi.org/10.1108/IJPDLM-07-2015-0175>
- Swardton, A. (2011). Logistics drives development of Africa's breadbaskets. Available at: <https://www.howwemadeitinafrica.com/logistics-drives-development-of-africa%e2%80%99s-breadbaskets/12960/>
- Thun, J. H. (2010). Angles of integration: an empirical analysis of the alignment of internet-based information technology and global supply chain integration. *Journal of Supply Chain Management*, 46(2), 30-44. <https://doi.org/10.1108/IJPDLM-07-2015-0175>
- Turkulainen, V., & Ketokivi, M. (2012). Cross-functional integration and performance: what are the real benefits? *International Journal of Operations & Production Management*. 32(4), 447-467. <https://doi.org/10.1108/01443571211223095>
- Uwamahoro, A. (2018). Effects of supply chain integration on performance: An analysis of manufacturing firms in Rwanda. *East Africa Research Papers in Business, Entrepreneurship and Management*, 3, 3-20.
- Vargas, J. R. C., Mantilla, C. E. M., & de Sousa Jabbour, A. B. L. (2018). Enablers of sustainable supply chain management and its effect on competitive advantage in the Colombian context. *Resources, Conservation and Recycling*, 139, 237-250. <https://doi.org/10.1016/j.resconrec.2018.08.018>
- Von Bertalanffy, L. (1972). The history and status of general systems theory. *Academy of management journal*, 15(4), 407-426. <https://doi.org/10.2307/255139>
- Wambua, I. M. (2021). *Supply Chain Integration and Performance of Manufacturing Firms in Nairobi, Kenya* (Doctoral dissertation, University of Nairobi).
- Wang, H. L. (2014). *Theories for competitive advantage*. 33-43
- Wang, H. M. D., & Sengupta, S. (2016). Stakeholder relationships, brand equity, firm performance: A resource-based perspective. *Journal of Business Research*, 69(12), 5561-5568. <https://doi.org/10.1016/j.jbusres.2016.05.009>
- Wang, W. C., Lin, C. H., & Chu, Y. C. (2011). Types of competitive advantage and analysis. *International Journal of Business and Management*, 6(5), 100. <https://doi.org/10.1016/j.jbusres.2016.05.009>
- Wernerfelt, B. (2014). On the role of the RBV in marketing. *Journal of the Academy of Marketing Science*, 42(1), 22-23. <https://doi.org/10.1007/s11747-013-0335-8>
- Wiengarten, F., Humphreys, P., Cao, G., & McHugh, M. (2013). Exploring the important role of organizational factors in IT business value: Taking a contingency perspective on the resource-based view. *International Journal of Management Reviews*, 15(1), 30-46. <https://doi.org/10.1111/j.1468-2370.2012.00332.x>
- Wong, C. W., Lai, K. H., Shang, K. C., Lu, C. S., & Leung, T. K. P. (2012). Green operations and the moderating role of environmental management capability of suppliers on manufacturing firm

performance. *International journal of production economics*, 140(1), 283-294.  
<https://doi.org/10.1016/j.ijpe.2011.08.031>

World Bank. (2009). *World Development Report 2009: Reshaping Economic Geography*, Washington DC: The World Bank.

Xu, D., Huo, B., & Sun, L. (2014). Relationships between intra-organizational resources, supply chain integration and business performance: an extended resource-based view. *Industrial Management & Data Systems*, 114(8), 1186-1206. <https://doi.org/10.1108/IMDS-05-2014-0156>

Yang, Q., Li, S., Cui, H., & Qiao, J. (2023). How does supplier relationship management affect supplier innovation contribution? Interorganizational learning and social exchange theory integrated perspectives. *Industrial Marketing Management*, 114, 165-180.  
<https://doi.org/10.1016/j.indmarman.2023.08.003>

Yee, J. T., & Oh, S. C. (2012). *Technology integration to business: Focusing on RFID, interoperability, and sustainability for manufacturing, logistics, and supply chain management*. Springer Science & Business Media. <https://doi.org/10.1007/978-1-4471-4390-1>

Yu, W. (2015). The effect of IT-enabled supply chain integration on performance. *Production Planning & Control*, 26(12), 945-957. <https://doi.org/10.1007/978-1-4471-4390-1>

Zeglat, D., & Shrafat, F. (2022). Customer Company Identification and Customer Loyalty: Using the Social Exchange Theory Perspective: Customer Reciprocity as a Mediating Factor. *Quality-Access to Success*, 23(191). <https://doi.org/10.1007/978-1-4471-4390-1>

Zenko, Z., Rosi, B., Mulej, M., Mlakar, T., & Mulej, N. (2013). General systems theory completed up by dialectical systems theory. *Systems research and behavioral science*, 30(6), 637-645.  
<https://doi.org/10.1007/978-1-4471-4390-1>



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