A Review of the Multidimensional Impact of Return Policies on Pricing Strategies, Retailers, and Consumer Pricing Strategies

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Abstract. In electronic retailing, the implementation of effective return policies and proper return management is essential for improving customer retention. However, many retailers focus solely on one-time sales, which leads to decreased customer satisfaction and ultimately, customer attrition. This paper employs mathematical modeling to analyze the behavior of retailers and consumers under two scenarios: with and without return policies. It reveals how return policies influence retailers' optimal pricing strategies. Additionally, it summarizes the impact of return policies on retailers, consumers, and pricing strategies. From a retailer's perspective, flexible return policies in sales-promotional scenarios can enhance consumers' repurchase intentions. Moreover, reverse supply chains and partial refund strategies can help reduce costs and increase expected profits. From a consumer's perspective, satisfaction significantly impacts loyalty, and reducing return costs can increase order rates.

Keywords: Electronic Retailing, Return Policy, Reverse Supply Chain, Return Cost, Pricing

1 Introduction

The study of return policies and their impact on consumer behavior holds significant practical importance in today's retail environment. With the continuous growth of

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e-commerce, understanding the complexities of returns has become crucial for retailers aiming to enhance consumer satisfaction and operational efficiency. Effective return policies can not only mitigate financial losses associated with returns but also play a key role in fostering consumer trust and loyalty.

According to Vikram and Vaishali (2021), this paper includes the return policy implications for E-retailers, the handling of product returns, and the impact of return policy implications for customers and customer satisfaction and loyalty summarize the paper research in the past 20 years. The difference between Amazon's and Flipkart's return policies is also discussed. The research indicates that the strictness of return policies influences customer satisfaction and repurchase intentions from a consumer's perspective. From an E- retailer's perspective, while return policies can lead to financial losses, lenient and convenient return processes can increase profits under certain conditions. E-retailers need to balance the impact of return policies on consumer purchasing decisions and satisfaction with their own profitability to formulate appropriate return policies.

This paper provides detailed guidance for retailers and investigates pricing strategies in scenarios with and without returns. Section 2 uses mathematical modeling to explore the impact of returns on optimal pricing strategies for retailers under both scenarios. Section 3 summarizes the impact of return policies on retailers based on three factors: lenient vs. stringent return policies, reverse supply chains, and full vs. partial refunds. Section 4 discusses the impact of returns on consumers, considering satisfaction and return costs. Section 5 presents the paper's main conclusions and identifies important areas for further research.

2 The Impact of Returns on Retailers' Pricing

According to YJ Kuang & K Fu (2021), considering valuation uncertainty within the framework of the classic newsvendor model, it is assumed that a retailer facing random market demand (D) must determine the order quantity before customer demand is clarified. Consumers' decisions are assumed to be independent of each other. Additionally, it is assumed that ($\mu>c>s$), where consumer surplus comprises both economic surplus and negative utility due to regret.

2.1 Model Parameters

Table 1. Model Parameters

Symbol	Model Parameters
D	Random Market Demand
Q	Order Quantity
F(·)	Cumulative Distribution Function of Total Demand
S	Salvage Value
C	Marginal Cost
μ	Mean of Consumer Valuation
p	Sales Price
V	Consumer Valuation
G(·)	Continuous Function
t	Costs Borne by Consumers Due to Returns
α	Post-Purchase Regret Coefficient
β	Hesitation Regret Coefficient
r	Provision of Returns
γ	Degree of Regret
S_r	Expected Net Surplus
ω(γ)	Consumer Reservation Price
p_n^*	Retailer's Optimal Price
q_r^*	Optimal Order Quality
k	Return Cost Coefficient
π_n	Retailer's Profit

2.2 Modeling Retailers and Consumers

When Retailers Do Not Provide Returns

a）Modeling Consumers.

We assume that the retailer sells goods on a first-come, first-served basis and promptly removes items from the listing when they are out of stock. Under these conditions, when consumers decide to make a purchase, the expected net surplus is calculated as follows:

$$S_{n1} = E\{(V-p) - \alpha[\max\{V-p, 0\} - (V-p)]\} = E(V-p) + \alpha E(V-p)^{-} \#(1)$$

The expected net surplus when choosing not to purchase is

$$S_{n2} = E\{0 - \beta[\max\{V-p, 0\} - 0]\} = -\beta E(V-p)^{+} \#(2)$$

The difference in expected surplus between purchasing and not purchasing for the consumer is

$$\Delta S_n = (1+\beta)(\mu - p) + (\alpha - \beta)E(V-p)^{-} \#(3)$$

Let $\gamma = \frac{\alpha-\beta}{1+\beta}$, $\gamma > -1$. Τηερεφορε, τηε εξπρεσσιον φορ τηε εξπεχτεδ ρεμαινινγ διφφερενχε ισ

$$\frac{\Delta S_n}{1+\beta} = \frac{\gamma}{\alpha-\beta} \cdot [(1+\beta)(\mu-p) + (\alpha-\beta)E(V-p)^{-}] = \mu - p + \gamma E(V-p)^{-} \#(4)$$

$$\frac{\Delta S_n}{1+\beta} = \mu - p + \gamma R(p) \#(5)$$

Τηε ηιγηεστ πριχε τηατ χονσυμερσ αρε ωιλλινγ το παψ σατισφιεσ $\Delta\Sigma v = 0$, τηατ ισ:

$$\mu - \omega(\gamma) + \gamma R\big(\omega(\gamma)\big) = 0 \#(6)$$

b）Modeling for Retailers.

Let D represent the random demand in one period, with a mean of $\mu = E[D]$. If Q units are ordered, then $\min(Q, D)$ units are sold. The expected profit at this time can be expressed as:

$$\pi(Q) = pE\min(Q, D) + sE(Q-D)^{+} - cQ \#(7)$$

Using the fact that $E\min(Q, D) = ED - E(D-Q)^{+}$, the profit can also be expressed as:

$$\pi(Q) = (p-c)\mu - G(Q) \#(8)$$

Where $G(Q) = (c-s)E(Q-D)^{+} + (p-c)(D-Q)^{+} \geq 0$

We can view the problem of maximizing $\pi(Q)$ as the problem of minimizing the expected excess costs (costs incurred when inventory exceeds actual demand) and the expected shortage costs (costs incurred when inventory is less than actual demand) $G(Q)$.

$$G'(Q) = (c - s)\Pr(Q - D > 0) - (p - c)\Pr(Q - D > 0) \#(9)$$

When the derivative is 0, $F(Q) = \frac{p-c}{p-s} = \beta$.

$$Q^* = \inf\{Q \geq 0 : F(Q) \geq \beta\} \#(10)$$

Q^* is increasing in β, and if F is strictly decreasing, then $Q^* = F^{-1}(\beta)$.

When $\Delta G(Q) = h - (h + b)\Pr(D > Q)$ and $\lim_{Q\to\infty} \Delta G(Q) = h > 0$, the expression for the optimal solution is:

$$Q^* = \min\{Q \in \mathbb{N} : F(Q) \geq \beta\} \#(11)$$

c） Optimal Pricing for Retailers.

When the retailer's price is greater than the consumer's reservation price, market demand is 0; conversely, when the price is lower than the reservation price, the retailer will capture the entire market demand (D). The retailer aims to maximize their profit:

$$\pi_n = pE\min\{D, q\} + s[q - E\min\{D, q\}] - cq = (p - s)E\min\{D, q\} + (s - c)q \#(12)$$

$$= (p - s)[\int_0^q xf(x)\,dx + q(1 - F(q))] - (c - s)q$$

For the reason $\frac{\partial q_n^*}{\partial \gamma} = \frac{c-s}{(\omega-s)^2 f(q)} \cdot \frac{\partial \omega}{\partial \gamma}$.

$$\frac{\partial \pi_n}{\partial \gamma} = \frac{\partial \omega}{\partial \gamma}[\int_0^q xf(x)\,dx + q \cdot \frac{c-s}{\omega-s}] + (\omega - s)[qf(q) \cdot \frac{\partial q}{\partial \gamma} + \frac{c-s}{\omega-s} \cdot \frac{\partial q}{\partial \gamma} - q \cdot \frac{c-s}{(\omega-s)^2} \cdot \frac{\partial \omega}{\partial \gamma}] -$$

$$(c - s) \cdot \frac{\partial q}{\partial \gamma} = \frac{\partial \omega}{\partial \gamma}[\int_0^q xf(x)\,dx + q \cdot \frac{c-s}{\omega-s}] \leq$$

(13)

The retailer's expected profit decreases with the increase of γ.Therefore, the optimal price for consumers at this time is:

$$p_n^* = \omega(\gamma)\#(14)$$

When Retailers Offer Returns.

When retailers offer returns, the consumer's return cost is (t). Combining this with the newsvendor model, it is clear that consumers will face three scenarios when choosing to purchase the product.

$V > p$ results in a positive economic surplus and keeps the product;

$p - t < V < p$ results in a negative economic surplus and keeps the product;

$V < p - t$ results in a negative economic surplus and returns the product.

a）Modeling for Consumers

At this time, when consumers choose to make a purchase, the expected net surplus is:

$$S_{r1} = E(z) - \alpha E[\max\{0, z\} - z] = E(V - p) + \alpha(V - p)^- - (1 + \alpha)E[V - (p - t)]^-\#(15)$$

$$\Omega\eta\varepsilon\rho\varepsilon \qquad z = \max\{V, p - t\} - p \qquad (16)$$

When choosing not to make a purchase, the expected net surplus is:

$$S_{r2} = -\beta E(V - p)^+\#(17)$$

The differential expected surplus of whether the consumer makes a purchase is:

$$\frac{\Delta S_n}{1 + \beta} = \mu - p + \gamma R(p) - (1 + \gamma) \times R(p - t)\#(18)$$

When retailers offer returns, the consumer's reservation price satisfies $\Delta S_n = 0$

$$\mu - \omega(\gamma, t) + \gamma R\big(\omega(\gamma, t)\big) - (1 + \gamma) \times R(\omega(\gamma, t) - t) = 0\#(19)$$

When $t = 0$， $S_{r1} \geq S_{r2}$

When $t = p$, it is the same as the situation where returns are not allowed, with $\omega(\gamma, t) = \omega(\gamma)$.

When $0 < t < p$, $\omega(\gamma, t) > \omega(\gamma)$.

b）Modeling for Retailers.

Introducing a fixed return cost (k), the retailer's profit can be expressed as:

$$\pi_r = pG(p-t)E\min\{D,q\} + (s-k)G(p-t)E\min\{D,q\} + s(q - E\min\{D,q\}) - cq$$

$$= [(p-s+k)G(p-t) - k]E\min\{D,q\} - (c-s)q\#(20)$$

When $t = 0$, the retailer's profit is:

$$\pi_r = pG(p-t)E\min\{D,q\} + sG(p-t)E\min\{D,q\} + s(q - E\min\{D,q\}) - cq$$

$$= (p-s)G(p-t)E\min\{D,q\} - (c-s)q\#(21)$$

According to the expression for the retailer's profit, adding a separate return cost parameter (k) will not fundamentally change the nature of the retailer's decision-making. Therefore, the retailer's optimal price is:

$$p_0^* = \operatorname{argmax}(p-s)G(p-t)\#(22)$$

Since the retailer needs to ensure that $p \le \omega(\gamma, t)$, when the retailer's price is higher than the price consumers are willing to pay, market demand is zero; conversely, when the price is lower than the price consumers are willing to pay, the retailer can capture the entire market demand. Therefore, the optimal price at this time is:

$$p_r^* = \min\{p_0^*, \omega(\gamma, t)\}\#(23)$$

When $t = 0$, the consumer's return cost is 0, that is, the consumer's reserve price is equal to the maximum value of the product valuation, and all people entering this market will choose to buy. When $t = p$, the return cost to the consumer is equal to the price of the product. When $0 < t < p$, offering a return increases the consumer's reserve price.

$$\frac{dq_r^*}{d\gamma} = \frac{c-s}{[(\omega-s)G(\omega-t)]^2 f(q)} \cdot [G(\omega-t)-(\omega-s)g(\omega-t)] \cdot \frac{d\omega}{d\gamma} \quad (24)$$

Hypothesis$(p-s)G(p-t)$is unimodal function that$\omega(\gamma,t) < p_0^*$, so

$$G(\omega-t)-(\omega-s)g(\omega-t) > 0 \quad (25)$$

And because$\frac{d\omega(\gamma,t)}{d\gamma} < 0$, $\frac{dq_r^*}{d\gamma} < 0$, that is, the optimal order quantity is a decreasing function of γ.

2.3 Summary

When returns are not offered, the consumer's reservation price $\omega(\gamma)$ is a decreasing function of the degree of regret γ.

When $\gamma > 0$, p_n^* will always be lower than the optimal price when $\gamma = 0$. Consumers are affected by the increased regret of purchase, and the retailer's profit decreases as γ increases. When $\gamma < 0$, p_n^* will be greater than the optimal price when $\gamma = 0$. Consumers are affected by the decreased regret of purchase, and the retailer's profit increases as γ decreases.

When retailers offer returns, the consumer's reservation price $\omega(\gamma,t)$ is a decreasing function of the degree of regret γ and the return cost t. Compared to the scenario where returns are not offered, allowing returns raises the consumer's reservation price.

When $t = 0$, the consumer's return cost is 0, meaning the consumer's reservation price equals the maximum value of the product. All individuals entering this market will choose to purchase. When $t = p$, the consumer's return cost equals the product's price, at which point $\omega(\gamma,t) = \omega(\gamma)$. When $0 < t < p$, offering returns increases the consumer's reservation price.

When $p_0^* \le \omega(\gamma,t)$, the retailer's optimal price p_r^* is independent of the degree of regret γ. When $p_0^* > \omega(\gamma,t)$, the retailer's optimal price p_r^* is a decreasing function of the degree of regret γ. Since returns bring the retailer a recovery value below cost, a high return rate may harm the retailer's profit. Therefore, the retailer's optimal price is not necessarily equal to the consumer's reservation price.

In the case where the consumer's valuation V follows a uniform distribution $U[0,1]$, when $0 \leq t < 1-s$, there exists a critical value $\gamma(s,t)$. When $-1 < \gamma \leq \gamma(s,t)$, the retailer's optimal price is $p_r^* = p_0^*$; otherwise, the optimal price is $p_r^* = \omega(\gamma,t)$.

In the case where the consumer's valuation V follows a uniform distribution $U[0,1]$, when $0 \leq t < 1-s$, there exists a critical value $\gamma(s,t)$. When $-1 < \gamma < \gamma(s,t)$, the optimal price offering returns is lower than the optimal price without returns, that is, $p_r^* < p_n^*$; otherwise, $p_r^* \geq p_n^*$.

3 The Impact of Return Policies on Retailers

Table 2. The impact of returns on retailers

Influencing factor	Main conclusion
Lenient Return Policies & Strict Return Policies	In the scenario where sales are achieved through sales promotion by sales personnel, the loose return policy can better enhance the willingness of consumers to buy back, and in the scenario without sales promotion, the restrictive return policy is more effective.
Reverse supply chain	Reverse supply chains can reduce costs by optimizing the way returns are handled.
Full refund & partial refund	The partial refund policy can effectively increase the expected profit and inventory through replenishment fees or non-refundable exchange fees, while the full refund policy is suboptimal in some cases.

3.1 Lenient Return Policies & Strict Return Policies

Kim and Wansink (2012) explore how sales recommendations (the extent to which participants felt influenced by those recommendations) and return policies influence consumer decision-making and repurchase intentions. The study emphasizes the psychological factors, particularly counterfactual thinking, where consumers reflect on alternative outcomes of their purchase decisions and how these thoughts interact with different return policies.

Sales Recommendations and Return Policies

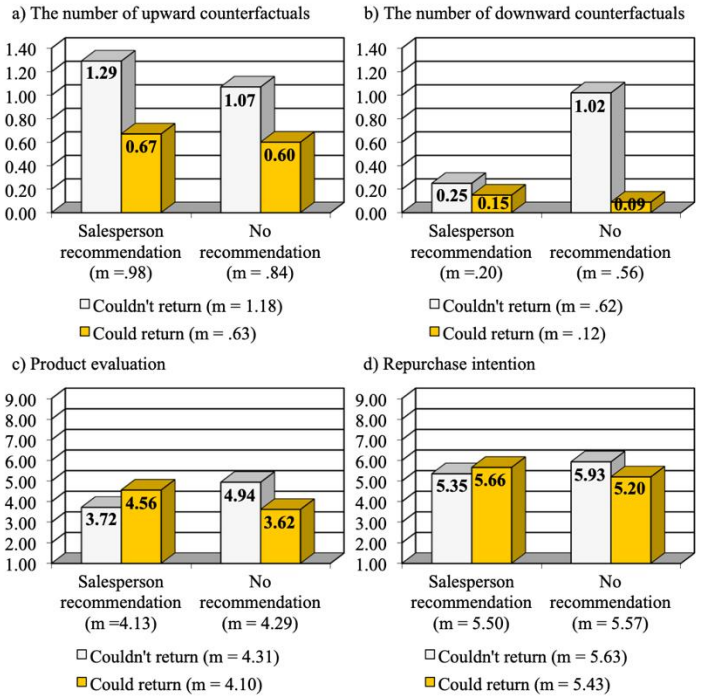
According to Kim and Wansink (2012), the presence or absence of salesperson recommendations plays a crucial role in shaping consumer intentions to repurchase,

especially when coupled with different types of return policies. The study explores how these factors interact to influence consumer behavior in the context of a retail purchase. The findings can be summarized as follows:

3.2 Impact of Sales Recommendations on Repurchase Intentions

Salespeople often provide advice to consumers about the performance, characteristics, and appropriate use of products during the purchasing process. The study shows that when sales recommendations are made, consumers are more likely to experience confidence in their purchase, and therefore, repurchase intentions under a lenient return policy are significantly higher than under a restrictive return policy.

This suggests that sales recommendations create a sense of security, making consumers feel more justified in their purchase, thus reducing any hesitations or negative feelings that might arise if the return policy is restrictive.



The chart shows that the interaction between sales recommendations and return policies affects consumers' re-purchase intention. Under a lenient return policy, re-purchase intention is higher, especially when sales recommendations are present

(score 6.5). Without recommendations, it's still relatively high (score 5.5), as the lenient policy boosts confidence. Under a strict return policy, re-purchase intention drops significantly, especially with sales recommendations (score 4), due to increased perceived risk and consumer dissatisfaction. Without recommendations, the score is slightly lower (score 5), but the impact is less severe. In summary, lenient return policies boost confidence and re-purchase intention, especially with recommendations, while strict return policies lower re-purchase intention, especially when recommendations are given.

3.3 Effect of Return Policies on Repurchase Intentions

Under a lenient return policy, consumers are more likely to feel comfortable with their purchase decision and are more willing to return products if needed, knowing they can easily undo a perceived mistake. On the other hand, under a restrictive return policy, the perceived risk of an unsatisfactory purchase is heightened. This leads to lower repurchase intentions when combined with salesperson recommendations, as consumers may feel trapped or dissatisfied if the product does not meet their expectations.

Psychological Mechanisms: Counterfactual Thinking and Consumer Behavior.

An important psychological concept discussed in the study is counterfactual thinking, where consumers reflect on alternative purchase scenarios and outcomes. Counterfactual thoughts can significantly influence consumer satisfaction and the likelihood of repurchase. Kim and Wansink (2012) suggest that the type of return policy moderates how these thoughts are experienced, particularly in the context of consumer guilt, embarrassment, and frustration.

Counterfactual Thinking in the Presence of Sales Recommendations.

When retailers promote a product through recommendations, consumers may experience negative counterfactual thinking if the product fails to meet their expectations. In this case, consumers are likely to attribute their dissatisfaction to the salesperson's recommendations, leading to feelings of anger or frustration. In such scenarios, a lenient return policy is particularly effective in alleviating negative psychological impacts, as it provides consumers with the opportunity to return the product, thus mitigating the emotional discomfort associated with a failed purchase.

3.4 Counterfactual Thinking in the Absence of Sales Recommendations

In contrast, when no recommendations are made by salespeople, consumers may be more inclined to attribute any dissatisfaction to their own decision-making mistakes. This can lead to feelings of guilt and embarrassment. The study suggests that under these conditions, a restrictive return policy may be more appropriate, as it reinforces the consumer's personal responsibility for their purchase decision. Consumers who feel accountable for their purchase errors may experience less negative emotional fallout when faced with a restrictive return policy, as they internalize the blame rather than externalizing it onto the retailer.

Experimental Design and Findings.

The paper employs analysis of variance (ANOVA) to determine the interactions and main effects among various variables. In the study, the authors recruited 128 participants from an undergraduate core business course at a university. Participants were taken to a local shopping mall to shop at a discount suit store and choose between two suits. They completed a survey that included evaluations of their purchased suits and inquiries about their purchase intentions. One retailer accepted returns under all conditions, representing a lenient return policy, while another retailer accepted returns only for suits with quality defects, representing a restrictive return policy. The study found that the manipulated mean under salesperson recommendations (the extent to which participants felt influenced by those recommendations) was significantly higher than that under non-recommendation conditions. Moreover, the manipulated mean under lenient return conditions was higher than that under restrictive return policy conditions.

3.5 Summary

Salesperson recommendations boost consumer confidence, making lenient return policies more effective for increasing repurchase intentions. Without recommendations, restrictive return policies are more effective by reinforcing personal responsibility for purchase decisions. Retailers should tailor return policies based on salesperson involvement:

Lenient policies work best when recommendations are given.

Restrictive policies are better when recommendations are minimal or absent.

4 Reverse Supply Chain

According to Min et al. (2006), reverse supply chain provides companies with significant competitive advantages. Reverse supply chain management mainly involves the process of returning products from consumers to retailers, usually including returns, remanufacturing, recycling and reuse. The goal is to effectively manage returns and waste in order to reduce resource waste and environmental pollution, while enhancing the economic efficiency of enterprises. By optimizing costs in these areas, companies can mitigate the negative impact of returns, turning it into a competitive advantage, thereby improving the efficiency and profitability of the overall supply chain.

4.1 Traditional Concepts and Challenges of Reverse Supply Chain

Traditionally, product returns have been seen as an unavoidable cost of doing business. Many businesses view the cost of returns (which includes the various expenses and losses incurred by consumers returning goods, such as shipping costs, repackaging costs, inventory management costs, markdown sales, and losses from not being able to sell) as "part of doing business" and consider these costs to be uncontrollable or unavoidable. This perception often leads companies to overlook opportunities to reduce costs in the return processing process.

Background of The Rising Cost of Returns. As market competition intensifies and profit margins shrink, the cost of product returns is increasing significantly. In this case, the handling of returns can be optimized with the following strategies:

Use economies of scale to reduce shipping costs: By setting up dedicated collection points, use economies of scale to reduce the per-piece cost of shipping returns. Economies of scale refers to the reduction in unit costs due to an increase in the scale of production or operations.

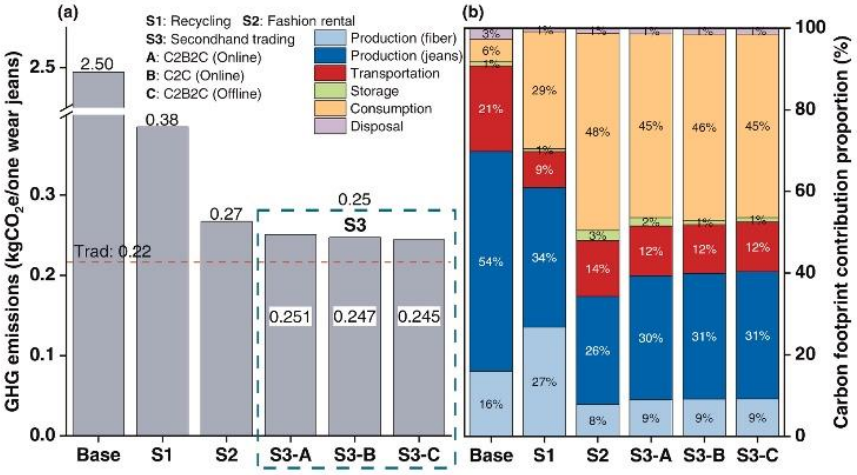
Improve customer convenience: Set up multiple return points in areas where customers are concentrated to reduce travel time for consumer returns and enhance customer experience.

Reduce the carrying cost of in-transit inventory: In-transit inventory refers to the inventory of goods that have been shipped but have not yet reached their final destination. Managing this inventory involves logistics costs, insurance costs, storage

expenses, etc. Since the cost of holding inventory in transit is directly related to the transportation time of returns, choosing a faster mode of transportation is an important strategy to optimize transportation costs.

Reverse Supply Chain Network Design and Optimization. Min et al. (2006) proposed that the network design of reverse supply chain can be optimized by establishing a nonlinear mixed integer programming model and using genetic algorithm (optimization technology that simulates biological evolution process) to identify the optimal solution. Reverse supply chain network design includes planning and designing return and recycling logistics systems and strategies to effectively manage and process consumer returned goods, including return, repair, remanufacturing, remarketing and recycling.

Environmental Protection and Sustainable Development. The study of Li et al. (2024) reveals the significant impact of fast fashion consumption on the environment, especially in the transportation and production links. They highlight that up to 90 percent of carbon emissions can be reduced by adopting mitigation strategies such as secondary transactions, showing that promoting sustainable reverse logistics practices in the fast fashion industry is critical to reducing the overall carbon footprint.



This chart explores in depth the carbon reduction potential of the fast fashion industry in different product service system related scenarios, in particular the

potential to reduce carbon emissions by optimizing the reverse supply chain. The chart consists of two parts:

(a) Per-wear Carbon Footprint of Global Jeans Supply Chain:

This section compares the carbon footprint under the Base scenario and three strategies: S1 (recycling), S2 (fashion rental), and S3 (second-hand trading). The baseline is 2.50 kg CO2e, which drops to 0.38 kg CO2e for S1, and to 0.251, 0.247, and 0.245 kg CO2e for the sub-scenarios of S3 (S3-A: C2B2C online, S3-B: C2C online, S3-C: C2B2C offline).

(b) Proportion of Lifecycle Process Emissions:

In the baseline scenario, production (fiber and jeans) contributes 88% of the carbon footprint. Strategies S1, S2, and S3 reduce this significantly, especially S3, which lowers production emissions by promoting second-hand trading. Transport and storage emissions also decrease under S3 due to reduced need for new product transport.

Overall, Optimizing the reverse supply chain through strategies like recycling, fashion rental, and second-hand trading can significantly reduce carbon emissions. Second-hand trading, in particular, reduces new production, transport, and storage emissions, offering great potential for carbon reduction in fast fashion.

4.2 Summary

The key to optimize the reverse supply chain is to reduce the waste of returns and waste management resources and improve economic efficiency. The cost of returns can be effectively reduced by using economies of scale to reduce transportation costs, increase convenience of returns and optimize in-transit inventory management. Reverse supply chain network design improves recycling efficiency through technical optimization, especially in remanufacturing and second-hand transactions. Promoting sustainability is particularly important in the fast fashion industry, where the optimization of reverse supply chains, especially secondary transactions, can significantly reduce carbon emissions, thereby driving environmentally friendly and sustainable practices.

5 Full Refunds and Partial Refunds

5.1 Limitations of the Full Refund Policy

A full refund policy, while seemingly generous to consumers, is not necessarily the best option in a low cost or high transaction risk scenario. Retailers often offer return guarantees (a service or policy offered by retailers that allows consumers to return products within a specified period in exchange for refunds or exchanges if they are dissatisfied or discover issues) to reduce the risk to the consumer, particularly functional risk (the product does not perform as expected) and time risk (the cost of time during the return process). However, while a full refund can eliminate downside risk for consumers, it doesn't necessarily improve supply chain efficiency. Supply chain efficiency involves the entire product circulation process from raw material supplier to final consumer, and full refund policies can lead retailers to increase inventory excessively, especially when the recycling value of returned goods is low.

5.2 The Impact of Return Policy on Retailers' Profits

When a full refund policy is implemented, the risk to consumers is virtually zero, as they can request a return at any time and receive a full refund. In this case, consumers are usually more willing to buy the product. However, while sales may increase, retailers' pure sales may not be profitable, especially if the value of the returned goods is low. For low-cost items, sellers are able to purchase more inventory at lower prices, but retailers may face losses if the item is returned with a lower value.

5.3 Advantages of Partial Refund Policy

Compared to full refunds, a partial refund policy (i.e. the refund amount is less than the price of the product) has significant advantages in improving profitability and inventory management. Partial refunds allow the refund difference (product price minus refund amount) to be used for cost estimation and market analysis (estimating potential profits over a given future period) to optimize the retailer's inventory management and pricing strategy. This strategy helps distribute goods better, boosts expected profits, and encourages retailers to build inventory. In this way, retailers are able to balance inventory and ordering costs while maximizing profits, ensuring market demand is met and minimizing total costs.

5.4 Core Functions of Return Guarantee

The main purpose of the return guarantee is to enhance consumer confidence in purchasing and reduce the risk of consumers in purchasing. For consumers, purchase risks often arise from uncertainty about product quality, including issues such as functional defects, non-conformity with expectations, or product inapplicability. A return guarantee policy reduces potential purchase resistance by providing an assurance that consumers feel more confident in the face of uncertainty.

5.5 Return Policy and Consumer Risk Perception

Risks to consumers include whether the purchased product meets expectations, whether it is defective or suitable. A return guarantee can effectively reduce these uncertainties, thereby reducing consumers' perception of risk and facilitating purchasing decisions. By offering a return guarantee, retailers are not only able to reduce consumer concerns when making a purchase decision, but also enhance brand credibility and customer loyalty.

5.6 Summary

According to a study by Xuanming (2009), although a full-refund policy may seem generous, it may not improve supply chain efficiency in a low-cost or high-transaction risk environment, and retailers may face losses when the value of returned goods to be recycled is low, and increased sales volume does not necessarily translate into profit. In contrast, the partial refund strategy can improve the retailer's expected profit by optimizing cost estimation and market analysis, and encourage the increase of inventory, so as to balance the cost of inventory and order, and ensure that market demand is met. In addition, as an effective means to reduce consumers' risk perception, return guarantee can enhance consumers' purchase confidence, reduce uncertainty, and promote purchase decisions, thus enhancing brand loyalty. Therefore, retailers should fully consider these factors when formulating return policies to optimize profits and meet consumer demand.

6 Factors Affecting the Impact of Returns on Consumers

Table 3. .Factors Affecting the Impact of Returns on Consumers

Influencing Factors	Main Conclusions
Satisfaction	Customer satisfaction significantly influences customer loyalty, and service quality is a prerequisite for enhancing customer satisfaction, thereby indirectly increasing customer loyalty.
Return Costs	Reducing return costs will increase order rates, providing positive value for both consumers and retailers.

6.1 Satisfaction

According to Vesel and Zabkar (2009), customer satisfaction is defined as the evaluation of how well a store or product meets or exceeds customer expectations after purchase. Satisfaction plays a critical role in fostering customer loyalty, which refers to the ongoing purchasing and supportive behavior of customers toward a specific brand, product, or service. This behavior reflects their trust, satisfaction, and propensity to repurchase. Satisfaction is a prerequisite for loyalty, as it significantly increases the likelihood of continued customer engagement and retention.

6.2 Impact of the COVID-19 Pandemic on Consumer Behavior

Recent research by Diaz-Gutierrez et al. (2023) highlights a significant shift in consumer behavior due to the rise of online shopping during the COVID-19 pandemic. Their study reveals that 75% of new online shoppers expect to continue purchasing online post-pandemic, indicating a permanent change in shopping preferences. Importantly, these consumers now expect more flexible and lenient return policies. This shift in expectations underscores the growing importance of return policies in consumer satisfaction, which directly influences customer loyalty.

6.3 The Role of Service Quality in Enhancing Customer Satisfaction

Satisfaction functions as a mediator between service quality and customer loyalty. Service quality refers to consumers' assessments of a company's performance and capabilities, including areas such as technical support and customer service. Service

quality is a prerequisite for satisfaction, as it directly influences how satisfied consumers feel with their experiences. By improving service quality, companies can enhance customer satisfaction, which in turn drives customer loyalty. This relationship highlights the critical need for companies to continually meet or exceed customer expectations in all aspects of service delivery.

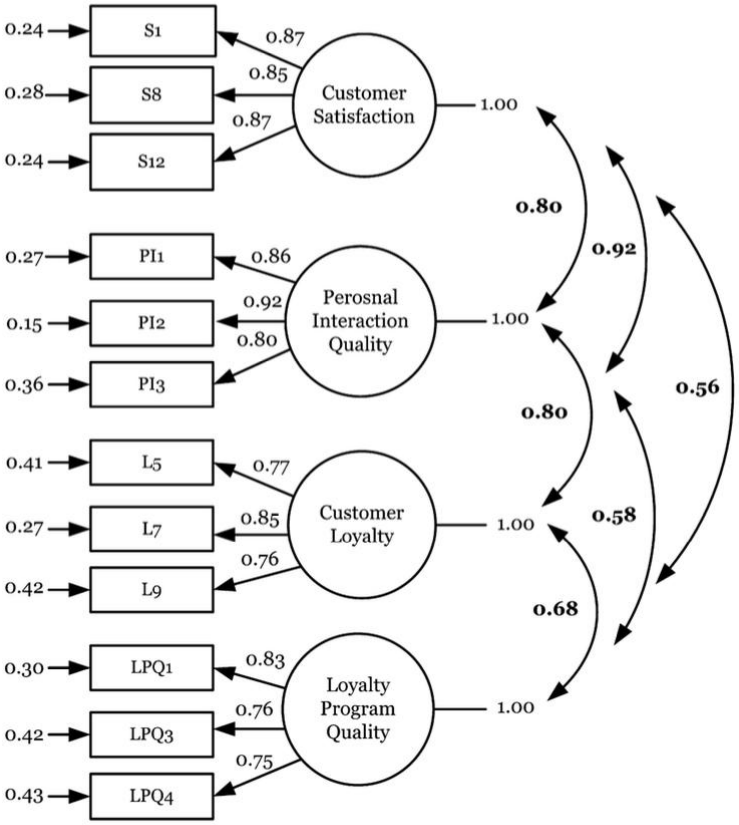


Fig. 1. Measurement model.

The graph shows the relationship between service quality, customer satisfaction, and customer loyalty, emphasizing the central role of service quality in improving satisfaction and loyalty. Individual interaction quality and loyalty program quality in the figure, as key dimensions of service quality, significantly affect service quality through multiple high path coefficient indicators (e.g. P1 to 0.92 of personal interaction quality and LPQ1 to 0.83 of loyalty program quality). Personal interaction quality and loyalty program quality directly increase customer satisfaction and loyalty through path coefficients (0.86 and 0.68, respectively). At the same time, the strong

correlation between customer satisfaction and loyalty (path coefficient of 0.80) further highlights the promotion effect of satisfaction on loyalty. Overall, the model shows that optimizing service quality can effectively improve customer satisfaction and loyalty, helping companies gain an edge over the competition.

The Risk of Customer Betrayal Despite Satisfaction. However, customer satisfaction alone is not enough to guarantee loyalty. Even satisfied customers may exhibit "betrayal" if they perceive that a competitor offers better value, convenience, or quality. This phenomenon occurs when customers feel that their expectations can be better met elsewhere. To prevent customer defection, retailers must focus on more than just satisfaction; they should offer superior products and services, as well as implement effective communication and feedback mechanisms that enhance customer retention.

Study Methodology and Findings. This study developed a comprehensive service quality scale with eight items based on the work of Too et al. Data analysis was performed using LISREL 8.72 software, which facilitates structural equation modeling and path analysis. The study involved 116 club members and 416 telephone interviews. The findings confirm that service quality is a key driver of customer satisfaction, which subsequently enhances customer loyalty. The study concludes that improving service quality is crucial for boosting both customer satisfaction and loyalty.

6.4 Return Costs

Anderson, Hansen, and Simester (2009) explore how reducing return costs can lead to increased purchase rates, which benefits both consumers and retailers. The study highlights that lowering return-related barriers encourages consumers to make purchases more frequently and confidently, as they face fewer risks related to returns. For retailers, this results in higher sales volumes and profitability, making the return policy an essential factor in their overall pricing strategy.

Return Costs and Purchase Rates. Reducing return costs is shown to directly increase average purchase rates, meaning consumers are more likely to buy products and return them at a higher frequency. This reduction in return costs lowers the

perceived risk of purchasing for consumers, as they can easily return items that don't meet their expectations. From the retailer's point of view, a lower return cost translates into increased sales, as consumers are more likely to engage in purchases when they feel assured about the return process. This relationship suggests that return policies should be designed to minimize consumer hesitation and maximize purchasing activity.

Retailer Perspective on Return Policies. From the retailer's perspective, a return policy that increases net category demand or overall profits is highly advantageous. The study finds that return policies that reduce the customer's return costs—such as by covering return shipping—lead to increased purchase behavior and net demand. Retailers can strategically adjust their return policies to enhance both consumer satisfaction and profitability. For example, instead of passing return shipping costs onto the consumer, retailers could cover part or all of these costs, which in turn could boost customer retention and increase overall sales.

Experimental Design and Findings. The study employed a nests extant model, a specialized economic model used to analyze consumer choices among multiple discrete options, combined with a structure model of consumer demand. This model allowed the researchers to predict how return policies influence consumer return behaviors. The sample consisted of 987 customers from online clothing retailers, and statistical analysis concluded that reducing return costs led to higher order rates and increased frequency of purchases. This finding supports the idea that return policies with lower costs are beneficial for both consumers and retailers.

6.5 Summary

The study suggests that retailers should focus on optimizing return strategies to reduce costs for customers. Specifically, allowing consumers to return mismatched products without incurring significant return fees encourages higher purchase rates. Retailers can further enhance their return policies by covering part or all of the return shipping fees, thus lowering the return costs for customers. This approach not only promotes more purchases but also builds customer loyalty, as consumers feel more confident in making decisions when they know the return process will be smooth and cost-effective.

The key takeaway from Anderson, Hansen, and Simester's study is that optimizing return policies to reduce return costs leads to increased purchase rates and enhanced consumer satisfaction. Both consumers and retailers benefit from these policies, as reduced return costs increase net demand and profitability. Retailers who carefully design their return strategies—such as by covering return shipping costs—can improve consumer trust and encourage repeat purchases, ultimately contributing to greater long-term profits

7 Conclusions

This study examined the impact of pricing strategies on various stakeholders and provided a comprehensive analysis of the factors influencing revenue from the perspectives of both retailers and consumers. It included a detailed summary of how returns affect optimal pricing, retailers, and consumers.

This review indicates that current research primarily focuses on pricing analysis and the effects of return policies on retailers and consumers. Future research should explore three key areas in greater depth: First, insights into consumer behavior are essential, necessitating more data on consumer behavior, market dynamics, and product characteristics to enhance modeling and analysis. This approach will facilitate a more nuanced examination of how different consumer groups respond to various return policies and pricing strategies. Second, there is substantial potential for technological integration and optimization, particularly in investigating the roles of advanced technologies such as artificial intelligence and blockchain in improving return processes. Recent research by Mohammad et al. (2024) discusses how AI-powered predictive analytics optimize supply chain processes, including real-time inventory management and demand forecasting, which can be applied to improving return processes in retail environments. Lastly, environmental issues should be prioritized, underscoring the need to study the ecological impacts of return policies and explore ways to incorporate sustainable practices into reverse logistics.

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