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OPTIMIZATION OF SUPPLY CHAIN PERFORMANCE OF LARGE SCALE MANUFACTURING FIRMS IN KENYA THROUGH EFFICIENT CONSUMER RESPONSE AND BUSINESS INFORMATION SYSTEM

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ABSTRACT

Kenya's large-scale manufacturing sector is central to industrialization and job creation, yet it continues to face persistent supply chain inefficiencies marked by high logistics costs, low-capacity utilization, and weak responsiveness to consumer demand. These challenges suggest gaps in the application of Efficient Consumer Response (ECR) practices and in the ability of Business Information Systems (BIS) to support such practices effectively. This study investigated the effect of ECR on supply chain performance and examined the moderating role of BIS among large-scale manufacturing firms in Kenya. The study adopted a descriptive and correlational design and collected primary data using structured questionnaires from firms registered with the Kenya Association of Manufacturers. Data was analyzed using multiple and hierarchical regression techniques. The results indicate that ECR practices significantly improve supply chain performance, explaining 56.8% of performance variation ($R^2 = 0.568$), with efficient replenishment having the strongest effect ($\beta = 0.387$, $p < 0.001$). The findings further show that BIS significantly strengthens the ECR-performance relationship, as demonstrated by a positive interaction effect ($\beta = 0.221$, $p < 0.001$) and an increase in explanatory power to $R^2 = 0.659$. The study concludes that while ECR directly enhances supply chain performance, its impact is substantially strengthened when supported by effective BIS. It recommends that manufacturing firms integrate ECR initiatives with robust, well-coordinated information systems and invest in digital capabilities that enhance real-time information sharing and supply chain responsiveness.

KEYWORDS: Efficient Consumer Response; Business Information Systems; Supply Chain Performance; Manufacturing Firms.

1.0 INTRODUCTION

The Efficient Consumer Response (ECR) concept was introduced in 1992 as a result of competition from alternative store formats which highlighted major inefficiencies within the supermarket industry and its supply chain. In order to survive, the US grocery industry leaders formed a task force that took an initiative to study how to improve the performance of their supply chain (Bhutta, Huq & Maubourguet, 2002).The concept emerged as a collaborative strategy aimed at enhancing efficiency across the entire supply chain by integrating suppliers, manufacturers, distributors, and retailers to better satisfy consumer needs while reducing costs and inefficiencies (Borin & Farris, 1995). ECR is built upon four primary pillars: efficient store assortment, efficient replenishment, efficient product introduction, and efficient promotion (Kumar, Verma, Shah & Kumar, 2025). Each of these dimensions focuses on optimizing different operational areas, leading to superior supply chain performance through cost reduction, improved inventory turnover, and better customer service.

ECR is a collaborative strategy between suppliers and distribution channels aimed at delivering maximum value, superior service, and a wide variety of products to end consumers by aligning supply-chain requirements with customer needs (Kurnia & Johnston, (2001). Solé (2000) describes ECR as both a system and, at times, a movement. He notes that it emerged in Europe in 1994 to eliminate unnecessary supply-chain costs and to enable faster, more appropriate responses to consumer demand. Ferrer and del Castillo (1996), Stern, Ansary, Curghlan, and Cruz (1999), as well as Whipple, Frankel, and Anselmi (1999), characterize the concept in a similar way. The aim of ECR initiatives is a responsive, consumer-oriented operation where retailers and manufacturers work together to maximize customer value and to minimize costs (Rokhzad, 2023).

In an ideal situation, high-quality products flow through a paperless and largely automated supply chain from the production line up to the checkout with minimal disturbance. The goal is to integrate and optimize supply chain, where inventories are as low as possible and product availability is high (Hofstetter, 2006). The ultimate goal of ECR is a responsive, consumer-driven system in which distributors and suppliers work together as business allies to maximize consumer satisfaction and minimize cost. Accurate information and high-quality products flow through a paperless system between the manufacturing line and checkout

counter with minimum degradation or interruption both within and between trading partners" (Kurt Salmon, 1993).

Efficient Consumer Response (ECR) is rooted in the logic of customer-centric supply-chain management, similar in philosophy to Customer Relationship Management (CRM), but extends beyond individual customer–retailer interactions by institutionalizing cooperation between manufacturers, retailers, and other supply-chain partners. Under ECR, enterprises coordinate their production, distribution, and merchandising activities with the aim of ensuring that consumer demand is satisfied efficiently providing the right products at the right time, place, and price while simultaneously reducing total supply-chain costs (Reyes & Bhutta, 2005). A central component of ECR is Category Management, which replaces traditional brand-centric management with a retail-oriented, category-based management of products. Through Category Management, manufacturers and retailers jointly treat each product category as a strategic business unit, aligning assortment, promotions, and replenishment depending on consumer needs a practice that has gained significant traction in European retailing (Dussart, 1998; Corsten & Kumar, 2005).

A key component of ECR is collaboration and information sharing. According to Martin, (1994), collaboration between supply chain partners ensures timely communication of demand data, which minimizes the bullwhip effect and enhances responsiveness. This partnership-driven model fosters trust and long-term relationships, thereby improving coordination efficiency. Furthermore, the adoption of technologies such as Electronic Data Interchange (EDI) and collaborative planning tools facilitates real-time visibility of supply chain activities (Jha, Velaga, Routhu, Sadaram,Boppana & Katnapally,2025). The integration of information technology is thus a critical enabler for ECR success.

Another significant variable in ECR implementation is demand management and forecasting accuracy. Efficient replenishment relies on accurate demand forecasts, ensuring optimal inventory levels and reducing stockouts (Hübner & Kuhn, 2012). Azevedo, (2014) asserted that firms implementing ECR experience up to 20% improvement in inventory efficiency due to enhanced demand visibility. This demonstrates that data-driven planning leads to better alignment between production and actual market needs. Moreover, organizational alignment and cultural readiness are essential to realizing ECR's full potential. Lambert and Cooper (2000) emphasize that cross-functional integration and inter-organizational culture are prerequisites for successful ECR implementation. Without alignment of objectives and incentives across the supply chain, even technologically sophisticated systems fail to deliver

intended results. Hence, leadership support and strategic commitment are critical factors in achieving performance gains.

From a performance perspective, ECR directly influences operational, financial, and service outcomes. Efficient product introduction and promotion strategies ensure faster time-to-market and higher product availability (Taleizadeh *et al*., 2019). Operational efficiency is reflected in reduced logistics costs, minimized cycle times, and improved asset utilization (Mentzer & Konrad, 1991). Financially, ECR contributes to cost savings through waste reduction and optimized procurement (Kumar, Mokha & Pattnaik, 2022). Furthermore, enhanced product availability and service reliability increase customer satisfaction and loyalty, leading to sustained competitive advantage (Zhang, Ren, Wang & He, 2018).

According to Kurnia & Johnston, (2001), the adoption of efficient consumer response (ECR) has been slow in many regions, despite its many potential benefits to supply chain participants through reduction of inventory level and operating costs. ECR adoption requires co-operation and trust between trading partners, which are unlikely to happen unless costs, benefits and risks of ECR implementation can be mutually shared. In essence, ECR is a modernized and updated CRM as it serves the same purpose managing relationships with consumers to satisfy their needs for products and increase their loyalty level (Liniņa & Zvirgzdiņa, 2017).

1.1.1 Business Information System and the Relationship Between Efficient Consumer Response and Supply Chain Performance

A critical aspect of successfully managing the supply chain lies in measuring and monitoring information about its key operational and performance parameters (e.g. inventory, delivery schedules and lead times) (Gunasekaran and Ngai, 2004). It is therefore important for a firm to adopt information systems (IS) that are aligned to its supply chain, that is, adopt IS that facilitate the particular processes of its supply chain and provide information about parameters that assess specific goals of its particular supply chain (SC) strategy.

According to a study by Jermsittiparsert, (2020), relationship between CRM dimensions and hotel performance, supply chain information technology capabilities plays a moderating role on the relationship between CRM and organizational performance of Thai restaurants and hotels. Christopher (2016) on the other hand asserts that ECR, which focuses on consumer-driven strategies such as demand forecasting, product replenishment, and information sharing, enhances responsiveness and minimizes inefficiencies within the supply chain. However, other recent studies suggest that the effectiveness of ECR practices is largely

reliant on the quality and integration of Business Information Systems (BIS) that facilitate real-time communication and data processing across supply chain partners (Mohaisen, Rahimi Aghdam, & Hosseini, 2025). This underscores BIS as a critical moderating factor influencing how ECR translates into superior supply chain performance outcomes.

Empirical research consistently indicates that the adoption of advanced business information systems(BIS) such as Enterprise Resource Planning (ERP), Supply Chain Management Systems (SCMS), and Customer Relationship Management (CRM) platforms enables manufacturing firms to synchronize their ECR initiatives with operational and strategic goals (Bai & Yaolei, 2025). By supporting data visibility and inter-firm coordination, BIS mitigates information asymmetry and reduces transaction costs, thus strengthening the positive impact of ECR on performance metrics such as order fulfillment rate, lead time reduction, and inventory turnover (Gunasekaran *et al.*, 2017). Without such systems, ECR efforts may remain fragmented and yield suboptimal results, particularly in complex, globalized manufacturing networks.

Moreover, Li, Su, & Chen, (2020) argue that BIS enhances the responsiveness and adaptability of supply chains by integrating demand signals from consumers into production and distribution planning. This digital integration fosters agility in managing demand fluctuations and enables firms to make data-driven decisions that improve service levels and reduce stockouts. For example, the implementation of business intelligence tools has been found to positively moderate the ECR–SCP relationship by facilitating predictive analytics and performance monitoring (Alzoubi & Yanamandra, 2020). This suggests that BIS not only acts as an enabler but also as a strategic moderator that amplifies the outcomes of ECR.

The moderating role of BIS is further supported by the Resource-Based View (RBV), which posits that information systems constitute a valuable, rare, and inimitable resource that enhances firm capabilities (Barney, 1991). When aligned with ECR initiatives, BIS contributes to the creation of dynamic capabilities that foster continuous improvement and innovation within the supply chain (Imtiaz,Hamid, Nadarajah, Mehmood & Ahmad,(2023). Firms that invest in digital infrastructure and analytics are better positioned to interpret consumer data effectively and translate it into actionable supply chain strategies, thereby achieving superior performance relative to less technologically equipped competitors (Paulino, Mazo, Boquila, Basa & Aterrado,2025).

Additionally, the integration of BIS in ECR frameworks helps bridge inter-organizational gaps and improves collaboration across the supply chain ecosystem (Fawcett, Wallin, Allred,

Fawcett & Magnan, 2011). Cloud-based platforms and digital supply chain dashboards, for instance, enable real-time sharing of sales and inventory data, promoting trust and joint decision-making among partners. This integration reduces inefficiencies and enhances the reliability of the entire value chain (Iyer, 2013). Consequently, the moderating effect of BIS manifests not only within firms but also across their extended networks, creating synergistic improvements in overall supply chain performance (Pintuma, Khaengkhan, Waiyawuththanapoom & Aunyawong,2020).

1.2 Statement of the Problem

The large-scale manufacturing sector (LSMS) is a foundational pillar of Kenya's economic growth, designated as a key driver under the nation's Vision 2030 development agenda. This sector is intended to contribute at least 15% to the Gross Domestic Product (GDP) and create significant employment opportunities. However, despite government support and ambitious industrial targets, the sector is still performing far below expectations. By 2022, it was contributing only about 7.7% to the GDP. This slow progress shows that there are serious practical problems holding back the efficiency and overall performance of large-scale manufacturing firms in Kenya.

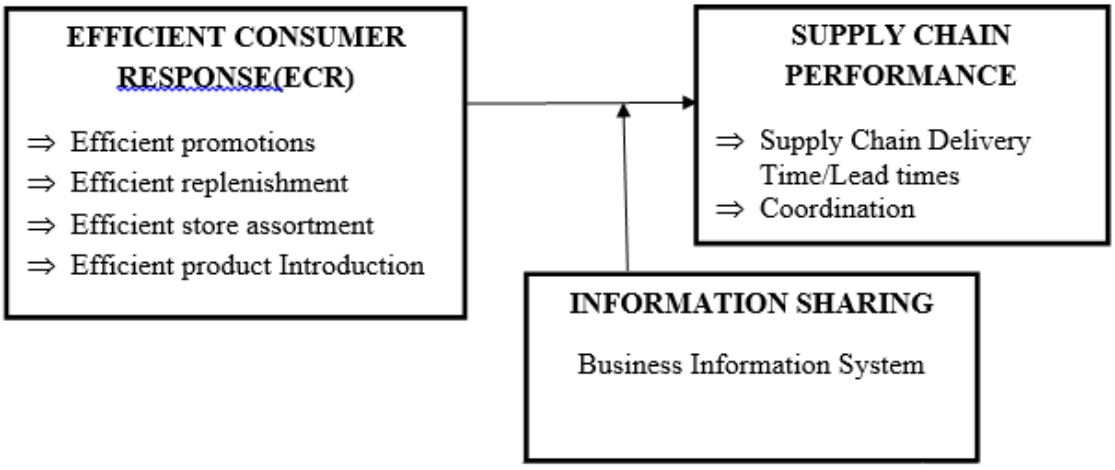
A primary and critical operational challenge facing LSMFs is the persistent inability to implement strong and streamlined Efficient Consumer Response (ECR) strategies. ECR refers to a company's ability to predict and meet consumer needs while keeping inventory and distribution costs low. This capability has become even more important due to rapid urbanization and the growth of modern retail outlets. However, Kenyan large scale manufacturers continue to struggle with rigid and poorly coordinated supply chains. As a result, many firms frequently experience stockouts that lead to lost sales, as well as overstocking that traps their working capital. Evidence from the Kenya Bureau of Statistics data shows that logistics costs in Kenya and the wider East African region make up between 18% and 25% of the cost of goods sold much higher than the global average of 8% to 10%. Such high costs reduce profit margins and make Kenyan products less competitive. Yet, it is still unclear which gaps in ECR practices contribute most to these high costs.

In addition, Business Information Systems such as Enterprise Resource Planning(ERP), Supply Chain Management(SCM), and Customer Relationship Management (CRM) systems are meant to help firms strengthen the link between ECR practices and performance. Many large manufacturing companies have invested heavily in these technologies, hoping they would improve coordination, support faster decision-making, and help firms react quickly to

changes in demand. In theory, a well-designed BIS should enhance collaboration, improve data sharing, and ultimately raise firm performance through better planning and inventory control. However, many firms are not getting the expected benefits from these systems. There are common problems such as fragmented data, poor integration across departments, and a general failure to turn system information into practical improvements. This means that both ECR practices and the BIS tools meant to support them are not working as intended, raising important concerns about the value of these costly investments.

As a result, although it is widely accepted that poor supply-chain practices weaken manufacturing performance, it is still not clear how BIS influences this relationship in the Kenyan setting. There is very little local research showing whether an effective BIS can significantly strengthen the connection between good ECR practices and better performance results, such as higher revenue or improved capacity utilization currently around 65% for the sector. Without this evidence, manufacturing firms cannot confidently plan their investments, improve their operations, or get good returns from the technology they adopt. This ongoing uncertainty contributes to weak performance and threatens Kenya's ability to achieve its industrial and economic goals. For these reasons, this study is necessary as it seeks to fill the practical and research gaps by examining how challenges in ECR, the moderating role of BIS, and the performance of large-scale manufacturing firms interact within the Kenyan manufacturing environment.

Conceptual Framework



The conceptual framework illustrates the relationship between Efficient Consumer Response (ECR) practices, information sharing, and supply chain performance. ECR represents the independent variable and is conceptualized through four key dimensions: efficient store

assortment, efficient replenishment, efficient product introduction, and efficient promotion. These practices are assumed to enhance collaboration between supply chain actors and streamline operational processes, consistent with prior ECR literature (Kurt Salmon Associates, 1993; Cannella *et al*., 2013). Information sharing, operationalized through the use of business information systems, is positioned as an enabling factor that strengthens the relationship between ECR practices and supply chain outcomes. The model assumes that timely, accurate, and transparent information exchange allows firms to better coordinate ECR activities and thus improve overall system responsiveness (Lee & Whang, 2000; Sahin & Robinson, 2005). As such, information sharing operates as a moderating variable that enhances the effectiveness of ECR initiatives.

1.1.2 Objectives of the study

1. To examine the effect of Efficient Consumer Response practices on the supply chain performance of manufacturing firms in Kenya
2. To determine the moderating effect of information sharing on the relationship between Efficient Consumer Response and supply chain performance among manufacturing firms in Kenya.

2.0 LITERATURE REVIEW

2.1 Resource Based View Theory

The Resource-Based View (RBV) of the firm posits that sustainable competitive advantage is derived from owning and controlling valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities (Barney, 1991; Wernerfelt, 1984). This theoretical lens provides a clear understanding of how manufacturing firms can achieve superior supply chain performance, particularly through the strategic implementation of Efficient Consumer Response (ECR) initiatives, and how information sharing (IS) via Business Information Systems (BIS) moderates this relationship.

Efficient Consumer Response (ECR) is a strategic capability that helps manufacturing firms improve the flow of products from production to the final customer by focusing on real consumer demand (Cottrill, 1997). From the Resource-Based View (RBV), ECR is more than a set of standard supply-chain practices. Instead, it is a combination of valuable internal resources such as accurate forecasting tools, strong inventory systems, skilled cross-functional teams, and close working relationships with retailers. When these resources work together effectively and are deeply rooted in the organization, they become valuable, rare,

hard for competitors to copy, and not easily replaced by alternatives (Grant, 1991). As a result, ECR becomes a powerful capability that improves supply chain performance by reducing lead times, lowering inventory costs, improving product availability, and raising customer satisfaction and firm profitability (Mentzer *et al*., 2001).

The success of ECR depends heavily on information sharing, especially when supported by Business Information Systems (BIS) which is a component of information sharing(Pramataris, Doukidis & Paul,1997). Information sharing involves exchanging key data such as sales numbers, inventory levels, and production plans among supply chain partners(Chen, 2003). BIS, including systems like ERP, SCM software, and CRM platforms, enable this information to move quickly, accurately, and securely across the supply chain (Chen & Huang, 2021). From an RBV standpoint, a well-designed BIS and a culture that supports transparent information sharing are strategic resources. They are valuable and rare because not all firms have advanced systems, skilled staff, and trusted relationships that allow open data exchange. These features are often difficult for competitors to imitate, making them a source of lasting competitive advantage (Mithas *et al*., 2007).

Information sharing through BIS greatly strengthens the relationship between ECR and supply chain performance (Flynn, Huo & Zhao, 2010, Wang & Wei, 2007). Without high-quality, real-time information, many ECR activities such as reducing stock-outs or maintaining lean inventories cannot function effectively (Lee, Padmanabhan & Whang, 1997). ECR needs accurate demand data to deliver its full benefits. When BIS provide real-time, reliable information, ECR becomes more effective and its positive impact on supply chain performance increases (Flynn *et al*., 2010). BIS-enhanced information sharing improves forecast accuracy, reduces the bullwhip effect, increases visibility across supply chain partners, and supports fast, informed decision-making. This improved visibility and coordination help firms get the most out of their ECR capabilities, allowing them to respond more quickly to market changes, operate more efficiently, and build more resilient supply chains. In this way, BIS and information sharing become key resources that strengthen the competitive advantage gained from ECR, making the entire supply chain more agile and cost-effective (Tian, Wang, Chen & Johansson, 2010).

2.2 Systems Theory

Systems theory provides a foundational framework for understanding the complex, interdependent structures that characterize modern manufacturing supply chains. Originally conceptualized by Ludwig von Bertalanffy (1968), systems theory posits that organizations

function as open systems composed of interconnected subsystems that interact dynamically with their environment. In the context of supply chain performance optimization, this framework underscores that firms, suppliers, distributors, and customers operate not as isolated entities but as interdependent components of a holistic system where the performance of one component affects the entire network (Liangrokapart & Prakongwittaya, 2025).

From a systems theory perspective, efficient consumer response (ECR) represents a feedback mechanism that aligns supply chain operations with consumer demand signals. ECR integrates demand-side information into production and logistics decisions, creating a self-regulating system that enhances responsiveness and minimizes inefficiencies (Ma *et al*., 2025). Manufacturing firms that effectively embed ECR principles treat customer feedback, inventory levels, and market data as systemic inputs that drive adaptive supply chain adjustments. This systemic alignment reduces the bullwhip effect and supports synchronization across supply chain nodes, consistent with systems theory's emphasis on balance and feedback loops (Zhang *et al.*, 2025).

Business information systems (BIS) act as the technological infrastructure enabling real-time data exchange, integration, and coordination across supply chain subsystems. According to Kulasekara & Sandaruwan, (2025), a robust information architectures enhance supply chain visibility, enabling manufacturing firms to achieve optimization through faster and more informed decision-making (Kühnel, 2025;). Within the systems theory framework, BIS serve as the connective tissue that allows different subsystems procurement, production, logistics, and sales to operate cohesively as a unified organism. The integration of enterprise resource planning (ERP), cloud computing, and analytics platforms facilitates feedback mechanisms that sustain equilibrium within the supply chain network (Ahmad & Museera, 2024).

Furthermore, Bahrami Yar *et al.* (2025) and Mir Jalali *et al*. (2025) highlighted that information fragmentation disrupts system equilibrium, leading to inefficiencies in decision-making and coordination. This reinforces the systems theory argument that performance optimization requires not only technological infrastructure but also the synchronization of human, informational, and process subsystems. Business information systems thus moderate the relationship between ECR and supply chain performance by ensuring systemic coherence, allowing real-time feedback from consumer markets to shape production schedules, inventory control, and logistics strategies (Holloway, 2025).

2.3 Empirical Literature Review

2.3.1 Effect of Efficient Consumer Response on Supply Chain Performance

Reyes and Bhutta (2005) conducted a comprehensive review of the literature on Efficient Consumer Response (ECR) to bring together and organize existing knowledge on the topic. Their study summarized key definitions, strategies, and initiatives found in previous academic works and analyzed 170 papers published between 1993 and 2003. They found that research on ECR peaked in 2001, with steady publication activity from 1996 to 2003, though a decline in 2003 from 29 to 12 papers prompted them to revisit the field and identify gaps in research. The reviewed studies were categorized into four groups, with more than half being empirical (31.76%) or descriptive (25.88%), which suggested that ECR research was well-developed and supported by substantial empirical evidence. Despite this, the authors identified several areas needing further exploration, particularly the global application of ECR and the barriers to its international implementation.

Sunil Giri, Pinku Paul, (2025) conducted a study on the Efficient Consumer Response and Supplier Collaboration. This study delved into the connection between efficient consumer response (ECR) and supplier collaboration. conducted a comprehensive primary survey and utilized OLS regression analysis. The responsiveness parameters examined included logistics costs, improved service, overall service enhancement, superior customer service, lead times, positive perceptions of the company, and competitiveness. The findings demonstrated a robust relationship between Customer responsive parameters and effective supplier collaboration. This emphasized the need for organizations to implement targeted strategies that strengthen their partnerships, ultimately driving exceptional success in supply chain management.

Corsten and Kumar (2005) conducted an empirical study examining whether suppliers gain advantages from collaborative relationships with large retailers through the adoption of Efficient Consumer Response (ECR) practices. Grounded in the relational view of competitive advantage, the research explored how the degree of ECR adoption by suppliers of a major retailer influences their business outcomes. The findings revealed that ECR adoption positively affects both suppliers' economic performance and capability development. However, it also leads to heightened perceptions of negative inequity among suppliers. Importantly, the study showed that retailer capabilities and supplier trust can moderate several of these effects. Overall, the results highlighted significant variations based on supplier size and whether the supplier produced branded or private-label goods.

Lohtia and Subramaniam (2004) conducted a study on the adoption of Efficient Consumer Response (ECR) in Japan, focusing on industry concerns, current progress, benefits, and barriers to implementation. Using data collected from Japanese manufacturers, wholesalers, and retailers, the researchers examined the competitive environment faced by supply chain members and explored both the perceived advantages and obstacles associated with ECR adoption. They also investigated the reasons why some firms had not yet implemented ECR. The findings indicated that Japan's business environment was highly suitable for large-scale ECR implementation, with more than 20% of the surveyed companies having moved beyond the planning stage—showing a strong belief in the benefits of ECR. In addition to the general efficiencies ECR provides, Japanese firms particularly valued its advantages in improving product replenishment processes. However, perceptions of barriers varied notably between companies that had already implemented ECR and those that had not. Firms that had yet to adopt ECR cited financial constraints as the main obstacle, while those that had adopted it pointed to challenges such as insufficient technological and skill-related capabilities, as well as resistance or negative attitudes among channel members.

Zvirgzdiņa, Liniņa, and Vēvere (2015) carried out a study examining the application of Efficient Consumer Response (ECR) principles within retail trade enterprises in Latvia. The main aim of the research was to assess how extensively ECR practices were being applied in the Latvian retail sector. To achieve this, the study pursued two specific objectives: first, to describe the general trends and developments in retail trade within the country, and second, to investigate how ECR principles influence the formation of product assortments. The researchers employed a combination of expert interviews and consumer surveys as their primary research methods, allowing them to gather insights from both industry professionals and shoppers. The findings revealed that implementing ECR principles plays a crucial role in shaping product assortments in a way that is more responsive to consumer needs. In essence, ECR adoption was found to enhance the ability of Latvian retail enterprises to align their product offerings more closely with customer preferences, thereby improving overall retail efficiency and customer satisfaction.

Soret (2008) conducted a study investigating how Efficient Consumer Response (ECR) practices contribute to the creation of knowledge and the development of sustainable competitive advantages in the grocery industry. The paper proposed a model to measure and explain how knowledge and competitive advantages emerge within the ECR framework.The study had several key objectives: identifying, selecting, and validating elements of

intellectual capital and sustainable competitive advantage; examining related concepts such as facilitators, implementation drivers, and critical success factors; and developing and validating a methodology for measuring these elements and adapting indicators to meet the needs of companies and consultants. Findings indicated that factors such as individual improvement, work conditions, management style, learning enhancement, education, management by objectives, and work environment directly contribute to the growth of human capital. Additionally, the use of data mining techniques, the creation of procedure manuals, and continuous improvement initiatives were linked to an increase in structural capital. The study also found that relational capital grows through the standardization of client procedures, customer satisfaction efforts, category management, and loyalty programs.The study concluded that the implementation of ECR practices fosters and strengthens organizational intellectual capital by promoting knowledge creation and, consequently, enhances the organization's sustainable competitive advantage.

The reviewed studies collectively demonstrate that Efficient Consumer Response (ECR) has a positive and multifaceted influence on supply chain performance, but they also reveal important contextual limitations that justify the current study. Reyes and Bhutta (2005) provide a strong foundational synthesis, showing that ECR research is conceptually and empirically well developed, yet their review highlights gaps in global applicability and implementation barriers, indicating that findings from developed markets may not be universally transferable. Empirical studies by Corsten and Kumar (2005) and Sunil Giri and Pinku Paul (2025) confirm that ECR enhances performance outcomes such as economic returns, capabilities, logistics efficiency, service quality, lead times, and competitiveness, largely through collaboration and responsiveness; however, these studies focus primarily on supplier–retailer relationships and do not isolate manufacturing-level operational performance metrics. Similarly, Lohtia and Subramaniam (2004) and Zvirgzdiņa *et al*. (2015) demonstrate that ECR improves replenishment efficiency, product assortment, and customer satisfaction, but their contexts are largely retail- and wholesaler-oriented and situated in Japan and Latvia, respectively, limiting their relevance to manufacturing environments in developing economies. Soret (2008) extends the discourse by linking ECR to intellectual capital and sustainable competitive advantage, offering valuable theoretical insights but relying more on knowledge-based outcomes than on measurable supply chain performance indicators such as delivery time or coordination efficiency. Collectively, these studies affirm the strategic value of ECR but emphasize collaboration, consumer alignment, and knowledge

creation rather than quantifiable manufacturing supply chain outcomes. Consequently, there remains a clear empirical gap regarding how specific ECR dimensions such as efficient replenishment, promotion, product introduction, and assortment directly affect supply chain performance indicators within large-scale manufacturing firms, particularly in the Kenyan context.

2.3.2 Moderating Effect of Information Sharing on the relationship Between ECR and Supply Chain Performance

Jermsittiparsert (2020) investigated the moderating role of supply chain information technology (SCIT) capabilities in the relationship between customer relationship management (CRM) and organizational performance among Thai restaurants and hotels. Data were collected through a survey method, with 450 questionnaires distributed to restaurant and hotel managers, resulting in a 44.44% response rate. Structural model analysis was employed to examine the interrelationships among CRM, SCIT capabilities, and organizational performance. The findings revealed a positive and significant relationship between CRM dimensions and the performance of restaurants and hotels. Furthermore, SCIT capabilities were found to moderate the relationship between CRM and organizational performance, enhancing the overall impact of CRM on business outcomes in the Thai hospitality sector.

Mohaisen, Rahimi Aghdam, and Hosseini (2025) conducted an extensive study in Iran, focusing on 384 large-scale manufacturing firms in the cities of Tabriz and Karbala. The researchers employed a descriptive-correlational design using structural equation modeling (SEM) to investigate how information sharing moderated the relationship between ECR practices and supply chain efficiency. Their findings revealed that firms with well-aligned business information systems (BIS) and structured data-sharing protocols achieved higher supply chain responsiveness and lower coordination costs. The authors recommended that manufacturing firms institutionalize real-time data integration systems and foster a culture of information transparency to maximize the benefits of ECR implementation. They concluded that strategic IT alignment and open data exchange were critical for optimizing overall supply chain performance.

Abdulameer and Yaacob (2020) examined the moderating role of information sharing on the relationship between lean supply chain practices and supply chain performance by proposing a conceptual framework. The study sought to integrate information sharing into lean supply chain practices as a means of improving supply chain performance. To achieve this objective, the authors reviewed existing literature published in the field of supply chain management,

with particular emphasis on lean supply chains and their effects on supply chain performance, while also identifying other relevant factors that significantly influence this relationship, especially information sharing. Based on the literature review, the study developed a conceptual framework to explain how information sharing moderates the relationship between lean supply chain practices and supply chain performance. The paper established that findings from previous empirical studies on the relationship between lean supply chain practices and supply chain performance are inconclusive, with some studies reporting a significant and positive relationship, while others finding no significant association. This inconsistency in empirical results highlighted the need to introduce a moderating variable to strengthen and clarify the relationship, leading to the identification of information sharing as a critical moderator. Consequently, the study concluded that information sharing plays a crucial moderating role in enhancing the effectiveness of lean supply chain practices on supply chain performance. The main contribution of the study lies in bridging the research gap by positioning information sharing as a moderating variable between lean supply chain practices and supply chain performance, while also demonstrating that both lean supply chain practices and information sharing share a common objective of improving overall supply chain performance.

Bai and Yaolei (2025), in their research explored the moderating effect of digital information flow on supply chain performance among Chinese manufacturing enterprises. Using a quantitative survey of 312 firms across three industrial zones in northern China, the study applied hierarchical regression analysis to assess moderating effects. The results indicated that firms adopting process digitalization and AI-enabled data platforms exhibited stronger linkages between ECR practices and improved trade credit structures. The authors recommended that manufacturers invest in ERP and cloud-based systems to strengthen vertical and horizontal information flow, concluding that digital transformation enhances ECR effectiveness and overall operational resilience.

Hajialiakbari and Babaei (2025) examined the effect of brand congruence components on brand equity and purchase intention, considering the mediating role of customer participatory and citizenship behaviors and the moderating role of influencers' metasocial relationships on Instagram. The study adopted an applied, descriptive–analytical research design using a causal survey approach. The target population comprised Instagram users, from whom 384 respondents were selected through convenience sampling based on the Krejcie and Morgan table. Data were collected using a standardized questionnaire with confirmed face validity,

construct validity assessed through confirmatory factor analysis, and high reliability (Cronbach's alpha = 0.904). The findings indicated that brand congruence significantly influenced brand equity and purchase intention through customer participatory and citizenship behaviors. Influencers' metasocial relationships were found to significantly moderate the relationship between brand congruence and customer behaviors. Additionally, brand equity had a direct positive effect on purchase intention, while customer participatory and citizenship behaviors played a critical role in strengthening purchase intention. Overall, the results highlighted the importance of brand-customer interaction through Instagram influencers in shaping consumers' perceived value and purchase decisions.

Baah, Opoku Agyeman, Acquah, Agyabeng-Mensah, Afum, Issau, and Faibil (2022) conducted a study on the effect of information sharing in supply chains, focusing on the roles of supply chain visibility, agility, and collaboration in enhancing supply chain performance. Grounded in the relational view, resource-based view, and extended resource-based view, the study assessed the critical role of information sharing by emphasizing its influence on supply chain visibility, collaboration, agility, and overall performance. The researchers proposed that information sharing, visibility, collaboration, and agility collectively exerted significant direct and indirect effects on supply chain performance, leading to greater competitiveness, flexibility, and superior gains. Employing a survey research design and a quantitative approach, the study utilized partial least squares structural equation modeling (PLS-SEM) for data analysis due to its suitability for predictive models. The findings revealed that information sharing positively and significantly influenced supply chain visibility, collaboration, agility, and performance. Moreover, supply chain visibility had significant effects on collaboration, agility, and performance, while collaboration and agility also significantly impacted supply chain performance. Overall, the results suggested that information sharing was a key driver of competitive advantage and enhanced supply chain performance.

Sundram, Chhetri, and Bahrin (2020) conducted a study on the consequences of information technology, information sharing, and supply chain integration on supply chain performance and firm performance. The paper addressed key concerns within the manufacturing supply chain and examined the roles of information technology (IT) and information sharing (IS) in influencing supply chain integration (SCI), supply chain performance (SCP), and manufacturing firm performance (FP) in Malaysia. The researchers developed a theoretical framework based on existing literature and administered a survey questionnaire to collect

data from 112 manufacturing firms in Malaysia. Multiple regression analysis was conducted to establish the relationships between IT, IS, SCI, and FP. The findings revealed that IT and information sharing had significant positive effects on supply chain integration and firm performance. Firms that utilized IT and practiced information sharing across supply chain partners were more likely to integrate their internal and external value chains, leading to improved performance both within individual firms and across the manufacturing supply chain. The study offered valuable insights for the manufacturing sector and other industry practitioners seeking to enhance organizational and supply chain performance.

The reviewed studies clearly show that information sharing and information technology capabilities play an important role in strengthening the link between operational practices and supply chain performance, although they differ in focus, context, and level of analysis. Studies such as Jermsittiparsert (2020) and Hajialiakbari and Babaei (2025) demonstrate that information-related capabilities can enhance performance outcomes through moderating effects, but their emphasis is on hospitality and digital marketing rather than manufacturing supply chains or ECR. Research by Abdulameer and Yaacob (2020), Baah *et al.* (2022), and Sundram *et al.* (2020) provides strong evidence that information sharing improves supply chain integration, agility, visibility, and performance; however, these studies focus on lean practices or general supply chain integration rather than specific ECR dimensions. More directly aligned with the present study, Mohaisen *et al.* (2025) and Bai and Yaolei (2025) show that information sharing and digital information flow significantly strengthen the impact of ECR practices on supply chain efficiency and responsiveness in manufacturing firms, yet their findings are based on evidence from Iran and China. While these studies confirm the importance of information sharing as a moderator, their conclusions may not fully apply to the Kenyan manufacturing context due to differences in digital infrastructure, institutional support, and inter-firm collaboration practices. Moreover, most of the existing literature measures performance using broad indicators such as efficiency, responsiveness, or competitiveness, with limited attention to specific outcomes like delivery time and coordination efficiency. This reveals a clear research gap regarding how information sharing through business information systems moderates the relationship between ECR practices and supply chain performance among manufacturing firms in Kenya, which this study seeks to address.

3.0 METHODOLOGY

3.1 Research Design

The study adopted a descriptive and correlational research design. The descriptive aspect was appropriate because it enabled the researcher to systematically describe the current state of Efficient Consumer Response (ECR) practices, information sharing through Business Information Systems (BIS), and supply chain performance among large-scale manufacturing firms in Kenya. The explanatory component was used to examine the causal relationships between ECR practices and supply chain performance, as well as the moderating effect of information sharing, as recommended by Creswell (2014). A cross-sectional approach was used since data were collected at a single point in time, which allowed for efficient analysis of relationships among variables without the need for long-term tracking (Saunders *et al.*, 2019).

3.2 Study Population

The population of the study consisted of large-scale manufacturing firms registered with the Kenya Association of Manufacturers (KAM). According to KAM's most recent records, there were 750 large-scale firms in Kenya, defined as those with a monthly production turnover exceeding 28 tonnes. These firms were selected because they typically lead in technological adoption, given their financial strength, operational scale, and complex supply chain structures. Their ability to invest in advanced information technologies such as Electronic Data Interchange (EDI) and other business information systems, combined with high transaction volumes that demand operational efficiency, made them ideal for this study. As such, these firms provided valuable insights into how ECR practices and BIS integration influence supply chain performance.

3.3 Sample Size and Sampling Technique

A representative sample was drawn from the 750 firms using stratified random sampling. The population was divided into strata based on manufacturing subsectors, such as food and beverages, pharmaceuticals, chemicals, and building materials, to ensure fair representation across industries. This approach enhanced the generalizability of the findings and minimized sampling bias by capturing the diversity within the manufacturing sector (Sekaran & Bougie, 2016). The sample size was determined using Yamane's (1967) formula, ensuring the data were statistically sufficient for regression and moderation analysis.

3.4 Data Collection Methods

Primary data was gathered using structured questionnaires administered to supply chain managers, operations managers, or IT managers in the selected firms. Questionnaires were chosen because they provided a standardized method for collecting data from a large number of respondents, enabling effective quantitative analysis. This approach has also been widely used in prior research on supply chain management and information systems (Flynn *et al*., 2010). The questionnaire captured data on ECR practices, information sharing through BIS/EDI, and supply chain performance indicators, such as delivery time and coordination efficiency. Secondary data were obtained from KAM reports, industry publications, and academic literature to provide additional context and support the interpretation of primary data.

3.5 Validity and Reliability Tests

To ensure the validity of the research instrument, the questionnaire underwent both content and construct validity testing. Content validity was established through reviews by academic experts and industry practitioners to confirm that the items adequately represented the study variables (Hair et al., 2019). Construct validity was assessed using factor analysis to verify that each item loaded correctly on its respective construct. Reliability was evaluated using Cronbach's alpha coefficient, with a value of 0.70 or higher considered acceptable for internal consistency (Nunnally & Bernstein, 1994). A pilot study was also conducted before the main survey to refine the questionnaire and improve measurement accuracy.

4.0 RESULTS

4.1 Effect of Efficient consumer Response on Supply Chain Performance of Large Scale Manufacturing Firms in Kenya.

A multiple linear regression analysis was conducted on the elements of Efficient Consumer response including efficient store assortment, efficient replenishment,efficient product introduction and efficient promotion. The results are as shown below:

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.473	.332		10.457	.000		
	Efficient Store Assortment	.172	.059	.194	2.915	.004	0.651	1.536
	Efficient Replenishment	.348	.067	.387	5.194	.000	0.603	1.658
	Efficient	.185	.054	.206	3.426	.001	0.673	1.486

	Product Introduction							
	Efficient Promotion	.161	.051	.176	3.220	.001	0.718	1.393
a. Dependent Variable: Supply Chain Performance								

Model Summary	
R	.754
R Square (R^2)	.568
Adjusted R^2	.559
Std. Error of the Estimate	.483
F Statistic	61.087
Sig. (F)	.000

Source: Survey Data, (2025)

The regression results above show that Efficient Consumer Response (ECR) practices significantly influence supply chain performance among large-scale manufacturing firms in Kenya. The overall model is statistically significant, with an R value of 0.754, indicating a strong positive relationship between the combined ECR dimensions and supply chain performance. The coefficient of determination ($R^2 = 0.568$) shows that approximately 56.8% of the variation in supply chain performance is explained by efficient store assortment, efficient replenishment, efficient product introduction, and efficient promotion. This relatively high explanatory power suggests that ECR practices are central drivers of delivery efficiency, coordination, and responsiveness in Kenyan manufacturing supply chains. The adjusted R square of 0.559, which accounts for the number of predictors, confirms that the model has strong explanatory power and is not overly inflated by the inclusion of variables. The standard error of the estimate of 0.483 indicates that the model's predictions deviate from the actual values by less than half a unit on average, suggesting good predictive accuracy.

The F-statistic of 61.087 with a significance value of 0.000 indicates that the model as a whole is statistically significant, meaning that the combined effect of efficient store assortment, efficient replenishment, efficient product introduction, and efficient promotion reliably explains variations in supply chain performance. Similarly the findings clearly demonstrate that efficient consumer response practices significantly and positively influence supply chain performance in large-scale manufacturing firms in Kenya, with efficient replenishment emerging as the most influential factor. The constant term had an unstandardized coefficient (B) of 3.473 with a standard error of 0.332, a t-value of 10.457, and a significance level of 0.000. This implies that when all the ECR dimensions are held at

zero, the baseline level of supply chain performance is 3.473 units, and this baseline is statistically significant, indicating that supply chain performance exists even in the absence of the measured ECR practices, though at a lower level.

The collinearity statistics indicate that multicollinearity is not a problem in the model. All the tolerance values for the efficient consumer response variables range from 0.603 to 0.718, which are above the commonly accepted minimum threshold of 0.10, implying that each predictor explains a sufficient amount of unique variance in supply chain performance that is not shared excessively with the other predictors .On the other hand, the variance inflation factor (VIF) values range from 1.393 to 1.658, which are far below the critical cut-off value of 10 and even below the more conservative threshold of 5. These low VIF values indicate that the standard errors of the regression coefficients are not inflated due to intercorrelations among the independent variables.

The findings of this study both align with and extend the existing empirical literature on Efficient Consumer Response by confirming its positive influence on supply chain performance while also revealing context-specific insights. Consistent with Reyes and Bhutta (2005), the results reinforce the view that ECR is a well-established and empirically supported approach for improving supply chain outcomes. The strong explanatory power of the regression model supports earlier studies such as Lohtia and Subramaniam (2004) and Corsten and Kumar (2005), which showed that ECR adoption enhances replenishment efficiency, coordination, and overall economic performance. Similar to the findings of Sunil Giri and Pinku Paul (2025), the study demonstrates that ECR practices improve responsiveness-related outcomes, including coordination and delivery efficiency. However, unlike several earlier studies that focused primarily on retail or supplier-retailer relationships in developed economies, this study extent the applicability of ECR theory to a developing-country manufacturing context.

Similarly,while many prior studies examined ECR as a single, aggregated construct or relied on descriptive and conceptual approaches, the present findings disaggregate ECR into efficient store assortment, efficient replenishment, efficient product introduction, and efficient promotion, allowing for a clearer understanding of their individual contributions. The identification of efficient replenishment as the most influential ECR dimension mirrors earlier findings in Japan by Lohtia and Subramaniam (2004), yet it also highlights the importance of demand-driven inventory management in environments characterized by infrastructure constraints and demand uncertainty, such as Kenya. In addition, while studies

like Soret (2008) emphasized ECR's role in knowledge creation and long-term competitive advantage, the current study empirically links ECR dimensions directly to measurable supply chain performance outcomes, thereby strengthening the evidence base for these theoretical claims.

The unique contribution of this study lies in its empirical demonstration that ECR practices are not only relevant but highly effective in improving supply chain performance within the Kenyan manufacturing sector, a context that has received limited attention in prior research. By quantifying the relative effects of individual ECR dimensions, the study provides practical understanding into which practices yield the greatest performance gains, offering actionable guidance for managers in emerging economies. Furthermore, the relatively high proportion of variance explained by ECR dimensions suggests that, in settings where supply chain inefficiencies are common, ECR can serve as a powerful strategic lever rather than merely an operational improvement tool.

4.2 Moderating Effect of Business Information System on the Relationship Between Efficient Consumer Response and Supply Chain Performance of Large-Scale Manufacturing Firms in Kenya

In order to determine the moderating effect of on Business Information system on the relationship Between Efficient Consumer Response(ECR) and Supply Chain Performance of Large Scale manufacturing firms in Kenya, an average of the elements of efficient consumer response was first computed and entered in a hierarchical regression model as independent variable then information sharing as an element of Business Information System and finally the average of the measures of Supply Chain performance sub variables were entered into the model as dependent variable.The results were as shown in the table below:

Moderating Effect of Business Information System(BIS) on the Relationship Between Efficient Consumer Response(ECR) and Supply Chain Performance of Large-Scale Manufacturing Firms in Kenya

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	3.218	.287		11.214	.000
	ECR	.521	.048	.754	10.841	.000
2	(Constant)	2.764	.301		9.181	.000
	ECR	.403	.052	.583	7.750	.000
	BIS	.286	.061	.354	4.689	.000

3	(Constant)	2.691	.298		9.030	.000
	ECR	.312	.058	.452	5.379	.000
	BIS	.241	.059	.298	4.085	.000
	Interaction term	.117	.031	.221	3.774	.000

a. Dependent Variable: Supply chain performance

Model Summary[d]										
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**					**Durbin-Watson**
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**	
1	.731[a]	.535	.531	.502	.535	91.18	1	259	.000	
2	.789[b]	.622	.615	.458	.087	19.64	1	258	.000	
3	.812[c]	.659	.651	.431	.037	9.94	1	257	.000	2.035
a. Predictors: (Constant), ECR										
b. Predictors: (Constant), ECR, IS										
c. Predictors: (Constant), ECR, IS, Interaction term										
d. Dependent Variable: Supply Chain Performance										

Source: Survey Data, (2025)

The results in the tables above show the analysis which proceeds in three hierarchical models, each building on the previous one to test the direct, additive, and moderating effects of BIS. In Model 1, ECR is entered as the sole predictor of supply chain performance. The unstandardized coefficient (B = 0.521) indicates that a one-unit increase in ECR leads to a 0.521-unit improvement in supply chain performance. The standardized coefficient (β = 0.754) shows a strong positive effect, while the high t-value (t = 10.841) and significance level ($p < .001$) confirm that this relationship is statistically significant. The model explains 53.5 percent of the variance in supply chain performance ($R^2 = 0.535$), which indicates that ECR alone is a determinant of supply chain performance of large scale manufacturing firms in Kenya.

In Model 2, BIS is introduced alongside ECR to assess its direct effect on supply chain performance. The coefficient for ECR decreases from 0.521 to 0.403, though it remains positive and statistically significant (β = 0.583, $p < .001$), suggesting that part of ECR's effect overlaps with BIS. BIS itself has a positive unstandardized coefficient (B = 0.286) and a standardized coefficient of 0.354, with a statistically significant t-value (t = 4.689, $p < .001$). This demonstrates that BIS independently contributes to improvements in supply chain performance beyond the influence of ECR. The R^2 increases from 0.535 to 0.622, representing an R^2 change of 0.087, which is statistically significant. This significant increase

in explained variance confirms that BIS is an important explanatory variable in supply chain performance.

Model 3 introduces the interaction term between ECR and BIS to test for moderation. In this model, ECR ($B = 0.312$, $\beta = 0.452$, $p < .001$) and BIS ($B = 0.241$, $\beta = 0.298$, $p < .001$) both remain significant predictors of supply chain performance.However, the interaction term has a positive and statistically significant coefficient ($B = 0.117$, $\beta = 0.221$, $t = 3.774$, $p < .001$). This indicates that the effect of ECR on supply chain performance varies depending on the level of BIS. The inclusion of the interaction term leads to a further increase in R^2 from 0.622 to 0.659, with an R^2 change of 0.037 that is statistically significant. According to moderation analysis principles articulated by Baron and Kenny (1986) and later reinforced by Aiken (1991), a statistically significant interaction term combined with a significant increase in explained variance provides clear evidence of a moderation effect.

The findings of this study agree with most of the earlier empirical studies that show information systems and information sharing make operational practices more effective. Similar to the work of Jermsittiparsert (2020), the results confirm that when firms use strong information systems, the positive impact of management practices on performance becomes stronger. While Jermsittiparsert focused on hotels and restaurants, this study shows the same idea applies to manufacturing firms, where business information systems help firms gain more value from Efficient Consumer Response (ECR) practices. This shows that information systems are not just support tools but play an active role in improving performance across different sectors.

The results are also in line with studies by Mohaisen *et al.* (2025) and Bai and Yaolei (2025), which found that information sharing strengthens the relationship between ECR and supply chain performance in manufacturing firms in Iran and China. Like those studies, the current findings show that ECR works better when firms share accurate and timely information through business information systems. However, this study adds new insight by showing that this effect also exists in Kenya, where digital systems and supply chain coordination are still developing. This means that even in less technologically advanced environments, firms can significantly improve their supply chain performance if they support ECR with effective information sharing.

The findings also support earlier research by Abdulameer and Yaacob (2020), Baah *et al.* (2022), and Sundram *et al.* (2020), which emphasized that information sharing improves coordination, integration, and overall supply chain performance. While those studies mainly

showed direct effects, this study goes further by showing that information sharing changes how strongly ECR affects performance. In simple terms, ECR alone improves supply chain performance, but its impact is much stronger when firms share information well. This helps explain why some past studies found mixed results since firms that lack good information systems may not fully benefit from ECR.

4.3 CONCLUSIONS AND RECOMMENDATIONS

The study concludes that Efficient Consumer Response practices significantly enhance supply chain performance among large-scale manufacturing firms in Kenya, and that this relationship is further strengthened by the presence of effective Business Information Systems. The findings show that when ECR practices are implemented, firms experience improved coordination, responsiveness, and overall efficiency within their supply chains. The analysis further confirms that Business Information Systems, particularly through effective information sharing, not only have a direct positive effect on supply chain performance but also strengthen the impact of ECR practices. The significant interaction between ECR and Business Information Systems demonstrates that ECR is more effective in firms where information systems support timely, accurate, and integrated flow of information. This implies that ECR practices do not operate in isolation; rather, their success depends on the technological and informational environment within which they are implemented. Therefore, superior supply chain performance is achieved when ECR initiatives are complemented by strong Business Information System capabilities.

Based on these conclusions, the study recommends that large-scale manufacturing firms in Kenya should adopt a holistic approach to supply chain improvement by integrating Efficient Consumer Response practices with strong Business Information Systems. Managers should invest in digital platforms that support real-time information sharing, demand visibility, and coordination with supply chain partners to fully leverage the benefits of ECR. Firms should also focus on building internal capabilities, including staff training and change management, to ensure effective use of information systems in supporting ECR initiatives. In addition, policymakers and industry stakeholders should promote the adoption of modern business information technologies by providing supportive infrastructure, guidelines, and incentives. Such measures will enable manufacturing firms to maximize the performance gains from ECR practices and build more agile, competitive, and resilient supply chains.

4.4 Contributions of the Study

This study contributes to policy by providing empirical evidence that highlights the importance of integrating operational supply chain practices with digital infrastructure in the manufacturing sector. The findings demonstrate that Efficient Consumer Response practices significantly improve supply chain performance, and that these benefits are amplified when supported by effective Business Information Systems, particularly information sharing. This offers policymakers a clear basis for formulating policies that encourage digital transformation in manufacturing supply chains. Government agencies and industry regulators can use these insights to design supportive frameworks, incentives, and standards that promote the adoption of integrated information systems and collaborative supply chain practices. By doing so, policy interventions can help strengthen supply chain resilience, enhance industrial productivity, and improve the global competitiveness of large-scale manufacturing firms in Kenya.

In terms of supply chain practice, the study provides practical guidance to managers and practitioners on how to achieve better supply chain outcomes. The study contributes to Supply Chain practice by emphasizing that technology should not be viewed as a standalone investment, but as an enabler of collaborative and responsive supply chain strategies. Managers can use these insights to prioritize integrated decision-making, improve coordination with supply chain partners, and align operational practices with digital tools to achieve higher levels of efficiency, responsiveness, and customer satisfaction.

From an academic perspective, the study contributes to the supply chain management literature by extending existing ECR research into a developing-country manufacturing context and by empirically testing the moderating role of Business Information Systems. While much of the existing literature has focused on the direct effects of ECR, this study advances knowledge by demonstrating how information systems shape the strength of the ECR-performance relationship. These findings open avenues for future research to explore other contextual moderators, compare sectoral differences, and further refine theoretical models linking supply chain practices, digital capabilities, and performance outcomes.

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