



A Study On Effectiveness Of 3pl In Handling Inventory Management

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Abstract: This study, titled "A Study on effectiveness of 3PL in handling inventory management at WONJIN AUTOPARTS PVT LTD, MARAIMALAI NAGAR" investigates the current logistics operations of the company with a focus on environmental sustainability. The objectives include assessing existing practices, identifying key challenges in adopting green logistics, and exploring strategies for improvement. Data was collected through a structured questionnaire targeting employees involved in logistics activities, and analyzed using descriptive statistics such as percentages, means cores, and visual charts. The findings reveal that while some sustainable practices are in place, there are significant gaps in areas like energy-efficient transportation, waste reduction, and employee awareness. Major challenges include high implementation costs, limited infrastructure, and insufficient training. The study recommends increasing investment in green technologies, enhancing employee training programs, and adopting an integrated approach to sustainable logistics planning. Overall, the research highlights the need for a strategic, cost-effective, and employee-inclusive model to strengthen sustainability in the forging industry.

Key Terms -effectiveness of 3pl , handling inventory management.

I. Introduction

Third-party logistics, or 3pl, refers to companies that specialize in managing various aspects of a business's supply chain—or who manage a company's entire supply chain. This can include inventory management, warehousing, order processing, reverse logistics, shipping and receiving services and distribution center management 3pl, as well as other logistical support and technology such as warehouse management software, 3pl system, 3pl warehouse system, or fulfillment service. 3PLs are staffed by logistics professionals who offer contract logistics services. Outsourcing logistics to a 3PL provider allows businesses to focus on their core activities— such as product development, sales, and marketing—without having to worry about the complexities of supply chain logistics. For small and medium-sized businesses, 3PL services can provide access to resources, infrastructure, and expertise that would otherwise be too costly or complex to manage in-house. Larger companies also benefit by expanding their reach and improving delivery performance.

Review of Literature

SHEER LOGISTICS (2024) 3PL providers significantly enhance stock accuracy through the use of real-time tracking technologies, which provide continuous visibility across the entire supply chain. This system not only ensures precise inventory levels but also enables proactive management of stock, minimizing the risk of stock outs, overstocking, and inventory errors. As a result, businesses can maintain smoother operations, optimize replenishment cycles, and improve overall customer satisfaction. KARAGIANNIS, G., MINIS, I., ARAMPANTZI, C., & DIKAS, G. (2024) introduces a Mixed Integer Linear Programming (MILP) model to optimize warehousing and distribution networks for 3PL firms. Applied in a real-world case, the model achieved a 10.8% reduction in warehousing and distribution costs, highlighting the potential of mathematical optimization in enhancing 3PL inventory management efficiency.

II. Objectives

1. Primary Objective:

- A study on effectiveness of 3pl in handling inventory management in wonjin autoparts pvt ltd.

2. Secondary Objectives:

- To assess how 3PLs contribute to timely order fulfillment and accurate stock levels, leading to improved customer satisfaction.
- To investigate the potential risks of outsourcing inventory management, such as loss of control, dependency, and coordination issues.
- To analyze the strategies used by 3PLs to stream line inventory replenishment and distribution.
- To Analyze emerging trends such as AI-driven inventory optimization, block chain for supply chain transparency, and the role of 3PLs in omnichannel retailing

III. Research Methodology

This study uses a descriptive research design. Primary data was collected using structured questionnaires from 115 employees at wonjin autoparts pvt ltd, selected through stratified sampling. Secondary sources included journal articles and reports.

1. Research Design

This study adopts a descriptive research design to analyze effectiveness of 3pl in handling inventory management in wonjin autoparts pvt ltd. The research focuses on assessing current logistics operations, identifying challenges, exploring opportunities, and evaluating the cost-benefit of inventory management in the autoparts industry.

2. Data Collection Methods

Primary Data : Collected using structured questionnaire targeting employees at wonjin autoparts pvt ltd. Sample size: **115 employees** selected through **stratified sampling** to ensure diverse representation. Questionnaires designed to measure employee perceptions of wonjin auto parts Pvt Ltd.

Secondary Data: Gathered from journal articles, books, company reports, and industry research. Sourced from industry reports, academic journals, company records, government policies, and case studies on inventory management.

3. Sampling Technique

Stratified Sampling : Employees were categorized based on department, tenure, and hierarchical level. This ensures balanced insights across various organizational roles.

4. Data Analysis Techniques

The study applies multiple statistical tools to evaluate wonjin autoparts pvt ltd.

Percentage Analysis: Used to summarize demographic details and general responses.

Chi-Square Test: Determines the relationship between categorical variables (e.g., age and received training on 3pl handling inventory management)

ANOVA(Analysis of Variance): Tests **group-wise differences** in perceptions about department of the respondents & the respondents ratings for current logistics of wonjin auto pvt ltd.

Correlation Analysis: Assesses the link between experience of the respondents & the respondents digital tools usage in wonjin autoparts pvt ltd

IV. Analysis Tools

- Percentage Analysis: To describe demographic data.
- Chi-Square Test: To identify relationships between categorical variables.
- ANOVA: To test group-wise perception differences about wonjin autoparts pvt ltd.
- Correlation Analysis: To evaluate the relationship between two variables..

Summary of Statistical Tests

Test Type	Variables Tested	Test Statistic	Degrees of Freedom (df)	Significance (p- value)	Inference
Chi-Square Test	Age vs received training on wonjin autoparts pvt ltd	.371	12	0.483	No Significant relationship exists
ANOVA Test	Department vs Rating of inventory	2.75	4,111	0.046	Significant difference exists
Correlation Analysis	Experience vs Digital Tool Usage	.464	-	.000	No significant correlation exists

V. Findings

- 86.1% of respondents are either satisfied or very satisfied with their 3PL provider.
- 73% confirmed that the 3PL provider always offers real-time tracking, ensuring visibility and control.
- 80.9% reported that inventory data from 3PL providers is mostly or very accurate.
- 80% of respondents felt that the 3PL performed audits adequately or very well.
- 67.8% rated the 3PL provider as cost-effective in inventory management.
- 84.4% observed improvements in delivery lead times, a crucial factor in production cycles.
- 80.8% rated 3PL returns and exchanges as effective or very effective.
- Only 17.4% found 3PL s to be “very flexible” in adjusting costs, indicating room for negotiation improvements.
- 86.9% saw improved ability to meet customer demand through better inventory handling.
- 67.8% found 3PL order processing to be fast or very fast.
- Some respondents noted that software integration issues still impact tracking accuracy.
- Only weak correlation (0.215) found between inventory communication and reduced lead times.
- 87% of respondents said they would recommend their 3PL provider to other businesses.
- Statistical tests confirmed significant associations between 3PL effectiveness and satisfaction.

VI. Suggestions

- Introduce dynamic or tiered pricing models based on client scale or demand cycles.
- Invest in robust APIs and middleware to connect ERP with 3PL warehouse systems seamlessly.
- Conduct monthly or bi-weekly audits to maintain inventory consistency and accuracy.
- Integrate AI tools to predict demand patterns and optimize replenishment schedules.
- Develop more efficient processes and teams for returns, recalls, and warranty replacements.
- Let clients track KPIs like stock out rates, lead times, and return frequency in real time.
- Tie payments to SLAs (e.g., 95% on-time delivery, <1% inventory error).
- Train both in-house teams and 3PL staff to ensure shared operational understanding.
- Establish shared portals or instant messaging tools for better supplier-client communication.

VII .Conclusion

The study clearly establishes that Third-Party Logistics (3PL) providers play a vital role in transforming inventory management practices across industries. Their ability to offer real-time visibility through advanced tracking systems has significantly improved inventory accuracy and responsiveness. The integration of 3PL services has enabled businesses to reduce stock outs, enhance order fulfillment, and ultimately increase customer satisfaction through timely deliveries. Moreover, outsourcing logistics has allowed companies to cut down on internal infrastructure and staffing costs, making operations leaner and more cost-effective.

VIII .References

- Sheer Logistics (2024). *Impact of Real-Time Tracking on Inventory Accuracy in 3PL*. Retrieved from industry reports on 3PL logistics technologies.
- Ricardo Moreira da Silva (2023). *Influence of Industry 4.0 on Third-Party Logistics Providers*. International Journal of Supply Chain Innovations.
- Fahimeh Hosseinnia Shavaki (2023). *Big Data Analytics in Supply Chain Optimization*. Journal of Business Analytics and Logistics.
- Gabriel, A., & Parthiban,P. (2020). *Global Challenges in 3PL: Technological and Operational Perspectives*. International Review of Supply Chain.
- Christopher,M. (2016). *Logistics & Supply Chain Management*. Pearson Education.
- Lee, H., Paik, S., & Cho, D. (2016). *Vendor-Managed Inventory: Theory vs. Practice*. Journal of Operations and Logistics.
- Kumar,N., Mishra,A., & George,A. (2013). *Bridging Theory and Practice in FMCG Inventory Management*. Supply Chain Management Review.
- Cho, J., Ozment, J., & Sink, H. (2008). *The Capabilities of 3PLs and Their Impact on Export Performance*. Transportation Journal.
- Marasco, A. (2008). *Third-Party Logistics: A Literature Review*. International Journal of Production Economics.

Websites:

- <https://www.netsuite.com>
- <https://www.odoo.com>
- <https://www.fishbowlinventory.com>
- <https://www.rfidjournal.com>
- <https://www.supplychaindi.com>