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Review

The Efficacy of Technological Integration and Data Sharing in Saudi Arabia: The Role of Category Management in Retailer–Supplier Partnerships

Khulud Alyafie

Business Administration, Strategy Enterprise and Innovation, The Applied College, Umm Al-Qura University, Makkah 24382, Saudi Arabia; khyafie@uqu.edu.sa

Abstract

Category management (CM) is crucial for optimising retailer–supplier partnerships via technological integration and data sharing. However, the role of CM in Saudi Arabia's unique fast-moving consumer goods sector (FMCG) remains underexplored. This study aimed to answer the following research question: How do cloud-based inventory platforms and real-time data sharing improve forecasting accuracy and inventory turnover for retailer–supplier CM partnerships in Saudi Arabia's FMCG sector? A systematic review of 87 studies from the Web of Science and Scopus databases was conducted, followed by thematic analysis. The findings indicate that CM improves demand forecasting, inventory optimisation, and collaborative decision-making. Key implementation barriers include cultural resistance to data sharing, high technology costs for small and medium-sized enterprises, and infrastructural limitations. Success relies on phased technology adoption, relational data governance, and trust building that aligns with Saudi cultural norms. The study concludes that CM is essential for leveraging technology and data capabilities, and it offers a contextualised framework to overcome local barriers and support the achievement of Vision 2030 objectives. This study provides practical strategies for sector stakeholders to adopt high-impact, low-cost technology and a basis for future comparative studies in Gulf Cooperation Council markets.

Keywords: culture; category management; retailer–supplier partnerships; technology integration; trust; data sharing; Saudi Arabia retail sector

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1. Introduction

Category management (CM) plays a key role in the success of operations and the satisfaction of consumer demand in retail company operations. It involves intelligent and efficient resource allocation, assortment planning, and inventory management (Pinzone et al., 2017). Since technology and data are becoming more integral to retailer–supplier relationships, CM has evolved to utilise these resources for optimised performance. With the power of technology and the massive availability of data in the market, CM has grown to incorporate various digital learning tools and analytical methods to improve performance in partnerships. Retailers and suppliers also have full access to the data world, where they can find data about the behaviours of consumers, trending market scenarios, and inventory levels, allowing for decision-making procedures and responses to change according to demand (Aithal et al., 2023; Cabral et al., 2012).

Integrating technology into CM enables the optimisation of hidden data patterns to boost sector profitability. This allows retailers and suppliers to predict demand more

accurately, identify cross-selling opportunities, and optimise product placement. Moreover, it allows for tailoring pricing strategies, such as dynamic pricing, and marketing effects to consumer engagement. Additionally, retailer–supplier partnerships have become more popular in this era of technological integration and data sharing (He et al., 2023), providing competitive advantages in analysing consumer behaviour and market trends and resulting in more effective inventory management and product assortment planning (Aithal et al., 2023; Kurtuluş et al., 2014).

Data sharing within retailer–supplier partnerships facilitates collaborative planning and improves the organisation of market forecasting with stockouts and inventory management (Schlaich & Hoberg, 2024). Both parties can then align sales and inventory data through shared analysis, enhancing product availability (Demirag et al., 2021; Isharyani et al., 2024).

Retailer–supplier partnerships thrive when there is a synergy between technological integration and data sharing, which leads to improved consumer satisfaction and more efficient inventory management (Grewal et al., 2021; Isharyani et al., 2024). As Piotrowicz and Cuthbertson (2014) noted, consumers maintain consistent demand, requiring retailers to innovate continuously to meet expectations. Therefore, CM, traditionally rooted in sales performance, now encompasses consumer insights and strategic planning. Consumer involvement is a key driver of innovation since it allows for blending technological advances with consumer experience.

The pivotal role of CM in technological integration and data sharing is particularly evident in the fast-moving consumer goods (FMCG) industry, which requires direct intervention, per consumer preference studies. An and Srethapakdi (2006) identified CM as a core component in the success of outcomes in retailer–supplier partnerships. Digitalisation has transformed CM with advanced data analytics and technological integration (Mohammed & Panserini, 2019). Implementing efficient consumer response practices, including CM, can provide a sustainable competitive advantage when suppliers and retailers combine their expertise (Dupre & Gruen, 2004). Information sharing is critical to CM since it allows for optimising supply chain activities and performance targets in the FMCG industry. Integrated IT infrastructure and top management support are key antecedents for quality information sharing, which can lead to higher order fulfilment rates and shorter order cycle times (Mbhele, 2014; Yarlagadda, 2025).

Despite there being much global CM research, little research has been conducted in the Saudi context, and a significant gap exists in our understanding of its application within Saudi Arabia's unique fast-moving consumer goods (FMCG) sector. Specifically, in the Saudi Arabian retail sector, there is limited research on the role of CM with technological integration and data sharing among retailer–supplier partnerships (Alahmad, 2021; Alzyadat & Almuslamani, 2021). Nevertheless, in the FMCG sector, data-driven work can increase value and improve supply chain visibility and responsiveness to market demand (Malik & Bustami, 2024).

Many studies have indicated that difficulties in the full use of technological integration and data sharing benefit category managers. A negative correlation between the profitability of some companies and financial leverage can increase the capital of many FMCG companies, thus giving them an advantage in technological integration (Kaur & Kaur, 2015). Since the retail industry has continuously embraced technological advancements, the role of CM has become increasingly important (Steiner, 2000) in the betterment of retailer–supplier relationships (Aastrup et al., 2007). The effectiveness of CM for product mix determination and assortment planning with data-driven results and insights can result in collaborative growth (Free, 2007) among suppliers by aligning their strategies with those of retailers.

This research showcases the benefits and limitations of technology and data in retailer–supplier partnerships with CM. It examines consumer satisfaction and product pricing in meeting the evolving consumer demands in the FMCG sector. To achieve this goal, a search of Web of Science and Scopus was conducted to identify relevant articles. The study analysed 87 studies related to CM, technological integration, and data sharing among retailer–supplier partnerships and their approaches toward collaborative decision-making. In summary, this paper aims to explore the role of CM to clarify its increasing significance in technological integration and data sharing for overall business performance, ultimately providing a basis for revolutionising retailer–supplier partnerships.

2. Research Gap

Despite the increasing importance of CM in retailer–supplier partnerships, a significant global research gap in our understanding of its role in enabling technological integration and data sharing within Saudi Arabia's unique market context exists (Grewal et al., 2021; He et al., 2023). Most literature remains theoretical or is focused on Western contexts, with limited empirical studies examining the implementation mechanisms and contextual challenges relevant to CM in emerging markets (Hani, 2022; Zhang & Huang, 2024; Yarlagadda, 2025). This gap is evident in the Saudi Arabian retail sector, particularly within the FMCG industry, where unique market structures and rapid digital transformation under the Saudi Vision 2030 create a unique environment that remains underexplored (Alquraish, 2025; Barbosa et al., 2022; Team Omniful, 2023).

Existing research fails to address barriers to the practical implementation of CM in the Saudi context (Altayyar, 2017; Alghamdi et al., 2018), including data governance challenges, cultural hesitancy toward information sharing, and the prohibitive technology adoption costs that small and medium-sized enterprises (SMEs) face (Alamri & Alzahrani, 2024). These overlooked yet crucial dimensions represent a significant gap in our understanding of how CM can be operationalised effectively in Saudi Arabia's distinctive socio-cultural and business environment.

While prior research acknowledges challenges such as financial constraints (Kaur & Kaur, 2015) and the need for integrated IT infrastructure (Mbhele, 2014; Shakur et al., 2024), there is insufficient information about how retailers and suppliers in Saudi Arabia's FMCG sector can overcome these barriers to leverage CM. The scarcity of context-specific frameworks further limits the applicability of existing global findings to the Saudi context (Alquraish, 2025), complicating the implementation of international best practices in the Saudi context. This study aims to fill this gap by answering the following research question:

- Research Question: How do cloud-based inventory platforms and real-time data sharing improve forecasting accuracy and inventory turnover for retailer–supplier CM partnerships in Saudi Arabia's FMCG sector?

By filling this gap, this research contributes both theoretical and practical applications for retailers and suppliers in Saudi Arabia's evolving market landscape.

3. Methodology

This study employed a systematic literature review (SLR) methodology to analyse and synthesise existing literature on CM, technological integration, and data sharing in retailer–supplier partnerships. SLRs were chosen since they enabled the comprehensive examination of diverse scholarly works while allowing for subjective interpretations and theoretical advancement (Green & Glasgow, 2006). This approach was particularly valuable for

1. Exploring under-researched aspects of retailer–supplier collaborations in the Saudi FMCG context;
2. Integrating complex, multidisciplinary evidence from operations management, information systems, and retail marketing literature;
3. Developing new conceptual insights by examining established theories through the lens of emerging market dynamics.

The SLR process had five key stages: the identification of core themes, a systematic literature search across the Scopus and Web of Science, a critical evaluation of the sources, thematic synthesis, and gap analysis. This methodology allowed for incorporating both qualitative and quantitative studies while maintaining rigorous analytical standards (Ferrari, 2015). By adopting this approach, the study could provide both a descriptive synthesis of current knowledge and prescriptive recommendations for advancing research in this domain. This synthesis could then ultimately serve as the foundation for developing propositions about optimal collaboration frameworks in technologically enhanced retail partnerships.

4. Search Protocol

The article selection process followed the established SLR protocols of Pittaway et al. (2004) and Tranfield et al. (2003) to ensure methodological rigour in identifying and including relevant studies in this analysis. To ensure a comprehensive and reproducible SLR, the following systematic search protocol was implemented:

4.1. Key Words and Terms

The keywords and terms used in the search were sourced from

1. The study's research questions and the aims and objectives of the included articles;
2. The titles and abstracts of the articles considered for the study;
3. The phrases of other CM literature used in the study.

Keywords were combined using Boolean operators (AND, OR) and grouped into three thematic clusters, as outlined in Table 1.

Table 1. Key words and terms of the search.

Key Words	Related Terms Used in the Search
Category management	'category management' OR 'retail assortment planning' OR 'product categorisation'
Technology integration	'technology adoption' OR 'digital transformation' OR 'data analytics' OR 'IoT in retail'
Retailer–supplier relationships	'retailer–supplier partnership' OR 'vertical collaboration' OR 'supply chain integration'

An example query is ('category management' OR 'retail assortment') OR 'product categorisation' AND ('technology adoption' OR 'digital transformation' OR 'data analytics' OR 'IoT in retail') AND ('retailer–supplier partnership' OR 'vertical collaboration' OR 'supply chain integration').

4.2. Database Selection

Primary scholarly databases were searched, including Scopus and Web of Science database, since these platforms include high-impact journals in operations management, retail studies, and information systems (Moher et al., 2009).

4.3. Inclusion and Exclusion Criteria

Studies were included if they were peer-reviewed articles (2000–2025), published in English or Arabic, and empirical or theoretical studies on FMCG or retail sectors. Studies were excluded if they were non-academic sources (e.g., blogs) or studies unrelated to collaboration or technology.

4.4. Screening Process

The initial screening involved reviewing the titles and abstracts of the studies for relevance (n = ~1200 results). The full-text review involved assessing 158 articles for methodological rigour and thematic alignment. The final selection resulted in 87 studies retained for synthesis (see the PRISMA flowchart in Appendix A).

4.5. Complementary Searches

Backward and forward citation tracking was conducted, which comprised snowballing from key papers (e.g., Corsten & Kumar, 2005; Grewal et al., 2021). Grey literature was included in the form of industry reports (e.g., Nielsen, SPS Commerce). The systematic search of academic databases yielded 87 relevant studies. Table 2 provides a summary of the most influential articles, emphasising their key findings and relevance to the Saudi FMCG context.

Table 2. Summary of the reviewed literature on CM, technological integration, and data sharing.

Author(s) (Year)	Country of Study	Method	Key Findings	Relevance to CM in Saudi FMCG
Aastrup et al. (2007)	Denmark (EU)	Conceptual framework	The retailer–supplier partnership process is linked to CM as a strategic, advantageous foresight.	Provides a foundational global model for collaboration, emphasising the importance of shared decision-making.
Abogamous (2022)	Saudi Arabia	Empirical study	Cultural hesitancy and organisational silos are key barriers to information sharing.	Directly relevant. Emphasises a critical, culturally rooted implementation barrier unique to the Saudi context.
Abunar and Zerban (2016)	Saudi Arabia	Case study and survey	IT and cloud computing play key roles in improving supply chain management activities, although there is a lack of access to market insights.	Directly relevant. Provides empirical evidence for both the technological potential and data accessibility challenges within Saudi Arabia.
Alahmad (2021)	Saudi Arabia	Review and conceptual study	Operational inefficiencies like stockouts are a virtue of data deficiency in retail.	Directly relevant. Contextualises the consequences of poor data sharing for Saudi retailers specifically.
Almughthim and Jradi (2023)	Saudi Arabia	Empirical study	There are challenges related to data accessibility, and there is a need for standardised data protocols.	Directly relevant. Addresses key technical and governance gaps that must be solved for effective CM in Saudi Arabia.
Alqahtani and Wamba (2012)	Saudi Arabia	Survey	Underdeveloped IT infrastructure is a significant barrier to technological adoption.	Directly relevant. Provides evidence for the 'technological gaps' challenge in the Saudi market.

Table 2. *Cont.*

Author(s) (Year)	Country of Study	Method	Key Findings	Relevance to CM in Saudi FMCG
Cui et al. (2015)	USA	Quantitative model	Data sharing is pivotal for driving consumer satisfaction and sales growth in retailer–supplier partnerships.	Provides a global theoretical basis for the value of data transparency, which Saudi partnerships can aspire to achieve.
Fatorachian and Kazemi (2021)	Global	SLR	Technology facilitates inventory control, demand forecasting, accurate replenishment, and data exchange.	Offers a comprehensive view of adopting technologies (AI, IoT, blockchain) relevant to modernising Saudi Arabia's FMCG sector.
Ganesan et al. (2009)	USA	Empirical study	Retailers focusing on the consumer thought process via CM achieve higher sales growth and profitability.	Validates the global benefits of a consumer-centric CM approach, which is the goal for Saudi retailers.
Grewal et al. (2021)	USA with a global focus	Conceptual review	Retailer–supplier partnerships thrive when there is a synergy between technological integration and data sharing.	Establishes a global connection between the core variables of the study (CM, technology, data).
Ivarsson and Alvstam (2010)	Sweden and Singapore	Case study	Standardised protocols are needed for data security to foster trust in collaborative partnerships.	Emphasises the universal need for data governance, a critical requirement for overcoming hesitancy in Saudi Arabia.
Kurtuluş et al. (2014)	USA	Field experiment	CM is key to understanding consumer needs and optimising pricing, promotion, and product placement.	Provides empirical evidence for the role of CM in assortment planning, a key component of this study's framework.
Mbhele (2014)	South Africa	Case study	Integrated IT infrastructure and top management support are key antecedents for quality information sharing.	Offers insights from another emerging market into the prerequisites for successful data sharing in SCM.

4.6. Quantitative Synthesis of Literature Trends

This study revealed that over 90% of the 87 included studies supported the integration of CM, technological integration, and data sharing for improving retail operations. The main barriers to its adoption were identified as cultural resistance to data sharing (cited by 65% of the studies), high technology costs for SMEs (60%), and inadequate IT skills or infrastructure (50%). These socio-cultural and economic challenges remain the primary barriers to the implementation of CM in Saudi Arabia's FMCG sector, despite strong theoretical agreement on its benefits.

5. Conceptual Frameworks

To synthesise the interconnected themes of CM, technological integration, and data sharing in retailer–supplier partnerships, this study proposes a conceptual framework (Figure 1) that maps their dynamic relationships and outcomes.

The framework above integrates insights from prior literature while contextualising them to Saudi Arabia's retail sector.

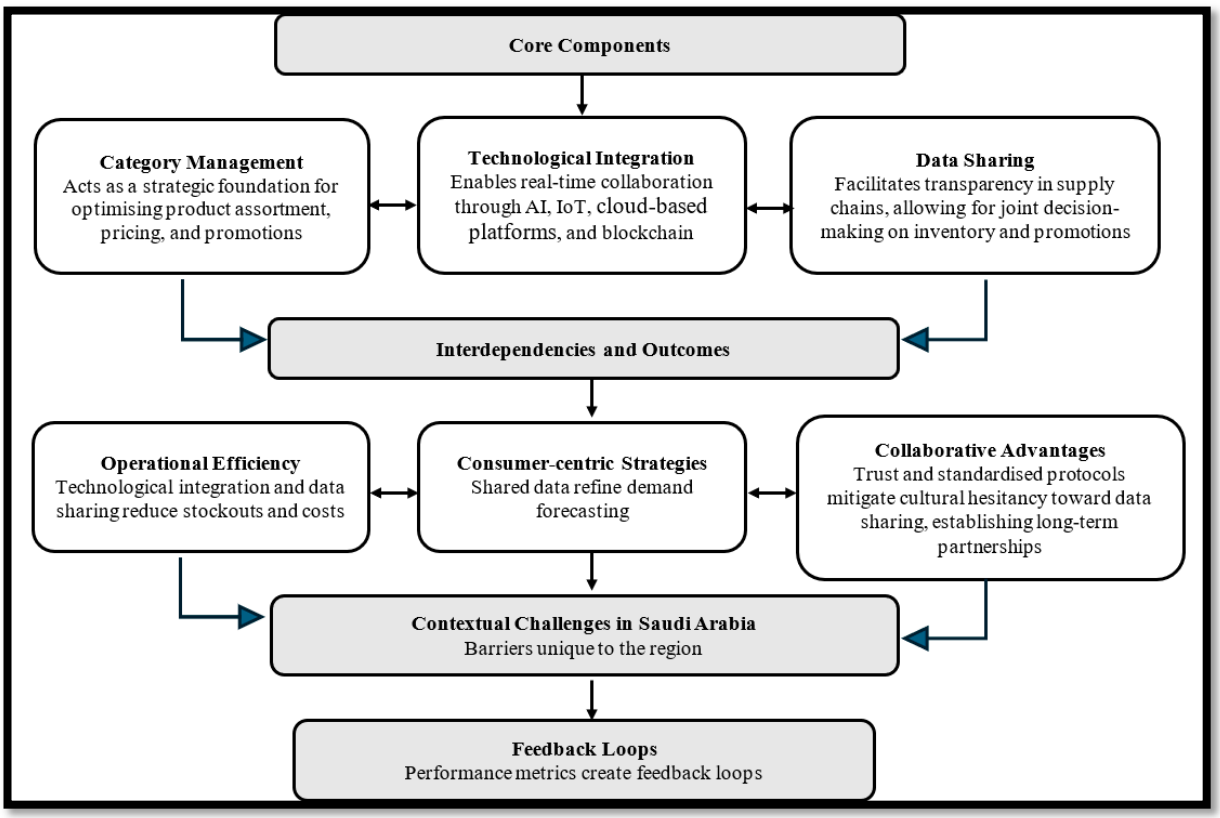


Figure 1. The conceptual framework for this study.

5.1. Core Components of the Framework

The core components of the framework are as follows:

- CM: Acts as the strategic foundation of the framework, optimising product assortment, pricing, and promotions based on consumer insights (Kurtuluş et al., 2014).
- Technological integration: Enables collaboration through AI, IoT (internet of things), blockchain, and cloud-based platforms, enhancing inventory control and demand forecasting (Fatorachian & Kazemi, 2021).
- Data sharing: Facilitates transparency in supply chains, allowing for joint decision-making on inventory, promotions, and market trends (Cui et al., 2015).

5.2. Interdependencies and Outcomes

The framework emphasises the following:

- Operational efficiency: Technology and data sharing reduce stockouts and costs and improve order fulfilment (Propositions 2 and 6).
- Consumer-centric strategies: Shared data refine demand forecasting, enabling personalised offers (Proposition 3).
- Collaborative advantage: Trust and standardised protocols mitigate cultural hesitancy toward data sharing (Almughthim & Jradi, 2023), fostering long-term partnerships.

5.3. Contextual Challenges in Saudi Arabia

The framework incorporates barriers unique to Saudi Arabia.

- Cultural resistance: Reluctance to share data due to organisational silos (Abogamous, 2022).
- Technological gaps: High implementation costs and skill shortages (Alqahtani & Wamba, 2012).

- Regulatory needs: A lack of data governance frameworks to ensure security (Ivarsson & Alvstam, 2010).

5.4. Feedback Loops

The following feedback loops were identified:

- Performance metrics: Real-time analytics (e.g., point-of-sale data) create feedback loops, allowing for the continuous refinement of CM strategies.
- Sustainability: Alignment with the Saudi Vision 2030 drives the adoption of sustainable retail practices and eco-friendly technology (Benzidia et al., 2021).

Figure 1 visually represents the relationships, positioning technology and data as enablers that bridge CM strategies and operational execution, while contextual challenges moderate their effectiveness. This framework extends prior global models (e.g., Corsten & Kumar, 2005) by localising insights to Saudi Arabia's FMCG sector, offering a roadmap for future empirical validation.

5.5. Aspects and Propositions

The retail industry is changing dramatically due to technological improvements and alterations in consumer behaviour (Grewal et al., 2021). Grounded in the resource-based view (RBV), this research posits that technological and informational resources are critical for building a competitive advantage in retailer–supplier partnerships. The following propositions, contextualised to the Saudi FMCG sector, reflect the specific mechanisms through which these resources can enhance CM:

- Proposition 1: Within the Saudi FMCG sector, the integration of culturally attuned data-sharing protocols and affordable technological solutions is a valuable strategic resource that can enhance the effectiveness of CM by improving joint decision-making.

While technology can be used to improve operational productivity globally (Qu et al., 2021), its effectiveness in Saudi Arabia is contingent on overcoming local barriers. According to the RBV, partnerships that successfully navigate cultural hesitancy toward data sharing and develop cost-effective technological resources develop a capability for superior demand forecasting and assortment planning, outperforming competitors who lack this collaborative resource (Sharif, 2012).

- Proposition 2: Technology-enabled data exchanges between Saudi retailers and suppliers can improve the efficiency of inventory management by providing real-time overviews of localised demand patterns, thereby reducing culturally influenced stock-outs and overstocking.

The RBV suggests that real-time information is a key strategic asset. In the Saudi context, where demand is often influenced by cultural and seasonal events (e.g., Ramadan, Hajj), shared data on these localised demand patterns are valuable. They allow partners to optimise inventory levels, thereby directly reducing costs and improving service levels, while competitors must rely on outdated or generic models (Grewal et al., 2021).

- Proposition 3: The combination of shared data and integrated technology within Saudi retailer–supplier partnerships can provide a unique knowledge resource that empowers category managers to make market-specific and strategic decisions about product selection, pricing, and promotions.

Shared data can offer an overview of Saudi Arabia's unique consumer preferences and market trends. According to the RBV, this shared knowledge is incredibly valuable. Category managers who leverage this resource can develop tailored strategies that align

with the needs of the local market, creating a sustainable competitive advantage that outside firms cannot replicate easily (Abunar et al., 2016).

- Proposition 4: Combining technology and data sharing within Saudi partnerships can reduce transaction and operational costs by improving the effectivity of culturally shaped business processes and minimising inefficiencies in the supply chain.

The high cost of technological adoption for SMEs is a Saudi-specific barrier to the adoption of CM. The RBV frames this as the cost of acquiring strategic resources. Partnerships that can overcome this financial barrier to implementing integrated systems will achieve cost-based advantages. Improving the efficiency of operations and reducing lead times through shared real-time information can reduce overall transaction costs, providing profits that can be reinvested (Li et al., 2010).

- Proposition 5: For Saudi retailers and suppliers, data sharing and technological integration can improve overall supply chain resilience and agility, ensuring that adaptations to the rapid transformations resulting from the Saudi Vision 2030 are more responsive.

The Saudi Vision 2030 is creating a dynamic environment in Saudi Arabia. From an RBV perspective, a supply chain that is agile and resilient is critical. This is augmented by technological integration and data sharing, improving order fulfilment and distribution. Partnerships that build this adaptive resource base can take better advantage of new opportunities and navigate market shifts more effectively, ensuring long-term viability and growth in the evolving Saudi economy (Li et al., 2010).

6. Analysis of the Literature

6.1. Information Extraction

CM, technological integration, and data sharing are critical factors for successful retailer–supplier partnerships in the retail sector at present. It is important to acknowledge various strategies and practices in the literature to better understand the need for CM (Al-Abdallah et al., 2014). The research showcases the effectiveness of CM, reflecting the type of strategic collaboration needed between retailers and suppliers to optimise dynamic pricing and supply chain management (Abunar et al., 2016).

Technology plays an important role in improving communication and helps in data exchanges between suppliers and retailers, thus enhancing supply chain and inventory management. Moreover, data sharing is pivotal since consumer satisfaction improves sales performance among retailers and suppliers (Cui et al., 2015). The following sections review the findings and discussions from the existing literature on related topics, providing an overview of the effects of retailer–supplier relationships.

6.2. Strategies for Effective CM

CM is not only helpful in product assortment but also proves the necessity of understanding the needs and preferences of potential consumers as they relate to pricing structures and promotional events (Kurtuluş et al., 2014). This can be achieved through a consumer-centric approach to CM, which allows for better alignment with the demand of consumers and improved performance overall. The retailers who consider the consumer thought process achieve higher sales growth and profitability with CM (Ganesan et al., 2009). Several authors discuss retailer–supplier partnerships and their link to CM as an advantageous foresight (Aastrup et al., 2007). Specifically, this partnership improves the effectiveness of the decision-making process via the sharing of information, expertise, and resources and the consideration of CM initiatives. While studies emphasise the benefits of CM globally (e.g., cost savings, consumer satisfaction), no localised analysis of how

CM can enhance technological integration and data-sharing practices in retailer–supplier relationships within the Saudi retail sector exists (Al-Abdallah et al., 2014).

6.3. Technological Integration for Retailer–Supplier Partnerships

Technology improves accuracy and the communication between retailers and suppliers in retailer–supplier partnerships (Ganesan et al., 2009). Many studies show that technology enhances various aspects of the relationship between a retailer and supplier, including inventory control, market demand forecasting, and order management. Technology also improves the accuracy and timeliness of product replenishment and sales data between retailers and suppliers (Fatorachian & Kazemi, 2021). Most studies discuss CM, technological integration, and data sharing in Western or global contexts (e.g., Akoijam & Singh, 2024; Corsten & Kumar, 2005; Grewal et al., 2021; He et al., 2023) and lack empirical evidence for supply chain partnerships (Alnahdi, 2025), except for (Ayorinde, 2024), especially in Saudi Arabia's unique retail landscape (Almutairi et al., 2022).

6.4. Leveraging Data Sharing for Enhanced Retailer–Supplier Partnerships

To boost the performance of retailers and suppliers, as well as their partnership, with long-term analysis, data sharing is another key factor alongside technological integration. Evaluations of consumer preferences and market trends can be conducted using shared data. Strategic data sharing among category managers involves a consideration of product innovation and supply chain management as opportunities. Challenges like data accessibility (Almughthim & Jradi, 2023), cultural hesitancy toward sharing information (Abogamous, 2022), and underdeveloped IT infrastructure (Alqahtani & Wamba, 2012) are noted but not deeply explored.

6.5. The Saudi Retail Sector

Profits from the advancing consumer product segment in Saudi Arabia will increase rapidly through technological integration and data sharing among retailer–supplier partnerships (Roy et al., 2020). Retailers and suppliers can combine category management strategies to nurture long-term industry growth (Ramanathan & Ramanathan, 2021).

Technological integration and data sharing can optimise product collections and inventory management (Ganesha et al., 2020). With accurate, real-time data, well-informed resolutions for product placement, pricing, and promotions can be determined to improve consumers' shopping experience. This is because providers will have access to consumer demand archetypes, allowing them to determine the ideal stock level for each product.

In supply chain management, the benefits of technological integration and data sharing in retailer–supplier partnerships are discussed (Akdoğan & Demirtaş, 2014). According to Angulo et al. (2004), information sharing is vital for sustaining supplier-managed inventory partnerships. Information sharing with technology can result in better inventory management, reduced stockouts and costs, and improved customer service. The assimilation of order promises and fulfilment and consumer or channel cooperation profits companies in the FMCG sector since these can improve companies' operational productivity, demand forecasting precision, and effectivity of responses to consumer needs (Yarlagadda, 2025).

In Saudi Arabia, it is crucial to leverage broadcast communication technologies (Ivarsson & Alvstam, 2010). However, there are challenges to innovative integration and information sharing in retailer–supplier relationships. Hence, to realise any benefits, companies in the FMCG sector in Saudi Arabia must overcome any challenges related to information accessibility (Almughthim & Jradi, 2023). By setting up standardised guidelines for privacy and information sharing, retailers and suppliers can develop more coordinated and collaborative approaches to category administration.

The interdependency between information and preparation between retailers and suppliers plays a key role in the success of technological integration and information-sharing activities (Ivarsson & Alvstam, 2010). By sharing information and experiences, both parties can benefit from a greater understanding of consumer trends, advertising patterns, and competition (Çetindamar et al., 2005). This collaboration leads to improved operational results, such as better resource utilisation and organisational execution, eventually driving profit. The level of collaboration between retailers and suppliers is pivotal in establishing the adequacy of technological integration and information sharing. That is, stronger collaboration, characterised by open communication and shared beliefs, leads to better results and development within the retail sector (Ivarsson & Alvstam, 2010). In agreement with the investigation of Gürhan-Canli and Batra (2004), the impact of social media channels on consumer behaviour is crucial for technological integration and information sharing in retailer–supplier partnerships. Social media has thus become more important for communication between retailers and consumers in Saudi Arabia (Ismail et al., 2023).

Examinations of information frameworks and analytics capabilities are vital in overcoming information accessibility restrictions. This includes leveraging progressive information analytics tools to gain deeper insights into consumer behaviour and advertising patterns. By securing control of information, retailers and suppliers can collaborate to create more viable category administration techniques tailored to the unique elements of the Saudi market (Almutairi et al., 2022).

Standardised methodologies are required to guarantee information privacy and security in retailer–supplier partnerships (Ivarsson & Alvstam, 2010). This will help address concerns about sharing personal data, guaranteeing that both retailers and suppliers feel confident in their data-sharing activities. The selection of retail tools, such as point-of-sale data and rapid renewal based on deals, can improve the productivity and adequacy of CM in retailer–supplier partnerships (Salam, 2017). Further, cultivating a culture of openness and honesty through training and programmes can aid in overcoming hesitancy toward sharing information and the social barriers that prevent the adoption of technological integration (Abogamous, 2022). By supplying partners with the information and skills required to use technology and information for CM, the FMCG sector in Saudi Arabia could become more competitive (Bansal, 2024).

Technological integration and data sharing present a transformative opportunity to improve CM and prompt development in retailer–supplier partnerships in the FMCG sector in Saudi Arabia (Almutairi et al., 2022). By addressing challenges and establishing collaborative approaches, industry partners can leverage technological integration and data sharing to develop a more productive and consumer-centric retail environment in Saudi Arabia (Alqahtani & Wamba, 2012). While prior research covers CM, technological integration, and data sharing in retailer–supplier partnerships in depth, the Saudi FMCG sector remains understudied. Critical gaps include (1) localised barriers (cultural, technological), (2) a lack of empirical evidence for the effectiveness of CM in Saudi Arabia, and (3) strategies to optimise data sharing in the FMCG market.

7. Results

7.1. The Interdependent Roles of CM, Technological Integration, and Data Sharing

The results of this study demonstrate that the effectiveness of CM in Saudi Arabia relies on the interaction between strategic CM, technological integration, and data sharing, as posited in the conceptual framework.

CM was confirmed as a strategic foundation for all collaborative efforts. However, its efficacy was found to be dependent on the quality of insights derived from data sharing

and the tools provided by technological integration. Retailers and suppliers utilising CM as a collaborative rather than siloed strategy report more accurate demand forecasting and better assortment planning, which improve performance and consumer satisfaction (Ganesan et al., 2009; Kurtuluş et al., 2014).

7.2. Contextual Challenges Moderating Implementation

The framework hypothesis was that contextual challenges moderate the effectiveness of its core components, as supported by the findings. Technological integration is considered vital for enabling real-time inventory control and accurate demand forecasting (Fatorachian & Kazemi, 2021). This was quantitatively supported by regional case studies; for instance, AI-powered demand forecasting tools showed a 20% improvement in forecast accuracy and have been shown to reduce carrying costs. In the FMCG sector, the AI systems that Unilever implemented resulted in a 25% decrease in stockouts and a 10% increase in sales efficiency (Nweje & Taiwo, 2025; Sajja et al., 2025). Furthermore, companies that have successfully implemented collaborative supply chain platforms report operational breakthroughs, such as achieving 100% order accuracy and reducing delivery times to 2–3 h in major metropolitan areas (Team Omniful, 2023). Despite these potential gains, implementation is consistently inhibited by the high implementation costs for SMEs and significant skill shortages (Alqahtani & Wamba, 2012; Khan et al., 2013). This validates the 'technological gaps' component of the framework.

The potential for data sharing to facilitate transparency and joint decision-making (Cui et al., 2015) is severely limited by cultural resistance to sharing information due to organisational silos and a lack of trusted, standardised data governance protocols (Abogamous, 2022; Almughthim & Jradi, 2023). This has resulted in a paucity of access to inclusive market acumens, creating operational issues like overstocking and stockouts (Abunar & Zerban, 2016; Alahmad, 2021).

7.3. Validation of Propositions and Framework Dynamics

The findings validate the framework's proposed relationships, demonstrating both their relevance and the contextual barriers to their full realisation in the Saudi market:

- Proposition 1 (Culturally Attuned Integration): The study confirmed that culturally attuned protocols are necessary for success. Partnerships that invest in relationship-building and clear data governance frameworks see markedly improved joint decision-making (Aastrup et al., 2007). However, the widespread cultural resistance to data sharing (Abogamous, 2022) means that this strategic resource is rare and undervalued throughout the sector.
- Proposition 2 (Inventory Efficiency): Inventory efficiency is partially achieved by firms that adopt inventory management systems, which then report reductions in stockouts (Grewal et al., 2021). However, the lack of fully integrated, real-time data sharing between partners prevents optimisation (Cui et al., 2015), confirming the framework's interdependency.
- Proposition 3 (Consumer-centric Strategies): Consumer-centric strategies go unused in many companies. The inability to share data efficiently prevents the development of the unique knowledge resource needed for personalised offers and tailored promotions (Abunar et al., 2016), thereby missing a key competitive advantage.
- Proposition 4 (Cost Reduction): Evidence for cost reduction is mixed. While some larger firms report marginal gains from streamlined processes, the prohibitive initial investment costs act as a primary barrier for SMEs (Alqahtani & Wamba, 2012; Khan et al., 2013), delaying the realisation of long-term cost savings (Li et al., 2010) and validating the financial challenge outlined in the framework.

- Proposition 5 (Supply Chain Augmentation): Vision 2030 is a powerful driver of supply chain augmentation. The national demand for economic modernisation is driving investments in technologies like AI and cloud computing (Alhumaid & Alotaibi, 2025), which are beginning to enhance supply chain agility. However, augmentation is still in its early stages and is limited by the foundational barriers of data silos and skill shortages (Almughthim & Jradi, 2023; Sallam et al., 2023).

The results strongly support the framework's emphasis on the necessity of collaborative advantages in overcoming barriers. Success was found only among partnerships that had built trust and developed shared goals, thereby mitigating cultural hesitancy and creating a foundation for overcoming other challenges (Ivarsson & Alvstam, 2010).

7.4. The Enabling Role of Vision 2030

A key finding was the role of Vision 2030 as an external catalyst of technological adoption, creating a top-down imperative for collaboration. The demand for operational superiority and sustainable practices is driving investments in cloud-based solutions, AI, and IoT (Alhumaid & Alotaibi, 2025), addressing the framework's focus on sustainability and feedback loops through real-time analytics.

In conclusion, the results validate the conceptual framework by demonstrating that its core components are interconnected and that their effectiveness is either enabled or constrained by the unique contextual challenges of the Saudi market. Enhanced CM effectiveness requires a coordinated approach that simultaneously addresses technological integration, data-sharing barriers, and strategic collaboration.

7.5. Summary of Key Challenges and Solutions

The implementation of effective CM in Saudi Arabia's FMCG sector is contingent upon overcoming several interconnected barriers. Culturally, the strong hesitancy to share information is preventing the collaboration essential for CM. This is compounded by significant financial constraints, particularly for SMEs, and technological gaps in infrastructure and skills.

The proposed solutions were designed to be practical and sequential. Building trust is the foundational first step and is achievable through small-scale pilot projects that demonstrate value, as well as joint training to ensure objective alignment. Addressing cost barriers involves leveraging scalable, cloud-based technologies that require lower initial investments. Finally, technological and governance challenges can be mitigated by adopting standardised integration protocols and developing industry-wide data governance frameworks that ensure security and build confidence between partners. Ultimately, overcoming the established barriers requires a coordinated effort from retailers, suppliers, technology providers, and policymakers to fully realise the potential of CM and align with the strategic goals of Vision 2030.

This synthesis of key implementation barriers and their corresponding, literature-supported solutions is presented in Table 3, wherein a strategic roadmap for overcoming adoption challenges in the Saudi FMCG sector is presented.

Table 3. Key barriers to and proposed solutions for implementing CM in Saudi Arabia's FMCG sector.

Barrier Category	Challenge	Literature-Supported Solution	Supporting Citations
Cultural and Relational	Hesitancy to share data due to organisational silos and a lack of trust.	Implement phased technological integration to demonstrate quick wins and build trust. Foster a culture of transparency through joint training programmes that focus on mutual benefits.	Abogamous (2022); Ivarsson and Alvstam (2010); Aastrup et al. (2007)

Table 3. *Cont.*

Barrier Category	Challenge	Literature-Supported Solution	Supporting Citations
Financial	High technological adoption and implementation costs, especially for SMEs.	Prioritise low-cost, high-impact cloud-based solutions (e.g., SaaS platforms) over large-scale custom systems. Advocate for government or joint venture subsidies aligned with Vision 2030 goals.	Alqahtani and Wamba (2012); Khan et al. (2013); Almutairi et al. (2022)
Technological and Infrastructural	Underdeveloped IT infrastructure and a lack of skilled personnel.	Invest in standardised application programming interface integrations to connect existing systems. Partner with technology providers to deliver training and capacity-building programmes to address skill shortages.	Fatorachian and Kazemi (2021); Almughthim and Jradi (2023); Sallam et al. (2023)
Governance	A lack of standardised data protocols, leading to security and confidentiality concerns.	Develop industry-wide data governance frameworks that define ownership, security, and usage protocols to build confidence in data sharing.	Ivarsson and Alvstam (2010); Almughthim and Jradi (2023)

8. Contributions

This study provides a comprehensive framework displaying how technologies can enhance CM through improved demand forecasting, inventory optimisation, and data-driven decision-making in the Saudi FMCG sector. This framework quantifies operational benefits like stockout reduction and sales lift from targeted promotions while addressing critical implementation barriers: cultural resistance to data sharing, high SME adoption costs, and infrastructural gaps. This research offers practical, scalable solutions through phased technological integration and establishes best practices for data governance and collaboration aligned with the digital transformation goals of Vision 2030. The findings advance emerging market CM theory by demonstrating how data transparency redefines retailer–supplier partnerships to foster greater cooperation. Furthermore, it provides a methodological foundation and localised benchmarks for future comparative studies across the Gulf Cooperation Council region, filling a significant empirical gap in the literature.

This research makes the practical contribution of providing Saudi retailers and suppliers with a validated roadmap for technological adoption whereby high-impact, low-cost tools like cloud-based analytics are prioritised for quick wins and building momentum for larger transformations. Theoretically, it extends beyond Western models by contextualising CM within the unique socio-cultural and economic environment of the Gulf region, introducing relational data governance as a key moderating variable for the success of retailer–supplier partnerships. This work ultimately bridges the gap between high-level strategic policy like Vision 2030 and real-world operational execution, offering stakeholders a strategic pathway to achieving both a competitive advantage and national economic objectives.

9. Future Research

The continuous technological advancements and compounding growth of data sharing in retailer–supplier partnerships have led to significant changes in CM (Dholakia et al., 2012). Consolidating a variety of technological integrations and ecosystems is obligatory to collect real-time metrics, mine data, and automate workflows (Aiolfi & Sabbadin, 2017; Raman & Selvaraj, 2024).

By utilising technological integration and data sharing, category managers will have better access to comprehensive and precise log data, allowing them to regulate their policies and formulate solutions to issues. Machine learning and AI heuristics can be used to predict client demand and trends and customise offers for products (Yarlagadda, 2025). This will result in increased consumer satisfaction, reduced stockouts, improved inventory control, and better profit margins for suppliers and retailers. Technological integration can improve the collaboration between retailers and suppliers via demand forecasting, assortment planning, and promotion scheduling (Yarlagadda, 2025). Usually, the aim of CM via technological integration and data sharing in retailer–supplier partnerships is to leverage advanced technologies and data-based output to underpin policy formulations and stimulate collaboration between retailers and suppliers.

Category managers can employ technology and data to assess consumer behaviour, streamline product choices, augment supply chain efficacy, improve operations, and build a competitive advantage (Akdoğan & Demirtaş, 2014). This will lead to improved performance and profitability for retailers and suppliers.

Modern technologies like blockchain and IoT can transform supply chain management and tracking for retailers and suppliers. By using a shared yet secure database, this technology ensures reliance and transparency in the retailer–supplier relationship by assuring the originality of goods (Raman & Selvaraj, 2024).

The Saudi retail sector has made noteworthy advancements in leveraging technological advancements and information sharing for CM. However, there are many opportunities for development and improvement in this area. As technological advancements continue to arise, retailers and suppliers must remain progressive by adopting advanced technologies to upgrade information analytics, stock administration, and consumer knowledge (Ivarsson & Alvstam, 2010). This will enable them to make more educated choices, optimise supply chain processes, and tailor shopping experiences to consumer needs. The use of data sharing and machine learning in CM can be studied to determine prospective capabilities and revolutionise retailer–supplier partnerships, refine product inventory processes, and evaluate queries (Mauro et al., 2022). Future studies can also examine sustainable and eco-friendly technological integration and data sharing methods within the retail sector (Benzidia et al., 2021; Junejo et al., 2023). While this study provides a conceptual framework, future research should empirically test this model using quantitative methods to validate the proposed relationships between CM, technological integration, and data sharing. The development of CM through technological integration and data sharing is key for the growth and ultimate success of the retail sector in Saudi Arabia.

10. Conclusions

Achieving success in the retail sector requires vital technological integration and data sharing. CM approaches can be used to improve operations, efficacy, and profitability in this regard. Retailers and suppliers can utilise real-time data to make data-driven judgements, leveraging new technologies, strengthening collaboration, improving predictions, and enhancing assortment planning, which will, in turn, increase consumer satisfaction, sales, and market profit.

The strategies and insights offered in this study show the connection between CM approaches and the adoption of novel technologies in retailer–supplier partnerships to advance in the retail sector. Companies utilising technologies for data management have been shown to achieve competitive advantages.

For efficient data sharing, companies should adopt sustainable technologies. Sustainable knowledge and training will aid in the widespread adoption of CM in the evolving market climate while considering consumer choices. The future contributions of CM must

be considered alongside the challenges associated with the implementation of data sharing and technological integration in the long-term relations between retailers and suppliers.

The retail sector shows great promise in its adoption of advanced technologies and data sharing. The industry can utilise novel, adaptive CM approaches and consumer-centric retail insights.

The disproportionate use of technological integration and data sharing may lead to outdated approaches and the dissemination of misinformation within retailer–supplier partnerships. This is because automated decision-making is not always as effective as human decision-making in business exchanges. Advanced technologies are also resource-intensive and costly, which might inhibit their use among SMEs with limited resources. Hence, companies should balance the benefits of technological integration against its costs to develop more effective retailer–supplier partnerships.

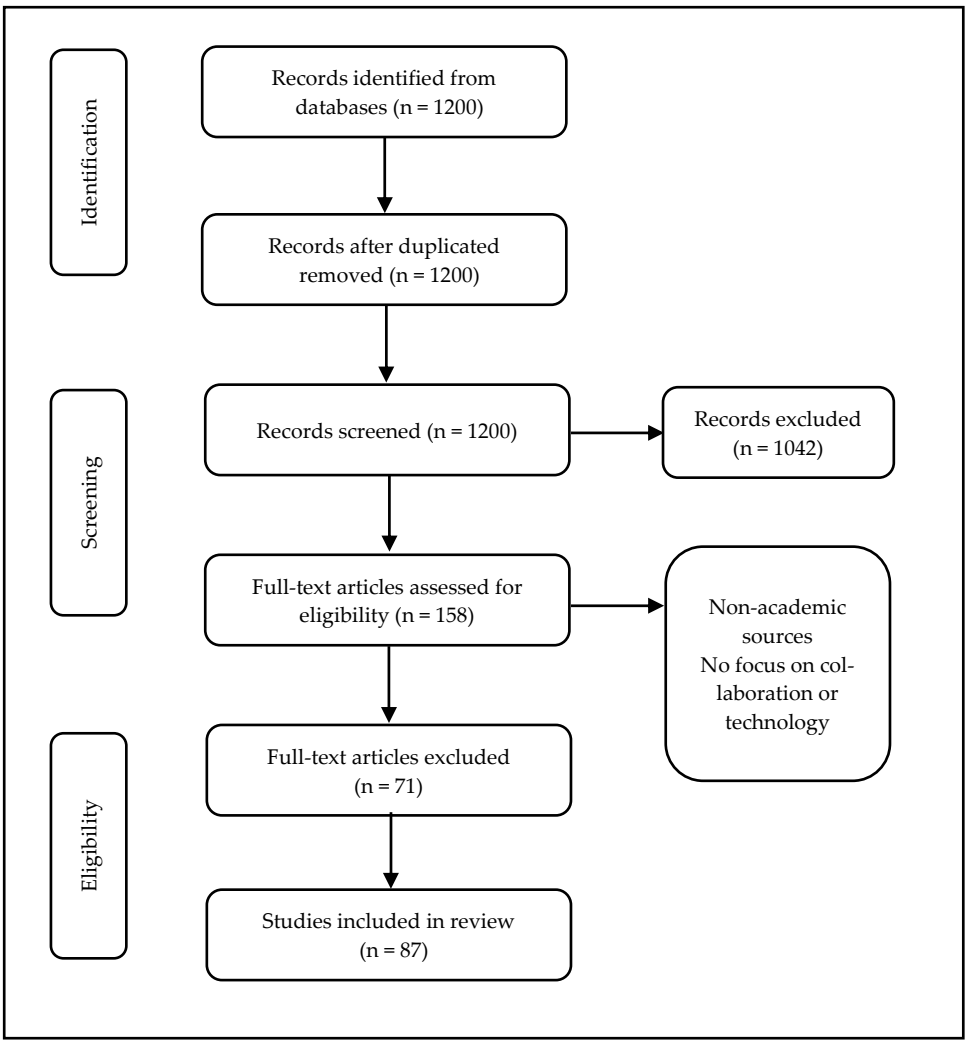
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Appendix A

PRISMA Flowchart: The article selection process followed the established SLR protocols that Tranfield et al. (2003) and Pittaway et al. (2004) developed.



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