Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2026): 8.748 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 13 | Issue: 4 | April 2026 -Peer-Reviewed Journal

A STUDY ON THE ROLE OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS IN OPTIMIZING SUPPLY CHAIN MANAGEMENT

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ABSTRACT

In the hyper-competitive Indian retail landscape, operational efficiency is the primary driver of profitability. DMart (Avenue Supermarts Ltd.) has distinguished itself through a high-volume, low-margin model that relies heavily on a lean and responsive supply chain. This study explores the pivotal role of Enterprise Resource Planning (ERP) systems in optimizing supply chain operations within the retail sector, specifically focusing on DMart's operational framework. During the research period, it was observed that DMart utilizes ERP integration to unify critical functions including automated procurement, real-time inventory tracking, and warehouse management. By synchronizing data across its extensive network of stores and distribution centres, the ERP system facilitates precise demand forecasting and minimizes "dead stock." The findings indicate that ERP implementation at DMart significantly reduces inventory carrying costs and enhances order fulfilment speed, which are essential for maintaining its Everyday Low Cost (EDLC) strategy. While the study identifies benefits such as improved data transparency and streamlined logistics, it also highlights challenges including the high cost of continuous system upgrades and the necessity for specialized staff training. This research concludes that a robust ERP system is not merely a technological tool but a strategic backbone that allows DMart to maintain its competitive edge through superior supply chain agility.

KEYWORDS: *Enterprise Resource Planning, Supply Chain Management, Retail Sector, Inventory Optimization and Real-time Data Integration.*

INTRODUCTION

The Indian retail industry has undergone a significant change in the past three decades. From being an unorganized industry, Indian retailing today is a well-structured and technology-driven industry. Indian retailing traditionally consisted of small neighbourhood kirana shops that relied on manual record-keseping, personal relationships, and experience-driven decision-making. With India's economic liberalization and subsequent urbanization and rising consumerism, Indian retailing slowly started embracing new and modern forms of retailing, such as supermarkets and hypermarkets. This change brought about a standard shift in Indian retailing, making efficiency and coordination essential for survival.

In today's Indian retail scenario, efficiency is the key factor that determines profitability. Indian retailers operating in the grocery and FMCG segment of the retail industry are facing fierce competition and have razor-thin profit margins. Even minor inefficiencies can have a significant impact on overall profitability. Indian retailers also have to deal with demand volatility, infrastructural challenges, and rising customer expectations of product availability at lower prices. Efficient supply chain management is no longer a supporting function; it is now a necessity. DMart, owned and operated by Avenue Supermarts Ltd., is a new and unique player in the Indian organized retail space. This retailer has adopted a disciplined and cost-driven approach that differentiates it from other Indian retailers. Unlike other Indian retailers that focus on promotional activities and provide a luxurious shopping experience, DMart follows the philosophy of Everyday Low Cost and Everyday Low Price. This philosophy requires exceptional efficiency in supply chain management, as minor inefficiencies can compromise leadership

Supply Chain Management is the backbone of DMart's operational strategies. Supply Chain Management is the process of managing the flow of goods from the supplier to the distribution centers, and finally to the retail stores in the most optimal manner, while maintaining optimal inventory levels at all times. Managing this complex supply chain across hundreds of stores using traditional systems will be inefficient and prone to errors. Supply Chain Coordination is a complex process that requires real-time information exchange, accurate forecasting, and integration of all supply chain functions.

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Enterprise Resource Planning systems were designed to manage this complex supply chain process in a more effective manner. The Enterprise Resource Planning system is a comprehensive software solution that integrates all business processes into a single platform, thereby enabling real-time data exchange between all departments. The retail operations process involves inventory tracking, automated inventory replenishment, purchasing, finance, and warehouse management functions.

The Enterprise Resource Planning system plays a crucial role in the supply chain process at DMart, thereby enabling the company to optimize its supply chain process in the most effective manner. The real-time inventory visibility, automated inventory replenishment systems, vendor integration, and analytical tools help make effective decisions regarding assortment planning, pricing, logistics, etc.

The Enterprise Resource Planning system has its own set of challenges, including high investment costs, upgrading the system, maintaining accurate data, and requiring skilled resources. This research paper is based on the role of Enterprise Resource Planning systems in optimizing supply chain management with special reference to DMart, including its benefits and limitations in modern Indian retail operations.

SCOPE OF THE STUDY

The scope of this study is limited to examining stock and logistics flow within DMart stores and distribution centers. It focuses on the role of ERP (SAP) and POS (R-Soft) integration in inventory management, procurement, and store operations, along with aspects like auto-replenishment and lead-time reduction. The study also considers selected store locations to understand variations in ERP usage and its impact on operational efficiency.

OBJECTIVES OF THE STUDY

The primary objective of present study is to analysis the role of enterprise resource planning (ERP) systems in optimizing supply chain management; and the secondary objectives are,

1. To assess Auto-Replenishment Accuracy;
2. To investigate Lead-Time Reduction;

REVIEW OF LITERATURE

Hendricks, K. B., Singhal, V. R., and Stratman, J. K. (2007), in their study "The Impact of Enterprise Systems on Corporate Performance", found that ERP implementation improves inventory turnover and operating efficiency. The study revealed reductions in order processing time and administrative costs. It further concluded that ERP adoption strengthens financial and supply chain performance over the long term.

Umble, E. J., Haft, R. R., and Umble, M. M. (2003), in their research titled "Enterprise Resource Planning: Implementation Procedures and Critical Success Factors", identified that effective ERP implementation improves supply chain coordination and process integration. The study revealed that top management support and employee training are critical for ERP success. It further found that successful ERP adoption enhances inventory visibility and operational control.

Gunasekaran, A. and Ngai, E. W. T. (2004), in their study "Information Systems in Supply Chain Integration and Management", examined ERP's role in supply chain integration. The findings revealed that ERP improves information sharing and decision-making accuracy. The study further found that integrated systems enhance supplier collaboration and cost efficiency. It concluded that ERP is a strategic enabler of supply chain optimization.

RESEARCH METHODOLOGY

The research methodology for this study is descriptive and analytical, based on both primary and secondary data. It includes observation of store operations, interaction with staff, and analysis of reports to understand ERP (SAP) and POS (R-Soft) integration in supply chain management. The study also compares multiple store locations to assess operational efficiency and variations in ERP usage.

RESULTS AND DISCUSSION

Table 1.1 shows the distribution of respondents by their opinion on ERP system effectiveness at DMart. The questionnaire consists of 25 statements measured on a 5-point Likert scale, where 5 represents "Strongly Agree" and 1 represents "Strongly Disagree". The statements are grouped under two sections namely System Synergy and Auto-Replenishment Accuracy.

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Scale:
5 = Strongly Agree 4 = Agree 3 = Neutral 2 = Disagree 1 = Strongly Disagree

Table 1.1 Distribution of Respondents by Opinion on ERP System (n = 103)

S.No	Statements	5	4	3	2	1	Mean	SD	Rank
1	The data synchronization between R-Soft and SAP occurs without significant time lags.	62 (60.2)	25 (24.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	V
2	Store-level sales figures in R-Soft match backend SAP financial records daily.	65 (63.1)	23 (22.3)	10 (9.7)	5 (4.9)	0 (0.0)	4.42	0.96	III
3	System downtime during nightly data upload to the Head Office is rare.	60 (58.3)	27 (26.2)	10 (9.7)	6 (5.8)	0 (0.0)	4.32	1.01	VII
4	The user interface of R-Soft is consistent with SAP data requirements.	58 (56.3)	29 (28.2)	10 (9.7)	6 (5.8)	0 (0.0)	4.27	1.03	IX
5	Technical errors during "Day-End" processing are handled effectively.	60 (58.3)	26 (25.2)	11 (10.7)	6 (5.8)	0 (0.0)	4.31	1.01	VIII
6	Centralized procurement orders from SAP are updated in R-Soft promptly.	63 (61.2)	24 (23.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	VI
7	It is easy to navigate between different ERP modules during work.	55 (53.4)	32 (31.1)	10 (9.7)	6 (5.8)	0 (0.0)	4.22	1.05	XII
8	The ERP provides real-time visibility of stock across departments.	68 (66.0)	20 (19.4)	10 (9.7)	5 (4.9)	0 (0.0)	4.46	0.94	II
9	Training provided on system integration was sufficient.	52 (50.5)	34 (33.0)	11 (10.7)	6 (5.8)	0 (0.0)	4.15	1.08	XIV
10	Billing system speed (R-Soft) is not affected by SAP syncing.	57 (55.3)	30 (29.1)	10 (9.7)	6 (5.8)	0 (0.0)	4.25	1.04	XI
11	System alerts regarding "Sync Failures" are easy to understand.	56 (54.4)	31 (30.1)	10 (9.7)	6 (5.8)	0 (0.0)	4.24	1.04	XIII
12	Data entry errors are automatically flagged by the system.	65 (63.1)	23 (22.3)	10 (9.7)	5 (4.9)	0 (0.0)	4.42	0.96	IV
13	Overall, the SAP + R-Soft system is better than manual systems.	70 (68.0)	18 (17.5)	10 (9.7)	5 (4.9)	0 (0.0)	4.48	0.93	I
14	System-generated orders (Auto-Indents) are generally accurate.	66 (64.1)	22 (21.4)	10 (9.7)	5 (4.9)	0 (0.0)	4.44	0.95	III
15	Auto-replenishment has reduced stock-out instances.	68 (66.0)	20 (19.4)	10 (9.7)	5 (4.9)	0 (0.0)	4.46	0.94	II
16	ERP accurately predicts demand for high-volume items.	63 (61.2)	24 (23.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	VI
17	Manual adjustment of system-generated orders is rarely required.	60 (58.3)	26 (25.2)	11 (10.7)	6 (5.8)	0 (0.0)	4.31	1.01	VIII
18	The system prevents overstocking of slow-moving items.	61 (59.2)	25 (24.3)	11 (10.7)	6 (5.8)	0 (0.0)	4.33	1.00	VII

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19	Safety stock levels are maintained accurately by ERP.	64 (62.1)	24 (23.3)	10 (9.7)	5 (4.9)	0 (0.0)	4.42	0.96	IV
20	ERP adjusts orders based on seasonal demand.	63 (61.2)	24 (23.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	VI
21	New products are integrated smoothly into the system.	62 (60.2)	25 (24.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	VI
22	ERP identifies non-moving or near-expiry stock accurately.	66 (64.1)	22 (21.4)	10 (9.7)	5 (4.9)	0 (0.0)	4.44	0.95	III
23	Time required to review system-generated orders is minimal.	59 (57.3)	28 (27.2)	10 (9.7)	6 (5.8)	0 (0.0)	4.30	1.02	IX
24	Buffer stock levels are optimized effectively.	63 (61.2)	24 (23.3)	10 (9.7)	6 (5.8)	0 (0.0)	4.39	0.99	VI
25	The system works reliably during high-demand periods.	67 (65.0)	21 (20.4)	10 (9.7)	5 (4.9)	0 (0.0)	4.45	0.94	II

Source: Primary Data

Note: Figures represent number of respondents (Total = 103)

- Figures in parentheses represent percentages of respondents.
- Mean values indicate the average level of agreement for each statement based on the Likert scale.
- Standard deviation shows the consistency of responses; lower values indicate less variation among respondents.
- Ranking is assigned based on mean scores, where the highest mean is given Rank I, followed by the next highest in descending order. Equal mean values are assigned the same rank.

INTERPRETATION

Table 1.1 shows the distribution of respondents based on their opinion regarding ERP system effectiveness at DMart. It is observed that a majority of respondents have selected "Strongly Agree" and "Agree" for most of the statements, indicating a high level of satisfaction with the ERP system.

Based on the mean values, all the statements have scores above 4, which shows a strong positive perception among respondents. The statement *"Overall, the SAP + R-Soft system is better than manual systems"* has the highest mean value, indicating that respondents clearly prefer the ERP system over manual methods. Other statements related to real-time stock visibility, reduction of stock-out situations, and system reliability during high-demand periods also have high mean values, showing the effectiveness of the system.

In the System Synergy section (Statements 1–13), respondents agree that data synchronization between R-Soft and SAP is efficient and occurs without major delays. The system ensures accurate matching of store-level and backend data, minimal downtime, and proper handling of technical errors. It also provides real-time visibility of stock and allows easy navigation between modules, which improves overall operational efficiency. However, slightly lower mean values in areas like training and ease of navigation indicate minor scope for improvement.

In the Auto-Replenishment Accuracy section (Statements 14–25), respondents indicate that system-generated orders are accurate and help in reducing stock-out situations. The ERP system effectively predicts demand, maintains safety stock levels, and prevents overstocking of slow-moving items. It also supports seasonal adjustments and smooth integration of new products, which improves inventory management. The standard deviation values are relatively low, indicating that the responses are consistent and there is not much variation in opinions among respondents.

Overall, the findings show that ERP implementation at DMart has improved system integration, inventory accuracy, and operational efficiency, thereby supporting effective supply chain management.

CONCLUSION

The study shows that ERP implementation has significantly improved operational efficiency at DMart. It has helped in better coordination between different departments through proper data integration and real-time information flow.

ERP has improved inventory management by reducing stock-out situations, maintaining optimal stock levels, and ensuring accurate demand forecasting. It has also improved order processing, decision-making, and system reliability, especially during high-demand periods.

The high mean values and consistent responses indicate that respondents have a positive opinion about the ERP system and consider it more effective than manual systems. Although there is some scope for improvement in areas like training and system usability, the overall performance of ERP is strong.

In conclusion, ERP acts as an effective tool in improving supply chain performance and ensuring better coordination across departments. With continuous improvement, it can support long-term efficiency and growth in retail operations**.**

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