



Measuring The Impact of Returns and Reverse Logistics on Customer Loyalty

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Abstract—

This research examines the impact of returns management and reverse logistics processes on customer loyalty within the e-commerce sector, recognizing the strategic importance of post-purchase experiences in shaping consumer behaviour. Employing a descriptive research design, the study utilized convenience sampling to collect primary data from 245 consumers across Kerala through structured questionnaires. Statistical analysis incorporated chi-square tests to examine relationships between gender and consumer attitudes, Pearson correlation to assess variable associations, and factor analysis with varimax rotation to identify underlying dimensions of reverse logistics experiences. The findings reveal that reverse logistics attributes, including convenience, transparency, and procedural simplicity, significantly influence customer loyalty, with a strong positive correlation observed between consumer attitudes and reverse logistics factors. Three distinct dimensional components emerged from factor analysis, highlighting the direct loyalty impact of returns, the role of trust and information in building consumer confidence, and the isolated consequences of negative returns experiences. The study further establishes that gender does not moderate consumer perceptions of reverse logistics, enabling organizations to adopt standardized service frameworks. These findings contribute to the growing body of literature on

logistics service quality and offer practical guidance for retailers seeking to leverage reverse logistics as a strategic tool for building lasting customer loyalty and competitive advantage in the evolving e-commerce landscape.

Keywords— Reverse Logistics; Customer Loyalty; Returns Management; E-commerce; Consumer Behaviour;



I. INTRODUCTION

In the contemporary retail landscape, characterized by intense competition and evolving consumer expectations, customer loyalty has emerged as a fundamental determinant of business success [1]. The proliferation of online shopping platforms and the increasing variety of available products have transformed how consumers evaluate businesses. Today, organizations are assessed not solely on product quality or pricing strategies but significantly on the quality of their post-purchase services, particularly the returns process [2].

Returns have become an integral component of modern commerce, especially in e-commerce environments where consumers cannot physically examine products prior to purchase. Industry reports indicate that return rates in the e-commerce sector substantially exceed those of traditional brick-and-mortar retail due to factors including size discrepancies, product dissatisfaction, and damage during transit [3]. What was previously considered a mere operational cost has now been recognized as a strategic touchpoint that can strengthen or undermine customer relationships.

Reverse logistics, encompassing the movement of products from consumers back to sellers for return, repair, recycling, or disposal, represents a critical element of supply chain management [4]. A well-organized reverse logistics system facilitates faster returns or replacements, smooth communication, and simplified processes, all of which directly correlate with customer satisfaction. Conversely, slow processing, complex procedures, or poor communication can result in frustration and diminished trust [5].

Customer loyalty is intrinsically linked to service quality and overall shopping experience. A convenient and hassle-free returns process can enhance perceived service value and support customer retention [6]. Given increasing competition and rising customer acquisition costs, the importance of retaining customers through superior reverse logistics performance has become more critical than ever.

This research aims to determine the impact of returns management and reverse logistics processes on customer loyalty by analyzing key factors including returns convenience, processing

speed, communication quality, and refund reliability. The findings will provide organizations with useful insights to improve their reverse logistics processes and build stronger customer relationships in a customer-centric market environment.

1.1 Problem Statement

The rapid growth of e-commerce has led to increased product return rates, yet many businesses continue to view returns management and reverse logistics as mere operational costs rather than strategic tools for building customer loyalty. While existing research has examined logistics service quality and customer satisfaction, limited empirical evidence exists regarding the specific dimensions of reverse logistics experiences that influence customer loyalty, and whether demographic factors such as gender moderate these relationships. This study addresses this gap by investigating the impact of returns policies, reverse logistics efficiency, and customer satisfaction on customer loyalty among online consumers.

1.2 Scope of the Study

The scope of this research is to examine the effects of returns and reverse logistics on customer loyalty by considering the demographic characteristics (age, gender, income, education) of the target population and understanding consumer behavior toward return policies and reverse logistics processes. The study encompasses key considerations such as consumer understanding and perceived fairness of return policies, efficiency and convenience of reverse logistics operations, customer satisfaction derived from the return experience, and the subsequent impact on customer loyalty—comprising repeat purchase intentions and positive word-of-mouth communications. The research is conducted among 245 consumers who have experienced product returns and reverse logistics processes, utilizing primary data collected through structured questionnaires distributed via Google Forms during the period of February to May 2026.



1.3 Objectives

1. To examine demographic characteristics of the target population and customer attitudes toward returns, reverse logistics, and their impact on customer loyalty.
2. To explore the influence of multiple factors, including returns policies, reverse logistics efficiency, and customer satisfaction on customer loyalty.

1.4 Hypothesis

H₀₁: There is no significant relationship between Gender and Customer Attitude toward returns and reverse logistics

H₀₂: There is no significant relationship between Gender and Factors of Returns and Reverse Logistics

II. LITERATURE REVIEW

2.1 Theoretical Foundations of Reverse Logistics

Reverse logistics has gained substantial scholarly attention as organizations recognize its strategic importance in supply chain management. Bielecki examines reverse logistics as a critical enabler of circular economy transitions, identifying the conditions, practices, and factors that influence its effective implementation when companies adopt circular economy principles [7]. The research demonstrates that reverse logistics operations extend beyond simple returns management to encompass broader sustainability objectives and resource optimization.

Sarkis and Jahanafroozi investigate how operations research and optimization techniques, particularly routing and location models, can enhance reverse logistics efficiency and sustainability, supporting circular economy goals [8]. Their findings suggest that mathematical optimization approaches can significantly improve reverse logistics performance while simultaneously reducing environmental impact.

The integration of advanced technologies in reverse logistics represents a growing research area. Schneikart and Mayrhofer examine how generative artificial intelligence can be applied to

improve reverse logistics processes and support closed-loop supply chains [9]. Their review of recent scientific research identifies promising generative artificial intelligence use cases and assesses their potential impact on sustainability and circular economy objectives.

2.2 Reverse Logistics and Supply Chain Efficiency

Kanagala et al. examine how reverse logistics activities affect the effectiveness of pharmaceutical supply chains, focusing on pharmaceutical wholesalers and distributors [10]. Using multiple regression analysis, their research reveals significant relationships between reverse logistics practices and supply chain efficiency in the pharmaceutical sector, highlighting sector-specific considerations in reverse logistics implementation.

Vanitelli analyzes the impact of logistics planning on companies responsible for generating hazardous waste in chemical manufacturing processes [11]. The study emphasizes the relevance of reverse logistics for environmental preservation from a sustainability perspective, demonstrating the cross-sectoral applicability of reverse logistics principles.

Moreira et al. investigate the role of artificial intelligence in green reverse logistics, analyzing how artificial intelligence applications in solid waste management enhance the efficiency and effectiveness of reverse logistics operations while promoting environmental sustainability through reuse, recycling, and remanufacturing [12]. Their findings underscore the potential of technological innovation to advance both operational and environmental objectives in reverse logistics.

2.3 Customer Loyalty and Logistics Service Quality

Ko explores how logistics service quality influences perceived sustainability, logistics value, and customer loyalty, utilizing the Coupang platform as a case study [13]. The research contributes to logistics and sustainability literature by proposing an integrated framework linking service quality, sustainability perception, value, and loyalty. It addresses limitations of SERVQUAL by reframing logistics service quality dimensions for digital logistics platforms, offering



both theoretical contributions and practical guidance.

Surakhman et al. examine the limitations of satisfaction-based loyalty models by investigating the fundamental role of trust in shaping customer loyalty within B2B service markets [6]. Their research assesses whether service quality and price perception remain effective drivers of customer loyalty in long-term, high-value business relationships, revealing the primacy of trust in B2B loyalty formation.

Manatunga et al. analyze logistics service quality in omni-channel purchasing scenarios, considering four dimensions: timeliness, availability, condition, and product returns [14]. Their assessment of the impact of these dimensions on customer loyalty provides insights into the multifaceted nature of logistics service quality in contemporary retail environments.

2.4 Returns Management and Customer Retention

Ogunleye analyzes the potential impact of return policies on customer loyalty and satisfaction in e-retailing environments [15]. The research establishes that return policies can improve customer service to secure repeat patronage and create long-term relationships essential for business growth. Loyalty is defined as the individual intention to repurchase products from a particular retailer, emphasizing the need for e-retailers to understand customer online shopping drivers to benefit from customer loyalty.

Ardra et al. address the gap in understanding the dual role of reverse logistics in achieving sustainability while enhancing customer satisfaction and loyalty [1]. Their findings reveal that efficient reverse logistics systems enhance customer satisfaction through seamless returns, contributing 58.82% to overall satisfaction. This substantial contribution underscores the importance of reverse logistics in the customer experience ecosystem.

Mimi and Huang demonstrate that customer loyalty can be improved by enhancing the quality of takeout O2O logistics services [4]. Through comprehensive survey analysis, their research identifies timeliness, convenience, and empathy for

logistics services as three factors with significant impact on customer loyalty. These findings provide empirical support for the multi-dimensional nature of logistics service quality.

III. METHODOLOGY

This research employed a descriptive research methodology to systematically examine the relationships between returns policies, reverse logistics efficiency, customer satisfaction, and customer loyalty through numerical data analysis. The descriptive approach was selected to effectively quantify and describe consumer perceptions and attitudes toward returns management and reverse logistics processes, enabling a comprehensive understanding of how these factors influence customer loyalty. The study was conducted across the state of Kerala, capturing responses from diverse consumer segments who had experienced e-commerce transactions and returns processes. Convenience sampling, a non-probability sampling technique, was employed wherein participants were selected based on their availability and willingness to participate across various districts of Kerala. This approach was appropriate given the exploratory nature of the research and the need for accessible data collection, yielding a sample of 245 consumers who had experienced product returns and reverse logistics processes.

Primary data was collected through a structured questionnaire distributed via Google Forms, encompassing demographic questions and Likert-scale items measuring attitudes toward returns, reverse logistics efficiency, and customer loyalty. The questionnaire was circulated among consumers across Kerala through various online platforms and social media channels to ensure diverse representation. Secondary data was gathered from books, academic journals, and internet sources to support the theoretical framework. Statistical analysis was conducted using SPSS, employing percentage analysis, bar diagrams, pie charts, chi-square tests to examine relationships between gender and attitudes, correlation analysis to assess variable relationships, and factor analysis to identify underlying dimensions of reverse logistics experiences. The study was conducted from February 2026 to May 2026, allowing sufficient



time for comprehensive data collection, analysis, and interpretation of findings.

IV. RESULTS AND DISCUSSION

4.1 Demographic Characteristics

Table 1: Age Distribution of Respondents		
Age Group	n	%
Below 18	20	8%
18 - 24	154	63%
25 - 34	42	17%
35 - 44	5	2%
45 and Above	24	10%
Gender		
Male	162	66%
Female	76	31%
Prefer Not to Say	5	2%
Others	2	1%
Income Level		
Below 25,000	140	57%
25,000 – 50,000	42	17%
51,000 – 75,000	37	15%
76,000 – 1,00,000	15	6%
Above 1,00,000	12	5%
Education Level		
High School	20	8%
Undergraduate	86	35%
Postgraduate	123	50%
Doctorate	10	4%
Others	7	3%

Note: Sample size =245

The demographic analysis reveals that the sample predominantly consists of young adults aged 18-24 years (63%), indicating that the study captures perceptions primarily from the younger, digitally-savvy consumer segment that actively engages in e-commerce. Gender distribution shows a male majority (66%), while the income profile indicates that most respondents (57%) fall in the below ₹25,000 category, reflecting the typical student or early-career demographic. Educational attainment is notably high, with 50% holding postgraduate qualifications and 35% undergraduate degrees, suggesting an educated sample capable of critically evaluating returns policies and reverse logistics processes. This demographic composition aligns well with the active e-commerce consumer base in Kerala, providing relevant insights into how educated young consumers perceive the relationship between returns management and customer loyalty. The findings suggest that the sample is appropriately positioned to offer meaningful perspectives on returns experiences, though caution should be exercised in generalizing findings to older or higher-income consumer segments.

4.2 Key Attitudinal Findings

Table 2: Key Attitudinal Responses			
Statement	Agree/Strongly Agree	Neutral	Disagree/Strongly Disagree
1. Often check return policies before online purchases	37%	31%	32%
2. Feel more confident with reliable return policy	59%	21%	20%
3. Would recommend brand with positive return experience	55%	24%	21%
4. Returns impact loyalty to brand/retailer	48%	25%	27%
5. Hassle-free returns build loyalty	43%	24%	33%
6. Clear reverse logistics info increases repurchase	64%	19%	17%
7. Fast/efficient reverse logistics affects loyalty	55%	28%	17%
8. Poor return experience decreases repurchase	53%	28%	19%
9. Free returns and easy logistics expected	54%	28%	18%
10. Easy returns increase likelihood of repurchase	52%	25%	23%
11. Transparency and efficiency build trust	51%	25%	24%

The attitudinal findings reveal that consumers overwhelmingly value reliable return policies, with 59% expressing greater purchase confidence when such policies exist, while 64% affirm that clear reverse logistics information increases their repurchase intentions, underscoring the critical importance of transparency in building customer loyalty. A substantial majority of respondents (55%) indicate that positive return experiences would lead them to recommend brands to others, demonstrating the significant role of returns management in driving word-of-mouth promotion and brand advocacy. The data further shows that 53% of consumers acknowledge that a poor returns experience would decrease their likelihood of shopping again, while 54% consider free returns and hassle-free logistics as standard expectations, indicating that these features have become essential rather than value-added services. Notably, while 48% agree that returns processes significantly impact loyalty, 52% confirm that easy returns directly influence their repurchase decisions, and 51% associate transparent and efficient systems with trust-building, collectively highlighting that reverse logistics serves as a strategic differentiator in competitive e-commerce markets.

However, the presence of neutral responses ranging from 19% to 31% across various statements suggests that a considerable segment of consumers remains undecided or conditional in their attitudes, indicating opportunities for retailers to convert these neutral consumers into loyal customers through superior returns experiences.



4.3 Chi-Square Test : Gender and Customer Attitude/Factors of Returns and Reverse Logistics

Hypothesis :

1. H_{01} : There is no significant relationship between Gender and Customer Attitude toward returns and reverse logistics
2. H_{02} : There is no significant relationship between Gender and Factors of Returns and Reverse Logistics

Table 3: Chi-Square Test Results for Gender and Customer Attitude/Factors of Returns and Reverse Logistics

Hypothesis	Variable 1	Variable 2	Pearson Chi-Square Value	df	p-value	Result
H_{01}	Gender	Customer Attitude to Returns and Reverse Logistics	40.903	36	0.264	No significant relationship
H_{02}	Gender	Factors of Returns and Reverse Logistics	74.389	96	0.95	No significant relationship

Note: $n < .05$.

A chi-square test of independence was performed to examine the relationship between gender and customer attitude toward returns and reverse logistics. The relationship between these variables was not significant, $\chi^2(36, N = 245) = 40.903$, $p = .264$. A second chi-square test was conducted to examine the relationship between gender and factors of returns and reverse logistics. The relationship between these variables was not significant, $\chi^2(96, N = 245) = 74.389$, $p = .950$. These findings suggest that gender does not significantly influence consumer attitudes toward returns and reverse logistics or perceptions of the underlying factors of reverse logistics.

Male and female consumers demonstrate comparable attitudes and value similar attributes in returns experiences, including convenience, transparency, processing speed, and procedural simplicity. The absence of gender-based differentiation implies that organizations need not develop gender-segmented approaches to returns management, as the fundamental drivers of customer satisfaction and loyalty operate uniformly across gender categories.

Retailers can therefore adopt standardized returns policies and reverse logistics frameworks that prioritize universal service excellence without

demographic customization. Consequently, businesses should focus their resources on enhancing the overall quality of reverse logistics experiences for all consumers rather than tailoring strategies based on gender considerations.

4.4 Correlation Analysis: Correlation Between Customer Attitude and Reverse Logistics Factors

Table 4: Correlation Between Customer Attitude and Reverse Logistics Factors

Variable	N	Customer Attitude	Reverse Logistics Factors
Customer Attitude	245	1	.890**
Reverse Logistics Factors	245	.890**	1

Note: ** indicate Correlation is significant at the 0.01 level (2-tailed).

A Pearson product-moment correlation coefficient was computed to assess the relationship between customer attitude toward returns and reverse logistics and the extracted factors of returns and reverse logistics. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. There was a strong, positive correlation between the two variables, $r(243) = .890$, $p < .001$, with higher levels of positive customer attitudes associated with more favourable perceptions of reverse logistics factors. The coefficient of determination indicated that customer attitudes accounted for approximately 79.2% of the variance in reverse logistics factor perceptions.

The magnitude of this correlation substantially exceeds Cohen's conventional threshold for a large effect size, $r = .50$, suggesting a practically significant relationship [16]. These findings provide compelling evidence that consumers' overall attitudes toward returns processes are closely aligned with their perceptions of specific reverse logistics attributes, including convenience, transparency, speed, efficiency, and procedural simplicity. The interconnected nature of these variables suggests that improvements in returns processes are likely to correspond with enhanced perceptions across multiple dimensions of reverse logistics, reinforcing the importance of comprehensive approaches to returns management in building customer loyalty.



4.5 Factor Analysis: To Explore the Influence Of Multiple Factors, Including Returns Policies, Reverse Logistics Efficiency, And Customer Satisfaction On Customer Loyalty.

The Kaiser-Meyer-Olkin measure of sampling adequacy was computed to evaluate the appropriateness of the data for factor analysis. The obtained KMO value of .951 substantially exceeds the recommended threshold of .60 and falls within the “marvelous” range according to Kaiser’s criteria, indicating that the patterns of correlations among the eight reverse logistics items were relatively compact and should yield distinct and reliable factors [17].

Bartlett’s test of sphericity was also conducted to examine whether the correlation matrix was significantly different from an identity matrix. The test yielded a significant result, $\chi^2(28) = 2394.97$, $p < .001$, rejecting the null hypothesis that the variables were uncorrelated in the population. This significant result confirmed that sufficient correlations existed among the variables to proceed with factor analysis, as the presence of substantial intercorrelations is a fundamental prerequisite for the extraction of meaningful factors.

Table 5: Pattern Component Matrix, Eigen Values and Total Variance Percentage for Components obtained by Principal Component Analysis with Varimax Rotation Method

Variables	Component		
	1	2	3
The convenience of the return process directly influences decision to continue purchasing	0.786		
The returns process has a significant impact on loyalty to brand/retailer	0.739		
Efficiency and speed of reverse logistics influence loyalty	0.647		
More likely to remain loyal with hassle-free returns	0.605		
Trust companies with efficient and transparent reverse logistics		0.791	
Expect free returns and easy reverse logistics		0.727	
Would continue purchasing with clear reverse logistics policies		0.668	
Poor returns experience decreases likelihood of shopping again			0.865
Eigen values	4.73	2.2	1.07
Percentage of total variance	47.3	22	10.7

Note: Factor loadings <0.35 have been omitted from the table.

Principal component analysis with varimax rotation was performed on the eight reverse logistics items, yielding three components with eigenvalues exceeding 1.0. Factor loadings below .35 were omitted from the interpretation to maintain clarity and focus on meaningful item-factor relationships. The three-component solution collectively explained 80.0% of the total variance in the data, indicating a parsimonious yet

comprehensive representation of the underlying constructs.

Factor 1: Direct Loyalty Impact of Returns demonstrated an eigenvalue of 4.73 and accounted for 47.3% of the total variance. This factor comprised four items with strong loadings: "The convenience of the return process directly influences decision to continue purchasing" (.786), "The returns process has a significant impact on loyalty to brand/retailer" (.739), "Efficiency and speed of reverse logistics influence loyalty" (.647), and "More likely to remain loyal with hassle-free returns" (.605). This factor captured the immediate and direct effects of reverse logistics experiences on customer loyalty decisions, emphasizing that operational aspects of returns management are directly linked to consumers' loyalty intentions.

Factor 2: Trust and Information Through Returns demonstrated an eigenvalue of 2.20 and accounted for 22.0% of the total variance. This factor comprised three items with loadings ranging from .668 to .791: "Trust companies with efficient and transparent reverse logistics" (.791), "Expect free returns and easy reverse logistics" (.727), and "Would continue purchasing with clear reverse logistics policies" (.668). This factor reflected the role of reverse logistics in building consumer trust and meeting expectations through transparency and information provision, highlighting that communication and reliability in returns processes contribute to enhanced consumer confidence and continued patronage.

Factor 3: Negative Returns Experience Consequence demonstrated an eigenvalue of 1.07 and accounted for 10.7% of the total variance. This factor consisted of a single item with a strong loading: "Poor returns experience decreases likelihood of shopping again" (.865). This distinct factor highlighted the particularly strong and isolated impact of negative returns experiences on customer defection, suggesting that poor reverse logistics outcomes represent a unique dimension of the consumer experience that warrants separate consideration from positive returns attributes. The presence of this distinct factor underscores the asymmetric nature of returns experiences, wherein negative encounters may have disproportionately



powerful effects on consumer behaviour compared to positive ones.

4.6 Discussion

The demographic profile of the sample reveals a predominantly young, educated consumer base, with 63% of respondents falling within the 18–24 age group and 50% holding postgraduate qualifications. This composition aligns with the active e-commerce consumer segment in Kerala, where digital literacy and online shopping adoption are notably high among younger populations. The attitudinal findings demonstrate that reverse logistics attributes significantly influence consumer behavior, with 64% of respondents affirming that clear information on reverse logistics policies increases their repurchase intentions, while 59% expressed greater purchase confidence when reliable return policies exist.

These findings corroborate the work of Ardra et al., who established that efficient reverse logistics systems enhance customer satisfaction through seamless returns, contributing substantially to overall satisfaction [1]. The substantial proportion of respondents indicating willingness to recommend brands following positive return experiences underscores the strategic importance of returns management in generating word-of-mouth advocacy, a finding consistent with Ogunleye, who emphasized that return policies capable of improving customer service can create long-term relationships essential for business growth [15]. The observation that a majority of consumers acknowledge that poor returns experiences would decrease their likelihood of repeat purchases highlights the asymmetric nature of returns satisfaction, wherein negative encounters exert disproportionately powerful effects on consumer behavior, supporting the theoretical framework proposed by Surakhman et al. regarding the fundamental role of trust in shaping customer loyalty [6].

The chi-square test results indicating no significant relationship between gender and customer attitudes or factors of returns and reverse logistics suggest that gender does not moderate consumer perceptions of reverse logistics, reinforcing the universality of service quality expectations across demographic categories. The strong positive

correlation between customer attitudes and reverse logistics factors provides compelling evidence that consumers' overall perceptions of returns processes are closely aligned with specific reverse logistics attributes, with customer attitudes accounting for a substantial proportion of the variance in reverse logistics factor perceptions.

This substantial correlation exceeds Cohen's threshold for large effect sizes, indicating a practically significant relationship with meaningful implications for retail strategy [16]. The factor analysis further elucidates the dimensional structure of reverse logistics experiences, revealing three distinct components that collectively explain the majority of the total variance. The first factor confirms that operational attributes including convenience, efficiency, and hassle-free processes directly influence loyalty intentions, aligning with the findings of Ko regarding the influence of logistics service quality on perceived value and loyalty [13]. The second factor highlights the relational dimension wherein transparency and clear communication build consumer confidence, consistent with Surakhman et al., who identified trust as a fundamental driver of customer loyalty in service relationships [6]. The third factor emerges as a distinct dimension emphasizing the isolated and powerful impact of negative returns experiences on customer defection, supporting the asymmetric response patterns observed in service quality literature.

These findings collectively suggest that reverse logistics has evolved from an operational necessity to a strategic priority, with transparent, efficient, and convenient returns processes serving as critical drivers of customer loyalty and sustainable business growth.

5. CONCLUSION

This study conclusively demonstrates that returns management and reverse logistics have evolved from peripheral operational functions to strategic imperatives that significantly influence customer loyalty in the e-commerce landscape. The findings reveal that consumers universally value convenience, transparency, efficiency, and reliability in returns processes, with these attributes collectively explaining a substantial proportion of variance in loyalty intentions across demographic



categories. The strong positive correlation between customer attitudes and reverse logistics factors, coupled with the identification of three distinct dimensional components—Direct Loyalty Impact of Returns, Trust and Information Through Returns, and Negative Returns Experience Consequence—provides empirical validation for the multi-faceted nature of reverse logistics experiences and their asymmetric effects on consumer behavior. The absence of gender-based differences in perceptions underscores the universality of service quality expectations, enabling organizations to adopt standardized, high-quality returns frameworks without demographic customization. Organizations that prioritize seamless, transparent, and customer-centric reverse logistics systems are better positioned to build lasting customer loyalty, enhance brand reputation, and achieve sustainable competitive advantage in the increasingly competitive e-commerce marketplace. Future research should explore the moderating effects of additional demographic variables, examine long-term customer lifetime value implications, conduct comparative analyses across different platforms and geographic regions, and investigate the role of emerging technologies such as artificial intelligence in enhancing reverse logistics efficiency and customer satisfaction.

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