

# Impact of Reverse Logistics on the Shopping Experience of E-commerce Customers

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## Abstract

Today, the retrieval of goods, production waste, and packaging is a common phenomenon that both traditional and online manufacturers, wholesalers, retailers, as well as logistics service providers frequently have to deal with. In the e-commerce, the retrieval of products plays a critical role in improving customer satisfaction. Consequently, numerous businesses and scholars are keen on comprehending the role of reverse logistics operations. This research has a primary focus on investigating how reverse logistics impacts the shopping experience of e-commerce customers. The study employed empirical methods and quantitative analysis with a sample size of 203 observations. The study's findings demonstrated a positive correlation between different aspects of reverse logistics and the shopping experience and satisfaction of e-commerce customers. Moreover, it was revealed that the shopping experience acts as a mediator in the relationship between reverse logistics and customer satisfaction. Based on these findings, this research seeks to assist businesses in enhancing the quality of their reverse logistics services and optimizing overall logistics operations in e-commerce.

## Introduction

The challenges of returning products in online shopping emphasize the vital role of reverse logistics, influencing the overall e-commerce experience. To retain customers and expand market share, companies must prioritize enhancing their reverse logistics. Many companies have relied on customer reviews instead of quantitative methods to gauge satisfaction. Clear understanding of customer expectations in reverse logistics quality is necessary to boost confidence in online purchases and improve satisfaction. Scholars argue that while numerous authors have contributed to the theoretical development of reverse logistics applications in online sales, these contributions often lack practical implementation and fail to support sustained growth and development [1]. Furthermore, although foreign studies have examined the quality of reverse logistics services and identified factors influencing the buying experience, there is inconsistency in research findings regarding the relationship between reverse logistics, purchasing experience, and customer satisfaction [2]. The current state of reverse logistics lacks a comprehensive and theoretically grounded perspective. Existing research is mainly descriptive and anecdotal, with limited empirical work on reverse processes and customer satisfaction [3]. In Vietnam, reverse logistics is seldom implemented, and few studies explore its

application, often neglecting its impact on customer satisfaction. This study addresses this gap by examining how reverse logistics affects the e-commerce customer shopping experience. It aims to investigate the relationship between various factors and customer satisfaction regarding reverse logistics in e-commerce. The research findings will propose solutions for businesses to enhance reverse logistics quality and streamline forward logistics processes.

## Literature Review

### *Reverse Logistics*

Reverse logistics (RL) is a systematic process aimed at moving products or components from consumption back to manufacturing, focusing on recycling, remanufacturing, or proper disposal [4]. This involves precise planning, execution, and control of materials and information to recover them for value recovery. RL encompasses various activities like product/material recovery, repair, maintenance, upgrading, and recycling to address defects or quality issues and ensure customer satisfaction. It is a vital element of supply chain management, reducing waste from handling returned items by using various disposition options [5]. In summary, RL plays a critical role in managing product flows, promoting sustainability through recycling and proper disposal, and meeting customer requirements. With the growth of e-commerce, optimizing reverse logistics is essential, streamlining overall logistics operations and enhancing customer satisfaction [6].

E-commerce's rise has increased the importance of RL by facilitating smooth forward logistics, saving costs. It serves as a mutually beneficial mechanism that encourages customer engagement, allowing exchanges, and ultimately improving customer satisfaction and the overall e-commerce shopping experience. Key determinants include recall/exchange information, return/exchange time, and customers' experiences with reverse logistics services (Customer RL experience) [5].

*Recall/exchange information* comprises two categories: manufacturer-provided recall data and customer-initiated return information [7]. Manufacturer-provided recall data includes information from manufacturers or regulatory agencies, informing consumers about product defects or non-compliance, necessitating product withdrawal or return. This empowers consumers to determine if their purchases are affected, ensuring safe handling. In contrast, return information pertains to customers returning products due to defects or quality issues. It helps process returns transparently, understanding reasons effectively, instilling trust and confidence in the retailer's service [8, 9].

The concept of *return/exchange time* denotes the period necessary for suppliers to process and address customer inquiries and demands [10]. Specifically, the fulfillment time for a manufacturer's recall request signifies the duration within which the manufacturer must effectively retrieve defective or hazardous products from the market upon receiving an official request from regulatory authorities or customers. This timeframe is subjected to variation based on product type, recall scale, chosen recall methodology, and prevailing legal regulations.

*Customer RL experience* occurs when delivered products don't meet specifications, leading to return or exchange [11]. During this process, customers gain experiential knowledge about reverse logistics services, including return/exchange policies, product quality, and staff attitudes. Yeon-Koo Che's 1996 research highlights the crucial role of e-commerce platforms with flexible and transparent return/exchange policies in building trust, fostering customer satisfaction, nurturing lasting customer-business relationships, and enhancing business competitiveness. This experience streamlines inventory management, quality assurance, and reduces risks and costs for e-commerce customers.

### *Shopping Experience of E-commerce Customers (Customer Shopping Experience)*

The concept of customer experience pertains to a customer's perception and emotional response toward various aspects associated with a company or business. In terms of the experiential dimension, which encompasses the interactions between customers and suppliers, Ref. [12] posit that customer experience (CX) encompasses the collective sum of all encounters a customer undergoes in their relationship with a supplier. This relationship is forged within the context of purchasing and selling goods and services. Echoing

this perspective, Ref. [13] contend that CX represents the direct interactions between an individual and an organization, resulting in an emotional state that evolves throughout the course of these interactions. When considering e-commerce customers, their shopping experience materializes through interactions with brands and platforms while engaging in online shopping activities. Although direct contact between sellers and buyers is absent in the online realm, various forms of “touches” occur through social platforms such as Zalo, Facebook, Tiktok, and other channels, as well as through chatbots integrated into e-commerce platforms that customers utilize during their shopping journey.

### ***E-commerce Customer Satisfaction***

Customer satisfaction refers to the state of contentment experienced by customers once their expectations and requirements have been fulfilled. This satisfaction is developed through the process of accumulation and experience during the purchase or utilization of products and services provided by a business. Scholars describe customer satisfaction as the comprehensive attitude held by a customer towards a service provider, encompassing an emotional response that arises from the perceived variance between the customer’s anticipated outcome and the actual outcome received in terms of meeting a particular need, goal, or desire [14]. Consequently, it can be understood that, following the purchase and utilization of specific products and services, customers engage in a cognitive comparison between their initial expectations and the realized reality. Subsequently, they express satisfaction if the actual experience aligns with their anticipated outcome or exhibit dissatisfaction if there is a disparity. In the context of this study, customer satisfaction in the realm of ecommerce pertains to the overall positive or negative attitude exhibited by customers toward their online purchasing experiences on e-commerce platforms [15].

## **Hypotheses Development**

### ***The Relationship Between Recall/Exchange Information and Shopping Experience of E-commerce Customers***

The satisfaction of customers with product quality is greatly influenced by the safe and careful delivery of goods. However, when customers receive products that don’t match their descriptions or are defective, facilitating product returns can enhance their sense of security and satisfaction. Information related to product recall/exchange, including timely issue resolution, refund processing, return transit, and non-exchange refund duration, plays a vital role in ensuring high-quality product production and distribution [16]. Insufficient transparency in the return process and unclear communication regarding recall/exchange information can lead to customer distrust and a reluctance to make future purchases on the e-commerce platform, reducing customer retention.

Scholars emphasize the significance of product recall/exchange information in shaping customer experiences in e-commerce, enhancing trust, satisfaction, and product reliability [17]. It also presents an opportunity for differentiation and gaining a competitive edge [9, 18, 19]. The interplay between recall/exchange information, product returns, and customer experiences in e-commerce requires professional management and development for business success and customer satisfaction. Providing comprehensive information about products, return policies, and warranties boosts customer confidence. Prompt and efficient handling of customer return requests is critical for building customer trust in the brand. The customer’s experience with the company’s products and services significantly influences future customer relationships, attracting a substantial customer base, fostering loyalty, and retention [19-21]. Consequently, the authors propose the following hypothesis:

H1: Recall/exchange information has a positive effect on customer shopping experience.

### ***The Relationship Between Recall/Exchange Time and Shopping Experience of E-commerce Customers***

In today’s digital age, e-commerce is a vital aspect of daily life, offering convenience, variety, and competitive prices. However, concerns about product quality can affect the customer experience and trust. The speed of recalls and product returns is critical, as it impacts customer satisfaction and brand trust. Clear return policies and timely recalls build customer confidence. Dissatisfaction or delays may lead to customers discontinuing purchases. Prolonged recall and return times result in inconvenience and dissatisfaction, harming the customer’s shopping experience and trust in the business.

Francesca Magno's study in 2012 highlights the significant impact of recall and exchange times on consumer attitudes [19, 22]. The research shows that the duration of recall and exchange significantly shapes consumer perceptions of product recall management. In cases where responsible liability recovery management is evident, shorter recall periods receive more positive consumer evaluations. Conversely, in opportunistic recall management scenarios, longer recall periods lead to dissatisfaction and a decline in consumer trust. These findings are directly applicable to online shopping, where shorter recall and exchange times boost customer satisfaction. Swift and efficient recall processes signal responsibility and effective issue resolution, resulting in heightened satisfaction and trust. Conversely, prolonged recall periods lead to dissatisfaction and trust erosion. Effective management and improvement of product recalls, returns, and delivery times are essential for building strong customer relationships and long-term retention on e-commerce platforms [23]. Based on these observations, the authors propose the following hypothesis:

H2: Recall and exchange time has a positive effect on customer shopping experience.

### ***The Relationship Between Customer RL Experience and Shopping Experience of E-commerce Customers***

Yeon-Koo Che [24] emphasizes the significance of a flexible and convenient return policy for building trust and improving customer satisfaction. The connection between customers' return or exchange experiences and their overall e-commerce shopping experience is pivotal. A smooth, prompt, and obstacle-free return process leads to trust and positive evaluations of the e-commerce platform. Further research supports these findings, confirming that a flexible, fair, and convenient return policy plays a vital role in nurturing customer trust [8, 25, 26]. On the other hand, customers who face challenges, extended time requirements, significant efforts, or complex regulatory procedures during the return or exchange process are less inclined to revisit the e-commerce platform for future purchases [25, 27]. Moreover, dissatisfied customers may share their negative experiences with others. Consequently, there is a correlation between customers' return or exchange experience and their overall shopping experience. Based on this, the research team proposes the following hypothesis:

H3: Customer RL experiences have a positive effect on customer shopping experience.

### ***The Relationship Between Customer Shopping Experience and Customer Satisfaction***

Online shopping, the act of purchasing goods or services on the Internet, has witnessed significant growth in Vietnam. According to the Vietnam E-commerce Association, the e-commerce delivery growth rate from 2018 to 2020 ranged from 30 to 70%. Facebook, Shopee, Lazada, and Tiki are the most popular online shopping platforms. The top-selling categories include fashion, health and beauty, home, and technology. Interestingly, male users dominate across Shopee, Lazada, and Tiki, indicating a rising trend in online shopping behavior across genders. Customer satisfaction is pivotal for both online and brick-and-mortar retailers, involving the creation of positive customer feelings after using a service (Chang et al. 2009) [28].

Studies emphasize the critical role of customer satisfaction in online shopping, as satisfied customers are more likely to return for future purchases, recommend the service, and engage in positive word-of-mouth promotion. Customer satisfaction fosters loyalty, reduces the search for alternatives, and enhances competitiveness [28].

Research underscores the significant impact of the e-commerce shopping experience on customer satisfaction, influenced by customer beliefs, perceived risks, and past experiences. The Expectancy Confirmation Theory (ECT) supports this idea, linking repurchasing decisions to past experiences. Satisfaction, stemming from emotions surrounding unmet expectations and prior consumption, is strongly affected by a smooth, convenient, and quick shopping experience. Key drivers include efficient shipping, trustworthiness, and a diverse product range. Conversely, issues like fraud, incorrect deliveries, poor quality, and counterfeit products directly diminish customer satisfaction [29].

Multiple studies confirm that a positive shopping experience, especially high-quality logistics services, positively influences customer satisfaction in online shopping [30].

Therefore, the shopping experience of e-commerce customers is closely associated with their level of satisfaction. Consequently, the authors propose the following research hypothesis:

H4: Customer shopping experience has a positive effect on customer satisfaction.

#### ***The Relationship Between Recall/Exchange Information and Customer Satisfaction Through Customer Experience***

During the reverse logistics process, customers are provided with comprehensive information about the product, withdrawal/return timelines, payment methods, and even suggestions for alternative products. This ensures that customers feel wellinformed and cared for, leading to increased satisfaction and the likelihood of returning for future purchases. Scholars also demonstrates the close relationship between recall/return information and the customer's buying experience in the online shopping process [31, 32]. Moreover, studies have shown that when customers trust the information and policies provided by the sales service, they tend to feel more satisfied with the product and service provider [33]. Additionally, the support team and customer service play a crucial role in meeting the information needs of customers. Based on these findings, it can be hypothesized that providing accurate and comprehensive return/return information can significantly improve the shopping experience and customer satisfaction, ultimately leading to increased sales and profits for e-commerce businesses.

Therefore, it is essential for businesses to focus on enhancing their return/ return information services in order to thrive in the highly competitive e-commerce environment. In light of the above, the authors propose the following hypothesis:

H5: Customer shopping experience mediates the relationship between recall/ exchange information and customer satisfaction.

#### ***The Relationship Between Recall/Exchange Time and Customer Satisfaction Through Customer Shopping Experience***

Previous research has indicated that delays in the processing of reverse logistics significantly contribute to negative buying experiences, resulting in customer dissatisfaction. When e-commerce customers decide to return a product, they expect timely receipt of their goods to fulfill their needs. Meeting this expectation leads to customer comfort and an enhanced shopping experience. Furthermore, Ref. [34] has demonstrated that an efficient reverse logistics process can reduce return orders by up to 50% and increase customer satisfaction. Additionally, Ref. [35, 36] have shown that improving the reverse logistics process time brings about cost reductions, increased customer satisfaction, and greater likelihood of customers returning to the company's stores or brands. Consequently, it can be inferred that enhancing recall/exchange time of reverse logistics improves the customer's shopping experience and increases customer satisfaction. Based on these findings, the authors propose the following hypothesis:

H6: Customer shopping experience mediates the relationship between recall/ exchange time and customer satisfaction.

#### ***The Relationship Between Customer RL Experience and Customer Satisfaction Through Customer Shopping Experience***

Customers' ability to return or exchange products significantly affects their satisfaction with an online store. Difficulties in this process can lead to dissatisfaction and deter future purchases [14]. Conversely, when customers experience comprehensive support and easy returns/exchanges, they feel valued and cared for, enhancing their satisfaction and likelihood of returning for future purchases [31]. Thus, ensuring a convenient and efficient return/exchange process is crucial for e-commerce businesses to maintain strong customer relationships and improve the overall shopping experience. Building on prior research, the hypothesis posits that the recall/return experience directly impacts e-commerce customer satisfaction through their shopping journey. Studies [37] emphasize that the convenience and processing time of returns greatly influence satisfaction. Likewise, research [30] highlights the role of ease and speed in product returns for enhancing satisfaction. This study aims to provide valuable insights for e-commerce businesses in enhancing their customers' shopping experiences and satisfaction. In light of the above, the authors propose the following hypothesis:

H7: Customer shopping experience mediates the relationship between customer RL experience and customer satisfaction.

## **Methodology**

### **Sample**

The authors employed a Google Form questionnaire to collect data for the study. The survey targeted students from three universities in Hanoi: Vietnam National University, Hanoi (VNU), Hanoi University of Industry (HAUI), and Thuongmai University (TMU). The convenience sampling method was utilized in the data collection process. From March 2023 to May 2023, the author team received a total of 230 responses from participants. However, after conducting a screening process, 27 responses were excluded due to duplicate data or incomplete answers. Thus, the final dataset used for analysis consisted of 203 responses.

### **Measurements**

The items of the questionnaire were obtained from the relevant literature. The measurement of recall/exchange time (RT) utilized five scales adopted from the research conducted by Ref. [38]. RI was assessed using four scales from the studies of Refs. [39, 40]. Customer RL experience (CRL) was measured using four scales derived from the research of Refs. [15, 41, 42]. Customer shopping experience (CX) was measured using six scales adopted from the research of Ref. [42]. Customer satisfaction (CS) was measured using six scales adopted from the research of Ref. [43].

### **Measurement Model**

The Cronbach Alpha is used to eliminate “junk” variables, these variables with the total correlation coefficient (Corrected item total correlation) less than 0.3 will be eliminated and the scale will be selected when the Cronbach Alpha coefficient is from 0.6 or more (Nunnally and Burnstein 1994). The results show that the Cronbach Alpha coefficients of all variables are greater than 0.8. From there, it shows that research concepts built from observed variables are accepted and will be used in the next factor analysis.

Exploratory factor analysis is used to reduce a set of many interdependent measures into a smaller set of variables so that they are more meaningful but still contain most of the information content of the original set of variables.

The results of EFA show that the KMO is  $0.885 > 0.5$ , which proves that the data used is completely appropriate.

The result of Bartlett's test is 2,331,769 with the significance level ( $p\_value$ )  $sig = 0.000 < 0.05$ , so the variables are correlated with each other and satisfy the conditions of factor analysis.

Confirmatory factor analysis (CFA) serves as a subsequent step to exploratory factor analysis (EFA). The purpose of CFA is to assess the model fit of the proposed model by calculating the values of composite reliability (CR) and average variance extracted (AVE), testing for discriminant validity, and assessing the convergence of factors. It aims to determine if the observed variables in a given scale are consistent with other variables within the same scale and if the model fits the data.

The analysis results indicate that Chi-square value of 287.529 with a Chi-square/df ratio of 1.445, which is less than 3. Root mean square error of approximation (RMSEA) value is 0.046, below the threshold of 0.08. CFI value is 0.958, exceeding the recommended threshold of 0.9, and the TLI value is 0.951, also surpassing the threshold of 0.9; GFI is 0.889, meeting the acceptable criterion of 0.8. Since all the criteria for model fit are met, this model is deemed to be a good fit for the surveyed dataset.

### **Testing of Research Hypotheses**

Structural modeling (SEM) was developed to test the hypotheses. The results of SEM model analysis show that all criteria are eligible: Chi-square is 291,769 with Chi-square/df =  $1444 < 3$ ; RMSEA =  $0.046 < 0.08$ ; CFI =  $0.957 > 0.9$ ; TLI =  $0.951 > 0.9$ ; GFI =  $0.888 > 0.8$ . The results of hypothesis testing are presented in Table 1.

<i>SRI</i>	<i>Hypotheses</i>	<i>Relationship</i>	<i>Estimate</i>	<i>Sig</i>	<i>Decision</i>
1	H1	RI → CX	0.355	0.003	Accept
2	H2	RT → CX	0.398	0.004	Accept
3	H3	CRL → CX	0.521	0.089	Reject
4	H4	CX → CS	0.710	0.002	Accept

**Table 1:** Direct relationship.

The results of hypothesis testing show that: There is a relationship between RI and CX ( $\beta = 0.355, p < 0.05$ ). The statistical reliability of this analysis confirmed the assumed relationship. Therefore, H1 is accepted. Similarly, the second hypothesis (H2) tested the relationship between RT and CX, this relationship was statistically significant with ( $\beta = 0.398, p < 0.05$ ). Therefore, H2 is accepted. In addition, the test results also show that CX has an effect on CS ( $\beta = 0.710, p < 0.05$ ) and the relationship between CX and CS ( $\beta = 0.710, t = 11.07, p < 0.05$ ) is significant. Therefore, H4 is also accepted. However, the effect of CRL on CX is not significant. The result does not confirm the relationship between CRL and CX. So, H3 is rejected.

To test the indirect relationship, the authors used bootstrap analysis. The results are presented in Table 2.

<i>SRI</i>	<i>Assumption</i>	<i>Relationship</i>	<i>Estimate</i>	<i>Sig</i>	<i>Decision</i>
1	H5	RI → CX → CS	0.308	0.003	Accept
2	H6	RT → CX → CS	0.415	0.002	Accept
3	H7	CRL → CX → CS	0.203	0.104	Reject

**Table 2:** Indirect relationship.

From the results, it can be seen that CX plays a mediating role in the relationships between RI and CS and RT and CS. Therefore, hypotheses H5 and H6 are accepted. However, the mediating role of CX with the relationship between CRL and CS is not statistically significant. Therefore, hypothesis H7 is rejected.

## Conclusion

The research findings emphasize the significant impact of reverse logistics services on e-commerce customer satisfaction. Several key factors, including the timeliness of product recalls, the availability of recall/return information, and customers' past experiences with reverse logistics services, play a crucial role in shaping satisfaction levels among e-commerce shoppers. Efficiently managing reverse logistics processes is essential to enhance the overall customer experience and foster greater satisfaction on e-commerce platforms. Businesses can optimize these operations to elevate customer experience, resulting in increased satisfaction and loyalty.

To enhance customer satisfaction and stimulate e-commerce growth in Vietnam, both service providers and e-commerce businesses must prioritize the improvement of their reverse logistics systems. This strategic approach recognizes the pivotal role of reverse logistics in shaping customer experiences and satisfaction within the e-commerce industry.

The study's outcomes have theoretical and practical implications. It deepens our understanding of the importance of reverse logistics services in influencing e-commerce customer satisfaction. Policymakers can use this knowledge to develop strategies for improving the quality and efficiency of reverse logistics services in the country.

Implementing the insights from this research enables businesses to retain customers and enhance their shopping experiences by offering seamless product recalls, returns, and reworks. This focus on improving reverse logistics also contributes to the overall growth of e-commerce in Vietnam, as positive experiences lead to increased sales and sustained business growth.

In conclusion, these findings offer valuable knowledge for developing better reverse logistics practices in e-commerce. Prioritizing the enhancement of reverse logistics systems creates a virtuous cycle of improved customer satisfaction, increased retention, and overall business growth. This approach strengthens Vietnam's e-commerce landscape, making it more competitive, customer-centric, and successful in the long run.

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