South African Journal of Business Management
ISSN: (Online) 2078-5976, (Print) 2078-5585

Connecting operational capabilities, supply chain responsiveness and flexibility in the fast-moving consumer goods manufacturing sector: The mediation of competitive performance

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Dates:
Received: 02 Jul. 2025
Accepted: 20 Apr. 2026
Published: 08 June 2026

How to cite this article:
Hweshure, N.C., Loury Okoumba, W.V., & Mafini, C. (2026). Connecting operational capabilities, supply chain responsiveness and flexibility in the fast-moving consumer goods manufacturing sector: The mediation of competitive performance. *South African Journal of Business Management, 57*(1), a5476. https://doi.org/10.4102/sajbm.v57i1.5476

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Purpose: The study aimed to investigate the relationships among operational capabilities, firm competitive performance, supply chain responsiveness and flexibility in the fast-moving consumer goods (FMCG) manufacturing sector in South Africa. The study also interrogated the mediating role of competitive performance in this association with the same sector. This investigation stemmed from operational challenges affecting FMCG's competitive sustainability.

Design/methodology/approach: A correlational design was used to collect data from 420 purposively selected supply chain professionals from the FMCG manufacturing sector in Gauteng province. Data were analysed using partial least squares structural equation modelling.

Findings/results: Three operational capabilities – innovation, technology and supply network diversity – emerged as driving factors of competitive performance. Competitive performance positively influenced the FMCG supply chain's flexibility and responsiveness. Competitiveness mediated the impact of operational capabilities on the flexibility and diversity of the FMCG supply chain.

Practical implications: Operational capabilities are a vital source of competitive performance and a supply chain flexibility and responsiveness of FMCG manufacturing firms.

Originality/value: The study applies a unique research model to the FMCG manufacturing supply chain, making it a novel attempt to apply that empirical lens to this economic sector in South Africa.

Keywords: operational capabilities; firm competitive performance; supply chain responsiveness; supply chain flexibility; South African FMCG sector.

Introduction

The fast-moving consumer goods (FMCG) manufacturing sector is one of the most economically important segments in South Africa (SA) (Statista, 2025). It contributes significantly to the country's growth and development. For instance, in 2024, it contributed 13% to the country's gross domestic product (GDP), while its overall contribution in 2023 was estimated at around R845.6 billion (Business Wire, 2024). Furthermore, the sector's participation in employment creation is evident, with the creation of direct and indirect employment of up to 2 million people, with notable input from key role players such as Tiger Brands' Langeberg and Ashton Foods division, which create about 3000 jobs (seasonal and permanent) (Reuters, 2024; Ward & Pillay, 2023). As a whole, the FMCG sector is credited with providing opportunities for entrepreneurship to many people who are out of formal employment and with improving consumer spending by offering a wide variety of goods for selection (Bushe, 2019; Montandon, 2015; Siyaya, 2021).

Like any other economic segment, FMCG manufacturing markets have their own unique dynamics, characterised by a plethora of internal and external challenges that limit the performance of most firms competing in this sector. The main challenges include the lack of skills, information asymmetries impacting the sharing of relevant information and data (Mhlanga et al., 2015), value chain underperformance (Wadi & Gebhart, 2017), supply chain uncertainties (Franchise Association of South Africa, 2018) and most recently, the impact of social disturbances such as the 2021 July unrest, pandemics (e.g. coronavirus disease 2019 [COVID-19]) and natural hazards such

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as flooding that are mostly affecting coastal provinces such as KwaZulu-Natal and Eastern Cape and the recurrent unstable electrical power supply (Kilpatrick, 2020; Mboto, 2022; McKenzie et al., 2022; Statistics South Africa, 2020). The impact of such challenges and the FMCG sector's inability to improve its capabilities cannot be underestimated and demands further action to deliver appropriate solutions.

Against the above background, the present study investigates the relationships among operational capabilities, firm competitive performance, supply chain responsiveness and flexibility in the FMCG manufacturing sector in SA. The specific objectives of the study were to: (1) determine the association between operational capabilities and firm competitive advantage (FCP) in the FMCG sector, (2) determine the predictive influence of FCP on supply chain flexibility (SCF) and supply chain responsiveness (SCR) in the FMCG sector, and (3) analyse the mediating role of FCP in the association between operational capabilities and the outcome variables, namely SCF and SCR in the FMCG sector.

The FMCG manufacturing sector, also known as the consumer-packaged goods sector, trades in basic commodities that sell cheaply and quickly due to high demand; they are often purchased at low prices and have a short shelf life (Pelser, 2021). Fast-moving consumer goods products are regarded as regularly purchased goods with low involvement, shorter product lifecycles and relatively low cost (Nierobisch et al., 2017). Such goods include packaged food, cosmetics and toiletries, household cleaning products, low-value consumer appliances, non-prescription drugs, pet care and stationery, among others. The FMCG manufacturing sector in SA is highly competitive, with numerous players such as Tiger Brands, Premier FMCG Limited, RCL Foods, Unilever, Coca-Cola Beverages, Illovo, McCain Foods (specialising in frozen food range), Kellogg's, Bokomo, Heineken Beverages and South African Breweries (alcoholic beverage products) (Reuters, 2024). The fierce competition in the FMCG manufacturing sector could, among other things, be attributed to the ease with which new entrants can penetrate this already saturated market (Kudakwashe & Pooe, 2024). These low entry barriers are further evidenced through market expansion efforts by established retail giants such as Pick'n Pay, Shoprite, and Checkers, as well as Woolworths, which broadened their product portfolio with generic brands (no-name label products) (Business Wire, 2024; McKinsey & Company, 2024; Zawya, 2025). Such expansionary efforts contribute further to the sector's congestion.

The intense competition and supply chain challenges facing the FMCG manufacturing sector have led to a significant decline in performance. The result has been highly volatile market demand and supply chain interruptions, linked to an ineffective distribution channel characterised by damage to the road network, port inefficiencies and rising transportation costs (Tazvivinga, 2023). The effects of such supply chain and competition-induced risks suggest that the FMCG manufacturing sector should focus on flexibility and responsiveness as key drivers of supply chain resilience.

There have been numerous attempts to explore the application of supply chain management (SCM) in the FMCG sector in South Africa. Sample examples include studies by Agigi et al. (2016), which examined the association between supply chain design and SCR as critical capabilities for mitigating supply chain risks. Another study by Jacobs and Mafini (2019) analysed the drivers of business performance. Magagula et al. (2020) focused on the strategic role of SCR, while Neboh et al. (2022) assessed the link between supply chain collaboration and SCR. Lastly, Ngomane (2022) considered the impact of supply chain strategies on SCF and performance. Despite this empirical evidence, the link between operational capabilities, competitive performance, SCF and SCR in FMCG environments in South Africa remains unexplored, creating a significant research gap. The current study is vital, as it not only addresses this gap but can also yield outcomes that the FMCG sector can utilise to improve its competitive performance and SCR.

Literature review

A review of the extant literature on the study's constructs is addressed in this section.

Operational capabilities practices

Operational capabilities are firm-specific sets of skills, processes and routines developed within the operations management system that regularly solve its problems by configuring its operational resources (Zimmermann & Foerstl, 2014). Operational capabilities include time-based management, manufacturing, technology, innovation, lean systems, delivery reliability, process flexibility, logistics integration, information visibility, collaboration capability, supply network flexibility (SNF) and supplier relationship management (Chin et al., 2014; Sandberg & Abrahamsson, 2011). The current study is based on four operational capabilities, namely manufacturing, technology, innovation capabilities, and SNF, and their contribution to firm competitive performance as a strategic solution to the problems hindering the effective response of supply chain operations within the FMCG manufacturing sector in SA. These operational capabilities are selected because they are critical success factors contributing to a firm's sustained competitive performance by optimising production adaptability, ensuring cross-functional integration, improving agile capabilities and maintaining a seamless and uninterrupted flow of supplies (Chin et al., 2014; Lyu et al., 2019; Mandal et al., 2016; Sandberg & Abrahamsson, 2011). Thus, their strategic adoption cannot be understated because of their impact on firms' resilience prospects (Lu et al., 2023).

Manufacturing capability

Manufacturing capability refers to the firm's ability to effectively manufacture goods in line with design specifications by integrating and reconfiguring internal and external competencies (Teece et al., 1997). These capabilities are essential because they help identify, utilise and assimilate internal and external information to

facilitate operational activities (Teece, 2018). Inventory responsiveness and order fulfilment speed are critical aspects of manufacturing capability (Chin et al., 2014). The attainment of robust manufacturing capabilities enables FMCG firms to develop competencies that facilitate efficient responsiveness to market demands (Durbha, 2024). Examples of such competencies include adopting lean and agile manufacturing systems and processes. These are renowned for speeding up production operations and improving on-time order replenishment, thereby boosting product availability and the firm's competitive position (Kgwadi & Samuels, 2025).

Technological capability

Technological capability is defined as a firm's ability to integrate digital tools and systems to facilitate the design and production of new products or services, new processes, and the upgrading of knowledge and skills (Wang et al., 2006). It is important because it enables the firm to develop more efficient processes to test new product ideas. This process improves firms' internal and external capabilities through new technologies (Yam et al., 2011). According to Filho and Moori (2018), technological capability enables companies to gain a competitive advantage by boosting their capacity to develop new products more efficiently and effectively. This being the case, SA FMCG retailers need to invest in technologies that support and enhance their operational capabilities. Such a commitment to technology adoption is vital to boosting supply chain visibility and responsiveness.

Innovation capability

Innovation capability refers to a firm's capacity to increase competitiveness by implementing new or improved production methods to produce goods and services (Forsman, 2011). To effectively respond to market expectations, sustaining innovation capacity is pivotal in keeping up with technological advancement and trends (Tsai & Yang, 2013). Additionally, innovation capability is essential for boosting firms' competitive aspirations and performance by offering unique and relevant product offerings tailored to specific markets (Rajapathirana & Hui, 2018). The ever-changing SA market environment calls for FMCG firms to continually evaluate and explore strategic avenues to retain or expand their market share (Hirsch et al., 2024). Offering innovative products attracts new customer segments, thereby contributing significantly to achieving this objective. As such, the FMCG sector needs to innovate to respond appropriately to evolving consumer preferences.

Supply network flexibility

Supply network flexibility (SNF) may be perceived as the regulation and rerouting of supplies, operations and resources to respond to variations in customer demand and sudden market conditions (Mendonça Tachizawa & Giménez Thomsen, 2007). It is characterised by supplier and resource switch and relocation, process lead, and delivery time flexibility and adjustments (Mendonça Tachizawa & Giménez Thomsen, 2007). Supply network flexibility significantly enhances customer satisfaction by swiftly implementing changes through information processing to respond quickly to customers' needs in changing business environments (Liao & Li, 2019; Luo & Yu, 2016). By broadening their supply bases, firms in the FMCG sector may benefit by responding swiftly to market disruptions and preventing logistical and supply delays for customers and consumers (Tazvivinga & Pooe, 2024). Fast-Moving Consumer Goods with flexible, resilient supply networks are thus better positioned to withstand market volatility and demand changes.

Competitive performance

Firms' competitive performance may be perceived as their ability to implement strategies that reduce costs, limit market competition and exploit opportunities more efficiently and effectively than competitors (Barney, 1991; Prajogo & McDermott, 2008). It is a key element of any firm that measures and differentiates its success from its competitors. It is achieved by optimising key performance indicators (KPIs), such as on-time delivery, competitive pricing and cost, high-quality, correct quantity and flexibility, which are known to be critical measures (Quaye & Mensah, 2017).

Supply chain flexibility

Supply chain flexibility (SCF) is the ability of all supply chain networks to adjust to environmental unpredictability and to satisfy an increasing variety of customer demands without incurring high costs, delays, organisational disruptions or performance losses (Piprani et al., 2022). Some notable benefits of SCF include reduced backorders, optimised lead times and increased client satisfaction (Delic & Eyers, 2020).

Supply chain responsiveness

Supply chain responsiveness (SCR) refers to integrating supply chain partners to respond quickly to changes in the business environment (Williams et al., 2013). It further entails how quickly a supply chain network can respond to changing customer and/or supplier needs. Supply chain responsiveness depends highly on integrating significant factors such as supply chain strategies, postponement and supplier relationships (Rajagopal et al., 2016). Responsive supply chains enable firms to manage market dynamics driven by high demand volatility and rising competition. It allows the sector to respond effectively to customer needs and the marketplace changes (Lurie & Andersson, 2018).

Research model

The study's research model is presented in Figure 1. It consists of four predictors (manufacturing capability,

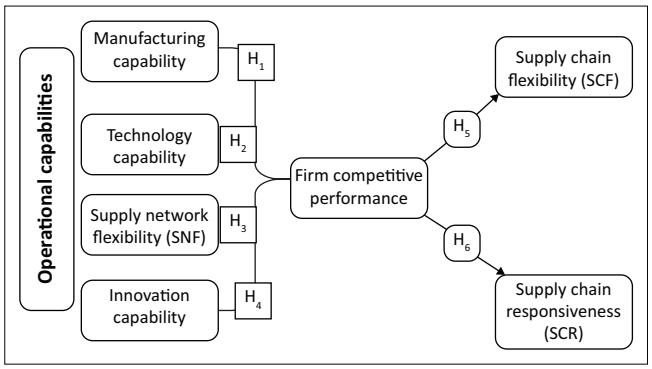


FIGURE 1: Research model.

technological capability, SNF and innovation capability), one mediator (firm competitive performance) and two outcomes (SCR and SCF).

Hypotheses development

The hypotheses depicted in Figure 1 are developed in this section.

Operational capabilities and firm competitive performance

The capacity to manufacture goods is an important factor influencing competitiveness by positively affecting a firm's resilience (Jin et al., 2014). Also, it enables the firm to produce high-quality products and deliver on time, thereby enhancing its competitive advantage (Razavi et al., 2016). A study by Razavi et al. (2016) established a positive and significant relationship between manufacturing capability and firm competitive performance, suggesting that firms should invest in innovative machinery to produce new products and improve existing ones, thereby strengthening their competitive position. Investing in technological capability is a critical strategy that optimises a firm's competitive aspirations (Philbin, 2013). Several empirical results have confirmed the positive association between technological capability and firm competitive performance (Ahmad et al., 2014; Hweshure, 2022; Reichert & Zawislak, 2014; Salisu & Bakar, 2020). Similarly, Palandeng et al. (2018) advocate developing agile, flexible capabilities through SNF to respond swiftly to market disruptions and sustain firm competitiveness. Furthermore, Omoruyi and Nwele (2020) found a direct positive link between SNF and competitive performance, notably through the firm's ability to deliver the right products to customers at the right time.

Based on the above results, the following hypotheses (H) are formulated:

H_1: There is a significant association between manufacturing capability and competitive performance.

H_2: There is a significant association between technological capability and competitive performance.

H_3: There is a significant association between SNF and competitive performance.

H4: There is a significant association between innovation capability and competitive performance.

Firm competitive performance, supply chain responsiveness and flexibility

Competitiveness is well recognised as a critical measure of firm success and survival, as it enables firms to respond quickly to market and customer changes to meet their needs (Al-Hawajreh & Attiany, 2014; Brusset, 2016; Thatte et al., 2013). Al-Hawajreh and Attiany (2014) found that competitive performance can improve firms' ability to ensure flexibility, responsiveness and customer responsiveness. Firms' ability to sustain their competitive edge is crucial for boosting responsiveness and flexibility, which enables them to adjust their supply chain strategies and operations in terms of volume, pace and location to meet market demands (Salavatihesari, 2016). Firms can then adjust and respond promptly to sudden demand variations across their supply chain networks (Gupta et al., 2019; Piprani et al., 2022). Based on these insights, the following hypotheses are formulated:

H_5: There is a significant association between firm competitive performance and SCF.

H_6: There is a significant association between firm competitive performance and SCR.

Research methodology and design

The following section discusses the research and sampling design.

Research design and study sample

This study is anchored on deductive reasoning, which supports the positivist paradigm, and it adopts a quantitative approach to enable generalisation of the results to other FMCG environments. A correlational research design was employed, as the study aimed to test predictions among constructs without testing causality. Some previous studies focusing on similar SCM topics used the same research design (Adeniran & Johnston, 2011; Jain et al., 2017; Nematatani & Chinomona, 2024; Protogerou et al., 2012; Zhou et al., 2019).

The study involved firms operating in the FMCG manufacturing sector in Gauteng province. The updated list of the number of registered FMCG firms was not accessible the Trade and Industrial Policy Strategies (2021) report estimates that there are about 1800 registered food processing companies in SA. Accordingly, the current study's sample comprised 420 supply chain professionals, including managers, supervisors and specialists drawn from FMCG manufacturing firms. This sample size is consistent with previous similar studies, such as Mafini and Muposhi (2017) (n = 500); Hove-Sibanda and Pooe (2018) (n = 500); Mofokeng and Chinomona (2019) (n = 600). Previous similar studies by Adeniran and Johnston (2011), Huang et al. (2023), and Bharadwaj (2024) used purposively selected respondents with expertise in supply chain.

The purposive sampling technique was employed to ensure that the targeted respondents were individuals who had the information relevant to the study.

Instruments

Data collection was conducted through an online survey using a structured, self-administered questionnaire. The instrument comprised 29 items adapted from previously validated scales. Manufacturing capability was measured using a four-item scale adapted from Wang et al. (2016). A five-item scale adapted from Wang et al. (2004) was used to measure technological capability. Another five-item scale, adapted from Koste et al. (2004), was used to measure innovation capability. Additionally, a six-item scale derived from Moon et al. (2012) was employed to measure SNF, while firm competitive performance was measured using three items developed by Fawcett et al. (2007). Lastly, the SCF scale used three items adapted from Sanchez and Perez (2005), while the SCR construct was measured using three items developed by Zhou and Benton (2007). Response options for the measurement scales were presented on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Appendix 1 presents the full list of adapted instruments.

Common methods bias

Harman's Single-Factor Test was run to determine if the data were subject to a single dominant factor. Consistent with the original factor structure of the data, the test yielded seven factors accounting for 62% of the variance, with the highest contributing an acceptable 16.241%. As such, no single factor emerged, and the first factor accounted for less than 50% of the variance, indicating that common methods bias was minimal. Additionally, further tests using inter-construct correlations (Table 3) yielded values below 0.9, further confirming that common method variance was insignificant. Procedurally, the measures for the predictor, mediator and outcome variables were adapted from different sources, reducing the possibility of bias in respondents' views of the observed associations. Moreover, as shown in Table 1, respondents were drawn from various firms and belonged to different demographic categories. Hence, sufficient statistical and procedural measures were implemented to reduce common method variance in the study.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Vaal University of Technology, Faculty Research Ethics Committee (Ref. No: FRECMS-21102020-051).

Results

Data analysis

The usable questionnaires were entered into an Excel spreadsheet and converted to SPSS format to perform descriptive statistics and an exploratory factor analysis (EFA) using SPSS version 30.0. Confirmatory factor analysis (CFA) was conducted to test the psychometric properties of validity and reliability. The regression analysis to determine the predictive influence of the constructs (hypotheses testing) was conducted using the partial least squares (PLS) composite-based method (PLS-SEM).

Demographic characteristics of participants

Of the initial 700 administered questionnaires, 501 were returned, yielding 420 for the final data analysis, for a response rate of 60%. Of the participating respondents, 61.2% (n = 257) were male, while 38.8% (n = 163) were female. The highest number of respondents were holders of a university degree (n = 127; 30.2%). Additionally, regarding the employment period, the largest number (n = 159; 37.9%) had been employed in their organisations for 3 years to 5 years. Lastly, in terms of professional field, those in the SCM category had the highest number (n = 195; 46.4%). Table 1 presents the demographic profile of the participants.

Psychometric properties

The CFA was used to test the psychometric properties of the measuring scales. The results are reported in Table 2.

Construct reliability

The study's reliability was assessed using Cronbach's alpha, Rho A, the composite reliability (CR) test, and item-to-total correlations (Ahmad et al., 2016). Therefore, the results presented in Table 2 show that all constructs were reliable, as they met the thresholds of 0.7 or higher for Cronbach's alpha and Rho A, and 0.5 or higher for item-to-total correlations. A scale purification process was conducted, which involved discarding items that scored below the recommended threshold on the item-total correlation.

TABLE 1: Demographic profile of respondents.

Variable	Category	Frequency (n)	Percentage
Gender profile	Male	257	61.2
	Female	163	38.8
Total	-	**420**	**100**
Qualification distribution	Matric	0	0
	Certificate	90	21.4
	Diploma	119	28.3
	Degree	127	30.2
	Postgraduate	84	20.0
Total	-	**420**	**100**
Employment period in the organisation (years)	< 1	141	33.6
	1–2	117	27.9
	3–5	159	37.9
	6–9	1	0.2
	10 >	2	0.5
Total	-	**420**	**100**
Professional experience in supply chain management (years)	< 1	195	46.4
	1–2	143	34.0
	3–5	44	10.5
	6–9	0	0
	10 >	38	9.0
Total	-	**420**	**100**

Validity analysis

In this study, validity was measured using content and construct validity. A panel of senior lecturers with expertise in SCM ascertained the former. The latter was determined using two aspects: Convergent and discriminant validity.

Convergent validity was measured using the average variance extracted (AVE), CR, and constructs' factor loadings, in which the cut-off values of the constructs must be equal to or greater than 0.5 as per Fornell and Larcker's (1981) recommendation. The AVE values of constructs are as follows: 0.716 for MC; 0.718 for TC, 0.905 for IC; 0.789 for SNF (SNF); 0.715 for CP; 0.718 for SCR and 0.698 for SCF. The CR values of the constructs are as follows: For MC, 0.881; for TC, 0.927; for IC, 0.966; for SNF, 0.957; for CP, 0.883; for SCR, 0.884; for SCF, 0.873. Lastly, MC factor loadings ranged from 0.760 to 0.989; TC ranged from 0.803 to 0.889; IC ranged from 0.939 to 0.964; SNF (SNF) ranged from 0.847 to 0.930; CP ranged from 0.828 to 0.879; SCR ranged from 0.826 to 0.877; and SCF ranged from 0.706 to 0.924, respectively. Therefore, convergent validity between the constructs is confirmed. Besides, the study used the Fornell-Larcker criterion to assess discriminant validity, which requires that the AVEs of the constructs be less than 0.90 to confirm discriminant validity (Ab-Hamid et al., 2017). Table 3 presents discriminant validity results using the Fornell-Larcker criterion.

TABLE 2: Psychometric properties results.

Research constructs		Factor loadings	Cronbach alpha (α) value	Item-to-total correlation	CR value	Rho A	AVE value
MC	-	-	0.855	-	0.881	0.726	0.651
	MC1	0.768		0.819			
	MC2	0.760		0.854			
	MC4	0.989		0.718			
TC	-	-	0.902	-	0.926	0.926	0.714
	TC1	0.886		0.836			
	TC2	0.803		0.701			
	TC3	0.818		0.689			
	TC4	0.838		0.736			
	TC5	0.889		0.831			
IC	-	-	0.948	-	0.926	0.950	0.906
	IC1	0.951		0.905			
	IC2	0.964		0.932			
	IC3	0.939		0.841			
SNF	-	-	0.966	-	0.936	0.936	0.690
	SNF1	0.850		0.812			
	SNF2	0.887		0.858			
	SNF3	0.930		0.921			
	SNF4	0.895		0.878			
	SNF5	0.847		0.727			
	SNF6	0.915		0.841			
CP	-	-	0.793	-	0.883	0.840	0.715
	CP1	0.829		0.648			
	CP2	0.879		0.631			
	CP3	0.828		0.668			
SCR	-	-	0.804	-	0.885	0.807	0.719
	SCR1	0.826		0.649			
	SCR2	0.837		0.631			
	SCR3	0.877		0.666			
SCF	-	-	0.797	-	0.878	0.877	0.707
	SCF1	0.924		0.669			
	SCF2	0.706		0.545			
	SCF3	0.862		0.757			

MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; CP, firm competitive performance; SCR, supply chain responsiveness; SCF, supply chain flexibility; CR, composite reliability; AVE, average variance extracted.

Discriminant validity

Table 3 presents the discriminant validity results.

Table 3 shows conformance with discriminant validity criteria, with all construct values below the recommended threshold of 0.9. Moreover, the square roots of the AVE values were higher than the corrections for all constructs.

Hypothesis testing results

The study's hypotheses (path analysis) were analysed through SEM using the composite-based technique (PLS-SEM). The path analysis was determined by assessing the path coefficients through the beta (β) score to support or reject the study's hypotheses. Figure 2 presents the path analysis model.

Figure 2 shows that four predictor constructs (MC, TC, SNF, IC) accounted for 76.4% of the variance in CP ($r^2 = 0.764$). Moreover, CP contributed only 2.6% ($r^2 = 0.026$) of the variance in SCF and 6.8% ($r^2 = 0.068$) of SCR. The remaining variances in each case are therefore attributed to factors outside the scope of the current study. Table 4 presents the hypothesis-testing results (the beta coefficient and its significance).

All six hypotheses put forward in the study were accepted based on significance levels ($t \geq 1.96$; $p \leq 0.05$). The outlier among the results is the inverse association observed between MC and CP ($\beta = -0.265$; $t = 3.013$; $p = 0.003$), indicating that CP decreases as MC improves.

Discussion

The study sought to establish links among operational capabilities, CP, SCR and SCF. Table 4 presents the results of the hypotheses, including the estimated path coefficients (betas) and *p*-values. These established hypotheses are discussed next.

Operational capabilities and firm competitive performance

In assessing the association between the predictor and mediator constructs, all four hypotheses were supported

TABLE 3: Discriminant validity results.

Research construct	Construct correlation						
	CP	IC	MC	SCF	SCR	SNF	TC
CP	0.85	-	-	-	-	-	-
IC	0.57	0.95	-	-	-	-	-
MC	0.46	0.46	0.85	-	-	-	-
SCF	0.15	0.17	0.13	0.84	-	-	-
SCR	0.25	0.07	0.09	0.25	0.85	-	-
SNF	0.64	0.05	0.31	0.12	0.22	0.89	-
TC	0.68	0.67	0.78	0.22	0.10	0.28	0.85

MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; CP, competitive performance; SCR, supply chain responsiveness; SCF, supply chain flexibility.

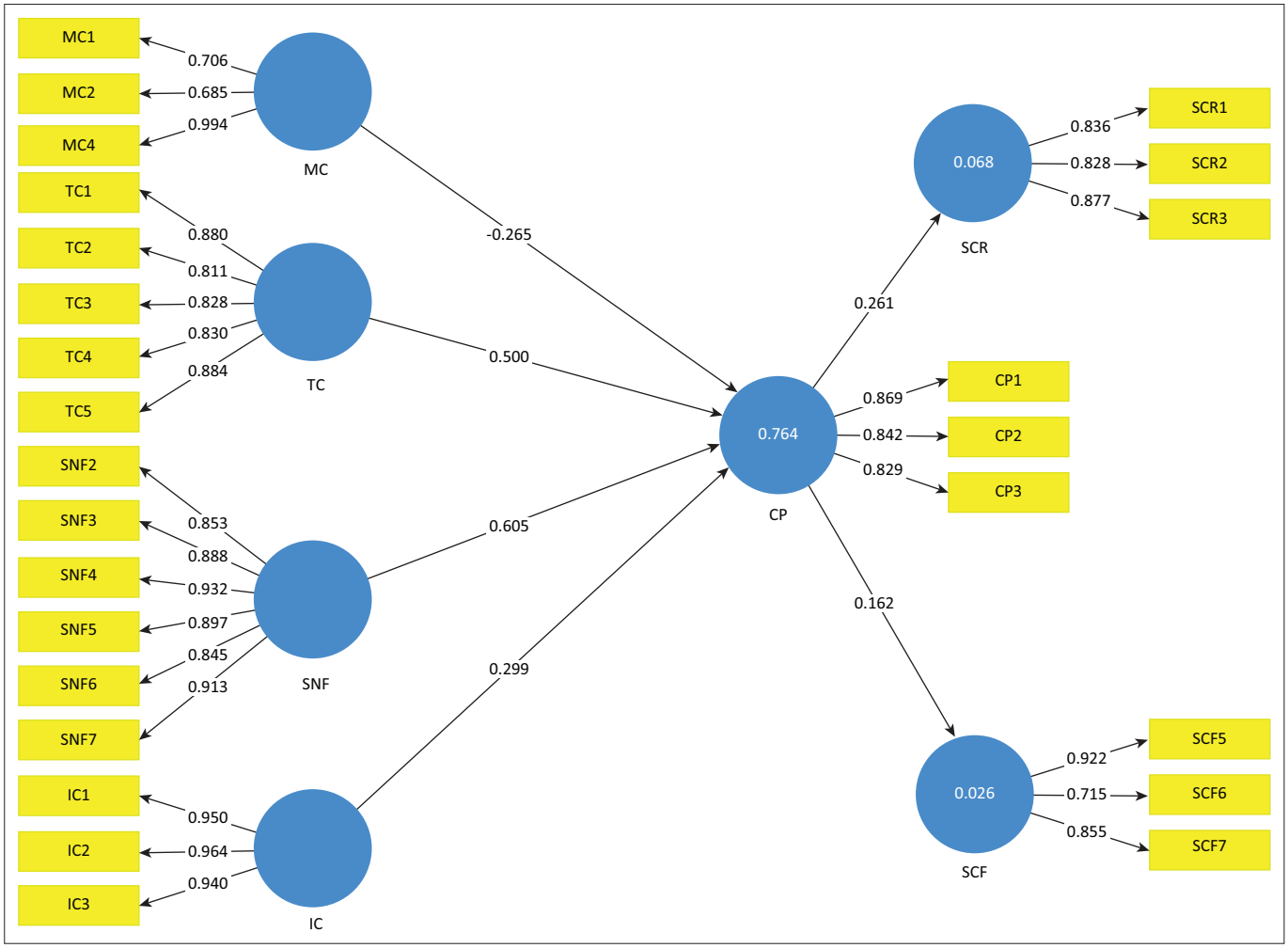
because of the reported significance. First of all, MC exerted a significant negative effect on CP (β = –0.265; t = 3.013; p = 0.003). This interesting result contrasts with most previous research (e.g. Bag et al., 2021; Cheng & Lu, 2022; Jin et al., 2014; Narenji et al., 2025; Yam et al., 2010), which has established positive associations between the two constructs. A possible reason for this uncommon result is the availability of alternative products on the largely monopolistically competitive FMCG market in South Africa. As suggested by Hweshure (2022) and Hirsch et al. (2024), the FMCG sector in SA is one of the most saturated markets, characterised by fierce competition among numerous brands that offer affordable options for consumers. This high congestion underlines the lower barriers to entry in this market, such that even small players are also introducing their own products. A common example is flooding the market with cheaper Chinese imports that appeal to price-sensitive consumers, who are the majority in SA, a country facing various economic hardships (Gupta, 2016). As a result, under such conditions, improvements in a firm's MC may not necessarily lead to enhanced competitiveness, as observed in the current study.

Unlike MC, the three other predictors (TC, IC and SNF) significantly influenced CP, indicating a positive connection. These were H2 (TC and CP [β = 0.500; t = 5.079; p = 0.000]), H3 (IC and CP [β = 0.605; t = 8.898; p = 0.000)]) and H4 (SNF and CP [β = 0.299; t = 25.190; p = 0.000]). All three hypotheses were accepted. The results are consistent with previous studies (Brusset, 2016; Chang, 2011; Kim et al., 2020; Palandeng et al., 2018; Reklitis et al., 2021; Shou et al., 2017; Tiwari et al., 2015), which found that IC, TC, as well as SNF, are critical input resources for sustained competitive success.

TABLE 4: Path analysis results.

Structural paths	Hypothesis	Path coefficient (β)	t-statistics	p-value	Decision
MC → CP	H_1	-0.265	3.013	0.003	Accepted
TC → CP	H_2	0.500	5.079	0.000	Accepted
IC → CP	H_3	0.605	8.898	0.000	Accepted
SNF → CP	H_4	0.299	25.190	0.000	Accepted
CP → SCR	H_5	0.261	4.875	0.000	Accepted
CP → SCF	H_6	0.162	3.640	0.000	Accepted

MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; CP, competitive performance; SCR, supply chain responsiveness; SCF, supply chain flexibility.



PLS, partial least squares; MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; CP, competitive performance; SCR, supply chain responsiveness; SCF, supply chain flexibility.

FIGURE 2: Structural model with path coefficients.

These results establish innovation, technology and SNF as critical driving factors of CP, while singling out IC as the most potent input factor among the three. This view is particularly important given the strategic role that innovation capabilities play in enhancing operational excellence in today's technology-dominated environments (Chirra & Raut, 2025; Fatoki, 2019; Kusi-Sarpong et al., 2021; Tiwari et al., 2015). As such, FMCG manufacturing firms should align their innovation strategies with evolving consumer trends and market opportunities. This strategy is possible through significant investment in research and development (R&D) and redesigning operational models. Such shifts will facilitate improved innovation during product development (organic or sustainable product offerings), leading to better products tailored to meet unpredictable customer needs.

Since TC also emerged as a positive enabler of CP, the results suggest that adopting recent technologies could boost the competitive positions of FMCG manufacturing firms. For example, embracing IT systems such as Oracle and SAP could enable the automation and integration of data and information across value and supply chain networks of FMCG firms in SA. The use of such systems could enhance the visibility, monitoring, alertness and control of their supply chain functions, optimising sound decision-making and facilitating rapid responses to market disturbances.

With respect to SNF and its impact on CP, the results suggest that optimising the SNF, such as through adopting multiple sourcing strategies, could enable firms to withstand macro-environmental shocks (Mwikali & Kavale, 2012). Such a multifaceted sourcing approach minimises the reliance on a single supplier and provides the necessary flexibility to ensure a seamless supply across a firm's supply chain ecosystems. Firms within the FMCG sector may then be able to meet their customers' expectations and maintain their competitive edge. Hence, diversification of their supply bases is a viable strategic option for firms in the FMCG sector to succeed in their supply chains.

Firm competitive performance and supply chain responsiveness

The results for H5 revealed that CP significantly influences SCR ($\beta = 0.261$; $t = 4.875$; $p = 0.000$). This finding, therefore, implies that the competitive performance of the FMCG supply chain depends, among other things, on its responsiveness. The results support previous studies (Aslam & Li, 2025; Brusset, 2016; Gupta et al., 2019; Lee, 2004; Mee-ngoen et al., 2020) that found that competitiveness positively influences responsiveness. These results suggest that the competitiveness of FMCG firms builds their agile capabilities, facilitating improved responsiveness to market trends and variations in consumer demand. As such, FMCG firms should endeavour to boost their responsiveness by emphasising competitive excellence, achievable through approaches such as the use of state-of-the-art IT tools and systems, diversifying their distribution networks through omnichannel strategies and fostering strategic partnership agreements with key players.

Firm competitive performance and supply chain flexibility

Similarly, CP was positively associated with SCF (H6) ($r = 0.162$; $t = 3.640$; $p = 0.000$). This finding further denotes the role that firms' competitive success plays in securing flexible supply chains. Consistently, previous studies by Gligor and Holcomb (2012) and Yu et al. (2014) found a similar connection between these two factors. By implication, highly competitive FMCG firms are capable of handling sudden changes in market and consumer demands. Typically, this is because highly competitive firms can redesign, readjust and reconfigure their production, distribution and product offerings to align with customers' and consumers' evolving demands.

Mediation results

The study also tested for the mediating effects of CP on the association between operational capabilities and SCF and SCR. The results are presented in Table 5.

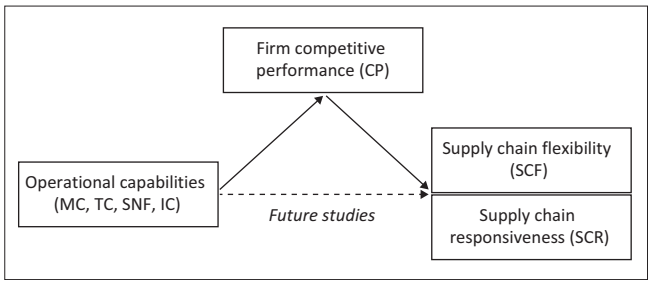
The results of the mediation analysis show that CP mediates the association between all four operational capabilities and the two outcome variables, SCR and SCF. For MC, the significant mediating effect is inverse, indicating that CP decreases the influence of MC on SCF ($\beta = -0.052$; $t = 2.930$; $p = 0.004$) and SCR ($\beta = -0.083$; $t = 3.695$; $p = 0.000$). However, the margins of decrease, 5.2% and 8.8%, respectively, are quite marginal and almost inconsequential. The rest of the significant mediating influences of CP are positive, with the highest occurring in the path between SNF -> CP -> SCR ($\beta = 0.155$; $t = 4.629$; $p = 0.000$). This indicates that CP improves the influence of SNF on SCR by 15.5%. Overall, and in practice, the results illustrate that strengthening CP is essential when using the three operational capabilities (TC, IC, SND) to improve SCF and SCR in the FMCG manufacturing sector.

The mediation model presented in Figure 3 indicates the results of the analysis.

TABLE 5: Mediation results.

Relationship	Mediating effect	*t*-statistics	*p*-value	Mediation decision
IC -> CP -> SCF	0.050	3.155	0.002	Full mediation
IC -> CP -> SCR	0.080	4.221	0.000	Full mediation
MC -> CP -> SCF	-0.052	2.930	0.004	Full mediation
MC -> CP -> SCR	-0.083	3.695	0.000	Full mediation
SNF -> CP -> SCF	0.097	3.392	0.001	Full mediation
SNF -> CP -> SCR	0.155	4.629	0.000	Full mediation
TC -> CP -> SCF	0.087	2.994	0.003	Full mediation
TC -> CP -> SCR	0.139	3.826	0.000	Full mediation

MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; CP, competitive performance; SCR, supply chain responsiveness; SCF, supply chain flexibility.



MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; SCF, supply chain flexibility; SCR, supply chain responsiveness; CP, firm competitive performance.

FIGURE 3: Mediation model.

Conclusion

Theoretical and practical implications

The study aimed to investigate the relationships among operational capabilities, firm competitive performance, supply chain responsiveness and flexibility in the FMCG manufacturing sector in SA. This study reveals that operational capability practices, particularly innovation, technology and SNF, are important drivers of CP in the sector. However, the influence of manufacturing capability on competitive performance is negative, indicating that the two factors move in opposite directions. The study further shows that how a firm in the FMCG manufacturing sector performs competitively affects the supply chain's flexibility and responsiveness. Additionally, competitive performance mediates the associations among technological capability, innovation capability, and SNF with SCF and SCR, demonstrating a positive stimulus effect of competitive performance on these connections.

The study has some theoretical and practical contributions. Theoretically, the study broadens the SCM literature by articulating the roles and importance of operational capabilities, their links to competitiveness, and SCF and SCR. Furthermore, the study tests the research model in the FMCG manufacturing sector in SA, where there is limited empirical evidence of such nature. This makes the study a groundbreaking attempt to extend this model to this vital economic sector within SA.

In practice,. these findings identify key success factors that must be adopted by SCM professionals operating in the SA FMCG manufacturing sector to optimise their firms' competitive performance, supply chain flexibility and responsiveness. The study further shows that an emphasis on operational capabilities, such as innovation, technology and supply diversity, is a critical catalyst for achieving their competitive aspirations. Nurturing competitiveness is also essential to achieve an agile FMCG supply chain that is both flexible and responsive to market dynamics.

Limitations and suggestions for future research

The quantitative data used in the study were collected in one SA province, Gauteng, which limits the generalisability of the findings. Future studies could therefore broaden the scope of the study by including FMCG manufacturing firms from other provinces in the country. This will effectively confirm whether the same positive connections found in most of the hypotheses in the current study are consistent across various regions of SA. The study is further limited by the lack of direct relationships between the four operational capabilities (manufacturing capability, technological capability, supply chain network flexibility and innovation capability) and firm competitive performance. As indicated in the mediation model (Figure 3), future studies can then expand the current results by testing these direct relationships as well. Future studies could also consider the moderating effects of demographic factors, such as firm size or turnover, to determine how these factors influence the associations examined in the study. Additionally, the model could be expanded by including other operational capabilities, such as lean systems, delivery reliability, process flexibility, logistics integration, information visibility, collaboration capability and supplier relationship management, that were excluded in the current study.

Acknowledgement

This article is based on research originally conducted as part of Nyashadzashe C. Hweshure's masters' dissertation titled 'Operational capabilities, firm competitive performance, and supply chain responsiveness in the fast-moving consumer good manufacturing industry in Gauteng Province', submitted to the Department of Supply Chain Management, Faculty of Management Sciences, Vaal University of Technology, in 2022. The dissertation was supervised by Prof. Chengedzai Mafini and Dr. Welby V. Loury Okoumba. The manuscript has since been revised and adapted for journal publication. The original thesis is available at: https://www.proquest.com/docview/3122639586?pq-origsite=gscholar&fromopenview=true&sourcetype=Dissertations%20&%20Theses.

Competing interest

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRediT authorship contribution

Nyashadzashe C. Hweshure: Conceptualisation, Investigation, Writing – original draft. Welby V. Loury Okoumba: Conceptualisation, Methodology, Project administration, Supervision, Visualisation, Writing – review & editing. Chengedzai Mafini: Data curation, Formal analysis, Software, Supervision, Validation, Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

Funding information

The authors received no financial support for the research, authorship, and/or publication of this article.

Data availability

The data that support the findings of this study are available from the corresponding author, Welby V. Loury Okoumba, upon reasonable request.

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Appendix

TABLE 1-A1: Measurement instruments.

Construct	Item code	Item description	Source
Manufacturing capability	MC1	Our manufacturing department has made a great contribution during the conceptual design stage in the innovation process.	Wang et al. (2016)
	MC2	Our manufacturing department transforms R&D output into production.	
	MC3	Our company has effectively applied advanced manufacturing methods.	
	MC4	Our company has a high degree of manufacturing cost advantage.	
IT capability	TC1	Our company is one of those firms in the industry that establishes technological standards.	Wang et al. (2004)
	TC2	Our company has a superior competitive technology strategy in the industry.	
	TC3	Our company has robust technological skills in several fields of operation.	
	TC4	Our company is competent in applying innovative technology to problem-solving.	
	TC5	Our company has strong abilities to integrate internal and external technological resources.	
Innovation capability	IC1	Our company frequently tries out new ideas.	Koste et al. (2004)
	IC2	Our company seeks out new ways to do things.	
	IC3	Our company is creative in its operating methods.	
	IC4	Our company is often the first to market with new products and services.	
	IC5	Our new product/service introduction has increased over the last 5 years.	
Supply network flexibility	SNF1	Ability to cope with predictable fluctuations in terms of time, volume, mix, price, product, etc.	Moon et al. (2012)
	SNF2	The ability of a system to cost-effectively vary its output within a certain range and in a given time frame.	
	SNF3	Ability of the supply chain to change or react to environmental uncertainty, to meet the increasing variety of customer expectations without high costs, time, organisational disruptions or performance losses.	
	SNF4	The agility of a supply chain in responding to marketplace changes to gain or maintain a competitive advantage.	
	SNF5	Ability to change suppliers to satisfy changing requirements.	
	SNF6	Ability to adjust manufacturing facilities and processes.	
Competitive performance	CP1	Sales volume increases compared to the competitors.	Fawcett et al. (2007)
	CP2	Market share growth compared to the competitors.	
	CP3	Customer retention power compared to the competitors.	
Supply chain responsiveness	SCR1	Our supply chain responds quickly to changing consumer needs.	Zhou and Benton (2007)
	SCR2	Our supply chain responds quickly to changing competitors' strategies.	
	SCR3	Our supply chain quickly develops new products.	
Supply chain flexibility	SCF1	Our supply chain is flexible enough to adapt to competitors' evolving strategies.	Sanchez and Perez (2005)
	SCF2	We can adapt swiftly to sudden changes in our target market's needs.	
	SCF3	We have a level of flexibility that enables us to satisfy our customers and consumers' demands	

Notes: Please see the full reference list of this article, Hweshure, N.C., Loury Okoumba, W.V., & Mafini, C. (2026). Connecting operational capabilities, supply chain responsiveness and flexibility in the fast-moving consumer goods manufacturing sector: The mediation of competitive performance. *South African Journal of Business Management, 57*(1), a5476. https://doi.org/10.4102/sajbm.v57i1.5476; Construct Scales were 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree 5 = strongly agree.

CP, competitive performance; MC, manufacturing capability; TC, technological capability; IC, innovation capability; SNF, supply network flexibility; SCR, supply chain responsiveness; SCF, supply chain flexibility.