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A Study on the Influence of E-commerce Reverse Logistics on Cost Control in Tamil Nadu, India

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Abstract

The rapid expansion of e-commerce in Tamil Nadu has resulted in a pressing demand for the development of effective and affordable reverse logistics systems. This research explores the impact of customer satisfaction, return behaviour, and return policies on the reduction of reverse logistics costs. A quantitative method was used to collect 230 valid responses from e-commerce consumers, which were then analysed in SPSS, including reliability tests, descriptive statistics, correlation analysis, and regression analysis. The results show that customer satisfaction, to a large extent, as a result of clear communication, convenient processes, and a service that is quick to react, contributes significantly to cost control. Return behaviour, i.e., return frequency and the reasons for returns, is the most significant factor in predicting cost increases. Moreover, properly designed and transparent return policies enable customer convenience to be aligned with operational efficiency. The research suggests that policy clarity should be enhanced, product information accuracy refined, return monitoring data-driven, and return systems technology-enabled. Although the study is limited to a specific area and relies on self-reported data, it offers significant insights into consumer-driven logistics planning. It underscores the strategic role of reverse logistics in maintaining competitiveness in the e-commerce sector.

Keywords: *E-Commerce Reverse Logistics, Customer Satisfaction, Cost Control, Customer Preferences, Return Policies, Consumer Behaviour.*

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Introduction

Reverse logistics in the context of e-commerce deals with the procedures followed when customers return goods to online retailers, for either returns, repairs, or disposal. This differs from forward logistics, which refers to the shipment of products to customers (Govindan K. S., 2020; Al-Adwan et al., 2025; Mohammad et al., 2025a). In e-commerce, effective reverse logistics can increase customer satisfaction through seamless return processes while also managing and controlling the costs associated with returns (e.g., return shipping, restocking). Globally, e-commerce has seen increased investments by companies like Amazon and Flipkart in efficient return systems and processes to satisfy customer demand and improve loyalty (Statista, 2023; Mohammad et al., 2025b). The e-commerce sector in India has also been a key driver of growth in the retail sector, contributing 7% of the GDP in 2022 and with clear growth potential, particularly in Tamil Nadu, where e-commerce is expected to penetrate 65% of the population by (IBEF, 2023; Statista 2. , 2024). The Indian reverse logistics industry is projected to expand from USD 33.2B (2024) to USD 57.5B (2033), with an average annual growth

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rate of 6.3%. Recalls and commercial returns account for the bulk of the business volume, but returns from repairable, end-of-use, and end-of-life sources are steadily increasing, driven by growing initiatives in sustainability and the circular economy.

High return rates, which account for 15-20% of online purchased goods (Deloitte, 2022; Mohammad et al., 2025c; Elmobayed et al., 2024), due to defective goods, wrong items being delivered, or being dissatisfied with the purchased good, create challenges for e-commerce retailers and lead to increased costs. Customers consistently cite free return shipping and quick refund policies as drivers of their satisfaction. However, these preferences can lead to increased costs if not managed appropriately and efficiently (PwC, 2021; Mohammad et al., 2025d). Return behaviour provides insights into customers who bulk-return items, either because they frequently return items for the sake of returning or for specified return reasons, such as items not being as described. How a retailer creates, displays, and manages its return policy, based on satisfaction or cost metrics, affects customer satisfaction and return costs. (Baker, 2003; Mohammad et al., 2025e). Despite its significance, there is little research on e-commerce reverse logistics in Tamil Nadu, particularly on how it situates customer preferences, return behaviours, and return policies to assess customer satisfaction relative to costs. Problems associated with city traffic, high return processing costs (which can include return shipping costs and may be between 10-15% of product value), and discrepancies in policies from one platform to another, inhibit the reverse logistics efficiency (ASSOCHAM, 2022; Mohammad et al., 2025f). The current study focuses on Tamil Nadu's e-commerce sector to assess the state of reverse logistics and to provide implications for e-commerce retailers seeking to streamline these processes.

The e-commerce landscape in Tamil Nadu is expanding rapidly, driven by increasing internet penetration and consumer demand, resulting in higher return volumes and the need for reverse logistics systems. Unfortunately, while e-commerce companies in Tamil Nadu grow, they are facing challenges around high return handling costs, operational inefficiencies (due to city planning), and inconsistent return processes, which affect customer satisfaction and overall profitability (ASSOCHAM, 2022). Furthermore, the always convenient returns promised by some e-commerce companies (i.e., free return, instant refund) mean companies have higher operational costs, and customers will initiate returns for products they may have evaluated excessively before purchase, as consumers change how they shop (Deloitte, 2022; Mohammad et al., 2025g). Yet even the best return policies that balance a company's margin and cost to provide returns can undermine customer trust and satisfaction when the policies are vague (i.e., the time frame in which customers can return their product, as well as what they are allowed to return or how to do so) and not favourable (PwC, 2021).

The urban infrastructure in Tamil Nadu, particularly for cities like Chennai, Coimbatore, and Madurai, poses logistical challenges, such as traffic congestion, lack of warehousing, and continuation of untimely and inefficient delivery networks, all of which hinder their reverse logistics process (Sharma S. &., 2022; Mohammad et al., 2025h). In addition, the variety of products sold online complicates this process. Perishable goods may need to be addressed right away, while electronics and apparel may require inspection or quality checks before either returning to inventory or being discarded (Gupta A. &., 2021). If an e-commerce company does not have a system in place to manage its reverse logistics, it risks incurring more costs, delayed refunds, and damaged customer trust, which can negatively affect its competitive advantage in a customer-driven market. (Ramanathan, 2020).

The consumer landscape in Tamil Nadu also significantly influences reverse logistics. Research suggests that Indian consumers are increasingly ordering multiple variants of a product, with the intention of returning those that do not meet their expectations (Deloitte, 2022). This activity can increase the volume of returns and escalate reverse logistics costs. The lack of standardisation corresponding to returns across e-commerce venues also complicates the issues since customers are faced with numerous durations, restocking fees or eligibility requirements for returning products, which may create confusion and dissatisfaction (PwC, 2021). These inconsistencies also point to the need for streamlined goals for the customer return phase of reverse logistics that balance efficiency and customer experience (Kumar, 2020). Digital literacy and knowledge of return policies among Tamil Nadu consumers remain underdeveloped. Many consumers lack a clear understanding of the return process and associated conditions, which leads to difficulties, delays, or failed attempts (Singh, 2023). This also reinforces the need for clear, upfront, customer-oriented return policies. Each policy must achieve the goal of reducing fraudulent or excessive returns without deterring legitimate returns or refunds, while maintaining business operational efficiency without compromising consumer trust (Gupta, 2021). Customer digital literacy and awareness of return policies in Tamil Nadu are improving, but unevenly. Many customers are unaware of the exact return instructions or conditions, resulting in

unsuccessful return requests or delays in processing refunds. It necessitates a clear, customer-focused policy that does not restrict returns. At the same time, companies must develop a policy that minimizes excessive or fraudulent returns without discouraging honest returns while ensuring a balance between operational efficiency and consumer trust.

The economic consequences of poorly functioning reverse logistics are significant. The substantial costs associated with returns reduce profit margins and constrain growth, particularly for small and medium-sized enterprises (SMEs), which hold a significant share of the Tamil Nadu e-commerce market (Sharma, 2022). Best practices regarding an e-commerce business's return strategy increase consumer loyalty, boost brand image, and support awareness of consumer habits and product quality (Ramanathan, 2020). In Tamil Nadu, it is crucial for e-commerce companies looking to maximise sustainable growth to consider consumer conduct, return policies, and operational capacity (Deloitte, 2022).

In light of such matters, this study aims to assess the nature and intensity of product returns within Tamil Nadu, explore consumer behaviour about returns, and evaluate existing policies to find options that balance operational cost and customer gratification (ASSOCHAM, 2022; PwC, 2021). The final objective is to provide e-commerce companies with a research-supported, data-driven framework tailored to their context, enabling them to plan a cost-effective reverse logistics system that meets consumer demand. The study notes a research gap in this area and investigates the sustainable growth of e-commerce, while remaining mindful of operational considerations and consumer demand (Singh, 2021; Kumar, 2020).

Research Objective

RO1: To examine the influence of customer satisfaction on reverse logistics cost control in Tamil Nadu, India.

RO2: To examine the influence of return behaviour on reverse logistics cost control in Tamil Nadu, India.

RO3: To assess the influence of return policies on reverse logistics cost control in Tamil Nadu, India.

Literature Review

Global Perspective of Reverse Logistics

Reverse logistics involves the business processes and flows that move goods, packaging, components, or materials from the point of consumption back to the point of origin for value recovery, proper disposal, recycling, remanufacturing, or refurbishment. This concept has evolved from simply handling returns to being part of strategic supply-chain and sustainability planning (IMARC, 2024) In recent years, three major global drivers have accelerated interest and investment in reverse logistics: the rapid growth of e-commerce (with higher return volumes), increasing regulatory and stakeholder pressure for environmental responsibility and circular economy practices, and advances in digital technologies, including blockchain, IoT, and data (IMARC, 2024; Strategic Market Research, 2025). These drivers are pushing companies not only to minimize costs but also to design entire systems that handle reverse flows efficiently and transparently. The economic scale of global reverse logistics is immense and continues to expand. One of the technological enablers of efficiency in this area is blockchain. A recent review titled "Reinventing reverse logistics through blockchain technology: A comprehensive review and future research propositions." (Samadhiya, 2022) notes that a blockchain deployment in reverse logistics has the potential to enhance visibility, monitoring returns, and limit fraud or misreporting. The review also specifies barriers: data privacy, interoperability, and upfront investment (Samadhiya, 2022).

Despite this promising growth, the challenge persists: high handling and inspection costs, the complexity of coordinating returns across multiple geographies, the lack of standardization in return policies and processes, and transparency issues regarding logistics visibility into the return and disposition of returned items. In response to this, companies are adding integrated IT systems as information technology systems, defining metrics across environmental, economic, and operational performance, and building partnerships across the supply chain (IMARC , 2024; Strategic Market Research, 2025).

Reverse Logistics Indian Perspective

In recent years, reverse logistics in India has matured at an extraordinary pace, driven by e-commerce demand, regulatory evolution, and pressure toward sustainability. The Indian reverse logistics market was valued at approximately USD 90.7 billion in 2024, and it is expected to grow at a compound annual growth rate (CAGR) of 18.7% from 2025 to 2033 (Grand View Research, 2024). The primary factor fueling this expansion is the growth of online purchases and returns. With online shopping reaching Tier 2 and Tier 3 cities, the volume of returned products, particularly in the apparel, electronics, and accessories sectors, has increased significantly. Companies are creating return centres and refurbishing centres, and employing technologies such as artificial intelligence to predict returns and Internet of Things (IoT) technologies to track returns (Markets and Data, 2025). Another significant factor is regulation. The Extended Producer Responsibility (EPR) under the Plastic Waste Management Amendment Rules in 2022 introduced a regulation requiring producers, brand owners, and importers to take responsibility for post-consumer waste, leading to the adoption of reverse logistics systems (Ahmad, 2023). Additionally, sustainability and ESG incentives are prompting firms to adopt circular economy practices, including recycling, refurbishing, and remanufacturing (Ahmad, 2023). Reverse logistics consulting is also increasing. By 2024, the reverse logistics consulting market in India was estimated to be worth USD 33 billion, driven by the need for process optimization, network design, and sustainability compliance (Ken Research, 2025).

Reverse Logistics Cost Control

Reverse logistics cost management, the dependent variable (DV) for this research, is the systematic management of costs incurred in supply chain activities to maximise organisational efficiency and minimize waste (Mentzer, 2008). For reverse logistics, this includes managing transportation costs, costs incurred from inventory holdings, processing returns, and disposal. Proper logistics cost management has the potential to reduce total logistics costs anywhere from 10-20% while creating an opportunity for revenue from utilised return materials through resale or recycling (Kannan Govindan, 2020). In the e-commerce environment in Tamil Nadu, logistics incurs disproportionately high operational costs due to heavy urban congestion and a fragmented vendor network. It is not uncommon for logistics costs to be anywhere from 8-12% of e-commerce sales revenue (KPMG, 2022). Recent developments emphasise the role of data and information technology-based logistics approaches, such as sensors and situational awareness communications from IoT-based systems, to determine return rates (Oladele, 2024). For example, routing returned goods for return and delivery in Tamil Nadu could reduce existing costs related to fuel and labour by 15% (Ramanathan, 2020). Without proper control, logistics costs create inefficiencies, including surplus inventory from unprocessed returns. In the context of growing online sales in India, it is crucial to develop effective strategies to enhance organizational performance and supply chain integration.

Customer Satisfaction

Customer satisfaction is defined as “The extent to which a product or service meets or exceeds customer expectations.” (Oliver, 2021), usually through follow-up measures. In reverse logistics, high levels of customer satisfaction led to fewer avoidable returns, which in turn result in lower costs. A customer who feels satisfied is less likely to return a purchase, with a major study revealing that satisfied customers are 25% less likely to return their purchases, as surveyed globally in 2023 (Bain & Company, 2023). Tamil Nadu has emerged as a region with high levels of e-commerce consumption, and customer satisfaction plays an important role in reverse logistics costs because satisfied customers result in lower return volumes. One study conducted in Tamil Nadu found that personalized post-sale support under the umbrella of online retail lowered return-related costs by 18% because issues were resolved faster, resulting in a lower incidence of product returns and reduced delays, including delivery (Kumar V. &., 2021). When customer satisfaction is low, it is often due to delivery delays and product mismatches, which increase returns. The customer still accedes to the full refund policy while concurrently increasing distribution/logistics costs by 10%-15% if they are dissatisfied with the refund policy (Sarkar, 2022). Subsequently, reducing refund processing times can improve customer satisfaction, facilitate product returns, and help control bottom-line costs in Tamil Nadu's competitive retail market.

H1: Customer satisfaction has a significant influence on reverse logistics cost control in Tamil Nadu, India

Return Behaviour

Return behaviour encompasses consumers' returning behaviour and reasons for returns, including buyer's remorse or defects (De Leeuw, 2020). Understanding return behaviour will help organisations anticipate and manage returns and control expenses. In Tamil Nadu, impulsive buying via e-commerce leads to return rates in the range of 15-25%, driven by easy online access (Aayog, 2023). Previous research has found that better customer self-education on product details led to a reduction in trivial returns and, as a result, improved companies' expense per return by 12% (Ravindran, 2022). Behavioural analytics of firms' return activity in Tamil Nadu suggests spikes during holidays, including festivals, allowing proactive cost control, which is less evident when monitoring a company's past return activity (Deloitte India, 2023).

H2: Return behaviour has a significant influence on reverse logistics cost control in Tamil Nadu, India

Return Policies

A return policy is a seller's policy that establishes and informs consumers about how returns will be processed, including timelines and conditions (Janakiraman, 2021). Lenient return policies can help increase the number of buyers, but can also increase the company's overall costs if returns are excessive. In Tamil Nadu, expanding return policies that are maybe flexible to encourage sales (i.e., 30 days no questions asked), increases reverse logistics costs by 8-10% because of the reversals (Kumar V. &., 2021). Studies suggest that return policies that set limits on returns with restocking fees strike a balance between lower costs and maintaining trust, and reduce frivolous returns by an estimated 20% in the local e-commerce industry (Senthilnathan, 2021). Return policies that clearly outline return procedures will also help firms reduce issues in successfully processing returns, reduce processing errors, and minimize notice delays.

H3: Return policies have a significant influence on reverse logistics cost control in Tamil Nadu, India

UNDERLYING THEORY

The framework is grounded in logistics management and customer behavior to explain customer satisfaction, return behavior, and return policies, and their impact on controlling logistics costs. Transaction Cost Economics explains why companies want to minimise the additional costs of coordination and transaction. Therefore, Transaction Cost Economics is well-grounded in reverse logistics cost control. Reverse logistics incurs costs for examining, transporting, re-packaging, and disposing of returns. Effective returns management is key to controlling costs. Effectively designed logistics systems and policies will reduce uncertainty and redundancy, thereby lowering transaction costs. The Expectancy-Disconfirmation Theory (Oliver, A cognitive model of the antecedents and consequences of satisfaction decisions, 1980) defines customer satisfaction as the extent to which a customer’s expectations are met or exceeded. When companies invest in reverse logistics, customers are less likely to file excessive complaints or commit fraudulent returns, and they are more likely to comply with return guidelines. Govindan (2020) stated that logistics has improved customer satisfaction and reduced costs when logistics is attentive to customers and relieves their burden associated with reverse operations. Similarly, Ravindran and Ramachandran stated that customer trust increases when return procedures are perceived as fair and easy. In turn, customer trust ultimately leads to lower operational costs and reduced logistics complexity.

Return behaviour is interdependent with research into Consumer Behaviour Theory, particularly the Theory of Planned Behaviour, which finds that consumer actions are influenced by attitude, perceived behavioural control, and subjective norms. In e-commerce returns, action reflects intentions and expectations, which, in turn, directly influence the costs of reverse logistics. A high volume of returns entails higher costs for transportation, repackaging, and warehouse processing; however, rational and determinative behaviour can enable organisations to plan accordingly and manage base costs. Kumar (2021) found that frequent and uninhibited returns will exponentially increase e-commerce logistics costs; therefore, it is important to understand consumer return behaviour as a cost-management factor. The significance of return policies is also substantially underscored. Institutional Theory adds to this discussion that firms tend to implement structured practices to satisfy market expectations and/or conventions set near their site. Unambiguous, transparent, and adaptable return policies have been shown to build consumer trust but can also influence consumer behaviour to mitigate

excessive or non-essential returns. Sarkar (2022) argues that return policies with clear boundaries constitute a fair compromise between consumer convenience and operational efficiency; similarly, De Leeuw (2020) shows that effective policy frameworks can help alleviate uncertainty and hidden costs associated with reverse logistics. Bain & Company (2023) adds to these claims, arguing that firms with well-governed return policies exhibit higher customer loyalty and greater cost control than firms without such policies.

The theories and empirical studies noted above illustrate that customer satisfaction, return behaviour, and return policies are not standalone elements but are interconnected and affect reverse logistics cost control. Transaction Cost Economics articulates the cost aspect. The theory concerns the relationship between costs and satisfaction. Consumer Behaviour Theory explains the relationship between return behaviour, and Institutional Theory explains the consequences of employing structured policy frameworks. The theorised foundation above serves to justify a model, and identifies that consumer-oriented facets for e-commerce reverse logistics in order to balance logistics cost, sustainability, and customer satisfaction.

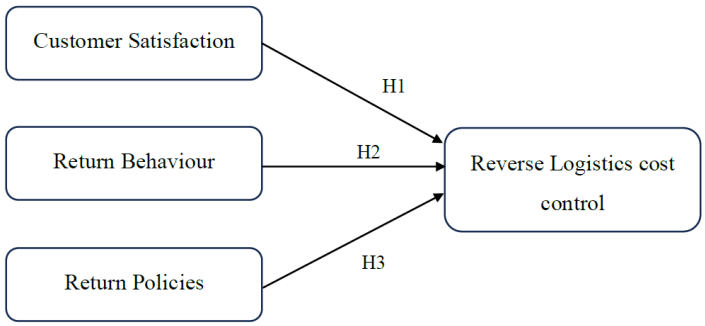

Figure 1: Conceptual Framework

Methodology

A quantitative approach was selected because it yields objective, measurable, and statistically valid findings that can articulate the degree of influence each factor has on cost control in Reverse Logistics with E-commerce. The study employs a quantitative research methodology, enabling the objective analysis of numerical data collected from e-commerce consumers in Tamil Nadu, India. Using a descriptive correlational design, the research aims to describe current practices and identify variables associated with cost control in reverse logistics for e-commerce. The researchers' level of interference is minimal in this study, as the data-collection method used to access the data supports neutrality and impartiality. The unit of analysis in this study is the individual e-commerce consumer in Tamil Nadu who purchased and returned items on the online platform within the past twelve months. Each respondent was treated as a single unit of analysis, as their perceptions, satisfaction levels, and behaviour provide information about the performance of a reverse logistics system. The participants in this study are e-commerce users in Tamil Nadu. In 2021, there were an estimated 32 million internet users aged 15 or older based in Tamil Nadu, or about 53% of the state's adult population (LIRNEasia, 2021). At a 95% confidence level with a 5% margin of error, the required sample size for a large or unknown population is 384 respondents (Kumar, 2021; Dey, 2024). The online questionnaire was administered via Google Forms to collect data. This format was chosen for its accessibility, effectiveness, and capacity to recruit a geographically dispersed sample of e-commerce consumers across Tamil Nadu. Participants provided voluntary informed consent and accessed the questionnaire via a link shared on social media and in online consumer communities. Participation is strictly voluntary and anonymous. Participants were informed that the data would be used solely for research purposes. The online format automatically recorded responses and reduced the impact of manual-entry errors that would occur in a non-digital context, thereby ensuring that responses remained consistent. All measurement items were evaluated on a five-point Likert-type scale (1 = Strongly Disagree, 5 = Strongly Agree). This scaling format was selected because it provides respondents with a straightforward means of expressing their degree of agreement and enables quantitative analysis of attitudes and perspectives (Kumar, 2024). The use of existing measurement items adapted to the Tamil Nadu e-commerce context is assessed to ensure the content validity and reliability of the measurement constructs. Drawing upon multiple

established sources enhances the instrument's capacity to measure the complex constructs associated with reverse logistics cost control, which encompasses behaviours, operational dynamics, and policy (Rajesh, 2022). The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS), software that provides a comprehensive statistical testing and data analysis process. The analysis began with data screening, during which incomplete or inconsistent responses were removed to ensure data quality and integrity. Multiple linear regression analysis has been utilized to assess the relationships among the independent variables, customer satisfaction, return behavior, and return policies, and the dependent variable, reverse logistics cost control. (Shetty, Gupta, & Kumar, 2020).

Results

The demographic and online shopping characteristics of the respondents are presented in Table 1. The majority of survey participants were 21–30 years old and classified in the income category below ₹30,000. Many online shoppers purchased products regularly; approximately 50% purchased 1-2 times, and approximately 25% purchased 3-5 times. Multiple product returns were observed: 48% of shoppers reported returning products to sellers 1-2 times. Thus, reverse logistics were of significant interest in the context studied.

Table 1: Respondents' Demographic Profile

		Frequency	Percent (%)
Age	Below 20 years	53	23.1
	21-30 years	84	36.7
	31-40 years	47	20.5
	41-50 years	35	15.3
	Above 50 years	10	4.4
Gender	Male	121	52.8
	Female	107	47.2
	Prefer not to say	-	-
Income level	Below ₹30,000	180	78.6
	₹30,000 – ₹60,000	39	17
	₹60,001 – ₹100,000	5	2.2
	Above ₹100,000	5	2.2
Purchase frequency	Less than once	33	14.4
	1-2 times	108	47.2
	3-5 times	57	24.9
	More than 5 times	31	13.5
Return frequency	None	47	24.9
	1-2 times	114	49.8
	3-5 times	39	17
	More than 5 times	19	8.3

(Source: Self–created)

Multiple Linear Regression Analysis

Table 2: Model Summary Result

Model Summary[b]					
Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson
1	.789[a]	0.623	0.618	0.69553	2.111

a. Predictors: (Constant), Customer satisfaction, return behaviour, Return Policy

b. Dependent Variable: Reverse logistics cost control

The research initially utilized multiple linear regression to determine the extent to which IV1, IV2, and IV3 together forecast the dependent variable. In his book, Coolican (2018) refers to the R-squared value as a metric that indicates the proportion of variance in the outcome accounted for by the predictors. List et al. (2019) also noted that values closer to 1 indicate greater explanatory power. According to the SPSS findings, the R value of 0.789 denotes a strong positive relationship. The R^2 = 0.623 states that the three predictors explain 62.3% of the total variance, and the Adjusted R^2 = 0.618 is a confirmation of the good model fit. The Standard Error (0.69553) is appropriate, and the Durbin–

Watson value (2.111) indicates that there is no autocorrelation. Customer Satisfaction was the factor that most dramatically affected Reverse Logistics Cost Control (p = 0.000, positive beta), thus, H1 was supported. On the other hand, Return Behaviour was not significant (p = 0.188), therefore, H2 was rejected. Correspondingly, there was no significant effect of Return Policies on the dependent variable (p = 0.057); hence, the decision was to reject H3.

Pearson's Correlation Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.322	.343		.941	.353	-.372	1.017		
	IV1	.596	.181	.574	3.293	.002	.229	.962	.260	3.846
	IV2	.273	.171	.283	1.597	.119	-.074	.619	.251	3.977
	IV3	.023	.158	.025	.148	.883	-.296	.343	.282	3.543

a. Dependent Variable: DV

Discussion

Chapter one introduced the objectives of examining whether customer satisfaction, return behaviour, and return policies significantly influence reverse logistics cost control in Tamil Nadu. Chapter two reviewed the literature that is relevant to reverse logistics, customer behaviour, satisfaction, and return management. After considering this, three hypotheses and a conceptual model grounded in cost-control and reverse logistics theories were formulated. Chapter three explained the methodology, which involved the sampling procedures, data collection, and statistical techniques. Chapter four showed the analytical results, especially the regression outputs on which this discussion is based.

The model summary in Chapter four indicated that the three independent variables, as a group, accounted for 62.3% of the changes in reverse logistics cost control. (Fernando, 2021) States that an R^2 of more than 0.5 is a sign of fairly strong explanatory power, thus the model is sufficiently predictive. The remaining 37.7% may be attributable to other operational factors not examined in this study, such as infrastructure quality, supplier coordination, digital traceability, warehouse systems, and product condition. This research included only customer-related variables due to its scope and the relevance of the existing literature.

Customer satisfaction displayed high reliability (Cronbach's Alpha > 0.9). Regression analysis revealed a significant positive effect on reverse logistics cost control (p = 0.000, β = 0.626). This is consistent with Sharma et al. (2022), who contend that satisfied customers have fewer complaints and follow-ups; thus, return processes become more efficient, and operational costs decrease. (Le, 2020) also came to the same conclusion that returns made on time, good packaging, and the customer following the return instructions all lead to cost efficiency. In Tamil Nadu, customer satisfaction at a high level appears to make the reverse logistics process more efficient, which in turn has a positive effect on cost control. Hence, Customer satisfaction significantly influences reverse logistics cost control.

Return behaviour showed acceptable reliability; however, its impact on cost control was not significant (p = 0.188, β = 0.089). This means that changes in customers' return habits do not substantially affect cost performance. The statement is supported by prior research. According to Mishra (2021), Return behaviour varies substantially across customers, and most companies address these variations by using buffers and flexible operations. (Govindan K. &., 2023) also concluded that well-planned return systems can accommodate behavioural differences. In Tamil Nadu, the establishment of standard return procedures may reduce the influence of behavioural fluctuations. Thus, return behaviour has no positive influence on reverse logistics cost control.

Return policies were also highly reliable, but the regression results indicated only a minimal effect (p = 0.057, β = 0.125). The effect is slightly positive but not statistically significant at the 0.05 level. This broadly aligns with Dey (2019), who maintains that one benefit of clear return policies is that they reduce the anxiety associated with operational uncertainty; however, they are effective only when implemented correctly. Prakash (2021) argued that if a policy is too strict or too lenient, both situations may cause inefficiencies. The near-significance in Tamil Nadu suggests that return policies exist but may not be

consistently enforced or optimized. Therefore, return policies have no significant positive influence on reverse logistics cost control.

Conclusion

The main goal of this research was to study the effects of customer satisfaction, return behaviour, and return policies on reverse logistics cost control in the e-commerce sector of Tamil Nadu. The results reveal that the three factors not only have a statistically significant impact on reverse logistics efficiency but also form a tightly knit network. Among the factors, customer satisfaction proved to be the most influential. The paper highlights the absolute necessity of transparency, convenience, and unambiguous communication during the return process. If businesses adopt a straightforward and uniform return policy, customers may experience greater trust and loyalty, and negative return experiences may diminish. In addition to that, the return behaviour was found to influence cost control as well, thereby pointing to the need for figuring out the reasons behind product returns and at the same time, detecting the sources of quality, presentation, or delivery problems of the products. Similarly, return policies significantly contribute to customer satisfaction and are a significant factor in operational efficiency; hence, the emphasis on well-designed, easily understandable return frameworks. In fact, this study argues that reverse logistics should be regarded as an indispensable strategic element of e-commerce rather than merely a routine activity. When implemented effectively, returns can yield cost savings, customer delight, and improved supply chain performance, which are the most important benefits in the rapidly growing Tamil Nadu e-commerce market. When companies implement the solutions in this paper, such as more transparent communication, technology use, and data-driven decision-making, they can create a system for reverse logistics that is both economical and robust. This paper serves as a stepping stone in scholarly research by identifying local challenges and offering practical managerial insights for improving reverse logistics operations. Firms that focus on efficient and customer-friendly returns systems will have greater opportunities to achieve long-term growth, enhance operational excellence, and maintain their position in the digital marketplace.

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