

AN EMPIRICAL STUDY TO MEASURE THE PERFORMANCE OF 3PL SERVICES IN TAMILNADU

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ABSTRACT

Third-party logistics services play a dynamic role in enhancing the competence of supply chain actions. In Tamil Nadu, a state recognized as a hub for industrial and manufacturing activities, the demand for 3PL services has grown significantly. With continuous investments in logistics parks and technological innovations, the 3PL sector in Tamil Nadu is expected to grow exponentially. Emphasis on sustainability and green logistics solutions will further reshape the industry dynamics. This empirical study evaluates the effectiveness of Third-Party Logistics (3PL) services and their impact on firms' performance in Tamil Nadu. The research focuses on understanding client preferences, identifying key factors influencing 3PL services, and analyzing the significant differences in these factors. A descriptive research design was employed, utilizing convenience sampling to collect data from 137 respondents through structured questionnaires. Statistical analyses such as Wilcoxon Signed Ranks tests and Discriminant analysis were applied to examine the data. The results revealed significant differences in the mean ranks of various 3PL service factors, with flexibility emerging as a critical determinant of service quality. The findings emphasize the need for 3PL providers to leverage advanced technologies, prioritize customer satisfaction, and adopt innovative logistics solutions to remain competitive. The study highlights the strategic importance of 3PL services in modern supply chain management and underscores their potential to enhance operational efficiency and customer retention. The research concludes with recommendations for firms to integrate cutting-edge logistics practices and suggests avenues for future studies in this dynamic and evolving field.

Keywords: Flexibility, Value Creation, Security and Tracking System, IT Integration System, Customer Service and firm performance.

1. INTRODUCTION

The rapid globalization and increased complexity of supply chain networks have elevated the significance of Third-Party Logistics (3PL) services in ensuring efficient and cost-effective logistics operations. Tamil Nadu, known for its industrial and commercial prominence, has emerged as a critical hub for logistics activities in India. With its strong infrastructure, strategic location, and thriving industries, the state presents a unique ecosystem for 3PL service providers to deliver value through transportation, warehousing, order fulfillment, and integrated logistics solutions. Despite the growing importance of 3PL services in supply chain management, a gap exists in understanding how well these services are performing in Tamil Nadu. Key challenges such as service reliability, cost efficiency, and technology adoption often limit the ability of 3PL providers to deliver optimal value. The lack of localized empirical studies creates a void in identifying specific client preferences and the effectiveness of various 3PL service parameters. This study focuses on assessing the performance of 3PL services in Tamil Nadu by examining the factors influencing their efficiency, the preferences of client firms, and the service provider's ability to meet the dynamic requirements of their clients. By leveraging empirical data, this research aims to provide actionable insights into the strengths and weaknesses of the current 3PL landscape in the state.

2. REVIEW OF LITERATURE

Mvubu, M., & Naude, M. (2020) evaluated the supply chain risk management techniques used by South African third-party logistics service providers to mitigate risks, the extent to which these strategies are implemented, and the benefits received from them. An exploratory and descriptive method approach was used. The empirical study consisted of email surveys sent to 398 supply chain managers working for South African 3PLs. The data show that respondents place a higher value on risk identification than on other SCRM tactics. Risk assessment had the lowest rating, indicating that 3PL providers placed the least value on this risk assessment technique. Risk response, monitoring, reporting, and control are all practiced to a far lesser extent. The data also showed that 3PL providers gain significantly from all SCRM solutions. One disadvantage of this study is that not all 3PL providers affiliated with SAAFF participated. Furthermore, because the survey primarily included members of senior management, perspectives from operational and tactical staff were not acquired. The study adds to the existing body of information on SCRM by investigating how 3PL providers in

a developing nation, such as South Africa, assess supply chain risks, the techniques they employ to mitigate them, and the procedures to monitor and control SCM risks.

Chen, X., Xu, P., Li, J., Walker, T., & Yang, G. (2022) explored that in a three-tiered closed-loop supply shackle entailing one manufacturer, one retailer, and one third-party logistics provider (3PL), with the retailer dominating. Inspired by game theory, we create an equilibrium model for a retailer-led, closed-loop supply chain with logistical outsourcing. We determine each supply chain member's optimal forward and reverse logistics options. This article investigates the impact of market size, consumer sensitivity to sales prices, the share of logistics expenses, consumer environmental awareness, and consumer sensitivity to recycling pricing on the decision-making process. Finally, we present a numerical example to demonstrate the validity of our findings. Our findings show that the more the manufacturer's portion of the forward logistics cost, the higher the sales, wholesale, and forward logistics service prices, and the smaller the order quantity. The more the manufacturer's part of reverse logistics costs, the lower the recycling price, transfer price, and recycling amount, and the higher the reverse logistics service price. Whether it is forward logistics or not, the greater the manufacturer's portion of the logistics costs, the lower the earnings of each member.

Juma, L., & Basheer, M. (2023) assessed warehouse value-added services data for a third-party logistics (3PL) provider, facilitating the identification of service enhancements and cost-reduction opportunities in executing VAS for clients through Pareto analysis as a quality instrument.

A case study methodology was employed to gather qualitative and quantitative data from a prominent third-party logistics organization in Belgium. The methodology is executed through the implementation of critical stages of Pareto analysis. Two pharmaceutical items were evaluated based on medical general classification: narcotic analgesics (NA) and ophthalmic antihistamines and decongestants (OAD). The findings demonstrated that the Pareto principle is validated in the NA—ticketing scenario, with five actions accounting for 83.3 percent of the total time spent on VAS procedures. Moreover, in the OAD display scenario, the Pareto principle is substantiated, with six actions verified for comprising 81.26 percent of the entire duration of primary VAS operations. The study proposed a remedy for the four delay factors: insufficient training/best practices, ineffective space utilization, absence of automation, and lack of cohesion and planning. Although the significance of mitigating inefficiencies in warehouse operations is acknowledged, the literature is deficient in practical research, and there are limited contributions concerning the analysis of warehousing value-added services data from third-party logistics providers. This research delineated all Value-Added Services operations for temperature-sensitive pharmaceutical products. The study presents a methodology for enhancing warehouse operations in non-automated third-party logistics (3PL) facilities and assists managers using Pareto analysis.

3. STATEMENT OF THE RESEARCH PROBLEM

Logistics services have become an indispensable part of organizational success in today's competitive business environment. The effective movement of goods and services is a critical determinant of customer satisfaction and business sustainability. As companies increasingly focus on their core competencies, outsourcing logistics and supply chain management activities has become a strategic necessity.

This shift has driven the growth of Third-Party Logistics (3PL) services, especially in industrially vibrant regions like Tamil Nadu. However, selecting the most suitable 3PL provider remains challenging for logistics managers. Poor outsourcing decisions can lead to increased operational costs, service disruptions, loss of customer trust, and even business failure. Conversely, effective outsourcing decisions can potentially enhance cost efficiency, service quality, and overall competitive Advantage. Despite these high stakes, many firms lack a clear framework for evaluating the performance of 3PL services, leading to inadequate outsourcing decisions that may also result in a loss of institutional knowledge and operational inefficiencies. IN Tamil Nadu, where industries such as automotive, textiles, electronics, and manufacturing thrive, the role of 3PL services is particularly significant. Yet, there is limited empirical research focused on assessing the performance and suitability of 3PL providers in this region. This study addresses this gap by evaluating the performance of 3PL services in Tamil Nadu, focusing on critical factors such as flexibility, reliability, cost efficiency, and technological innovation.

4. OBJECTIVES OF THE STUDY

- To investigate client preferences and mean ranks relative to the factors of third-party logistics services.
- To study the significant difference in the mean score of value creation and Flexibility as a dimension towards 3PL service.
- To identify Group clients based on their responses and validate the discriminant function to assess its accuracy in classifying respondents into predefined performance categories.

5. RESEARCH METHODOLOGY

The research adopted a descriptive design to systematically explore and analyze the performance of 3PL services in the Chennai region of Tamil Nadu. This design was selected to provide a comprehensive understanding of the factors influencing client satisfaction and the overall efficiency of 3PL services. The study targeted 137 clients involved in logistics activities, using a convenience sampling approach to ensure accessibility and relevance. Data was composed using a structured questionnaire to gather insights into the performance, reliability, and technological adoption of 3PL services. The questionnaire included items rated on a Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to measure respondents' perceptions across multiple dimensions of 3PL service quality. The hypotheses were assessed to explore critical factors influencing the performance of 3PL services. The Cronbach's alpha coefficient of 0.953 for the 42 items indicates a high level of internal consistency among the questionnaire items. This suggests that the instrument is reliable and well-suited for measuring perceptions and experiences related to 3PL service performance in the Chennai region.

6. DATA ANALYSIS AND INTERPRETATION

Friedman test

H₀: There is no significant difference among mean ranks towards the factors of third-party Logistics services.

FACTORS OF 3PL SERVICES	MEAN RANK	CHI-SQUARE VALUE	P VALUE
Flexibility	(3.92)	(25.380)	(.000)
Value Creation	(3.24)		
Security and Tracking System	(3.34)		
IT Integration System	(3.19)		
Customer Service	(3.42)		
Customer Accommodation	(3.89)		

The results of the Friedman test determine that the observed probability value ($P = 0.000$) is less than 0.05. Hence, the null hypothesis is rejected at a 5% significance level, and there is a significant difference among mean ranks towards the factors of third-party Logistics services. Based on the mean value, it was observed that flexibility (3.92) is the most critical factor of third-party Logistics services.

Wilcoxon Signed Ranks Test

H₀: There is no significant difference in the mean score of value creation and Flexibility as a dimension towards 3PL services.

Dimensions	N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Value Creation - Flexibility	(65)	(55.08)	(3580.00)	-3.692	0.000
	(35)	(42.00)	(1470.00)		
	(37)				
	(137)				

The Wilcoxon Signed Ranks Test results exposed that the P value is less than 0.05. Hence, the null proposition is rejected at a 5% significance level. Therefore, it is determined that there is an influential difference in the mean score of value creation and flexibility as it relates to 3PL services.

Discriminant Analysis

By using discriminant analysis, the study seeks to segment the 3PL service market in Tamil Nadu and provide empirical evidence for the factors that determine performance success. This can guide service providers and client organizations in making informed decisions to optimize logistics operations.

Box's Test of Equality of Covariance Matrices

Log Determinants		
GBO	Rank	Log Determinant
Global	8	6.208
National	8	5.816

Pooled within-groups	8	6.384
The ranks and natural logarithms of determinants printed are those of the group covariance matrices.		

The test assesses whether the covariance matrices of the groups (Global and National) are equal. The log determinants suggest some variation in the covariance matrices, which may influence the discriminant function's ability to separate the groups effectively.

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.947	7.110	8	.000

A Wilks' Lambda of 0.947 indicates that the discriminant function explains a significant portion of the group variance. The associated Chi-square value (7.110) with a p-value of 0.000 confirms that the function is statistically significant in distinguishing between Global and National providers.

Canonical Discriminant Function Coefficients	
	Function
	1
Flexibility	.167
Value Creation	.597
Security and Tracking System	-.207
IT Integration System	-.109
Customer Service	-.075
Customer Accommodation	-.064
Competitive Advantage	-.361
Logistics Excellence	.153
(Constant)	-2.157
Unstandardized coefficients	

The unstandardized coefficients indicate the contribution of each variable to the discriminant function. Value Creation (0.597) and Flexibility (0.167) are the most significant positive contributors to distinguishing Global and National providers. Competitive Advantage (-0.361) negatively influences the separation, suggesting the groups might perceive it differently.

Classification Results					
Particular		GBO	Predicted Group Membership		Total
			Global	National	
Original	Count	Global	46	29	75
		National	26	36	62
	%	Global	61.3	38.7	100.0
		National	41.9	58.1	100.0
a. 59.9% of originally grouped cases were correctly classified.					

The classification table shows the effectiveness of the discriminant function in correctly predicting group membership. While the discriminant function is statistically significant, the accuracy of classification (59.9%) suggests that other unmeasured factors may also influence group membership. Additional variables such as pricing models, sustainability practices, or regional expertise may need to be considered to improve classification accuracy.

7. CONCLUSION

The standard transportation notion is being replaced by the perception that the logistics industry in India is a better way of managing the supply chain and a tool for strategy. This transformation is taking place in the logistics industry. Due to globalization, companies have concentrated more on their core production processes. They have also started to

outsource the logistical requirements to logistics service providers, which unquestionably drives the sector to the growth curve. There is reason to be optimistic about the future of third-party logistics (3PL) services in India. Because of the government's investments in the development of freight corridors, ports, and highways, as well as the growing demand from the retail and pharmacy industries and the expansion of e-commerce, the market has reached its highest possible level. In the current period, shippers and individuals working in the logistics industry anticipate diverse services to achieve success in their businesses. These shippers are looking for a service provider who can comprehend the issues appropriate for the industry, products, consumers, and the objectives of their firm. In addition to standard fulfillment and distribution services, the best third-party logistics (3PL) service providers can offer various extra services and solutions. By using these additional capabilities, including e-commerce storefronts, assistance for contact centers, accounting services, highly customized reports, and printing and mailing services, one may save time and money by removing the difficulties and costs of working with various providers. The third-party logistics industry is experiencing rapid expansion, and many businesses have opted to outsource their logistical operations to third-party logistics providers. There is a great deal of fragmentation in the market for third-party logistics, which is still in its earlier stages. Many businesses are not fully aware of all the duties that a third-party logistics provider performs, and they are also unaware of the benefits that come with specific services that the third-party logistics provider provides. Nevertheless, the market for third-party logistics features a significant amount of untapped potential for expansion. Companies continue to be concerned about outsourcing their logistics operation since there is a lack of trust and awareness among business owners.

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