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Supply Chain Innovative Practices and Customer Satisfaction: Insights from Manufacturing SMEs

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Abstract: In today's highly competitive business landscape, SMEs face the challenges of meeting customer demands and expectations. To remain competitive, attract and satisfy customers, manufacturing SMEs must adopt innovative practices within their supply chain. This research investigates the influence of supply chain innovative practices (SCIPs) on customer satisfaction within the context of manufacturing SMEs. A cross-sectional questionnaire survey was utilised to collect the data from 172 customers of manufacturing SMEs in Mwanza, Tanzania to gain comprehensive insights into the influence of SCIPs on customer satisfaction. Descriptive statistics and binary logistic regression (BLR) were used for data analysis. The research findings revealed that manufacturing SMEs adopt SCIPs, including digitalization and IoT integration, vendor-managed inventory, customisation, Just-In-Time, collaborative relationships, and lean manufacturing to a moderate extent. Moreover, the findings demonstrate a significant and positive correlation between SCIPs and customer satisfaction. We conclude that SMEs that successfully adopt SCIPs experience higher levels of customer satisfaction, which, in turn, positively influences customer loyalty and brand reputation. Therefore, manufacturing SMEs can capitalise on customer satisfaction, loyalty, and sustainable growth by strategizing SCIPs along their supply chain. The study contributes to the existing knowledge by providing valuable insights into the importance of SCIPs in improving customer satisfaction in manufacturing SMEs.

Keywords: supply chain; SCIPs; manufacturing SMEs; customer satisfaction.

Introduction

In today's highly competitive business environment, small and medium-sized enterprises (SMEs) operating in the manufacturing sector play diverse roles in socio-economic transformation across many countries. They serve as important catalysts for job and wealth generation, fostering innovation and enhancing value creation (Gurria, 2020; Mahuwi & Israel, 2023; Rahman & Kavida, 2022). Manufacturing SMEs account for approximately 25% of global formal SMEs (Gurria, 2020; Rahman & Kavida, 2022; World Trade Organisation (WTO), 2020) and employ about 7.1% of the global workforce (United Nations (UN), 2020). Their primary goal is to generate value by converting raw materials into a useful form through various methods, approaches, and operational systems. Moreover, the sector plays a significant role in the regional and global supply chains, contributing approximately 50% to 60% of the total value of goods produced (Gurria, 2020; Rahman & Kavida, 2022; World Bank, 2020).

Despite their pivotal role, manufacturing SMEs encounter several challenges that adversely affect their operational performance, growth, and sustainability. Studies by Asgary et al. (2020), Lim et al. (2021) and Thekkoote (2022) reported the inability to access, satisfy, and retain customers as the major constraints faced by manufacturing SMEs. Furthermore, dynamic market forces, volatility in demand, and limited innovative practices signify the complexities in meeting customer demands and expectations along

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the supply chain (SC) of manufacturing SMEs (Asare et al., 2023; Mwenda et al., 2023; Odunayo & Victor, 2020).

To remain competitive, sustain growth, attract, and satisfy customers, manufacturing SMEs must adopt innovative practices within their SC. Adopting supply chain innovative practices (SCIPs) has the potential to revolutionize the way manufacturing SMEs operate and interact with their customers. SC innovation encompasses the adoption and integration of advanced technologies, data analytics, and new methodologies to optimize various aspects of the SC (Jermsittiparsert et al., 2019; Liu et al., 2023; Nezhadi & Faraji, 2021). It includes, but is not limited to customization of requirements, digitalization and IoT integration, fostering collaborative relationships, strategic sourcing, inventory management, distribution strategies, and logistics. Studies reveal that SCIPs play a crucial role in delivering products efficiently and meeting deadlines at cost-effectiveness, thereby leading to improved service levels and enhanced customer satisfaction (Israel, 2022; Siwandeti et al., 2023; Thekkoote, 2022). Subsequently, satisfied customers are more inclined to become repeat patrons, advocate products or services to others, and contribute to a favourable brand image and reputation.

On the other hand, deficiencies like delayed delivery of requirements due to logistical inefficiencies can tarnish a company's reputation and subsequently deter both existing and potential customers (Funke et al., 2022; Lagat et al., 2021). In line with these arguments, Lagat et al. (2021), Millson and Shockley (2021), and Thanh (2020) opined that the implementation of SCIPs such as agile supply chains, Just in Time (JIT) strategies, vendor-managed inventory (VMI), and outsourcing plays a pivotal role in enabling flexible sourcing and rapid responses to dynamic customer demands without the need for excessive inventory.

Understanding the influence of SCIPs on customer satisfaction holds paramount significance for manufacturing SMEs aiming to gain a competitive advantage in the market. Experience shows that robust adoption of SCIPs, including digital solutions, customized requirements, collaborative relationships, and VMI, has enabled SMEs in OECD countries to emerge as major players in the global economy and supply chains (Gurria, 2020; WTO, 2020). Malaysia reflects a similar scenario, where approximately 16% of SMEs engage in exports due to effective planning and well-coordinated SC practices with foreign firms (WTO, 2020).

Although studies addressing the relations between SCIPs and customer satisfaction are available in a global context (Bouhelal & Adouka, 2022; Diaw & Asare, 2018; Gligor et al., 2020; Kawa & Zdrenka, 2023; Nikneshan et al., 2023; Teng et al., 2023), the existing body of knowledge concerning the influence of SCIPs on customer satisfaction within the context of local manufacturing SMEs, remains limited. Previous studies primarily focus on examining socio-economic challenges faced by SMEs and their role in fostering inclusive growth (Berne & Donaire, 2019; Israel & Kazungu, 2019; Kuswanto et al., 2019), as well as barriers and enablers for SCIPs (Bouhelal & Adouka, 2022; Okpoko et al., 2022; Rahman & Kavida, 2022; Thanh et al., 2020). There is a gap in understanding how SCIPs influence customer satisfaction in smaller-scale operations, such as manufacturing SMEs. Therefore, this proposed research aims to address this gap in the literature by investigating the direct effects of SCIPs on customer satisfaction within the manufacturing SME sector. The study aims to explore the following key research questions:

RQ1. What SCIPs are manufacturing SMEs adopt to enhance customer satisfaction?

RQ2. How do SCIPs influence customer satisfaction within the SC of manufacturing SMEs?

The research targets a diverse sample of manufacturing SMEs in Mwanza, Tanzania, encompassing various SCIPs and the status of customer satisfaction. The findings of this research contribute significantly to the existing literature on supply chain management (SCM) and customer satisfaction within the context of SMEs. Moreover, the results provide valuable practical implications for manufacturing SMEs, helping them strategize their SC innovations to drive customer satisfaction, loyalty, and sustainable business growth.

Literature review and theoretical perspectives

The theory of service-dominant logic (SDL)

Considering the empirical nature of this research, we employ the Service-Dominant Logic (SDL) theory, consistent with recent studies on customer satisfaction (Barrett et al., 2015; Boorsma, 2006; Rehman et al., 2012). SDL is a marketing and management theory that emphasizes the primacy of service and value co-creation in economic exchange. The theory posits that value is not embedded solely in products but is instead co-created through interactions between customers and service providers (Lusch & Vargo, 2014; Yazdanparast et al., 2010). SDL emphasizes the importance of integrating resources, approaches, processes, and systems, both internal and external, to co-create value.

In particular, SDL theory suggests that integrated approaches and systems lead to improved performance, consequently enhancing customer satisfaction (Lusch & Vargo, 2014). In the context of this study, SDL provides a relevant and comprehensive theoretical framework to explore how SCIPs exist to fulfil customer needs and enhance the value co-creation process between manufacturing SMEs and their customers. SCIPs involve the integration of advanced technologies and methodologies, such as digitalisation and IoT integration, VMI, lean manufacturing, and collaborative relationships, all aimed at creating a seamless and customer-centric SC (Asare et al. 2023; Nezhadi & Faraji, 2021; Wong & Ngai, 2022). By adopting SCIPs, manufacturing SMEs can involve customers more closely in the process and tailor their offerings to better meet customer needs and preferences, leading to higher levels of customer satisfaction. It is theorised that SCIPs, as a form of value co-creation, lead to improved efficiency and effectiveness, better customer experiences, and higher levels of satisfaction.

Adoption of SCIPs in manufacturing SMEs

Existing literature confirms that manufacturing SMEs encounter both external and internal challenges arising from constantly changing socio-cultural, political, technological, legal and economic factors (Nogami & Veloso, 2021; Odunayo & Victor, 2020). In addition, these enterprises encounter financial constraints and uncertain market conditions, which pose obstacles to their SC operations and marketing effectiveness. To surmount these difficulties, manufacturing SMEs are driven to adopt innovations throughout their SC. Studies reveal that nurturing innovation culture and building the ability to innovate among managers enhance the competitiveness and long-term viability of SMEs (Nikneshan et al., 2023; Rahman & Kavida, 2022; Rasib et al., 2021). According to Wong & Ngai (2022), innovation entails the incorporation and effective utilization of fresh value-added components in economic endeavours, encompassing the creation of novel processes, products, systems, and operations. Moreover, Rahman & Kavida (2022) asserted that SCIPs encompass revised and emerging strategies applied to SC processes and associated activities. Managers hold a pivotal position in establishing efficient operational strategies for manufacturing SMEs, which includes the adoption of SCIPs. Over the past decades, SCIPs have been adopted by manufacturing SMEs across many countries as mechanisms to enhance their operational and financial performance. These include digital solutions such as electronic data interchange (EDI), VMI, JIT, green procurement practices, reverse logistics, collaborative SC, early buyer involvement (EBI), outsourcing, and cross-docking (Doratiotto et al., 2023; Komah & Pujawan, 2021; Rahman & Kavida, 2022; Teng et al., 2023).

According to Asgary et al. (2020), manufacturing firms in Turkey that have adopted SCIPs demonstrate agility and are better positioned for growth, development, and survival. In Ghana, Diaw & Asare's study (2018) indicated that SMEs strive to adopt SCIPs but often encounter implementation failures. SMEs lag behind in embracing SCIPs, relying mostly on outdated technology and traditional operations, which restrict their growth and sustainability. Studies suggest that information asymmetry among SC actors hinders the effective adoption and implementation of SCIPs, particularly in emerging economies

(Okpoko et al., 2022; Sunil, 2019). In contrast, manufacturing SMEs in China have extensively integrated SCIPs, leading to lower transaction costs, enhanced competitive advantages, reduced SC risks, and improved access to resources and customers (Lagat et al., 2021; Wong & Ngai, 2022) (see Table 1).

Table 1. Definitions of SCPs and customer satisfaction

SCIPs	Author(s)	Definitions
Digitalization and IoT integration	Afolabi et al. (2019)	A computer-based system where business information, data and documents are exchanged between trading partners based in different locations and countries through an electronic format.
EBI	Jermisittiparsert et al. (2019)	A practice whereby the buyers become an active part of product designing, specification and development to elicit their knowledge and expertise towards a better quality of the product.
JIT	Sunil (2019)	Inventory management approach where materials are received from the suppliers only as close as possible to when they are needed by the company or customers for operations.
Collaborative SC	Al-Josaiman and Faisal (2021)	A practice involving SC stakeholders working together to strategize, execute, and implement SC activities, aiming for efficient flows of goods, funds, and information while meeting customer demands on time and in a cost-effective manner
VMI	Wong and Ngai (2022)	Inventory management system in which the supplier of goods is responsible for planning, managing, maintaining, and optimizing inventories on behalf of the customer.
Lean manufacturing	Lagat et al. (2021), Nikneshan et al. (2023)	SC and manufacturing models that focus on eliminating non-value-adding activities, achieving high-cost efficiencies and realise value-added activities to a final product.
Agile SC	Jermisittiparsert et al. (2019), Gligor et al. (2020).	The SC model expresses how a firm is quickly responsive, flexible and adjustable to meet the unexpected needs of customers under given resources and capacities.
Outsourcing and offshoring	Rasib et al. (2021)	Hiring a third party or obtaining goods, services or experts from organizations or countries with low labour costs or specialized skills to handle non-core activities and provide services for the organization
Cross-docking	Komah and Pujawan, (2021)	Logistic practice and procedure where goods from manufacturers and suppliers are shipped and distributed directly to retailers or customers with less or no handling cost and storage time.
Customer satisfaction	Funke et al. (2022), Kawa et al. (2023)	The measure of the extent how well a firm's products and services meet and surpass customers' expectations.
Digitalization and IoT integration	Afolabi et al. (2019)	A computer-based system where business information, data and documents are exchanged between trading partners based in different locations and countries through an electronic format.
EBI	Jermisittiparsert et al. (2019)	A practice whereby the buyers become an active part of product designing, specification, and development to elicit their knowledge and expertise towards a better quality of the product.

Source: own processing

The adoption of EDI and cross-docking has resulted in robust operations and minimized the involvement of intermediaries, thereby shortening product delivery times. These changes have led to a significant reduction in lead time and operational expenses. Despite facing some challenges, manufacturing SMEs remain committed to SCIPs. Notably, evidence shows that SMEs contribute four times more to innovation compared to larger

firms (Gherghina et al., 2020; Millson & Shockley, 2021). A study conducted in Malaysia by Rasib et al. (2021) and the WTO report in 2020 both emphasized the significant contribution of SMEs in promoting innovation. Malaysian SMEs actively implement diverse SCIPs, including EDI, collaborative SC, total quality management (TQM), JIT, VMI, EBI, green SC and reverse logistics (Rasib et al., 2021).

Studies reveal that manufacturing SMEs possess higher agility and flexibility, enabling them to swiftly adapt to new business approaches and fostering creativity (Nogami & Veloso, 2021; Odunayo & Victor, 2020; Rehman & Jajja, 2023). Due to their smaller customer base, SMEs find it easier to involve customers actively in product design and development through customization. Moreover, SMEs often have dominant and more potent customers, making it easier for them to establish long-term relationships and cultivate loyalty (Chin et al., 2012). Fostering buyer-customer relationships plays a crucial role in bringing customers closer, building loyalty, and enhancing SCM performance. Studies reveal that maintaining close relationships and collaborations with suppliers has been observed as one of the SCIPs that help Indonesian and Algerian manufacturing firms meet customers' requirements promptly (Bouhelal & Adouka, 2022; Kuswanto et al., 2019).

The adoption of SCIPs varies among firms and across countries based on their specific activities and the business environment in which they operate. However, certain barriers hinder the effective adoption of SCIP among SMEs in developing countries. These barriers include changes in organizational culture, financial constraints, reluctance to embrace change, and information asymmetry (Aliyev, 2020; Berne & Donaire, 2019; Rahman & Kavida, 2022). In addition, the volatility and dynamism of market conditions often limit manufacturing SMEs' ability to contribute significantly to SCIPs. Through an extensive review of literature, the present study identifies nine SCIPs commonly adopted in manufacturing SMEs, as summarized in Table 1.

Adoption of SCIPs in manufacturing SMEs

The primary goal of SCM is to improve the delivery of products to customers, both in terms of quality and quantity, by reducing costs, selecting suitable suppliers, and ensuring timely delivery of goods (Komah & Pujawan, 2021; Mwenda et al., 2023; Nezhadi & Faraji, 2021). Moreover, the strategic short-term objectives of SCM are to reduce manufacturing and procurement lead times, both internally and externally. Successfully achieving these immediate objectives and short-term goals in SCM lays the foundation for long-term objectives, such as maximizing profits, improving customer service levels, and cultivating customer satisfaction and loyalty. To fulfil these SCM objectives, SMEs must embrace modern, innovative, and creative approaches, departing from traditional SC operations. Studies carried out in Romania and Kenya by Gherghina et al. (2020) and Lagat et al. (2021) respectively, indicate a strong correlation between the measured performance of SCM and the implementation of SCIPs. Adopting SCIPs like JIT, e-procurement systems, VMI, and cross-docking leads to cost savings in service provision by minimizing inventories, delivery time, and cycle time (Afolabi et al., 2019; Siwandeti et al., 2021). Consequently, these efficient approaches meet customers' requirements at a minimal cost and within short lead times, thereby promoting customer satisfaction and loyalty. Ultimately, this helps meet customers' primary objectives of acquiring high-quality products at minimal costs and within the shortest possible lead time.

Further studies reveal that SCIPs facilitate improvements in SCMS and ensure timely delivery of requirements for up to 60% of customers (Chin et al., 2012; Odunayo & Victor, 2020). For instance, e-supply chain systems can reduce SC operational costs by approximately 40% (Chin et al., 2012). In a study conducted by Gurria (2020) across EU countries, significant uptake and remarkable advantages of SCIPs in SMEs were emphasized, resulting from integrated and collaborative SC, adoption of e-commerce, and customization of requirements. In countries like Merseyside and the UK, around 90% of SMEs have adopted one or more SCIPs, contributing significantly to their substantial

growth and progress. Consequently, these SMEs can successfully meet and retain approximately 80% of their customers (WTO, 2020). Particularly in Kenya, there have been noteworthy enhancements in customer service levels, decreased SC risks, improved responsiveness, robust information sharing among SC participants, and enhanced communication, all credited to the implementation of SCIPs (Lagat et al., 2021). Likewise, Asgary et al. (2020) discovered that in Turkey, manufacturing SMEs that successfully embrace SCIPs gain flexibility, agility, reduced production lead times, and enhanced precision in meeting customer demands. Manufacturing SMEs with robust SCIPs demonstrate greater flexibility in adapting to ever-changing socio-economic, political, and technological environments (Al-Josaiman & Faisal, 2021; Rehman & Jajja, 2023; Sunil, 2019).

Materials and methods

We employed a cross-sectional research design and a quantitative approach to examine the effect of SCIPs on customer satisfaction among manufacturing SMEs. As suggested by Flick (2020), the quantitative research approach allows for the quantification and measurement of specific phenomena, making it suitable for investigating cause-and-effect relationships and drawing statistically significant conclusions (see Table 2).

Table 2. Respondents' characteristics

Attributes of Respondents	Frequency [n = 172]	Percent [%]
Gender:		
Female	83	48.26
Male	89	51.74
Age of respondents:		
18 - 25	35	20.35
26 - 35	31	18.02
36 - 45	51	29.65
46 - 55	27	15.70
56 and above	28	16.28
Education background:		
Secondary Education	32	18.60
Diploma	47	27.33
First Degree	54	31.40
Postgraduate	39	22.67
Years of being a customer of a firm:		
Less than 6 months	14	8.14
6 months - 1 Year	42	24.40
More than 1 year - 2 years	49	28.52
More than 2 years - 5 years	39	22.67
Above 5 years	28	16.28
Manufacturing SMEs used by customers:		
Food processing	38	22.09
Textile manufacturing	36	20.93
Beverages	21	12.21
Rubber and plastics	27	15.70
Chemicals	23	13.37
Non-metallic products	27	15.70

Source: own processing

Moreover, the cross-sectional research design was valuable for this study because it enabled researchers to gather data to establish associations between variables and provide a snapshot of the population's characteristics at a single point in time (Saunders et al., 2019). The target population for this study comprised active and loyal customers of manufacturing SMEs in Mwanza City, Tanzania. Since it was not possible to ascertain the total population and reach all customers in the study area, we utilized a convenience

sampling approach to determine the sample size for the study. Only customers who had been associated with specific manufacturing SMEs for more than six months were considered for observation. Based on this criterion, questionnaires were administered to 187 customers selected from 18 manufacturing SMEs' databases in Mwanza city. However, due to non-responses, only 91.98% (n = 172) of the questionnaires were successfully completed and returned.

Table 2 provides a summary of the selected respondents' characteristics for this research. The analysis revealed that most customers in manufacturing SMEs were female, accounting for 51.74% of the sampled customers, while males constituted 48.26%. Around 31.40% of the respondents had at least a first-degree qualification, with the smallest percentage (18.60%) having completed secondary school education. Approximately 28.52% of the respondents included in the sample had been customers of a particular manufacturing SME for about 1 to 2 years. Subsequently, 24.40% had a customer experience ranging from 6 months to 1 year, and 22.67% had been customers for 2 to 5 years. This indicates that most respondents in the study possessed sufficient experience in customer satisfaction in manufacturing SMEs, aligning well with the study's focus. The highest number of respondents (29.65%) fell within the age range of 36 to 45 years, followed by 20.35% aged between 18 to 25 years. Mwanza was purposefully chosen for the study due to its economic significance as a port city with a substantial number of manufacturing SMEs compared to other regions. As reported by the NBS (2020) and UN (2020), manufacturing SMEs comprise approximately 23% of the formal SMEs in a particular area. The research sampled customers from various sectors of manufacturing SMEs, with the majority being customers of food processing (22.09%), followed by textiles manufacturing (20.93%).

To examine the relationship between the study variables, the study collected quantitative and primary data through a questionnaire survey method. A five-point Likert scale (1 = not at all and 5 = very great extent) was employed, making it suitable for generating and easily interpreting the relevance of SDL theory in assessing the influence of SCIPs on customer satisfaction. Prior to analysis, the data underwent cleaning and coding to identify errors. Descriptive statistics, including mean and standard deviation, were employed to gauge the level of SCIP adoption among manufacturing SMEs. Additionally, binary logistic regression (BLR) was utilized to evaluate the relative influence of SCIPs on customer satisfaction. BLR was chosen for this study as it involved nine independent variables (SCIPs) and one dummy dependent variable (customer satisfaction), as defined and operationalized in equation 1 and Table 3.

$$\text{Logit}[p(Y_i)] = \log \left[\frac{p(y)}{1 - p(y)} \right] = \beta_0 + \beta_1 x_1 + \dots + \beta_3 x_3 + e \dots \dots \dots (1)$$

Table 3. Definitions and operationalisation variables

Dependent Variable: Customer satisfaction coded as 1 = satisfied customer, 0 = otherwise	
Independent Variables: Supply chain innovative practices (SCIPs)	
x_1	Digitalization and IoT integration (1 = adopt, 0 = otherwise)
x_2	Early buyer involvement (1 = enhances EBI, 0 = otherwise)
x_3	Just in time (1 = practices JIT, 0 = No)
x_4	Collaborative SC (1 = enhances collaborative SC, 0 = otherwise)
x_5	Vendor management inventory (1 = practices VMI, 0 = otherwise)
x_6	Lean manufacturing (1 = embraces lean manufacturing, 0 = otherwise)
x_7	Agile supply chain (1 = enhances ASC, 0 = otherwise)
x_8	Outsourcing of goods and services (1 = constantly outsource, 0 = make in-house)
x_9	Cross-docking (1 = prefers cross-docking, 0 = otherwise)

Source: own processing

Findings and discussion

Measures of SCIPs in manufacturing SMEs

This part presents and discusses the findings on the extent to which manufacturing SMEs adopt SCIPs as an important tool for customer satisfaction. The results of the reliability analysis revealed an average Cronbach's Alpha value of 0.806 from the adopted 9 SCIPs. None of the adopted SCIPs has less than the recommended Cronbach's Alpha value of 0.7, hence revealing the attainment of internal consistency of the research data (Morgan et al., 2020). The measures of adoption of SCIPs were ascertained by using mean scores and standard deviation. We found that manufacturing SMEs embrace the adoption of digitalization and IoT integration in business transactions to a moderate extent (mean = 3.168; Std. Deviation = 0.705). A std. deviation of 0.705 implies convergence in responses among respondents that manufacturing SMEs adopt SCIPs to a moderate extent. The findings are in line with Siwandeti et al.'s (2021) and Rahman and Kavida's (2022) findings who reported limited adoption and application of digital tools among SMEs in business operations due to limited ICT experts, high acquisition and installation costs of ICT tools and poor ICT infrastructures that support EDI. Moreover, manufacturing SMEs enhance EBI during product designing and development to a moderate extent (mean = 3.227; Std. Deviation = 0.726). This reveals consensus in responses among respondents regarding the moderate adoption of EBI among manufacturing SMEs. This could be attributed to information asymmetry regarding the perceived benefits of EBI and concerns about data leakage, acting as barriers to the effective adoption of SCIPs in certain business firms as it was reported by Bouhelal and Adouka (2022) and Komah and Pujawan (2021) as well.

The study also identified that manufacturing SMEs moderately adopt JIT as an inventory control technique (mean = 2.905), with respondents showing a consensus in their responses (Std. Deviation = 0.528). This finding agrees with Liu and Lee (2018) as well as Sunil (2019), who revealed the effective adoption of JIT among SMEs, particularly for managing non-moving and slow-moving goods. Furthermore, the study noted that manufacturing SMEs exhibit a relatively lower preference for collaboration and coordination (horizontal integration) with other firms across their supply chain (mean = 2.501; Std. Deviation = 0.815). The consistent responses (Std. Deviation = 0.815) indicate a shared viewpoint among respondents that manufacturing SMEs engage in collaborative relationships and integration along their chain to a lesser extent (Table 4).

Table 4. Definitions and operationalisation variables

SCIPs	Cronbach's Alpha	Mean	Std. Deviation
Firms favour IoT integration business transactions	0.798	3.168	0.705
Customers actively participate in product development	0.865	3.227	0.726
Firms exclusively prioritize and implement JIT	0.715	2.905	0.528
Firms engage in collaborative efforts with customers	0.798	2.844	0.815
Firms solely practice VMI for products and materials	0.893	2.512	0.733
Firms integrate with customers and suppliers	0.774	2.593	0.952
Firms exclusively emphasize lean manufacturing	0.826	3.105	0.712
Firms respond promptly to changing customer demands	0.801	3.267	0.723
Firms enhance SC efficiency through outsourcing	0.795	3.344	0.806
Emphasis is placed on eliminating storage links in the SC	0.782	3.211	0.719
Firms have witnessed increased customer satisfaction	0.807	3.158	0.814

Source: own processing

Adebisi and Bakare (2019), Asare et al. (2023) and Ramjaun et al. (2022) linked this tendency of SMEs to limited resources, a limited understanding of the benefits of collaboration and integration, and apprehensions about mergers and acquisitions. Regarding VMI, the study found a mean score of 2.512 and a Standard Deviation of 0.733,

suggesting convergence in respondent opinions. This underscores that manufacturing SMEs partially delegate inventory planning and management responsibilities to vendors for specific objectives. Other studies by Lagat et al. (2021), Liu and Lee (2018), and Nogami and Veloso (2021) identified drivers for VMI among SMEs, including limited storage capacity, high inventory holding costs, and inadequate inventory management skills.

The study also found that manufacturing SMEs exhibit a relatively lower degree of vertical integration with suppliers and customers along their SC (mean = 2.593), and there was a significant variation in responses (Std. Deviation of 0.952). This finding aligns with Ho et al.'s (2020) research, which suggests that due to limited resources and their small size, SMEs face challenges in effectively merging and conquering the necessary expertise and resources for sustainable growth and survival in both downstream and upstream of the SC. Additionally, the study indicated that manufacturing SMEs are moderately committed to lean manufacturing (mean = 3.105; Std. Deviation = 0.712). This is consistent with the explicit goals of manufacturing firms, aiming for zero waste and the realization of value-added activities (Millson & Shockley, 2021; Odunayo & Victor, 2020). Furthermore, the research revealed that manufacturing SMEs are flexible, agile, and capable of responding to changing customer demands, environmental factors, and technologies (mean = 3.267).

The responses among the respondents showed less variability (Std. Deviation = 0.723), indicating that manufacturing SMEs possess a moderate level of responsiveness to dynamic environments, technologies, and customer needs. These findings are in line with Diaw and Asare's (2018), Gligor et al. (2020) as well as Nogami and Veloso's (2021) studies, which demonstrated significant flexibility among manufacturing SMEs in the USA, Brazil and Ghana. Such flexibility is linked to the explicit goals of achieving enhanced customer service levels, satisfaction, and loyalty.

Again, the study found that manufacturing SMEs exhibit a moderate preference for outsourcing and offshoring goods and services, with a mean score of 3.344 and a standard deviation of 0.806. This indicates a consensus among respondents that manufacturing SMEs employ outsourcing and offshoring as strategic objectives to enhance efficiency, effectiveness, and cost reduction to a moderate extent. This finding aligns with previous research by Adebisi and Bakare (2019) and Doratiotto et al. (2023) which linked outsourcing and offshoring objectives to ensuring supply continuity and providing higher-quality goods and services at a lower cost. Similarly, the study revealed that manufacturing SMEs moderately adopt cross-docking, a practice where goods are shipped directly to the end customers after production, thereby minimizing handling costs and storage time. The mean score for cross-docking was 3.211, with a standard deviation of 0.719, indicating convergence in responses among the participants. Cross-docking helps SMEs address delivery delays to retailers and customers while reducing storage and handling costs, as supported by studies conducted by Lagat et al. (2021) and Millson and Shockley (2021).

Regarding customer satisfaction, the study found that manufacturing SMEs effectively adopting SCIPs along their supply chain achieved customer satisfaction to a moderate extent, with a mean score of 3.158 and a standard deviation of 0.816. This suggests a consensus among respondents that SCIPs positively influence customer satisfaction. These findings are consistent with the results reported by Ho et al. (2020) and Komah and Pujawan (2021), as well as the fundamental assumptions of SDL theory, which emphasize the importance of robust processes, procedures, and interactions between customers and service providers towards improved marketing and operational performance.

Regression analysis

Table 4 presents the coefficients (β) and important $\exp(\beta)$ values resulting from the BLR used to establish the relationship and the influence of SCIPs on customer satisfaction. The $\exp(\beta)$ values are crucial in interpreting the influence of the explanatory variables on the outcome variable. Prior to the analysis, model fitting tests were conducted to validate the

suitability and relevance of BLR in predicting and determining the influence of SCIPs on customer satisfaction. The outputs of these tests indicated that the BLR model was well-suited to the data, and the explanatory variables (SCIPs) exhibited consistency with the model ($\chi^2 = 0.012 < \alpha$, Hosmer and Lemeshow Test = $0.205 > \alpha$). Furthermore, the analysis revealed a Pseudo R2 value (Nagelkerke R2) of 0.687, signifying that the explanatory variables (SCIPs) used in this study accounted for a substantial 68.7% contribution to customer satisfaction in manufacturing SMEs, leaving 31.3% for unaccounted variables. The average variance inflation factor (VIF) was 1.30, indicating that multicollinearity among the explanatory variables was not a concern. Overall, the results of these tests offer strong evidence that the BLR model was highly appropriate for the data and demonstrated both significance and effectiveness in predicting and elucidating variations in customer satisfaction among manufacturing SMEs, considering the adopted SCIPs (Table 5).

Table 5. Beta coefficients and Exp(β) of BLR

Variables	Coefficients (β)	Exp(β)	VIF
Digitalization and IoT integration (1 = adopt EDI, 0 = otherwise)	0.593*** (0.0652)	1.809	1.23
Early buyer involvement (1 = enhances EBI, 0 = otherwise)	1.515* (0.0887)	4.549	1.35
Just in time (1 = practices JIT, 0 = No)	0.775** (0.0941)	2.171	1.044
Collaborative supply chain (1 = enhance collaborative SC, 0 = otherwise)	2.270** (0.0790)	9.679	1.109
Vendor management inventory (1 = practices VMI, 0 = otherwise)	0.329** (0.0833)	1.389	1.433
Lean manufacturing (1 = embraces lean manufacturing, 0 = otherwise)	0.625** (0.0599)	1.868	1.307
Agile SC (1 = enhances agile SC, 0 = otherwise)	1.024* (0.0819)	2.784	1.455
Outsourcing of goods and services (1 = constantly outsource, 0 = make in-house)	1.047** (0.838)	2.849	1.311
Cross-docking (1 = prefers cross-docking, 0 = otherwise)	0.915*** (0.0950)	2.496	1.229
Constant	0.319* (0.0715)	1.376	-
$\chi^2 = 0.012 < \alpha$; Nagelkerke R ² = 0.687; Hosmer and Lemeshow Test p-Value = $0.205 > \alpha$; Average VIF=1.30.			
Note: *, **, *** Donates Statistic Significant level at p < 0.1; p < 0.05 and p < 0.01 respectively. Standard errors in parentheses			

Source: own processing

The findings indicated that SCIPs once effectively adopted and streamlined in the manufacturing SMEs play a significant role in enhancing customer satisfaction. Holding all explanatory variables constant, the ability of manufacturing SMEs to satisfy customers would be significantly enhanced by 37.6% ($\beta = 0.319$, $\exp(\beta) = 1.376$, $p < 0.1$). This study found a moderate adoption of SCIPs among manufacturing SMEs (Table 3). Nevertheless, even with moderate adoption, SCIPs exhibited a positive and noteworthy influence on customer satisfaction. Digitalization and IoT integration in business operations and transactions was 80.9% more likely in enhancing customer satisfaction ($\beta = 0.593$, $\exp(\beta) = 1.809$, $p < 0.01$). This implies that the adoption of IoT systems such as EDI, e-procurement, e-commerce, and e-business systems play an important role in enhancing customer satisfaction among manufacturing SMEs. IoT offers time and cost savings and information security, which is one of the pre-requisite requirements for customer satisfaction (Afolabi et al., 2019; Siwandeti et al., 2021; Teng et al., 2023). The study further revealed that manufacturing SMEs that regard customers as active participants during product designing and development were 54.9% more likely to enhance customer

satisfaction ($\beta = 1.515$, $\exp(\beta) = 0.4.549$, $p < 0.1$), indicating that EBI is an important approach to customer satisfaction in manufacturing SMEs. Like Jafari et al.'s (2022) and Kuswanto et al.'s (2019) findings, the practice of EBI results in enhanced customer loyalty and quick responses to everchanging customer needs, demands and specifications in time and at cost-effective.

Furthermore, we revealed that manufacturing SMEs that collaborate and integrate their operations with other firms and actors along their supply chain were 67.9% more likely to satisfy their customers ($\beta = 2.270$, $\exp(\beta) = 9.679$, $p < 0.05$). Collaboration and integration essentially make all SC actors collectively plan, execute, share information, and complete the manufacturing process in time. In their studies on the effects of a firm's innovations in a marketplace, Asare et al. (2023), Kuswanto et al. (2019) and Sunil (2019) asserted that collaboration and integration simplify SC activities and satisfy customers' needs at cost and time effective. Again, embracing JIT system in inventory control by manufacturing SMEs increases the likelihood of customer satisfaction by 17.1% ($\beta = 0.775$, $\exp(\beta) = 2.171$, $p < 0.05$). This implies that the adoption of JIT plays an important role in enhancing customer satisfaction among manufacturing SMEs. In line with Millson and Shockley's (2021) and Sunil's (2019) findings, this study asserts that JIT guarantees timely delivery of requirements and flexibility in meeting customers' needs on time with less or no inventory holding costs.

The findings also revealed that manufacturing SMEs that adopt VMI would significantly and positively enhance customer satisfaction by 38.9% ($\beta = 0.329$, $\exp(\beta) = 1.389$). Streamlined frameworks for VMI help in eliminating firms' deficiencies related to inventory management such as limited storage facilities and inventory management skills in manufacturing SMEs. This guarantees continuity of supplies in manufacturing SMEs and to customers which form an integral part of customer satisfaction. Similar studies conducted by Bouhelal and Adouka (2022) and Komah and Pujawan (2021) in Algeria and Sierra Leone revealed that VMI reduces storage costs and ensures timely availability of materials at each node of the SC, thus keeping customers satisfied with timely delivery. Agile SC was 78.4% more likely to enhance customer satisfaction in manufacturing SMEs ($\beta = 1.024$, $\exp(\beta) = 2.784$, $p < 0.1$). Therefore, firms that constantly and quickly respond to customers' needs, volatility markets and technology stand a high chance of satisfying their customers. The findings are in line with Jermisittiparsert et al. (2019), Nikneshan et al.'s (2023) and Thanh et al.'s (2020) findings who spotted agile supply chain as one of the essential practices for enhancing marketing performance in Vietnam's firms. Agile SC emphasises timely decision-making toward optimized flows of goods along the SC of manufacturing SMEs.

Outsourcing and offshoring revealed a positive and significant influence on customer satisfaction ($\beta = 1.047$, $\exp(\beta) = 2.849$, $p < 0.05$). Manufacturing SMEs that undertake outsourcing and offshoring of services and goods were 84.9% more likely to satisfy their customers in terms of a better quality of services and goods, timely delivery and cost-effectiveness. In line with this finding, Doratiotto et al. (2023) and Lagat et al. (2021), connected the perceived benefits of outsourcing and offshoring with the firm's ability to procure and deliver better quality goods and services at the lowest cost using skilled and experienced personnel. Lastly, the study revealed that the use of cross-docking in product distribution enhances customer satisfaction by 49.6% ($\beta = 0.915$, $\exp(\beta) = 2.496$, $p < 0.01$). This implies that manufacturing SMEs that prefer direct distribution channels with minimal or no storage time of product after production are more likely to satisfy their customers. The findings concur with Bouhelal and Adouka's (2022) and Nogami and Veloso's (2021) views that cross-docking eliminates delay whilst enhancing timely delivery of goods to the ultimate customers, which is one of the key requirements and objectives of manufacturing SMEs toward customer satisfaction.

Conclusions

The main objective of this research was to assess the influence of SCIPs on customer satisfaction in manufacturing SMEs. The study's findings showed that manufacturing SMEs moderately adopt and implement SCIPs in their operations (Mean scores < 3.0; Std. Deviations < 1.0). These include digitalization and IoT integration, collaborative and integrated SC, early buyer involvement, JIT, VMI, lean production, cross-docking, outsourcing, and agile SC. Despite this moderate adoption, the research revealed a positive and significant correlation between the adopted SCIPs and customer satisfaction among manufacturing SMEs. It was concluded that SCIPs are vital tools that play a positive and significant role in enhancing customer satisfaction in the surveyed manufacturing SMEs. SCIPs enable modern operations and timely delivery of products to customers in a cost-effective manner, forming the basis for customer satisfaction.

To maintain and further enhance customer satisfaction, the study recommends manufacturing SMEs to fully embrace SCIPs at all levels of their supply chain. To the government and policymakers, the study suggests organizing regular training sessions and establishing centralized platforms to bring together manufacturing SMEs and familiarize them with the benefits of SCIPs and associated approaches. This approach is expected to alleviate the complexities that hinder full adoption and implementation of SCIPs in manufacturing SMEs.

This research investigated the influence of SCIPs on improving customer satisfaction within manufacturing SMEs, utilizing the SDL theory as a theoretical lens. The study assumed that the application of SDL enhances the adoption of SCIPs and customer satisfaction in manufacturing SMEs. The SDL stresses modern operation, innovative practices, ideas and streamlined structures, procedures, and practices as the key tools for enhanced customer satisfaction and service levels. The theories apply to both strategic, operational, and tactical activities of an organisation. In this study, SDL theory was used to assess how transactional and operational activities along the SC of manufacturing SMEs are structured, designed, and streamlined toward the realisation of cost-effective, timely delivery of requirements, and customer satisfaction. Well-streamlined SC activities, networks and designs are an integral part of SCIPs. SDL regards innovative practices in business operations as an essential tool for sustainable operational, marketing performance and customer satisfaction. This research establishes that the challenges and deficiencies in customer satisfaction in manufacturing SMEs is the results of limited adoption of SCIPs by various actors in their SC. Similar to other supply chains, the manufacturing SMEs' SC is influenced by dynamic market forces, environmental factors, and technological advancements. To match these forces and minimise the deficiencies in customer satisfaction, manufacturing SMEs must consider the worth of innovative practices along their chain.

While prior studies have focused on identifying factors, innovative obstacles, and strategies for sustainable growth among SMEs in the market (as was described in the first part of the paper), this research delves into the adoption levels of diverse SCIPs by manufacturing SMEs and their influence on enhancing customer satisfaction. This study makes a novel contribution to the existing body of knowledge, providing valuable insights to scholars, policymakers, and researchers about the different forms of SCIPs and their influence on customer satisfaction in manufacturing SMEs. However, it is important to note that the findings of this study are limited to Tanzania's manufacturing SMEs and should not be generalized to larger firms or SMEs in other regions and sectors of the economy.

Additionally, the study did not consider other factors beyond SCIPs that may influence customer satisfaction in manufacturing SMEs. As a result, there may be a lack of understanding of these unaccounted variables and their broader implications for customer satisfaction in the manufacturing SME context. To address these limitations, future studies should encompass all types of firms across different regions, extending

beyond manufacturing SMEs. Furthermore, future studies should comprehensively investigate the various factors, such as legal and socio-economic factors that influence the adoption of SCIPs and customer satisfaction in manufacturing SMEs. Such research would provide valuable insights to inform decision-making and policy development in enhancing customer satisfaction across different industries.

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