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Role of digitalization in influencing the relationship between warehouse optimization, transport optimization and distribution performance of FMCG companies: A review of literature

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Abstract: *one of the largest contributors to the Indian GDP is the FMCG sector and the products that are primarily purchased by consumers. India's distribution and sales channel structure is both important and straightforward, which makes it easier to distribute FMCG products throughout the country. The distribution structure which includes transportation and warehousing that play a significant role in distribution performance. however, there are very few studies that are available in India that explore the influence of digitalization on boosting the physical distribution of FMCG. The present study fills this research gap. The present review has brought out the factors determining warehouse optimization, and transport optimization. Perceivability of the in-transit vehicles, dumping delays, manual booking of vehicles, slow request handling, and all other variables that can be improved with the help of digitization which can further enhance distribution performance.*

Keywords: Digitalization; Warehouse optimization; Transport optimization; Distribution performance.

1. Introduction

Distribution performance refers to a process that aids in addressing the effectiveness of distribution management in companies. Additionally, distribution management has long been one of the biggest problems facing commercial enterprises. According to researchers (Gregory et al.,2019) a company's marketing capabilities are highly related to the degree of distribution and preservation of communication within the company. In order to sustain inventory management and the supply chain, organizations must efficiently manage distribution activities. In addition, controlling distribution processes from suppliers to customers involves managing the processes of distributing commodities. In this regard, distribution management involves a variety of tasks and procedures, and controlling these tasks is essential for ensuring profitability.

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Organizations are concentrating on preserving corporate performance through procedure optimization and management. It has been noted that businesses are more likely to manage distribution performance if they maintain a consistent focus on sales success, return on investment, and outlet coverage (Fuller et al., 2022). Additionally, it is essential to maintain and manage the distribution processes in order to avoid unfavorable effects related to business operations (Mazumder et al. 2018).

Business activities, particularly those involving the supply chain, have grown and become more complex in recent years due to globalization and the greater integration of new technologies (Placek, 2022). These issues have also increased the necessity of controlling distribution performance and avoiding related difficulties. On the other side, fast-moving foods are described as the commodities and products that are readily available and very inexpensive. According to Stewart and Niero (2018), the "fast-moving consumer goods" industry has a crucial relationship to the ideas of the circular economy. Consumer demand for the products has been shown to be considerable, and as a result, regulating distribution performance has become essential for this industry. Due to the great demand for these goods, it has been shown that they can maintain a rapid turnover. FMCG products are those that consumers use practically daily and frequently buy. Over-the-counter medications, groceries, packaged foods, personal care items, office supplies, toiletries, cleaning and laundry supplies, beverages, and other items are included. The population, consumer needs, and other variables influence the demand for these products. The demand for FMCG items is rising along with India's population, which is expanding quickly. The leading FMCG companies in India are shown in the graph below, including Hindustan Unilever, Nestle India, Dabur India, Godrej, and others.

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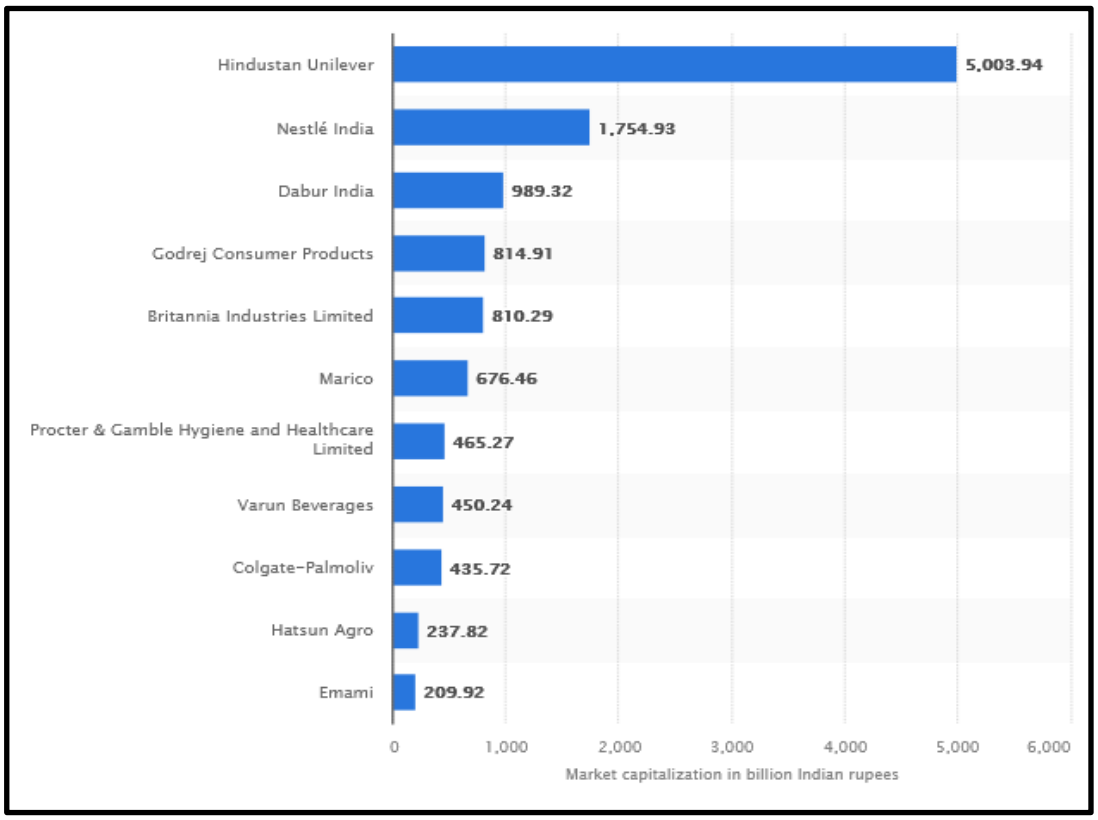

Figure 1.1.2: Leading FMCG companies in India

(Source: Statista, 2022)

According to Sharma et al. (2023), one of the largest contributors to the Indian GDP is the FMCG sector and the products that are primarily purchased by consumers. Manufacturing, wholesaling, retailing, and then distributing to consumers are some of the steps involved in the distribution of FMCG items (Srivastava, 2022). There are various businesses that create various goods, and these manufacturers sell those goods to wholesalers. Then, the wholesalers offer various FMCG product kinds to the retailers, and the clients buy products from the retailers based on their needs. As a result, the products are delivered to customers via a variety of channels, which helps manufacturers deliver their goods on time.

Each of the parties clearly plays an important role in the distribution of FMCG goods. On the other hand, one of the key elements affecting the selling of the products is pricing. Although FMCG products are the least expensive of all product categories, India's price growth rate has accelerated in 2021 (Panda et al., 2022). All industries suffered losses as a result of the COVID-19 epidemic, which led to an increase in the cost of basic goods. The growth rate of FMCG items was 4.4% in the first quarter of 2021 and changed to 11.3% in the third quarter

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(Statista, 2022). Distributors have experienced challenges as a result of the suspension of transit during the outbreak. India's distribution and sales channel structure is both important and straightforward, which makes it easier to distribute FMCG products throughout the nation (Lang et al. 2023). The "three-tier selling and distribution structure" that includes distributors, wholesalers, and retailers is acknowledged as being used by Indian manufacturers. There are many additional sectors in between these three tiers that play significant roles in distribution, as was already described in this section, but these are the fundamental components of the organization. Thus, it can be said that India's highly organized distribution systems aid in the expansion of the FMCG industry there.

Technology has made it easier for businesses to understand the wants and needs of their customers and to provide goods on schedule. The study is primarily concerned with finding the influencing elements for the distribution performance of FMCG companies in India. This section of the study provides a brief summary of the distribution process of FMCG items across India. It has been determined that transportation optimization, and warehouse optimization, significantly influence how well fast-moving items are distributed in the Indian market.

2. Theoretical framework and literature review

The products that consumers often use and buy are known as fast-moving consumer goods. It can be characterized as aggressively low-priced goods that are in high demand and must be often replenished (Shahmohammadi et al., 2020). With an increase in population, there is a greater need for FMCG goods. One of the industries with the quickest rate of growth in India is the FMCG industry, which supports the growth of the national economy. Debata, Patnaik, and Mishra (2020) claim that the FMCG sector primarily offers consumers grocery items and other essential products, such as hygienic goods. Since the FMCG category mostly includes products that are perishable, it becomes immensely important to make sure that these products are delivered on time to the final consumer. Hence it can be concluded that the logistic performance of these companies plays a profound role in enhancing their performance. Fast-moving consumer goods (FMCG) logistics performance heavily depends on transportation and warehouse performance, both of which can be improved through digitalization. Inefficiencies in warehousing and transportation are investigated in this paper's

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analysis of FMCG distribution. The primary focus of this study is to take this forward and identify the relevant literature on the influence of warehouse performance optimization and transport performance optimization on the effectiveness of distribution performance of FMCG companies in India.

The distribution strategy helps the organization reach its target customers with efficient goods and services (Karaxha & Karaxha, 2015). An important determinant in a product's performance in the competitive FMCG sector is the distribution plan (Trihatmoko et al., 2018). By digitalizing and mechanizing business tasks, supply chains should be more flexible, and versatile to emergencies and market shocks, with less dependence on human aspect (Ivanov et al., 2018; Kumar, 2020; Rizou et al., 2020).

2.1 Establishing Links Between Warehouse Optimisation, Transportation, and Distribution Performance

In the sphere of logistics and retail, the warehousing function has attracted growing interest from supply chain management academics in recent years (Pires et al., 2017; Hübner et al., 2016).The majority of transport is focused on street mobility, which also offers a tonne of adaptability (Rossi et al., 2021), and doorstep delivery because FMCG items have a shorter shelf life (Bhakat et al., 2021). This is how transport board frameworks fundamentally and decisively affect the delivery of FMCG scheduled activities (Damodaran et al., 2020). In the context of SCM, warehouses are crucial to achieving a number of supply chain objectives. In this context, warehouse optimisation may be characterised as the process by which the resources and space of the warehouses are successfully employed in accordance with thorough planning to increase customer satisfaction by offering them better services. Effective warehouse design is crucial for the system since it may affect the startup and ongoing costs, which affect how efficient the system is (Yetkin Ekren, 2021).

The importance of the FMCG sector's distribution system performance was highlighted by a study on the crucial topic of picking productivity (Dixit et al., 2020). Along the same lines, Kuteyi and Winkler (2022) highlighted the importance of the supply chain management's digitalization component. In order to improve distribution performance, the paper discusses effective tracking systems, the digitized flow of information, and the use of AI and automation. By reducing waste during picking and its related processes, such as packaging and sorting, a hybrid approach was proposed to increase picking productivity. This highlights

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the importance of each individual connection in the broader supply chain distribution process. In today's very competitive world, having a strong distribution performance structure in place and developing a successful distribution strategy is essential. The study identified three crucial elements—financial capacity, transportation optimization, and information system—that have a significant impact on an organization's distribution performance.

The two very important factors of warehouse optimization and transport optimizations were brought out in studies on managing logistics distribution (Abushaikha et al., 2018; Anand & Grover, 2015; Chauhan et al., 2023; Tracey, 2004). It was indicated that the optimization of these two processes had a positive impact on the distribution performance of any FMCG company. Warehouse optimization performance was proposed to influence business performance through the mediating effect of distribution performance. While some research focused on lean warehousing and recognized transportation and warehousing as crucial performance indicators when discussing supply chain/logistics/distribution performance, other studies made a direct connection between these and business success. Digitalization was used as a mediating factor in the relationships between transport optimization and distribution performance as well as warehousing optimization and distribution performance. Authors (Moldabekoca et al., 2021) who used multiple regression analysis to examine the effect of digitalization on distribution performance echoed similar ideas. According to the authors, government policies should foster an environment that would encourage the development of ICT professionals and the integration of digital technologies like big data and cloud computing. Further research was done to determine how a digital supply chain affected organizational performance (Lee et al., 2022) in order to make suggestions to academics and practitioners, particularly industrial firms.

On-time conveyance, upgraded perceivability of in-transit vehicles, opportune dock stacking and dumping, vehicle limit usage, and programmed vehicle planning are some of the factors that have been brought out as important determinants of transport optimization according to the literature (Gupta & Jigeesh, 2019; Joghee et al., 2021; Kukreja et al., 2020; Pundir et al., 2019; Wang et al., 2020).

2.2 Establishing links between digitalization and distribution performance

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According to researchers (Gebauer et al.,2020) digitalization is the use of "computerized innovation to change plans of action and make new income and worth creation open doors." Computerized transformation, is using new advancements to achieve business advantages, such as improving the client experience, process enhancement, and new plans of action. As organizations rapidly adopt Industry 4.0 technologies, distributed ledger technologies, and IoT-based cyber-physical systems (CPS) architecture to achieve sustainable productivity, profitability, and performance, there has been an increase in demand for digital solutions (Chavarría-Barrientos et al.,2018).

Global trade has been made possible through digitalization in logistics, which includes improved tracking systems, digitized information flows, automation, and artificial intelligence (Kuteyi & Winkler, 2022). Mechanical advancements like scanner tags, radio frequency identification (RFID), sensors, stockroom management systems (WMS), transportation management systems (TMS), robotized capacity and recovery frameworks (ASRS), wearable PCs, and other devices are undeniably suggested as ways to improve planned operations dispersion execution. Additionally, store network joining can be accelerated by digital innovation (Kache & Seuring, 2017; Memon et al., 2021); it can also gather information and data from various sources and locations to begin the manufacture and distribution of goods and services. The WMS maintains high levels of administrative uniformity while increasing distribution centre competency and viability (Mashhur & Attia, 2021; Miralam, 2017). Latif and Shin (2020) established a system that uses integrated mixed reality tactics to lessen travel and pick time by improving observable quality.

Researchers have suggested (Kumar et al., 2013; Loske & Klumpp 2022) numerous digitization initiatives have important long-term recommendations for transportation productivity. A web-based method for locating centre points and directing loads at limit was described by the author. Resat and Turkay (2019) used a mixed number straight enhancement model to test the Turkish transport sector. Blockchain was suggested as a solution for the trust- and openness-required portioned cargo transportation. The digitalization components investigated for this concentration under transportation include transport the board frameworks (TMS), vehicle limit usage devices with regard to rapid client item dissemination, and vehicle worldwide positioning frameworks (VTS) (Arora & Kumar, 2022; Lee et al., 2014). In essence, standardized identifications, undertaking asset arranging, and

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distribution centre administration frameworks have been taken into consideration for warehousing.

3. Conceptual Gap

Most studies have used digitalization either as an individual factor effecting distribution performance or linked digitalization directly to business performance or even performance of countries (Abushaika et al., 2018; Dixit et al.,2020; Moldabekova et al.,2021). These studies talk about the digitization and optimization of the storage layout using a blend of ABS- FSN categorization to assess the leanness by identifying non-value-added activities in order to reduce wastage. The effect of digitization on the logistic performance of countries has also been analyzed and it was indicated that government policies should be conducive to deliver favorable conditions for the integration of digital technologies and digital connectivity to facilitate improvement of supply chain performance. While some studies have also proposed digitalization as a mediating factor between warehouse performance, transport performance and distribution performance (Chauhan et al.,2023), some authors used information technology as a factor influencing distribution performance which is only an aspect of digitalization (Anand & Grover, 2015). Negligible studies have proposed digitalization as a moderating factor that strengthens the relationship between warehouse optimization and distribution performance or even transport optimization and distribution performance The present study proposes the use of digitalization as a moderating factor that strengthens the relationship between transport optimization and distribution performance and warehousing optimization and distribution performance.

4. Discussion and Conclusion

The FMCG industry in India is a developing and rapidly growing business sector that has an impact on everyone's life, either directly or indirectly. Research reveals that there are a few issues throughout the inventory network. Actual distribution suffers the most because it is frequently reevaluated and handled by third-party logistics partners (3PL) over whom the organisation has limited control. According to Sharma et al. (2023), one of the largest contributors to the Indian GDP is the FMCG sector and the products that are primarily purchased by consumers. India's distribution and sales channel structure is both important and straightforward, which makes it easier to distribute FMCG products throughout the nation (Lang et al. 2023). The distribution structure which includes transportation and warehousing

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that play a significant role in distribution performance. Several studies corroborate this (Abushaika et al.,2018; Anand & Grover, Chauhan et al.,2023; Dixit et al.,2020). Studies have been carried out, according to the literature, to highlight supply chain inefficiencies; however, there are very few studies that are available in India that explore the influence of digitalization on boosting the physical distribution of FMCG. The present study fills this research gap. The present review has brought out the factors determining warehouse optimization, and transport optimization. Perceivability of the in-transit vehicles, dumping delays, manual booking of vehicles, slow request handling, and all other variables that can be improved with the help of digitization which can further enhance distribution performance. This supports the assumption of the present study that digitalization can strengthen the relationship between transport optimization, warehousing optimization, and distribution performance.

Due to cutting-edge technological breakthroughs, growing global competition, and rapidly shifting customer expectations, organizations must assess how they can use digitalization to better manage their distribution activities. Through cross-organizational business process partnerships, particularly in the case of demand changes, and flexibility in the face of capacity constraints, the inherent digital technologies enhance responsiveness.

5. Limitations and future scope

The physical distribution of FMCG sector companies is the main topic of this study. Infrastructure, the state of technology, the availability of resources, and human knowledge are a few examples of specific factors that may vary as geography and goods change.

Future research offers fresh directions thanks to the conducted study. Subsequent studies may examine estimates for other factors because the study's measurements are restricted to only the most crucial variable. Other geographical areas or the supply chains of industrialized nations may likewise be the subject of similar analyses. The supply chains of other industries apart from the FMCG sector might undergo a similar analysis.

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