



A STUDY ON OPTIMIZING INVENTORY CONTROL PRACTICES IN AUTOMOBILE MANUFACTURING SECTOR TOWARDS KANCHIPURAM DISTRICT

Ms.Jayasri K ¹ Dr. P. Tamilselvan²

¹ II Year Student, ²Assistant Professor

Department of Management Studies,

Vel Tech Rangarajan Dr. Sagunthala R & D Institute of
Science and Technology, Chennai.

E-Mail: vtp4271@veltech.edu.in

Abstract

The aim and objective of this research are to study the inventory management techniques of Automobile and their impact on the company. It is applying analytical tools and techniques on the financial information of the company for a period of five years, from 2021 to 2025. It is using various tools and techniques, such as Trend Analysis, Common Size Statements, Economic Order Quantity, Working Capital Cycle, and DuPont Analysis, etc. The research found significant growth in sales, profitability, and liquidity, and efficient inventory management. The inventory conversion period of the

company has also improved significantly. It shows the efficient utilization of resources. It also proves the point that inventory management plays an important part in reducing costs, customer satisfaction, and profitability. It also recommends the use of advanced technology like ERP and AI in inventory management for better decision-making and controlling the business.

Keywords: Inventory Management, EOQ, Working Capital Cycle, Financial Performance, Manufacturing Efficiency.

Introduction

Inventory management is an extremely vital aspect in the profitability, efficiency, and sustainability of manufacturing organizations. The basic purpose of inventory management in any manufacturing organization is to ensure that a specific amount of inventory, i.e., raw materials, products, etc., is made available to the organization at the most appropriate time to support the production process in the organization. The availability of an appropriate quantity of inventory is critical to the manufacturing organization, as excess inventory would result in capital blockage, whereas insufficient inventory might cause disturbances in the production process,



which might affect the organization's goodwill. Hence, inventory management is not just an operational activity, but its effective implementation has a critical influence on the competitiveness of an organization.

In the automobile manufacturing industry, where the manufacturing process is highly intricate, inventory management becomes a critical function. Automobile manufacturing organizations require a constant flow of inventory from various suppliers located globally. If any problem or hindrance occurs in the smooth flow of inventory, the production process might come to a halt, which might cause a loss to the organization. Therefore, inventory management is required to support the production process.

Poor inventory control, on the other hand, can have a number of cascading effects. For example, excess inventory can tie up working capital that could have been used for innovative strategies or expanding the business. Excess inventory can also increase costs for storing inventory and for depreciation, particularly for industries with high technological changes, as is the automobile industry. Conversely, poor inventory control can lead to production

delays, missed deadlines, and ultimately customer dissatisfaction. All of these have a negative effect on profitability. Therefore, it is evident that inventory control is a significant link between performance and profitability.

This study aims to investigate the influence of inventory control on both financial and operational performance for automobile manufacturing industries. The study will focus on a five-year period and will provide a significant insight into how inventory control can sustain profitability and customer satisfaction. The study is expected to provide significant insights into how traditional inventory control approaches compare with modern technology-driven approaches

Background Of The Study:

Inventory management is an important aspect of a successful business strategy in any industry within the manufacturing sector. The concept of inventory management is defined as a systematic planning, controlling, and monitoring approach to ensure a smooth production process with minimum costs. The automobile industry is a highly competitive industry where production is a complex process. The automobile industry is a capital-intensive industry. The automobile industry is a global industry where production is a global process. The automobile industry involves



sourcing materials from different vendors.

The production process is a global process where inventory management is an important aspect. Any imbalance in inventory levels can create a negative impact on customer satisfaction.

Manufacturing industries traditionally used various inventory control approaches, including Economic Order Quantity and Working Capital Analysis. With the advent of new technologies and innovations in decision-making, modern inventory control approaches have adopted new technologies including Enterprise Resource Planning and Artificial Intelligence.

The automobile industry, in particular, has its own challenges because of the just-in-time production system and the high variability of demand. Moreover, the industry has to keep on innovating in order to keep pace with the changing environment. Therefore, the management of inventories is not only required to keep the production process going but is also important in maintaining the stability of the business in terms of finances and profitability. It has been observed that over the years, organizations have come to realize that the management of inventories is a key factor in the efficient management

of the business as well as its profitability.

This research is a further extension of the aforementioned context in the sense that the research aims at understanding the inventory management practices of an automobile manufacturing company over a period of five years from 2021 to 2025. The analytical tools used in the research would include trend analysis, common size statement analysis, EOQ model, working capital cycle, and Du Pont analysis in order to determine the effect of the company's inventory management practices on its sales growth, profitability, liquidity, and overall resource utilization

Objectives of the Study:

Primary Objective:

- To study the inventory management practices in Automobile industry.

Secondary Objectives:

- To determine the financial position of the company.
- To examine inventory movement and optimization.
- To identify measures for improving inventory control efficiency.

Review of Literature:

Silver, E. A. (2023). "Operations research in inventory management" The objectives of inventory management, including the relevant related costs, are examined in this paper.



Mauldin, M. (2024). “Foundations of inventory management”. Inventory management can have a huge effect on the financial performance of your practice. This session will review common inventory terms and techniques to help you better manage your practice's inventory and improve your bottom line.

Bonney, M. C. (2023). “Trends in inventory management” Modern inventory management emphasizes global sourcing, logistics integration, and digital tools like barcoding and electronic data exchange.

Williams, B. D., & Tokar, T. (2021). “A review of inventory management research in major logistics journals” The purpose of this paper is to provide a review of inventory management articles published in major logistics outlets, identify themes from the literature and provide future direction for inventory management research to be published in logistics journals.

Koumanakos, D. P. (2022). “The effect of inventory management on firm performance. International journal of productivity and performance management” Lean management is getting more and more attention in today's highly competitive environment. In this context, the aim of this study is to test the hypothesis that efficient (lean) inventory management leads to an improvement in a firm's financial performance

Conceptual Framework

The conceptual framework shows how tools like Economic Order Quantity, Common Size Balance Sheet, Trend Analysis, DuPont Analysis, and Working Capital Cycle Analysis support effective Inventory Valuation Techniques. These techniques help in achieving better Inventory Control and Cost Control, ensuring efficient resource use, reduced costs, and improved financial performance.

Research Methodology

The study on Inventory Control Management at Automobile industry uses an analytical research design based on five years of financial data (2021–2025). It relies on secondary data from annual reports and financial statements, analyzed using tools like ratio analysis, trend analysis, EOQ, working capital cycle, and DuPont analysis. This approach helps evaluate inventory efficiency, identify improvement areas, and link inventory



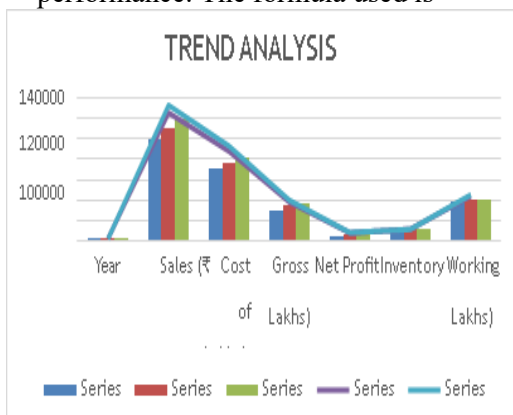
control with overall financial performance.

Tools For Analysis Trend Analysis

Trend Analysis is a financial technique used to study the movement or pattern of financial data over a specific period of time. It helps identify whether a company's performance is improving, declining, or remaining stable by comparing figures such as sales, profits, expenses, or inventory levels across multiple years. In this method, one year is taken as the base year, and the values of subsequent years are expressed as a percentage of the base year, making it easy to observe growth or decline trends.

Dupont Analysis

DuPont Analysis is a financial performance evaluation method that breaks down a company's Return on Equity (ROE) into three key components Net Profit Margin, Asset Turnover, and Equity Multiplier. This analysis helps identify the specific factors driving a company's profitability and overall financial performance. The formula used is



$$ROE = \text{Net Profit Margin} \times \text{Asset Turnover} \times \text{Equity}$$

Data Analysis And Interpretation

Trend Analysis

Table 4.1.1 Table Shows The Growth And Performance Trend Over 5 Years

S.NO	Year	Sales (₹ Lakhs)	Cost of Goods Sold (₹ Lakhs)	Gross Profit (₹ Lakhs)	Net Profit (₹ Lakhs)	Inventory (₹ Lakhs)	Working Capital (₹ Lakhs)
1	2021	1,00,000	70,000	30,000	5,000	10,200	38,500
2	2022	1,10,000	76,000	34,000	6,200	10,800	40,200
3	2023	1,18,500	82,000	36,500	7,000	11,000	41,000
4	2024	1,25,794	88,056	37,738	7,500	11,307	43,866
5	2025	1,33,294	93,306	39,988	8,100	11,247	45,406

Chart 4.0.1 Chart Showing Trend Summary

Interpretation

Over the five-year period, sales at the company rose consistently from ₹1,00,000 lakhs to ₹1,33,294 lakhs, reflecting a strong 33% growth. Gross profit also improved by ₹9,988 lakhs, indicating effective pricing strategies and better cost management. Inventory levels remained steady at around ₹11,000 lakhs, demonstrating efficient stock control and alignment with production and demand. Additionally, working capital showed a steady increase, signifying strong liquidity and sound financial health. Overall, the trend highlights consistent business expansion supported by well-managed inventory and financial stability

2. Dupont Analysis:

Break down Return on Equity (ROE) into 3 components:

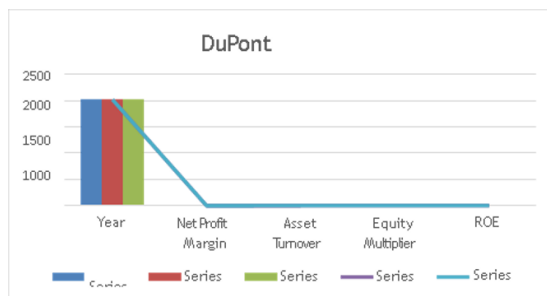


$$ROE = (\text{Net Profit Margin}) \times (\text{Asset Turnover}) \times (\text{Equity Multiplier})$$

TABLE SHOWING ROE

S.No	Year	Net Profit Margin	Asset Turnover	Equity Multiplier	ROE
1	2021	5%	1.1	1.5	8.30%
2	2022	5.60%	1.12	1.6	10%
3	2023	5.90%	1.15	1.7	11.50%
4	2024	6%	1.18	1.8	12.70%
5	2025	6.10%	1.2	1.8	13.20%

Chart Showing Reo Components



Interpretation:

The DuPont Analysis of Delphi–TVS from 2021 to 2025 shows a steady improvement in Return on Equity (ROE) from 8.30% to 13.20%, reflecting enhanced profitability and financial efficiency. The Net Profit Margin increased from 5% to 6.10%, indicating better cost control and profit generation. Asset Turnover rose from 1.1 to 1.2, showing improved utilization of assets to generate revenue. Additionally, the Equity Multiplier increased from 1.5 to 1.8, suggesting a moderate rise in financial leverage to support growth

Summary Of Findings

- Working capital improved year by year, confirming that current assets and liabilities are balanced efficiently

to maintain smooth day-to-day operations.

- The net profit margin increased steadily, driven by improved cost control, production efficiency, and proper inventory planning.
- Implement Just-in-Time (JIT) Practices: Gradual adoption of JIT inventory systems can reduce storage costs and improve cash flow. Requires close coordination between production and procurement departments.

Conclusion:

The study on Inventory Control Management at Automobiles highlights that efficient inventory practices have strengthened both financial and operational performance. From 2021–2025, the company achieved steady growth in sales, profitability, and liquidity through optimal ordering, timely replenishment, and effective working capital management. The rise in EOQ and reduction in the cash conversion cycle reflect improved efficiency and demand alignment. Strong asset utilization and higher ROE show that inventory control drives profitability

References

- 1) Wild, T. (2022). Best Practice in Inventory Management. Routledge.



- 2) Silver, E. A. (2023). Operations Research in Inventory Management. International Journal of Operations & Production Management.
- 3) Singh, N., & Adhikari, D. (2023). AI in Inventory Management: Applications and Future Opportunities. Journal of Artificial Intelligence Research.
- 4) Koumanakos, D. P. (2022). The Effect of Inventory Management on Firm Performance. International Journal of Productivity and Performance Management.
- 5) Munyaka, J. B., & Yadavalli, V. S. S. (2022). Inventory management concepts and implementations: A systematic review. South African Journal of Industrial Engineering.
- 6) Cheng, X. (2024). Research on the inventory management in modern business. Advances in Economics, Management and Political Sciences.
- 7) Madamidola, O. A., Daramola, O. A., Akintola, K., & Adeboje, O. T. (2024). A review of existing inventory management systems. International Journal of Research in Engineering and Science.
- 8) Alsoussi, A., & Tahboub, K. (2025). Inventory management practices and challenges: An exploratory study. An-Najah University Journal for Research.
- 9) Vilchez, A. A. B., Tunquipa, A. J. V., & Padilla, R. D. P. L. (2022). Inventory management in the warehouse area of manufacturing companies: Literature review. Journal of Scientific and Technological Research Industrial.
- 10) Babai, M. Z., Syntetos, A. A., & Teunter, R. H. (2025). Fifty years of inventory research from a forecasting perspective. European Journal of Operational Research.
- 11) Kasar, A., Mukund, M., Tripathi, M., & Jadav, D. (2025). Evolution of the perishable inventory management landscape: A bibliometric analysis and future directions.
- 12) Alamri, A. A. (2023). Carbon emissions effect on vendor-managed inventory systems. Logistics.
- 13) Adirektawon, S., Theeraroungchaisri, A., & Sakulbumrungsil, R. C. (2024). Efficiency of inventory in hospitals: Comparing traditional and vendor-managed inventory systems.
- 14) Olaniyi, O. A., & Pugal, P. S. (2024). Optimising inventory management



strategies for cost reduction in supply chains: A systematic review. *Journal of Accounting and Business*.

- 15) Anaba, D., Kess-Momoh, A., & Ayodeji, S. (2024). Optimizing supply chain and logistics management: A review of modern practices. *Open Access Research Journal of Science and Technology*.
- 16) Maitra, S., & Kundu, S. (2025). Backorder prediction in inventory management: Classification techniques and cost considerations.
- 17) Mousa, M., van de Berg, D., Kotecha, N., del Rio-Chanona, E. A., & Mowbray, M. (2024). Multi-agent reinforcement learning for decentralized inventory control systems.
- 18) Meisheri, H., Nath, S., Baranwal, M., & Khadilkar, H. (2024). A learning-based framework for handling uncertain lead times in multi-product inventory management.
- 19) Neesha. (2023). Study of inventory management methods and its importance. *Innovative Research Thoughts*
- 20) Swadhi, R., Gayathri, K., Suresh, N. V., Catherine, S., & Velmurugan, P. R. (2025). Leveraging Machine Learning for Enhanced Patient Engagement and Outcomes: Revolutionizing Healthcare Marketing. In *Impact of Digital Transformation on Business Growth and Performance* (pp. 313-340). IGI Global.
- 21) Swadhi, R., Velmurugan, P. R., Gayathri, K., & Catherine, S. (2026). Evolving critical themes in advanced human resource management: Navigating change in the modern workplace. In *Critical aspects in advanced human resource management* (pp. 75-102). IGI Global.
- 22) Tartari, E., Weterings, V., Gastmeier, P. J. R. B., Rodríguez Baño, J., Widmer, A., Kluytmans, J., & Voss, A. (2017). Patient engagement with surgical site infection prevention: an expert panel perspective. *Antimicrobial Resistance & Infection Control*, 6(1), 45.
- 23) Venice, A., Swadhi, R., Gayathri, K., Chandra, P., & Sajana, K. P. (2026). Rehabilitation Robotics and Adaptive Motion Planning for Patient-Centric Care. In *Intelligent Motion Control for Human-Centered Systems* (pp. 51-76). IGI Global.
- 24) Vettriselvan, R. (2025). Harnessing innovation and digital marketing in the era of industry 5.0: resilient healthcare SMEs. In *The Future of Small Business in Industry 5.0* (pp. 163-186). IGI Global.
- 25) Vettriselvan, R., & Anto, M. R. (2018). Pathetic health status and working condition of Zambian women. *Indian Journal of Public Health Research & Development*, 9(9), 259-264.



- 26) Vettriselvan, R., & Rajan FSA, A. J. (2019). Occupational Health Issues Faced by Women in Spinners. *Indian Journal of Public Health Research & Development*, 10(1).
- 27) Vettriselvan, R., Deepan, A., Jaiswani, G., Balakrishnan, A., & Sakthivel, R. (2025). Health Consequences of Early Marriage: Examining Morbidity and Long-Term Wellbeing. In *Social, Political, and Health Implications of Early Marriage* (pp. 189-212). IGI Global.
- 28) Vettriselvan, R., Ramya, R., Selvalakshmi, V., Jyothi, P., & Velmurugan, P. R. (2026). Empowering Patients through Knowledge: Educational Strategies in Rehabilitation. In *Holistic Approaches to Health Recovery* (pp. 263-290). IGI Global.
- 29) Vettriselvan, R., Velmurugan, P. R., Varshney, K. R., EP, J., & Deepika, R. (2025). Health Impacts of Smartphone and Internet Addictions Across Age Groups: Physical and Mental Health Across Generations. In *Impacts of Digital Technologies Across Generations* (pp. 187-210). IGI Global.
- 30) Vijayalakshmi, M., Subramani, A. K., Vettriselvan, R., Catherin, T. C., & Deepika, R. (2025). Sustainability and Responsibility in the Digital Era: Leveraging Green Marketing in Healthcare. In *Digital Citizenship and Building a Responsible Online Presence* (pp. 285-306). IGI Global.
- 31) Vijayalakshmi, M., Subramani, A. K., Vettriselvan, R., Velmurugan, P. R., & Hasine, J. (2025). Strategic Collaborations in Medical Innovation and AI-Driven Globalization: Advancing Healthcare Startups. In *Navigating Strategic Partnerships for Sustainable Startup Growth* (pp. 85-110). IGI Global.
- 32) Williams, M. (2008). Infection control and prevention in perioperative practice. *Journal of perioperative practice*, 18(7), 274-277.
- 33) Zahoor, H., Mustafa, N., Ashifa, K. M., Safaei, M., & El Gamil, R. (2025). Unlocking resilience: Emotional intelligence and self-leadership shape stress perception among health students. *International Journal of Innovation and Learning*, 38(4), 395–419.
- 34) Catherine, S., Suresh, N. V., Mangaiyarkarasi, T., & Jenefa, L. (2025). Unveiling the enigma of shadow: Ethical difficulties in the field of AI.
- 35) Suresh, N. V., Selvakumar, A., Sridhar, G., & Jain, V. (2025). Dynamic Pricing Strategies Implementing Machine Learning Algorithms in E-Commerce. In *Building Business Models with Machine Learning* (pp. 129-136). IGI Global Scientific Publishing.
- 36) Catherine, S., Ramasundaram, G., Nimmagadda, M. R., & Suresh, N. V. (2025). Roots, routes, and identity: how culture shapes heritage travel. In *Multiple-Criteria Decision-Making (MCDM) Techniques and Statistics in Marketing* (pp. 343-352). IGI Global Scientific Publishing.



- 37) Kalaivani, M., Suresh, N. V., & Catherine, S. (2025). The Next Wave in Marketing: Data Science in the Age of Generative AI.
- 38) Vettriselvan, R., Deepan, A., Garg, P. K., Suresh, N. V., & Velmurugan, P. R. (2025). Advanced Text Analysis, Simplification, Classification, and Synthesis Techniques: Leveraging AI for Enhanced Medical Education. In *Using AI Tools in Text Analysis, Simplification, Classification, and Synthesis* (pp. 37-66). IGI Global Scientific Publishing.
- 39) Vettriselvan, R., Deepa, R., Gautam, R., Suresh, N. V., & Cathrine, S. (2025). Bridging Academia and Industry Through Technology and Entrepreneurial Innovation: Enhancing Supply Chain Efficiency. In *Bridging Academia and Industry Through Cloud Integration in Education* (pp. 145-174). IGI Global Scientific Publishing.
- 40) Venice, J. A., Vettriselvan, R., Rajesh, D., Suresh, N. V., & Abirami, P. (2025). Enabling personalized learning and adaptive systems through strategic management: cloud integration in education. In *Bridging Academia and Industry Through Cloud Integration in Education* (pp. 49-72). IGI Global Scientific Publishing.
- 41) Swadhi, R., Gayathri, K., Suresh, N. V., Catherine, S., & Velmurugan, P. R. (2025). Leveraging Machine Learning for Enhanced Patient Engagement and Outcomes: Revolutionizing Healthcare Marketing. In *Impact of Digital Transformation on Business Growth and Performance* (pp. 313-340). IGI Global Scientific Publishing.
- 42) Aravind, D., Kurnaz, S., Suresh, N. V., Reddy, E. E., Reddy, P. J. L., & Jayalakshmi, S. (2026). Hybrid Renewable Energy Systems and Effective Resource Utilization for Sustainable Aviation. In *Green Approaches and Environmental Stewardship for Aviation Management* (pp. 1-30). IGI Global Scientific Publishing.
- 43) Patil, S. H., Shanmugam, R., Gadhane, S. H., & Suresh, N. V. (2026). Workplace culture and employee perceptions in Xiaomi corporation. In *Empowering Inclusive Innovation* (pp. 701-708). Routledge.
- 44) Shanmugam, R., Pradeepa, S. V., Singh, P., & Suresh, N. V. (2026). Brand personality and its important role in purchase decisions. In *Empowering Inclusive Innovation* (pp. 769-776). Routledge.
- 45) De Chlarence, J. M., Sarkar, B., Gawande, N., & Suresh, N. V. (2026). Impact of multi-sensory marketing on consumer purchase decisions and loyalty in restaurants. In *Empowering Inclusive Innovation* (pp. 739-749). Routledge.
- 46) Singh, P., Shanmugam, R., Pradeepa, S. V., & Suresh, N. V. (2026). Performance evaluation of large cap mutual fund schemes in India: An empirical study using risk-return measures. In *Empowering Inclusive Innovation* (pp. 750-755). Routledge.



- 47) Gadhave, S. H., Shanmugam, R., Patil, S. H., & Suresh, N. V. (2026). Work–Life Balance as an HR initiative: An empirical study on employee perceptions in the Indian IT sector. In *Empowering Inclusive Innovation* (pp. 717-724). Routledge.
- 48) Gadhave, S. H., Shanmugam, R., Patil, S. H., & Suresh, N. V. (2026). Work–Life Balance as an HR initiative: An empirical study on employee perceptions in the Indian IT sector. In *Empowering Inclusive Innovation* (pp. 717-724). Routledge.
- 49) Gadhave, S. H., Shanmugam, R., Patil, S. H., & Suresh, N. V. (2026)

