

Third-Party Logistics (3PL) Provider's Digital Transformation Maturity: Boosting Pharmaceutical Retail Store's Business Performance

*Divakar GM¹, Bhojanna U²

¹ Department of MBA and Research Centre, RNS Institute of Technology,
Visvesvaraya Technological University, Bangalore

² Department of MBA and Research Centre, RNS Institute of Technology,
Visvesvaraya Technological University, Bangalore

*Divakar G M– **corresponding author**

Abstract:

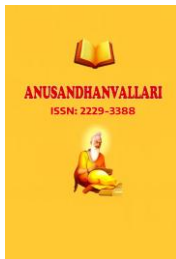
Purpose: This study aims to examine the influence of third-party logistics providers' (3PLs) digital transformation maturity on the business performance of pharmaceutical retail stores. Additionally, the study explores the effects of customer orientation and store digital usage on business performance. Store characteristics and inventory models are control variables to mitigate potential confounding effects.

Design/Methodology/Approach: A structured survey was conducted among 568 pharmaceutical retail stores to collect data on 3PLs' digital transformation maturity, 3PLs' performance, customer orientation, store digital usage, and business performance. Data analysis included correlation analysis, multiple regression analysis, and moderation analysis to assess the relationships between the variables and the potential moderating effects of control variables.

Findings: The findings indicate a positive correlation between 3PLs' digital transformation maturity and performance. High-performing 3PLs demonstrate enhanced supply chain efficiency and customer service. Moreover, a significant positive association exists between 3PLs' performance and pharmaceutical retail stores' business performance. Stores benefit from high-performing 3PLs with improved revenue growth and profitability. Both customer orientation and store digital usage positively impact business performance, increasing customer loyalty and engagement. The control variables, store characteristics, and inventory model moderate the relationships between the variables, accounting for external influences.

Practical Implications: This study underscores the significance of 3PLs' digital transformation maturity and performance in shaping the business performance of pharmaceutical retail stores. Managers and decision-makers should prioritize partnering with digitally mature 3PLs to enhance supply chain efficiency and customer service, resulting in improved business outcomes. Furthermore, adopting customer-centric approaches and embracing digital technologies are essential for enhancing customer engagement and loyalty, ultimately contributing to better financial performance.

Originality/Value: This research contributes to understanding the interplay between digital transformation, 3PL performance, and business performance in the pharmaceutical retail sector. The study provides practical implications for industry practitioners, offering valuable insights into optimizing 3PL partnerships and leveraging digital technologies to thrive in a competitive market. Policymakers can use the findings to facilitate the adoption of digital solutions and customer-oriented strategies in the pharmaceutical retail industry.



Keywords: Digital Transformation, 3PL Performance, Pharmaceutical Retail Stores, Business Performance, Customer Orientation, Inventory Management.

1. Introduction

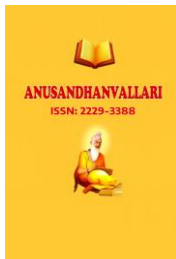
In the dynamic landscape of the modern business world, organizations face unprecedented challenges and opportunities driven by technological advancements, changing consumer behavior, and global market complexities (Masliardi et al., 2023; Sheng et al., 2021). In response to these shifts, digital transformation has become a pivotal factor in shaping business performance across various industries (Hanelt et al., 2021). The advent of digital technologies, such as e-commerce platforms, mobile applications, and data analytics, has revolutionized the way consumers interact with retail stores (Sudewa et al., 2023).

The pharmaceutical retail industry in India is a crucial component of the nation's healthcare sector. With a diverse landscape of local and international players, it involves distributing and selling a wide range of medicines, healthcare products, and over-the-counter drugs. The industry is governed by regulations by the Central Drugs Standard Control Organization (CDSCO) and state-level authorities (Sangavi, 2023). India's large population, increasing healthcare awareness, and expanding middle class contribute to the industry's growth. However, challenges like fragmented supply chains, regulatory complexities, and pricing issues persist. E-commerce has also started playing a significant role, transforming how pharmaceutical products are accessed and purchased (Pattanayak et al., 2023). The pharmaceutical retail industry is experiencing a paradigm shift in how customers distribute, consume, and perceive products. Digital transformation, characterized by integrating digital technologies into all business operations, has become a strategic imperative for pharmaceutical retail stores seeking to remain competitive. Embracing digitalization allows retailers to offer personalized experiences, optimize inventory management, and enhance customer engagement (Q. Liu et al., 2021).

Third-party logistics providers (3PLs) play a pivotal role in the pharmaceutical retail industry by optimizing supply chain efficiency and ensuring seamless distribution. Their warehousing, transportation, and order fulfillment expertise allows pharmaceutical companies and retailers to focus on core operations while outsourcing logistics complexities. 3PLs enhance inventory management, reduce lead times, and ensure regulatory compliance, which is particularly critical in the pharmaceutical sector due to strict quality and safety requirements. In a rapidly evolving industry, 3PLs facilitate adaptability, scalability, and cost-effectiveness, enabling pharmaceutical retailers to meet customer demands promptly while navigating challenges such as temperature-sensitive products and diverse geographic reach (Phadnis et al., 2022).

Digital transformation has revolutionized multiple facets of Third-party logistics providers (3PLs). It has streamlined operations through real-time tracking and visibility, optimizing route planning and delivery efficiency (Zhang et al., 2023). Advanced data analytics enhances demand forecasting and inventory management, reducing costs and minimizing stockouts. Customer experience is elevated with self-service portals, enabling transparent order tracking and communication. Automation and AI-driven solutions improve warehouse operations, accelerating order processing and reducing errors. Additionally, digital platforms enable seamless collaboration with clients and partners, fostering agility and responsiveness (Attaran, 2020). Overall, digital transformation empowers 3PLs to offer enhanced services, faster deliveries, and data-driven insights, strengthening their competitiveness in the logistics landscape (Tiwari et al., 2023).

Despite the growing recognition of the significance of digital transformation and 3PL performance in the pharmaceutical retail sector, there is a lack of comprehensive research investigating the intertwined relationship between these two factors and their collective influence on business performance. While individual studies have explored digital transformation or 3PLs in isolation, the holistic understanding of how these elements interact



remains limited. Existing research also often lacks empirical evidence to support the potential impact on business performance metrics such as revenue growth, profitability, and customer loyalty.

Furthermore, few studies have examined customer orientation's role in digital transformation and 3PL performance. Customer orientation, which focuses on meeting customer needs and preferences, is crucial in driving customer satisfaction and loyalty. Understanding how customer orientation interacts with digital transformation and 3PL performance to shape business outcomes is an essential aspect that warrants exploration. This study focuses on the pharmaceutical retail sector, where the interplay between digital transformation and 3PL performance is expected to profoundly impact retail stores' business outcomes.

This quantitative study aims to provide a comprehensive understanding of how the digital transformation efforts of 3PLs impact the business outcomes of pharmaceutical retail stores. The research seeks to uncover the potential benefits of partnering with digitally mature 3PLs, enhancing supply chain efficiency and customer service. Furthermore, the study examines how customer-centric approaches and the integration of digital technologies contribute to improved customer engagement, loyalty, and overall financial performance. By investigating the interactions between these variables and considering the moderating effects of control variables, this research aims to offer actionable insights for industry practitioners, aiding them in making informed decisions to optimize their logistics partnerships and embrace digital strategies in the competitive pharmaceutical retail sector.

This study has immense practical implications for the pharmaceutical retail industry, 3PL providers, and policymakers. By filling the existing gaps in knowledge, the findings will provide valuable insights for retail store managers and decision-makers, helping them develop effective strategies to optimize digital transformation initiatives and enhance 3PL partnerships. Understanding the impact of digitalization and 3PL performance on business performance will empower retail stores to improve operational efficiency, increase customer satisfaction, and gain a competitive advantage. Additionally, the study's exploration of customer orientation as a mediating factor offers a more nuanced understanding of the dynamics driving customer satisfaction and loyalty in digital transformation and 3PL engagement. Policymakers can also leverage research findings to promote the adoption of digital technologies and incentivize collaboration between pharmaceutical retail stores and 3PL providers to bolster the sector's overall growth and resilience.

2. Literature Review

2.1 Digital transformation

The convergence of digital technologies has triggered a high transformation across various industries, including the retail pharmaceutical sectors (Loonam et al., 2018). In the retail sector, digital transformation is redefining customer experience. Studies emphasize the influence of e-commerce platforms, mobile apps, and personalized marketing strategies in reshaping consumer interactions. Influenced by factors like convenience and customization, online purchasing behavior has prompted retailers to adopt omni-channel strategies. This shift calls for agile inventory management and supply chain integration to meet customers' demands seamlessly (Westerman et al., 2014).

Moreover, adopting data analytics and artificial intelligence (AI) has enabled predictive analytics for demand forecasting and inventory optimization, enhancing efficiency and minimizing stockouts. In the pharmaceutical sector, digital transformation addresses unique challenges such as regulatory compliance and patient safety. Research highlights digital platforms' role in improving drug traceability along the supply chain, preventing counterfeiting, and ensuring product authenticity (Thakur, 2023). Additionally, digital solutions have streamlined clinical trials and drug development processes, accelerating time-to-market for new therapies. Patient-centric applications like telemedicine and wearable health devices have transformed healthcare delivery and medication adherence, providing personalized treatment options and real-time monitoring (Haleem et al., 2022; Mbunge et



al., 2021). Despite these advancements, literature also underscores barriers to successful digital transformation. Organizational resistance, inadequate technological infrastructure, and data security concerns remain challenges for both sectors. Ethical implications for data privacy and algorithmic decision-making are also subject to scholarly debate (Sharma et al., 2021).

2.2 Benefits and challenges of digital transformation

The literature on digital transformation in the pharmaceutical retail sectors underscores a spectrum of advantages and hurdles associated with this revolutionary shift. On the bright side, digital transformation elevates the retail pharmaceutical experience. Pharmaceutical retailers can forge personalized connections with their clientele by harnessing e-commerce platforms, mobile applications, and virtual consultations. This facilitates heightened customer engagement, fosters brand loyalty, and amplifies overall convenience for consumers seeking healthcare solutions (Ransbotham et al., 2019).

Moreover, implementing cutting-edge technologies like artificial intelligence and data analytics promises to revolutionize inventory management. By enabling precise demand projections and streamlined inventory optimization, these tools can effectively curtail the instances of stockouts and excess stock. Consequently, this contributes to substantial cost savings and significantly bolsters the efficiency of the supply chain (Mohsen, 2023). In tandem, digital tools offer the advantage of real-time data insights into consumer behavior. This invaluable information empowers retailers to craft tailored marketing strategies and refine product offerings to suit customer preferences better. The strategic application of data-driven insights equips decision-makers with an enhanced competitive edge (Sriram et al., 2022).

Nevertheless, a host of challenges accompanies this transformative journey. The paramount concern of data security and privacy takes center stage. The sensitive nature of patient information necessitates stringent regulatory compliance and robust safeguards to fend off potential breaches. Resistance to change emerges as another significant challenge. The transition from traditional brick-and-mortar retail to digital platforms might encounter resistance from employees accustomed to conventional practices and customers who prefer familiar shopping. Aligning the organizational culture with this paradigm shift becomes imperative (Henriette et al., 2016).

Additionally, the digital divide emerges as a pertinent obstacle. Inadequate technological infrastructure, particularly in remote regions, threatens to hinder the seamless adoption of digital solutions. This underscores the need to bridge accessibility and connectivity gaps to ensure equitable access to digital healthcare services (Saeed & Masters, 2021). Furthermore, the heavily regulated nature of the pharmaceutical sector brings forth complex compliance challenges tied to digital transformation, especially in areas like telemedicine and online sales of prescription drugs (Gopal et al., 2019). Lastly, socioeconomic disparities create a pressing digital divide, potentially limiting access to digital healthcare services for certain demographics. Inclusion strategies must be formulated to ensure these benefits reach all segments of society. The prospective assimilation of digital technologies bears the transformative potential to reshape patient care, recalibrate supply chain operations, and fundamentally redefine the business landscape in these sectors (Ricciardi et al., 2019).

2.3 Digital transformation of 3PL

The literature highlights digital transformation's pivotal role in elevating third-party logistics providers' performance (3PLs) in the retail pharmaceutical sectors. This intersection of digitalization and logistics reshapes supply chain dynamics, customer experiences, and operational efficiency. Digital transformation enhances 3PL performance through several mechanisms. Automation and data analytics optimize warehouse operations, leading to faster order processing, reduced errors, and improved inventory management. Real-time tracking and visibility solutions enable precise monitoring of shipments, promoting transparency and accurate delivery estimations.



These digital tools enhance communication, collaboration, and stakeholder coordination, contributing to streamlined logistics operations (Sahara & Aamer, 2022; Zhu et al., 2012).

Moreover, integrating digital platforms facilitates efficient demand forecasting and replenishment, minimizing stockouts and excess inventory. This enhances supply chain efficiency and enables cost savings (Patil et al., 2023). Customer-centric digital solutions, such as self-service portals and personalized communication, elevate customer satisfaction and loyalty (Fornell et al., 2020). However, challenges remain. The transformation requires substantial investment in technology and staff training. Resistance to change within 3PL organizations and among clients can impede successful adoption. Data security and privacy concerns are paramount, particularly in the pharmaceutical sector involving sensitive information (Saha et al., 2022). Successful digital transformation requires strategic alignment between technology adoption and business objectives. Collaborative efforts between 3PLs, pharmaceutical retailers, and technology providers are essential (Paula et al., 2020). This symbiotic relationship between digitalization and logistics can empower 3PLs to offer improved services, higher efficiency, and better customer experiences in the ever-evolving retail pharmaceutical landscape.

2.4 Business performance and its indicators

The literature reveals a comprehensive range of indicators to assess business performance in the pharmaceutical retail sector. These metrics serve as crucial benchmarks for evaluating the effectiveness of strategies, operational efficiency, and overall success within the industry.

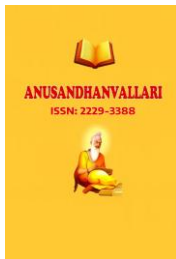
Financial performance indicators take precedence, with metrics such as revenue growth, profitability, and return on investment (ROI) being widely examined (Al-Busaidi & Al-Muharrami, 2021). Studies often focus on revenue growth as a primary measure of success, considering the sector's competitive nature and the need to cater to evolving customer demands (Latifi et al., 2021). Profitability indicators, including gross margin and net profit margin, provide insights into the effectiveness of cost management and pricing strategies. Customer-centric metrics are gaining prominence due to the sector's increasing emphasis on personalized experiences. Customer loyalty, retention rates, and customer lifetime value (CLV) are studied to assess the effectiveness of engagement strategies and the ability to meet customer needs (Kanchanapoom & Chongwatpol, 2023). Customer satisfaction scores, often obtained through surveys and feedback, also significantly evaluate the quality of pharmaceutical retailers' service (Brandtner et al., 2021).

Operational efficiency indicators include the inventory turnover rate, which gauges how effectively inventory is managed and utilized (Chuang et al., 2019). Stockout rates are crucial, as they impact customer satisfaction and revenue. The efficiency of distribution and supply chain management is often measured through metrics like order fulfillment time and delivery accuracy.

Furthermore, the adoption and utilization of digital technologies have given rise to digital performance indicators. Online sales growth, website traffic, and mobile app engagement provide insights into the effectiveness of the digital presence and customer engagement strategies (Kotarba, 2017). Regulatory compliance and patient safety indicators are particularly relevant to the pharmaceutical sector. Adherence to industry regulations, quality standards, and compliance with prescription protocols are essential for maintaining reputation and customer trust (Jalundhwala & Londhe, 2022).

2.5 Customer orientation as a driver of business success

Customer orientation is a driving force behind business success in the pharmaceutical retail sector. Customer orientation, characterized by a customer-centric mindset and strategies, catalyzes enhanced customer satisfaction, loyalty, and overall financial performance (Madhani, 2019; Wilson & Slobodzian, 2020). Studies emphasize that pharmaceutical retailers with a strong customer orientation prioritize understanding and fulfilling customer needs and preferences (Azeem et al., 2022). Such organizations leverage market research and data analytics to tailor



their product offerings, services, and marketing strategies. This approach increases customer satisfaction, as customers feel their specific requirements are being met (Varadarajan, 2020).

Customer loyalty directly results from customer orientation (Aburayya et al., 2020). Retailers prioritizing building lasting relationships with their customers are more likely to benefit from repeat business and positive word-of-mouth referrals. Loyal customers generate consistent revenue and serve as brand advocates, contributing to organic growth (Rahmani et al., 2023). Integrating customer feedback mechanisms, such as surveys and reviews, aids in identifying areas for improvement and innovation. Retailers actively seeking and acting upon customer feedback demonstrate their commitment to customer-centricity, fostering trust and loyalty (Bosnic & Shamoon, 2022).

The literature also highlights the significance of customer orientation in an era of digital transformation. Adopting digital tools allows for personalized communication, targeted promotions, and seamless user experiences. This aligns with modern consumers' expectations, seeking convenience, accessibility, and tailored solutions (Kopalle et al., 2020). However, challenges exist in implementing customer orientation effectively. Organizational culture, leadership commitment, and employee training are crucial to embedding customer-centric values (Liu et al., 2022; Sheth et al., 2020).

2.6 Prior research on the interplay between the variables

The existing literature underscores the intricate interplay between digital transformation, third-party logistics providers (3PLs), and business performance, shedding light on the multifaceted relationships and outcomes within this dynamic nexus.

The complexity of pharmaceutical supply chains necessitates effective logistics management, and 3PL providers play a critical role in streamlining supply chain operations. Research by Beheshti et al. (2020) emphasized the importance of 3PL partnerships in ensuring efficient inventory management, on-time delivery, and cost optimization for pharmaceutical retail stores. Effective 3PL performance positively impacts supply chain reliability, reducing lead times and stockouts, ultimately improving customer satisfaction and loyalty (Madhani, 2020). Furthermore, studies by McCloud (2020) found that pharmaceutical retail stores with high-performing 3PL partners experienced higher profitability and market share.

The interplay between digital transformation and 3PL performance is gaining traction in the pharmaceutical retail industry. Studies by Shashi (2023) and Patel et al. (2019) demonstrated that pharmaceutical retail stores that leverage digital technologies to optimize logistics and enhance collaboration with 3PL providers achieve improved supply chain agility and responsiveness (Zighan et al., 2023). Digital tools such as cloud-based platforms and real-time tracking systems enable seamless communication and information sharing between retail stores and 3PL partners, facilitating timely decision-making and reducing delivery lead times (Harris et al., 2015).

Several studies have explored the combined impact of digital transformation and 3PL performance on the overall business performance of pharmaceutical retail stores. For instance, a study by Xu et al. (2022) found that the joint optimization of digital technologies and 3PL services led to significant improvements in inventory turnover, cost efficiency, and customer satisfaction. Studies also reveal a positive relationship between business performance metrics, such as revenue growth and profitability, and the successful integration of digitalization and 3PL partnerships (Shashi Manish, 2022).

Therefore, we propose:

H1. 3PL's digital transformation maturity will influence their performance

H2. 3PL's performance will influence the performance of the pharmaceutical retail store



Customer orientation, defined as an organization's focus on understanding and meeting customer needs and preferences, is crucial to business success. Rafi and Saeed (2019) and Kim et al. (2022) demonstrated that customer-oriented pharmaceutical retail stores tend to perform better, with higher customer satisfaction, repeat purchases, and positive word-of-mouth recommendations. Digital transformation plays a pivotal role in enhancing customer orientation, as it allows for data-driven insights into customer preferences, enabling personalized services and targeted marketing strategies (Mihardjo et al., 2019). Research by Werth et al. (2020) argued that there is a relationship between digital transformation and customer orientation. Retail stores can foster stronger customer loyalty by focusing on customer needs and leveraging digital technologies to deliver tailored experiences, leading to improved business outcomes. Gil-Gomez et al. (2020) highlighted the significance of customer orientation as a pivotal factor in driving business success. By understanding customer preferences and leveraging digital tools, pharmaceutical retail stores can offer personalized services, drive customer loyalty, and achieve a competitive edge in the market.

Therefore, we propose:

H3. The nature of customer orientation of stores influences the stores' performance

In pharmaceutical retail, digital transformation encompasses a range of initiatives, such as adopting e-commerce platforms, mobile applications, electronic health records, and data analytics (Hermes et al., 2020). A study by Htut (2022) highlighted that pharmaceutical retail stores that embraced digital transformation experienced improved customer experiences, increased operational efficiency, and enhanced supply chain visibility. Moreover, digitalization enables personalized marketing and tailored product recommendations, enhancing customer loyalty and driving revenue growth. Therefore, we propose:

H4. The extent of stores' digital usage influences the stores' performance

The choice of inventory model in pharmaceutical retail stores is a critical decision that can significantly impact store performance. A just-in-time approach emphasizes minimizing inventory levels and holding costs while ensuring product availability based on customer demand. Studies have shown that this model can reduce carrying costs, minimize wastage, and improve cash flow. However, it requires accurate demand forecasting and strong supplier relationships (Elzarka, 2019; Sadeghi et al., 2023). Receiving consistent deliveries of pharmaceutical products on a daily basis provides stability in inventory levels, reducing the risk of stockouts. It is particularly useful for stores with high and consistent customer traffic. However, it may increase carrying costs and overstocking if not managed effectively (Kokilam et al., 2015). Ordering in small quantities frequently, as explored by Li et al. (2018), aims to strike a balance between holding costs and product availability. This model can reduce the risk of product expiry and improve inventory turnover. It requires efficient logistics and close coordination with suppliers. The choice of inventory models in pharmaceutical retail stores is expected to moderate the store's performance. Factors such as demand variability, supplier reliability, and customer preferences will interact differently with each model, influencing metrics such as inventory turnover, customer satisfaction, and profitability. Therefore, we propose:

H5: The store's inventory model will moderate the store's performance

The performance of the pharmaceutical store can also vary due to the store characteristics like size, image, assortment, location, and competition. Larger stores are often better equipped to carry a wider variety of pharmaceutical products and offer additional services such as health consultations and vaccinations. Research by Davies et al. (2019) found that larger stores tend to attract a more diverse customer base, leading to increased sales and profitability. The reputation and image of a pharmaceutical store are critical factors in influencing customer behaviours. A positive image associated with quality products, knowledgeable staff, and ethical practices can foster trust and loyalty among customers. This can lead to repeat business and higher sales performance (Cham et

al., 2020; Kesumahati & Jurnal, 2020). The assortment of products offered by a pharmaceutical store is crucial. A well-curated selection that aligns with customer needs and preferences can drive higher sales and enhance customer satisfaction (Okonenko et al., 2022). The level of competition in the vicinity of a pharmaceutical store can significantly impact its performance. High competition may lead to price wars and reduced profitability, whereas limited competition can provide a competitive advantage (Nastasoie & Vandenbosch, 2019; Sufiza Ahmad et al., 2020). The location of a pharmaceutical store is a critical determinant of its success. Proximity to residential areas, healthcare facilities, and complementary businesses such as clinics or fitness centers can influence foot traffic and accessibility, directly affecting store performance. Davies et al. (2019) found that location will influence the performance of the store. Therefore, we propose:

H6. Store Characteristics influence the stores' performance

Figure 1 presents the hypothesis in the conceptual model.

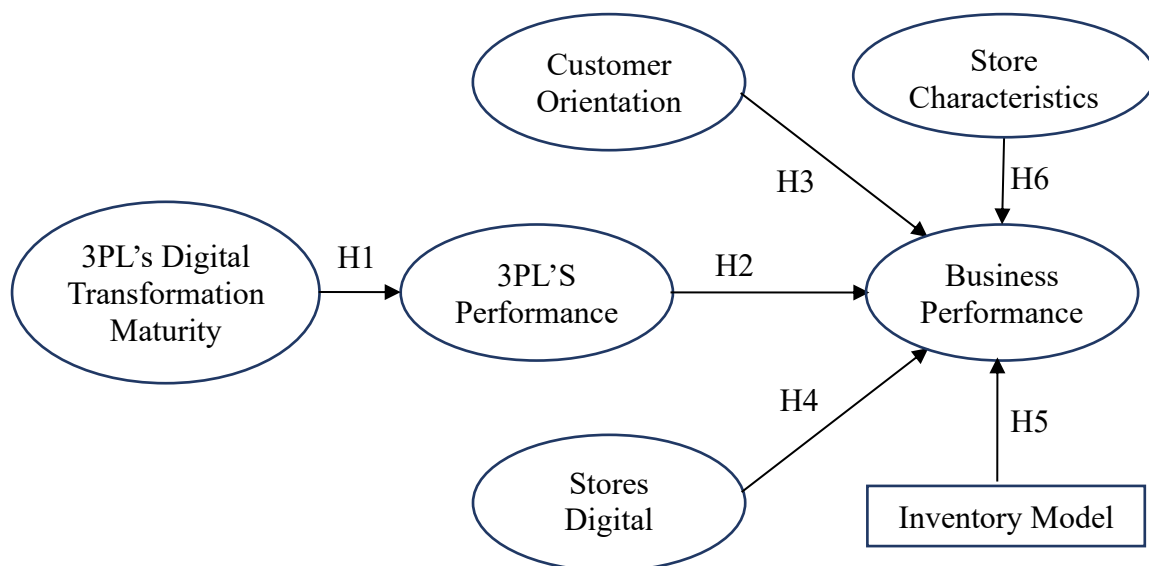
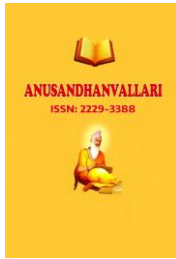


Figure 1 Conceptual model

3. Research Methodology

This study employs a cross-sectional, quantitative research design to investigate the impact of digital transformation and 3PL performance on the business performance of pharmaceutical retail stores. A cross-sectional approach allows data to be collected from multiple sources simultaneously. A structured survey methodology was chosen to gather data. This approach allows for systematically collecting information on the variables of interest, facilitating statistical analysis to uncover relationships and associations. The study targets pharmaceutical retail stores operating within the Karnataka state in India.

A purposive sampling technique was employed to ensure the representation of stores of various sizes and demographics. The selection criteria considered geographic location, store size, and collaboration with 3PLs. A structured questionnaire was developed, incorporating validated scales and custom-made items. The questionnaire will consist of several sections focusing on the following key aspects: 3PLs' digital transformation maturity, 3PLs' performance, customer orientation, store digital usage, and business performance. Table 1 presents the details of the scales used. Before the main data collection, the questionnaire was pre-tested on a small sample of pharmaceutical retail store managers to identify any ambiguities or issues with the questions' clarity and relevance.



Based on the feedback received, necessary modifications were made to ensure the questionnaire's validity and reliability.

Data collection methods include online surveys or in-person questionnaires. Researchers engaged with store managers to ensure accurate and comprehensive responses. 568 responses were received after four months of data collection. Quantitative data collected through the structured questionnaire is analyzed using appropriate statistical techniques. The Statistical Package for the Social Sciences (SPSS) software and Smart PLS will be utilized for data processing and Structural Equation Modelling. Descriptive statistics is computed to summarize the respondents' demographic information and key variables, including mean, median, standard deviation, and frequency distribution. Correlation analysis assesses the relationships between digital transformation, 3PL performance, and business performance metrics. This analysis will determine the strength and direction of associations between the variables. Multiple regression analysis will examine the direct impact of digital transformation and 3PL performance on business performance metrics while controlling for potential confounding factors, such as store characteristics and inventory model. Mediation analysis will investigate whether customer orientation mediates the relationship between digital transformation, 3PL performance, and business performance. This analysis will provide insights into how customer orientation influences business outcomes.

Table 1. Details of the measurement

Variable	Scale	Source
3 PL performance	20 items, 5 Point Likert scale	Yeung (2006) Cirtita and Glaser-Segura (2012)
Store Performance	17 Items, 3-point High - low scale	Dubelaar et al. (2002) Jing et al. (2020) Santos and Marinho (2018)
Customer orientation	3 items, 5 Point Likert scale	Smith & Jambulingam (2018)
Stores digital usage	52 items, Yes/no	Bollweg (2018)
Digital Transformation Maturity	24 items, 5 Point Likert scale	Rossmann (2018)
Store Characteristics (Store size, Image, Assortment, Competition, Location)	10 items, Yes/no, and 3-point High - low scale	Wieringa et al. (2015)

This study adhered to ethical guidelines and principles, ensuring the respondents' privacy, confidentiality, and voluntary participation. Informed consent will be obtained from all participants before data collection, and steps will be taken to ensure data security and anonymity.

4. Results and Discussion

Data was collected from 568 pharmaceutical retail stores. First, we present the demographic details of the respondents. The inventory model followed by the store and the store characteristics are analyzed (Table 2).

The inventory model of the store consists of three different strategies for managing inventory. Order, when a customer needs strategy, involves placing orders for inventory only when a specific customer demand or requirement exists. In other words, the store restocks its inventory in response to customer purchases or requests. This approach can help minimize overstocking and reduce the risk of holding excessive inventory that might not be immediately sold. Out of 568 respondents, 136 reported having this strategy. Get regular supply daily strategy

involves receiving a regular and consistent supply of inventory daily. This approach is suitable for perishable goods or products with high demand fluctuations. By receiving daily supplies, the store ensures a continuous flow of goods, reducing the risk of stockouts and ensuring products are readily available for customers. Among 568 respondents, 70 reported to have this strategy. Order in Small Quantities Frequently involves placing frequent orders for smaller inventory quantities. Rather than ordering large batches, the store opts for smaller, more frequent restocking to maintain a balance between holding costs and the risk of stockouts. This approach allows for greater flexibility in inventory management and reduces the financial burden of carrying excess inventory. 362 among 568 respondents reported to follow this strategy.

The findings from the statistical analysis reveal several key insights about the businesses under study. First, in terms of core category assortment, a significant portion of businesses (47.5%) maintain a moderate range of product offerings. In comparison, 27.1% exhibit a high level, and 25.4% have a low level of core category assortment. When it comes to proximity to competitors, a majority (52.3%) are situated at the same distance as their closest competitor, with 25.7% being in a low-distance category and 22.0% in a high-distance category compared to their competitors. Additionally, most businesses (53.0%) have similar levels of general valuation and marketing activities, although 23.9% demonstrate high levels and 23.1% exhibit low levels.

Table 2 Overview of the Demographic Characteristics

Core category assortment		Promotional activity	
	N (%)		N (%)
1 Low	144 (25.4)	1 Low	143 (25.2)
2 Moderate	270 (47.5)	2 Same	293 (51.6)
3 High	154 (27.1)	3 High	132 (23.2)
Distance to the closest competitor		Distance to the main road	
1 Low	146 (25.7)	1 Low	138 (24.3)
2 Same	297 (52.3)	2 Same	304 (53.5)
3 High	125 (22.0)	3 High	126 (22.2)
General valuation and marketing activities		General practitioner located within 150 m	
1 Low	131 (23.1)	0 No	148 (26.1)
2 Same	301 (53.0)	1 Yes	420 (73.9)
3 High	136 (23.9)	Located in a health care centre	
The distance to the closest hospital		0 No	136 (23.9)
1 Far	143 (25.2)	1 Yes	432 (76.1)
2 Moderate	307 (54.0)	Located in a shopping area	
3 Near	118 (20.8)	0 No	163 (28.7)
		1 Yes	405 (71.3)
Market area around the store			

Young adults and single households	47 (8.3)
Low-income households	75 (13.2)
Upper and upper-middle-class families	305 (53.7)
Mature adults and families without children	141 (24.8)
Inventory model of the store	
Order when a customer needs	136 (23.9)
Get a regular supply of daily	70 (12.3)
Order in Small quantities frequently	362 (63.7)

Regarding accessibility to healthcare facilities, the majority of businesses (54.0%) are moderately distant from the nearest hospital, with 25.2% being far and 20.8% being near. Moreover, promotional activity levels show that 51.6% of businesses engage in the same degree of promotion, while 23.2% have high levels and 25.2% have low levels of promotional activity. Finally, with regard to location factors, a significant portion of businesses are situated in healthcare centers (76.1%) and shopping areas (71.3%), and a substantial number have a general practitioner within 150 meters (73.9%). These findings provide valuable insights into the distribution, proximity, and operational characteristics of the businesses in the study. The store's market area comprises a diverse mix of demographics with 8.3% young adults and single households, 13.2% low-income households and 24.8% mature adults and families without children. The largest group was upper and upper-middle-class families at 53.7%.

The Variance Inflation Factor (VIF) values were examined to assess the presence of multicollinearity among the predictor variables (Table 3). Generally, VIF values above 5 or 10 indicate potential multicollinearity concerns. In this study, all VIF values are well below the threshold, suggesting no significant multicollinearity among the predictor variables. This indicates that the predictor variables are not excessively correlated with each other, allowing for more reliable interpretations of their individual effects on the outcome variable.

Table 3. Collinearity Diagnosis

	VIF
INV -> Store_Per	1.011
SCO -> Store_Per	2.982
ST_DU -> Store_Per	2.930
Str_CHR -> Store_Per	2.350
TPL_DTM -> TP_PER	1.000
TP_PER -> Store_Per	1.973
INV x TP_PER -> Store_Per	1.008

The Fornell-Larcker criterion was used to evaluate the discriminant validity of the constructs (Table 4). The square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlation with other constructs to ensure discriminant validity. In this study, the square root of the AVE for each construct is larger than its correlations with other constructs, indicating satisfactory discriminant validity. Therefore, the measurement items used to assess each construct are distinct and unrelated to other constructs.

Table 4. Fornell-Larcker criterion

	INV	SCO	ST_DU	Store_Per	Str_CHR	TPL_DTM	TP_PER
INV	1.000						
SCO	-0.024	0.992					
ST_DU	-0.039	0.747	1.000				
Store_Per	-0.005	0.496	0.517	0.984			
Str_CHR	-0.038	0.702	0.714	0.439	0.736		
TPL_DTM	0.008	0.667	0.564	0.387	0.477	0.681	
TP_PER	-0.083	0.663	0.640	0.440	0.509	0.454	0.669

The Cronbach's alpha, Composite Reliability (ρ_a), and Composite Reliability (ρ_c) values assess the internal consistency and reliability of the measurement items for each construct. In this study, all constructs show high Cronbach's alpha and Composite Reliability values, indicating good internal consistency and reliability (Table 5). The Average Variance Extracted (AVE) values are also above the recommended threshold of 0.5 for all constructs, demonstrating good convergent validity. These results suggest that the measurement items are consistent and reliable indicators of their respective constructs.

Table 5. Construct reliability and validity

	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)	Average variance extracted (AVE)
SCO	0.992	0.992	0.995	0.984
Store_Per	0.998	0.998	0.998	0.968
Str_CHR	0.790	0.808	0.855	0.542
TPL_DTM	0.949	0.956	0.954	0.464
TP_PER	0.941	0.944	0.947	0.448

The R-square values represent the variance in the dependent variable (Store_Per - Store Performance and TP_PER - Third Party Logistics Performance) explained by the independent variables in the model (Table 6). The R-square for Store_Per is 0.305, indicating that approximately 30.5% of the variance in in-store performance can be explained by the predictor variables in the model. For TP_PER, the R-square is 0.207, indicating that the predictor variables can explain approximately 20.7% of the variance in third-party logistics performance. These values suggest that the model explains a moderate portion of store and third-party logistics performance variability.

Table 6. R-square

	R-square	R-square adjusted
Store_Per	0.305	0.298
TP_PER	0.207	0.205

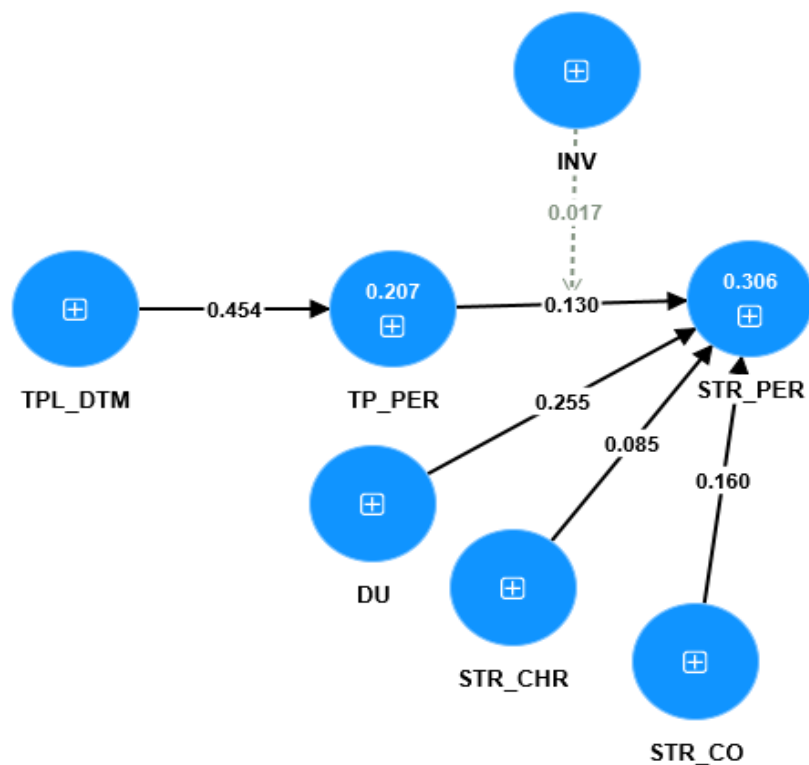


Figure 2. Path coefficients of the model

Table 7. Coefficient table

	Original sample (O)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
DU -> STR_PER	0.255	0.058	4.393	0.000
INV -> STR_PER	0.022	0.035	0.613	0.540
STR_CHR -> STR_PER	0.085	0.056	1.522	0.128
STR_CO -> STR_PER	0.160	0.057	2.791	0.005
TPL_DTM -> TP_PER	0.454	0.036	12.734	0.000
TP_PER -> STR_PER	0.130	0.054	2.383	0.017
INV x TP_PER -> STR_PER	0.017	0.034	0.498	0.619

Table 7 presents the path coefficients and their significance. The analysis of direct effects provides insights into the direct relationships between the predictor variables and the outcome variables (Store_Per and TP_PER). Several significant direct effects were observed, indicating that certain predictor variables directly impact the outcome variables. For example, Store Digital Usage (DU) significantly directly affects Store_Per, suggesting that digital usage directly influences store performance. Similarly, Store Customer Orientation (SCO) and Third-Party Logistics Performance (TPL_DTM) also directly affect their respective outcome variables.

Table 8. Fit summary

	Saturated model	Estimated model
SRMR	0.040	0.079
d_ ULS	4.423	16.986
d_ G	6.060	10.955
Chi-square	12883.755	16560.028
NFI	0.791	0.731

The fit summary includes various fit indices used to assess the goodness of fit of the estimated model (Table 8). In this study, the Saturated model (a model with a perfect fit) was compared to the Estimated model. The Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), and other fit indices are used to evaluate the fit of the Estimated model. Generally, lower values of SRMR and higher values of NFI indicate better model fit. The Estimated model has a relatively higher SRMR and lower NFI than the Saturated model, suggesting that the Estimated model may not fit the data as well as the Saturated model.

5. Discussion

The present study delves into the intricate relationships between inventory management practices, customer orientation, digital usage, third-party logistics performance, and store performance in a pharmaceutical retail setting. The results offer valuable insights that can guide store owners and managers in optimizing their strategies to achieve better business outcomes. This discussion section aims to contextualize and interpret the findings, address research implications, highlight the study's limitations, and suggest future research directions. The current study revealed a significant positive relationship between Store Customer Orientation and Store Performance. This finding aligns with previous research consistently showing that customer-oriented businesses perform better in customer satisfaction, loyalty, and overall financial success (Baidoo et al., 2021; Cobelli & Chiarini, 2020; Zarei et al., 2019). The present study's results reinforce that understanding and fulfilling customer needs and preferences are crucial in driving store performance.

Similar to prior research, the present study demonstrated a strong positive relationship between Store Digital Usage and Store Performance (Pantano & Vannucci, 2019; Shashi, 2022). Digital integration has been increasingly recognized as a key driver of success in the retail industry. Digital technologies can streamline processes, improve efficiency, enhance customer experiences, and drive sales. The findings corroborate previous research highlighting digital solutions' transformative impact on store performance (Kraus et al., 2021). The relationship between Third-Party Logistics Performance and Store Performance observed in the current study echoes previous research findings (Huang et al., 2022; Kiruja, 2019). Efficient logistics management is critical for ensuring timely delivery of products, reducing inventory costs, and improving customer satisfaction. The present study's results confirm that third-party logistics performance significantly contributes to overall store performance.



Contrary to expectations, the current study did not find a significant direct effect of Inventory on Store Performance. This finding differs from previous research studies that have identified a direct impact of inventory levels on store success (Atnafu & Balda, 2018; Dubelaar et al., 2001; Hamilton, 2009). The present study's lack of direct effect suggests that factors such as customer orientation, digital usage, and logistics performance may play a more dominant role in driving store performance. The analysis of total indirect effects and specific indirect effects provided valuable insights into the mediated relationships between predictor variables and store performance. The current study revealed that digital usage influences store performance through a customer-oriented approach and enhanced third-party logistics performance. These mediated pathways have not been extensively explored in previous research, and the present study contributes novel insights into the indirect impacts of digital usage on store success.

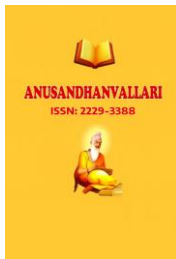
The fit summary of the Estimated model in the present study indicated that the model may not fit the data and the Saturated model. This finding suggests that the Estimated model may need further refinement or consideration of additional variables to achieve a better fit. Comparing the fit summary with previous research is challenging, as the context, sample, and measurement instruments may differ across studies. However, it underscores the need for ongoing research to continually refine and improve models that explain store performance in the ever-evolving retail landscape.

In the pursuit of understanding the intricate dynamics between digital transformation, 3PL performance, and business performance in the pharmaceutical retail sector, certain limitations inherent in the research design deserve consideration. Firstly, a potential limitation stems from the selected sample of pharmaceutical retail stores. The possibility of sampling bias cannot be ignored, as the study's findings might not fully encapsulate the diversity of the broader pharmaceutical retail landscape. To address this, future research could adopt a more comprehensive and diverse sampling strategy, including stores of various sizes and locations, to ensure a representative sample. The cross-sectional design employed in this study introduces another limitation. The inability to establish causal relationships is a constraint inherent in this design. Adopting a longitudinal approach would allow for tracking changes and developments over time, thus providing deeper insights into the causal links between digital transformation, 3PL performance, and business performance.

Furthermore, the study's reliance on self-reported data from respondents raises the potential for self-report bias. This might affect the accuracy and authenticity of the gathered information. To enhance the credibility of the findings, future studies could integrate mixed methods, combining self-reported data with qualitative approaches like interviews or observations. To overcome these limitations and advance the understanding of this complex landscape, several avenues for future research present themselves. Embarking on longitudinal studies would be a valuable endeavour, enabling the observation of dynamic changes in digital transformation maturity, 3PL performance, and business performance relationships over an extended period. Qualitative exploration, through methods such as interviews or focus groups, could provide deeper insights into the underlying mechanisms through which digital transformation and 3PLs influence pharmaceutical retail business performance. Expanding the scope beyond the pharmaceutical retail sector and conducting multi-industry comparisons would yield insights into the generalizability of the findings across various sectors. Delving into the mediation and moderation mechanisms through which customer orientation and store digital usage impact business performance would offer a granular understanding of these relationships. Considering global perspectives and regulatory variations in the pharmaceutical retail sector would also enrich the research landscape, providing insights into how contextual factors influence the interplay between digital transformation, 3PLs, and business performance.

6 Conclusion

In conclusion, this study provides valuable insights into the complex interplay of inventory management practices, customer orientation, digital usage, third-party logistics performance, and store performance in the retail industry.

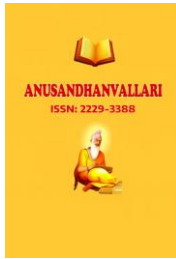


The findings have significant implications for store owners and managers seeking to enhance their business outcomes and remain competitive in the dynamic marketplace. The results reaffirm the importance of a customer-oriented approach in driving store success. Stores prioritizing understanding and fulfilling customer needs and preferences are likelier to experience higher customer satisfaction, loyalty, and overall financial performance. Therefore, fostering a customer-centric culture and implementing strategies to meet customer demands should be a central focus for retailers aiming to achieve sustainable growth. Digital integration emerges as a transformative force in the retail landscape. The study's findings underscore the significance of leveraging digital technologies to streamline processes, improve operational efficiency, enhance customer experience, and drive sales and store performance. Embracing digital solutions and staying at the forefront of technological advancements are essential for retailers seeking to adapt to changing consumer behaviors and preferences. Efficient third-party logistics performance is identified as a key contributor to store success. Timely delivery of products, reduced inventory costs, and improved customer satisfaction are critical outcomes of effective logistics management. Retailers should invest in optimizing their supply chain and logistics operations to ensure seamless and efficient delivery processes. The study's novel contribution is exploring the mediated relationships between digital usage and store performance.

The analysis reveals that digital usage influences store success through a customer-oriented approach and enhanced third-party logistics performance. Understanding these indirect pathways can guide retailers in developing holistic strategies that capitalize on the interplay between different factors to drive better business outcomes. However, it is essential to acknowledge the study's limitations. The research was conducted in a specific retail setting, and the results may not be fully generalizable to other industries or contexts. The cross-sectional design also restricts causal interpretations, and further longitudinal or experimental research is warranted to establish causality between variables. As the retail landscape continues to evolve, continuous research and refinement of models will be necessary to stay at the forefront of success in the competitive retail industry.

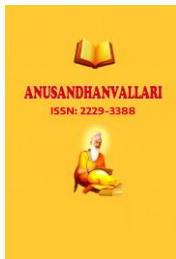
References

- [1] Aburayya, A., Al Marzouqi, A., Alawadhi, D., Abdouli, F., & Taryame, M. (2020). An empirical investigation of the effect of employees' customer orientation on customer loyalty through the mediating role of customer satisfaction and service quality. *Management Science Letters*, 10, 2147–2158. <https://doi.org/10.5267/j.msl.2020.3.022>
- [2] Al-Busaidi, K. A., & Al-Muharrami, S. (2021). Beyond profitability: ICT investments and financial institutions performance measures in developing economies. *Journal of Enterprise Information Management*, 34(3), 900–921. <https://doi.org/10.1108/JEIM-09-2019-0250>
- [3] Atnafu, D., & Balda, A. (2018). The impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. *Cogent Business and Management*, 5(1), 1–16. <https://doi.org/10.1080/23311975.2018.1503219>
- [4] Attaran, M. (2020). Digital technology enablers and their implications for supply chain management. *Supply Chain Forum*, 21(3), 158–172. <https://doi.org/10.1080/16258312.2020.1751568>
- [5] Azeem, M., Aziz, S., Shahid, J., Hayat, A., Ahmed, M., & Khan, M. I. (2022). The impact of customer-centric business strategies on customer relationship management: pharmaceutical field-force perspective. *International Journal of Pharmaceutical and Healthcare Marketing*, 16(1), 138–154. <https://doi.org/10.1108/IJPHM-09-2020-0083>
- [6] Baidoo, A., Tandoh, I., Israel, N., Nii, C., & Ayiku, A. (2021). Assessing the Effects of Customer Service on Customer Retention in Selected Community Pharmacies in Kumasi Original Paper Assessing the Effects of Customer Service on Customer Retention in Selected Community Pharmacies in Kumasi. *International Education*

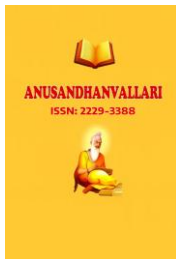


and Culture Studies, 1(1), 40–53.

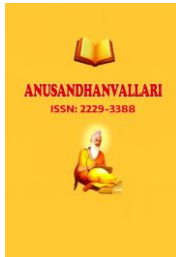
- [7] Beheshti, H. M., Clelland, I. J., & Harrington, K. V. (2020). Competitive Advantage with Vendor Managed Inventory. *Journal of Promotion Management*, 26(6), 836–854. <https://doi.org/10.1080/10496491.2020.1794507>
- [8] Bollweg, L. M. (2018). *The Digital Transformation of Local Owner-Operated Retail Outlets*. 219. https://eldorado.tu-dortmund.de/bitstream/2003/36990/1/Dissertation_Bollweg.pdf
- [9] Bosnic, E., & Shamoon, S. (2022). *Towards Customer-Centricity in the Aftermarket: A Case Study of Customer-Centricity in an Aftermarket Logistics Organisation*. CHALMERS UNIVERSITY OF TECHNOLOGY.
- [10] Brandtner, P., Darbanian, F., Falatouri, T., & Udokwu, C. (2021). Impact of COVID-19 on the customer end of retail supply chains: A big data analysis of consumer satisfaction. *Sustainability (Switzerland)*, 13(3), 1–18. <https://doi.org/10.3390/su13031464>
- [11] Cham, T. H., Cheng, B. L., Low, M. P., & Cheok, J. B. C. (2020). Brand image as the competitive edge for hospitals in medical tourism. *European Business Review*, 33(1).
- [12] Chuang, H. H.-C., Oliva, R., & Heim, G. R. (2019). Examining the link between retailer inventory leanness and operational efficiency: Moderating roles of firm size and demand uncertainty. *Production and Operations Management*, 28(9), 2338–2364.
- [13] Cirtita, H., & Glaser-Segura, D. A. (2012). Measuring downstream supply chain performance. *Journal of Manufacturing Technology Management*, 23(3), 299–314. <https://doi.org/10.1108/17410381211217380>
- [14] Cobelli, N., & Chiarini, A. (2020). Improving customer satisfaction and loyalty through mHealth service digitalization: New challenges for Italian pharmacists. *TQM Journal*, 32(6), 1541–1560. <https://doi.org/10.1108/TQM-10-2019-0252>
- [15] Davies, A., Dolega, L., & Arribas-Bel, D. (2019). Buy online collect in-store: exploring grocery click&collect using a national case study. *International Journal of Retail and Distribution Management*, 47(3), 278–291. <https://doi.org/10.1108/IJRDM-01-2018-0025>
- [16] Dubelaar, C., Bhargava, M., & Ferrarin, D. (2002). Measuring retail productivity: What really matters? *Journal of Business Research*, 55(5), 417–426. [https://doi.org/10.1016/S0148-2963\(00\)00160-0](https://doi.org/10.1016/S0148-2963(00)00160-0)
- [17] Dubelaar, C., Chow, G., & Larson, P. D. (2001). Relationships between inventory, sales and service in a retail chain store operation. *International Journal of Physical Distribution and Logistics Management*, 31(2), 96–108. <https://doi.org/10.1108/09600030110387480>
- [18] Elzarka, S. (2019). Assessing Supply Chain Maturity For Retail Pharmacy Chain. *9th International Conference on Operations and Supply Management, December 2019*. <https://www.researchgate.net/profile/Sara-Elzarka/amp>
- [19] Fornell, C., Morgeson III, F. V., Hult, G. T. M., & VanAmburg, D. (2020). *The Reign of the Customer: Customer-Centric Approaches to Improving Satisfaction*. Springer Nature.
- [20] Gil-Gomez, H., Guerola-Navarro, V., Oltra-Badenes, R., & Lozano-Quilis, J. A. (2020). Customer relationship management: digital transformation and sustainable business model innovation. *Economic Research-Ekonomska Istrazivanja*, 33(1), 2733–2750. <https://doi.org/10.1080/1331677X.2019.1676283>
- [21] Gopal, G., Suter-Crazzolara, C., Toldo, L., & Eberhardt, W. (2019). Digital transformation in healthcare - Architectures of present and future information technologies. *Clinical Chemistry and Laboratory Medicine*, 57(3), 328–335. <https://doi.org/10.1515/cclm-2018-0658>
- [22] Haleem, A., Javaid, M., Pratap Singh, R., & Suman, R. (2022). Medical 4.0 technologies for healthcare: Features, capabilities, and applications. *Internet of Things and Cyber-Physical Systems*, 2(April), 12–30. <https://doi.org/10.1016/j.iotcps.2022.04.001>
- [23] Hamilton, J. (2009). Building a targeted pharmacy customer engagement approach. *International Journal of Pharmaceutical and Healthcare Marketing*, 3(4), 381–396. <https://doi.org/10.1108/17506120911006065>
- [24] Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, 58(5), 1159–1197. <https://doi.org/10.1111/joms.12639>



- [25] Harris, I., Wang, Y., & Wang, H. (2015). ICT in multimodal transport and technological trends: Unleashing potential for the future. *International Journal of Production Economics*, 159, 88–103. <https://doi.org/10.1016/j.ijpe.2014.09.005>
- [26] Henriette, E., Feki, M., & Boughzala, I. (2016). Digital Transformation Challenges. *Mediterranean Conference on Information Systems (MCIS)*, 1–7. <https://exosystems.africa/digital-transformation-challenges-in-africa-2/>
- [27] Hermes, S., Riasanow, T., Clemons, E. K., Böhm, M., & Kremer, H. (2020). The digital transformation of the healthcare industry: exploring the rise of emerging platform ecosystems and their influence on the role of patients. *Business Research*, 13(3), 1033–1069. <https://doi.org/10.1007/s40685-020-00125-x>
- [28] Htut, K. M. (2022). Impact of Digital Transformation on Pharmaceutical Retail in Myanmar. In *Handbook of Research on Social Impacts of E-Payment and Blockchain Technology* (pp. 376–391). IGI Global. <https://doi.org/10.4018/978-1-7998-9035-5.CH020>
- [29] Huang, L., Wu, Y., & Liu, L. (2022). Research on Cooperative Benefit Distribution Mechanism of Pharmaceutical Supply Chain with the Participation of Third-Party Logistics Service Providers. *Advances in Applied Sociology*, 12(02), 34–51. <https://doi.org/10.4236/aasoci.2022.122004>
- [30] Jalundhwala, F., & Londhe, V. (2022). A systematic review on implementing operational excellence as a strategy to ensure regulatory compliance: a roadmap for Indian pharmaceutical industry. *International Journal of Lean Six Sigma*. <https://doi.org/10.1108/IJLSS-04-2022-0078>
- [31] Jing, F. F., Avery, G. C., & Bergsteiner, H. (2020). Leadership Variables and Business Performance: Mediating and Interaction Effects. *Journal of Leadership and Organizational Studies*, 27(1), 80–97. <https://doi.org/10.1177/1548051818824532>
- [32] Kanchanapoom, K., & Chongwatpol, J. (2023). Integrated customer lifetime value models to support marketing decisions in the complementary and alternative medicine industry. *Benchmarking*. <https://doi.org/10.1108/BIJ-07-2021-0431>
- [33] Kesumahati, E., & Jurnal, T. (2020). *Analysis of Factors Influencing Customer Satisfaction and Purchase Intention at Pharmacy in Batam City*. 151(Icmae), 216–220. <https://doi.org/10.2991/aebmr.k.200915.050>
- [34] Kim, W., Hantula, D. A., & Di Benedetto, A. (2022). Organizational citizenship behaviors perceived by collectivistic 50-and-older customers and medical-care service performance: an application of stimulus-organism-response theory. *Asia Pacific Journal of Marketing and Logistics*, 34(10), 2237–2268. <https://doi.org/10.1108/APJML-01-2021-0027>
- [35] Kiruja, A. K. (2019). Influence of Third Party Logistics Management on Performance of Level Four and Five Hospitals in Kenya. *Ijssit.Com*, 86–102. <https://www.ijssit.com/main/wp-content/uploads/2019/04/Influence-Of-Third-Party-Logistics-Management-On-Performance-Of-Level-Four-And-Five-Hospitals-In-Kenya.pdf>
- [36] Kokilam, M. B., Joshi, H. G., & Kamath, V. G. (2015). Assessment of Pharmaceutical Store and Inventory Management in Rural Public Health Facilities--A study with reference to Udupi District, Karnataka. *Pharmaceutical Methods*, 6(2).
- [37] Kopalle, P. K., Kumar, V., & Subramaniam, M. (2020). How legacy firms can embrace the digital ecosystem via digital customer orientation. *Journal of the Academy of Marketing Science*, 48(1), 114–131. <https://doi.org/10.1007/s11747-019-00694-2>
- [38] Kotarba, M. (2017). Measuring Digitalization-Key Metrics. *Foundations of Management*, 9(1), 123–138. <https://doi.org/10.1515/fman-2017-0010>
- [39] Kraus, S., Schiavone, F., Pluzhnikova, A., & Invernizzi, A. C. (2021). Digital transformation in healthcare: Analyzing the current state-of-research. *Journal of Business Research*, 123, 557–567. <https://doi.org/10.1016/j.jbusres.2020.10.030>
- [40] Latifi, M. A., Nikou, S., & Bouwman, H. (2021). Business model innovation and firm performance: Exploring causal mechanisms in SMEs. *Technovation*, 107(April), 102274. <https://doi.org/10.1016/j.technovation.2021.102274>



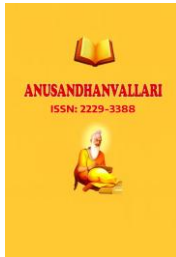
- [41] Li, J., Liu, L., Hu, H., Zhao, Q., & Guo, L. (2018). An inventory model for deteriorating drugs with stochastic lead time. *International Journal of Environmental Research and Public Health*, 15(12). <https://doi.org/10.3390/ijerph15122772>
- [42] Liu, Q., Zhao, Y., Kamioka, T., & Nakamura, M. (2021). Digital Transformation Challenges in the Sales of Pharmaceutical Companies in Japan. *Asian Journal of Business Research*, 11(3), 72–91. <https://doi.org/10.14707/ajbr.210115>
- [43] Liu, S.-F., Fan, Y.-J., Luh, D.-B., & Teng, P.-S. (2022). Organizational Culture: The Key to Improving Service Management in Industry 4.0. *Applied Sciences (Switzerland)*, 12(1). <https://doi.org/10.3390/app12010437>
- [44] Loonam, J., Eaves, S., Kumar, V., & Parry, G. (2018). Towards Digital Transformation: Lessons learned from Traditional Organisations. *Strategic Change*, 27(2), 101–109.
- [45] Luiz dos Santos, I., & Vieira Marinho, S. (2018). Relationship between entrepreneurial orientation, marketing capability and business performance in retail supermarkets in Santa Catarina (Brazil). *Innovation and Management Review*, 15(2), 118–136. <https://doi.org/10.1108/INMR-04-2018-008>
- [46] Madhani, P. M. (2019). Building Customer-Centric Supply Chain Strategy: Enhancing Competitive Advantages. *The IUP Journal of Business Strategy*, 16(2), 28–42. <https://ssrn.com/abstract=3424669>
- [47] Madhani, P. M. (2020). Customer-focused supply chain strategy: Developing 4Rs framework for enhancing competitive advantages. *International Journal of Services and Operations Management*, 36(4), 505–530. <https://doi.org/10.1504/IJSOM.2020.109010>
- [48] Masliardi, A., Effendi, M., Ningrum, P. A., & Mala, I. K. (2023). *SEIKO : Journal of Management & Business Digital Disruption : Exploring the Dynamics of Marketing in the Digital Age*. 6(2), 421–430.
- [49] Mbunge, E., Muchemwa, B., Jiyane, S., & Batani, J. (2021). Sensors and healthcare 5.0: transformative shift in virtual care through emerging digital health technologies. *Global Health Journal*, 5(4), 169–177. <https://doi.org/10.1016/j.glohj.2021.11.008>
- [50] Mccloud, C. (2020). *Achieving Profitability in Global Small Business Supply Chain* Walden University This is to certify that the doctoral study by.
- [51] Mihardjo, L. W. W., Sasmoko, S., Alamsjah, F., & Elidjen, E. (2019). Digital leadership role in developing business model innovation and customer experience orientation in industry 4.0. *Management Science Letters*, 9(11), 1749–1762. <https://doi.org/10.5267/j.msl.2019.6.015>
- [52] Mohsen, B. M. (2023). Developments of Digital Technologies Related to Supply Chain Management. *Procedia Computer Science*, 220, 788–795. <https://doi.org/10.1016/j.procs.2023.03.105>
- [53] Nastasoïu, A., & Vandenbosch, M. (2019). Competing with loyalty: How to design successful customer loyalty reward programs. *Business Horizons*, 62(2), 207–214. <https://doi.org/10.1016/j.bushor.2018.11.002>
- [54] Okonenko, T. I., Fikhtner, O. A., & Antropova, G. A. (2022). Analysis of the Medicinal Assortment as a Factor of Increasing the Competitiveness of Organizations in the Pharmacy Market of the Region. *Proceedings of the International Scientific and Practical Conference Strategy of Development of Regional Ecosystems “Education-Science-Industry” (ISPCR 2021)*, 208(Ispcr 2021), 351–357. <https://doi.org/10.2991/aebmr.k.220208.050>
- [55] Pantano, E., & Vannucci, V. (2019). Who is innovating? An exploratory research of digital technologies diffusion in retail industry. *Journal of Retailing and Consumer Services*, 49, 297–304. <https://doi.org/10.1016/J.JRETCONSER.2019.01.019>
- [56] Patil, K., Garg, V., Gabaldon, J., Patil, H., Niranjana, S., & Hawkins, T. (2023). Firm performance in digitally integrated supply chains: a combined perspective of transaction cost economics and relational exchange theory. *Journal of Enterprise Information Management*. <https://doi.org/10.1108/JEIM-09-2022-0335>
- [57] Pattanayak, R. K., Kumar, V. S., Raman, K., Surya, M. M., & Pooja, M. R. (2023). *E-commerce Application with Analytics for Pharmaceutical Industry*. 291–298. https://doi.org/10.1007/978-981-19-3590-9_22
- [58] Paula, I. C. de, Campos, E. A. R. de, Pagani, R. N., Guarnieri, P., & Kaviani, M. A. (2020). Are collaboration and trust sources for innovation in the reverse logistics? Insights from a systematic literature review. *Supply Chain*



- Management*, 25(2), 176–222. <https://doi.org/10.1108/SCM-03-2018-0129>
- [59] Phadnis, S. S., Sheffi, Y., & Caplice, C. (2022). Managing Supply Chains: Three Organizational Roles. In *Strategic Planning for Dynamic Supply Chains* (pp. 19–43). Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-91810-1_2
- [60] Rafi, A., & Saeed, T. (2019). Salespersons as Boundary Spanners : Moderating Role of Salespersons ' Emotional Intelligence in the Pharmaceutical Industry Salespersons ' function is to build trust among customers by providing them better solutions to their problems . Salespersons requi. *Paradigms*, 13(1), 32–39. <https://doi.org/10.24312/1900097130106>
- [61] Rahmani, S., Pahlevi, A., Suzana, A. J., Rijal, S., & Susilowati, E. (2023). The Impact of Customer Relationship Management on Customer Satisfaction and Loyalty : A Case Study of BSI Bank in West Jakarta. *SEIKO : Journal of Management & Business*, 6(2), 327–335.
- [62] Ransbotham, S., Khodabandeh, S., Fehling, R., LaFountain, B., & Kiron, D. (2019). Winning With AI. *MIT Sloan Management Review*. <https://sloanreview.mit.edu/projects/winning-with-ai/>
- [63] Ricciardi, W., Pita Barros, P., Bourek, A., Brouwer, W., Kelsey, T., Lehtonen, L., Anastasy, C., Barry, M., De Maeseneer, J., Kringos, D., McKee, M., Murauskiene, L., Nuti, S., Siciliani, L., & Wild, C. (2019). How to govern the digital transformation of health services. *European Journal of Public Health*, 29, 7–12. <https://doi.org/10.1093/eurpub/ckz165>
- [64] Rossmann, A. (2018). Digital maturity: Conceptualization and measurement model. *International Conference on Information Systems 2018, ICIS 2018, January 2019*.
- [65] Sadeghi, R., Hajian, A., & Rabiee, M. (2023). Blockchain and Machine Learning Framework for Financial Performance in Pharmaceutical Supply Chains. In *Advancement in Business Analytics Tools for Higher Financial Performance* (pp. 112–128). IGI Global. <https://doi.org/10.4018/978-1-6684-8386-2.CH006>
- [66] Saeed, S. A., & Masters, R. M. R. (2021). Disparities in Health Care and the Digital Divide. *Current Psychiatry Reports*, 23(9), 1–6. <https://doi.org/10.1007/s11920-021-01274-4>
- [67] Saha, E., Rathore, P., Parida, R., & Rana, N. P. (2022). The interplay of emerging technologies in pharmaceutical supply chain performance: An empirical investigation for the rise of Pharma 4.0. *Technological Forecasting and Social Change*, 181, 121768. <https://doi.org/10.1016/J.TECHFORE.2022.121768>
- [68] Sahara, C. R., & Aamer, A. M. (2022). Real-time data integration of an internet-of-things-based smart warehouse: a case study. *International Journal of Pervasive Computing and Communications*, 18(5), 622–644. <https://doi.org/10.1108/IJPC-08-2020-0113>
- [69] Sangavi, C. (2023). Regulatory Requirements for the New Drug Approval Process in Different Countries Regulatory Requirements for the New Drug Approval Process in Different Countries. *International Journal of Drug Regulatory Affairs.*, 11(2), 1–6. <https://doi.org/10.22270/ijdra.v11i2.574>
- [70] Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2021). Implementing challenges of artificial intelligence: Evidence from public manufacturing sector of an emerging economy. *Government Information Quarterly*, September 2021, 101624. <https://doi.org/10.1016/j.giq.2021.101624>
- [71] Shashi, M. (2023). Sustainable Digitalization in Pharmaceutical Supply Chains Using Theory of Constraints: A Qualitative Study. *Sustainability (Switzerland)*, 15(11). <https://doi.org/10.3390/su15118752>
- [72] Shashi Manish. (2022). Digital Strategies to Improve the Performance of Pharmaceutical Supply Chains. *Walden University*.
- [73] Sheng, J., Amankwah-Amoah, J., Khan, Z., & Wang, X. (2021). COVID-19 Pandemic in the New Era of Big Data Analytics: Methodological Innovations and Future Research Directions. *British Journal of Management*, 32(4), 1164–1183. <https://doi.org/10.1111/1467-8551.12441>
- [74] Sheth, J., Jain, V., & Ambika, A. (2020). Repositioning the customer support services: the next frontier of competitive advantage. *European Journal of Marketing*, 54(7), 1787–1804. <https://doi.org/10.1108/EJM-02-2020-0086/FULL/PDF>



- [75] Smith, B., & Jambulingam, T. (2018). Entrepreneurial orientation: Its importance and performance as a driver of customer orientation and company effectiveness among retail pharmacies. *International Journal of Pharmaceutical and Healthcare Marketing*, 12(2), 158–180. <https://doi.org/10.1108/IJPHM-07-2017-0038>
- [76] Sriram, V. P., Shaikh, A. A., Sumana, B. K., Kumar, A., Dhiman, V., & Naved, M. (2022). Consumer Behaviour on Digital Marketing Platforms—Specifically in Terms of Consumer Loyalty Using Machine Learning. *Proceedings of Second International Conference in Mechanical and Energy Technology: ICMET 2021, India*, 377–386.
- [77] Sudewa, J., Yusat, K. S., Maulana, M. F., & Fauzan, T. R. (2023). *Digital Entrepreneurship : The Role of Digital Technology in Building New Businesses*. 12, 1340–1350.
- [78] Sufiza Ahmad, N., Makmor-Bakry, M., & Hatah, E. (2020). Multi stakeholders of health and industries perspectives on medicine price transparency initiative in private health care settings in Malaysia. *Saudi Pharmaceutical Journal*, 28(7), 850–858. <https://doi.org/10.1016/j.jsps.2020.06.003>
- [79] Thakur, M. (2023). Applications of Artificial Intelligence and Machine Learning in Supply Chain Management: A Comprehensive Review. *Eur. Chem. Bull.*, 12(8), 2838–2851. <https://doi.org/10.13140/RG.2.2.29327.56480>
- [80] Tiwari, S., Sharma, P., Choi, T. M., & Lim, A. (2023). Blockchain and third-party logistics for global supply chain operations: Stakeholders' perspectives and decision roadmap. *Transportation Research Part E: Logistics and Transportation Review*, 170(December 2022). <https://doi.org/10.1016/j.tre.2022.103012>
- [81] Varadarajan, R. (2020). Customer information resources advantage, marketing strategy and business performance: A market resources based view. *Industrial Marketing Management*, 89(January), 89–97. <https://doi.org/10.1016/j.indmarman.2020.03.003>
- [82] Werth, O., Schwarzbach, C., Rodríguez Cardona, D., Breitner, M. H., & Graf von der Schulenburg, J. M. (2020). Influencing factors for the digital transformation in the financial services sector. *Zeitschrift Fur Die Gesamte Versicherungswissenschaft*, 109(2–4), 155–179. <https://doi.org/10.1007/s12297-020-00486-6>
- [83] Westerman, G., Bonnet, D., & McAfee, A. (2014). The Nine Elements of Digital Citizenship. *Sloan Management Review*, 55(3), 1–6. <http://www.iste.org/docs/excerpts/DIGCI2-excerpt.pdf>
- [84] Wieringa, J. E., Reber, K. C., & Leeftang, P. (2015). Improving pharmacy store performance: The merits of over-the-counter drugs. *European Journal of Marketing*, 49(7–8), 1276–1299. <https://doi.org/10.1108/EJM-06-2013-0331>
- [85] Wilson, G. A., & Slobodzian, A. D. (2020). Enhancing financial performance by pharmacy innovation. *Canadian Journal of Administrative Sciences / Revue Canadienne Des Sciences de l'Administration*, 37(4), 459–467. <https://doi.org/10.1002/CJAS.1562>
- [86] Xu, X., He, Y., & Ji, Q. (2022). Collaborative logistics network: a new business mode in the platform economy. *International Journal of Logistics Research and Applications*, 25(4–5), 791–813. <https://doi.org/10.1080/13675567.2021.1926948>
- [87] Yeung, A. C. L. (2006). The impact of third-party logistics performance on the logistics and export performance of users: An empirical study. *Maritime Economics and Logistics*, 8(2), 121–139. <https://doi.org/10.1057/palgrave.mel.9100155>
- [88] Zarei, G., Lalisarabi, A., & Topraghlou, M. J. (2019). Impact of relationship marketing on performance of pharmacies (the mediating role of satisfaction, loyalty and competitive advantage). *Journal of Advanced Pharmacy* <https://japer.in/storage/models/article/4KzXxG0TAIdrF1nvOQ2AbU57Oe81oIL1Y4QuhjbN9N4xNp2qimLW6aXdcmlj/impact-of-relationship-marketing-on-performance-of-pharmacies-the-mediating-role-of-satisfaction-l.pdf>
- [89] Zhang, X., Li, Z., & Li, G. (2023). Impacts of blockchain-based digital transition on cold supply chains with a third-party logistics service provider. *Transportation Research Part E: Logistics and Transportation Review*, 170, 103014. <https://doi.org/10.1016/J.TRE.2023.103014>



-
- [90] Zhu, X., Mukhopadhyay, S. K., & Kurata, H. (2012). A review of RFID technology and its managerial applications in different industries. *Journal of Engineering and Technology Management*, 29(1), 152–167. <https://doi.org/10.1016/J.JENGTECMAN.2011.09.011>
- [91] Zighan, S., Dwaikat, N. Y., Alkalha, Z., & Abualqumboz, M. (2023). Knowledge management for supply chain resilience in pharmaceutical industry: evidence from the Middle East region. *International Journal of Logistics Management*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/IJLM-05-2022-0215/FULL/PDF>