ANALYSING LOGISTICS SERVICES QUALITY ON E-COMMERCE CUSTOMER SATISFACTION

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MASTER OF SCIENCE (TRANSPORTATION AND LOGISTICS MANAGEMENT)
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Abstrak

Dalam landskap e-dagang yang sangat kompetitif hari ini, perkhidmatan logistik memainkan peranan penting dalam membentuk pengalaman pelanggan dan tahap kepuasan. Ketepatan produk, masa penghantaran, keadaan produk, kos penghantaran dan logistik berbalik adalah semua aspek penting dalam perkhidmatan logistik. Kajian ini bertujuan untuk menganalisis kualiti perkhidmatan logistik terhadap kepuasan pelanggan e-dagang. Kajian ini menggunakan pendekatan kaedah kuantitatif untuk menjalankan tinjauan soal selidik terhadap 427 pelanggan penduduk di negeri utara Semenanjung Malaysia seperti Perlis, Kedah dan Pulau Pinang. Data kemudiannya dianalisis melalui Statistical Package for Social Sciences (SPSS) versi 28.0 tentang kepuasan pelanggan e-dagang. Dapatan kajian menunjukkan bahawa kepuasan pelanggan e-dagang mempunyai hubungan yang signifikan dengan ketepatan produk, kos penghantaran dan logistik berbalik. Masa penghantaran dan keadaan produk menunjukkan tiada hubungan signifikan dengan kepuasan pelanggan e-dagang. Kajian ini memberi manfaat kepada syarikat logistik dan pengangkutan, pengirim dan penjual. Apabila pembekal perkhidmatan logistik meningkatkan aspek kualiti ini, ia membawa kepada kepuasan pelanggan yang lebih tinggi.

Kata kunci: Perkhidmatan logistik, e-dagang, kepuasan pelanggan

Abstract

In today's highly competitive e-commerce landscape, logistics services play a crucial role in shaping customer experiences and satisfaction levels. Product accuracy, delivery time, product condition, shipping costs, and reverse logistics are all significant aspects of logistics services. This study aimed to analyse logistics services quality on e-commerce customer satisfaction. This study used a quantitative method approach to conduct a questionnaire survey of 427 customers residents in northern states of Malaysia such as Perlis, Kedah and Penang. The data were then analysed by normality, reliability, correlation, and regression through Statistical Package for Social Sciences (SPSS) version 28.0 on e-commerce customer satisfaction. The findings showed that e-commerce customer satisfaction has significant relationship with product accuracy, shipping cost and reverse logistics. Delivery time and product condition showed as no signification relationship with e-commerce customer satisfaction. This study benefit to the logistics and transport companies, shipper, and sellers. When logistics service providers (LSPs) enhance these quality aspects, it leads to higher customer satisfaction.

Keywords: Logistics services, e-commerce, customer satisfaction

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List of Abbreviations

PA: Product Accuracy

DT: Delivery Time

PC: Product Condition

SC: Shipping Cost

RL: Reverse Logistics

CS: Customer Satisfaction

ACSI: American Customer Satisfaction Index

LSQ: Logistics Service Quality

LSP: Logistics Service Providers

SPSS: Statistical Package for the Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This study tends to elaborate about research on how the logistics services quality is impact the e-commerce customer satisfaction. E-commerce and logistics are deeply intertwined, and their interconnection is crucial for the smooth operation of online businesses. "E-commerce," commonly referred to as electronic commerce, refers to the exchange of products and services facilitated by the internet. Its growth has occurred with the wide availability of the internet (Jain, Malviya & Arya, 2021). E-commerce offers numerous business opportunities and revenue growth potential for organizations, particularly e-retailers, because of its efficient and interactive characteristics, competitive pricing, and personalized consumer experiences (Vasić, Kilibarda, Andrejić & Jović, 2021). It has become a significant aspect of modern business, allowing companies and individuals to engage in online transactions. E-commerce has revolutionized business interactions for both sellers and buyers, providing convenience, accessibility, and global reach. The most significant advantage of e-commerce for customer is that it improves drastically, saves time, and is easy to access from anywhere in the world (Jain, Gajjar & Shah, 2021). The COVID-19 pandemic boosted the expansion of commerce online through internet-based marketing networks (Son, Bae & Kim, 2021).

Figure 1.1 shows a significant increase in total global retail sales from 2019 to 2020, which contributes significantly to the predicted 8% growth in retail e-commerce sales worldwide. This indicates how the paradigm shift in business caused by COVID-19

disruptions has resulted in an increase in online retail sales (International Trade Administration, n.d).

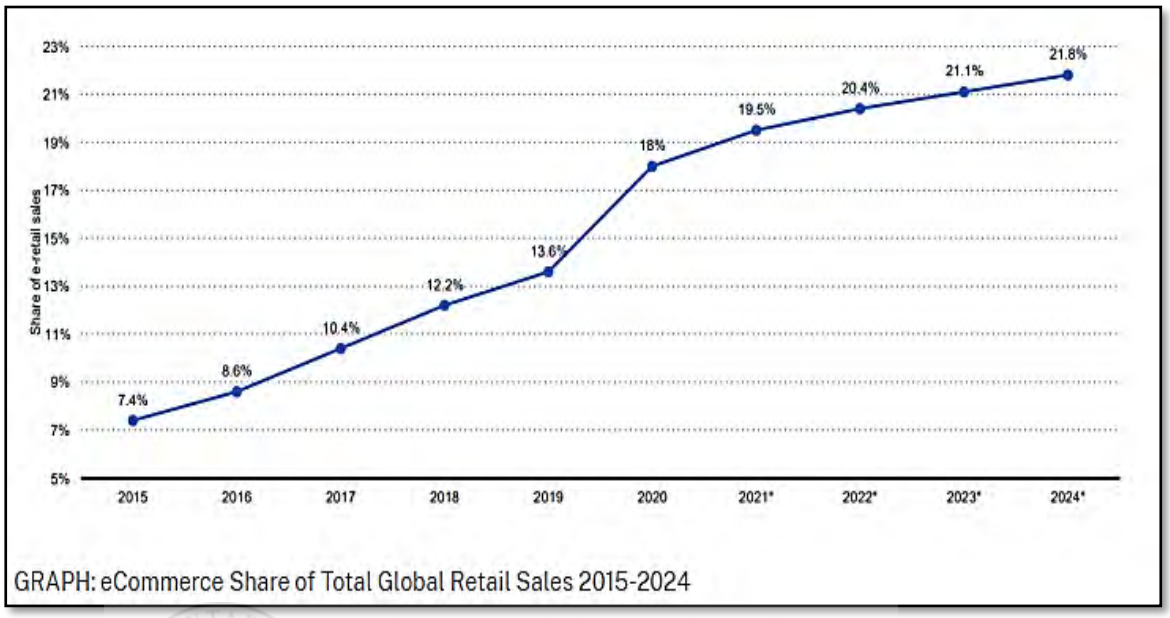

Figure 1.1
Impact of Covid Pandemic on eCommerce
Source: International Trade Administration

Global e-commerce revenue continues to grow significantly, allowing businesses to expand their customer base beyond local boundaries and facilitating cross-border trade. According to Gelder (2023), global retail e-commerce sales were projected to reach $5.7 trillion in 2022, with expectations for continued growth in the future. In the fourth quarter of 2023, retail e-commerce sales reached $285.2 billion, up 0.8 percent from the previous quarter, according to data from the U.S. Census Bureau's Department of Commerce (Quarterly Retail E-commerce Sales 4th Quarter 2023, 2024). Over the past decade, B2B online sales have shown steady annual increases, leading to projections that the global B2B e-commerce market could reach $36 trillion by 2026 (Bledsoe, n.d.).

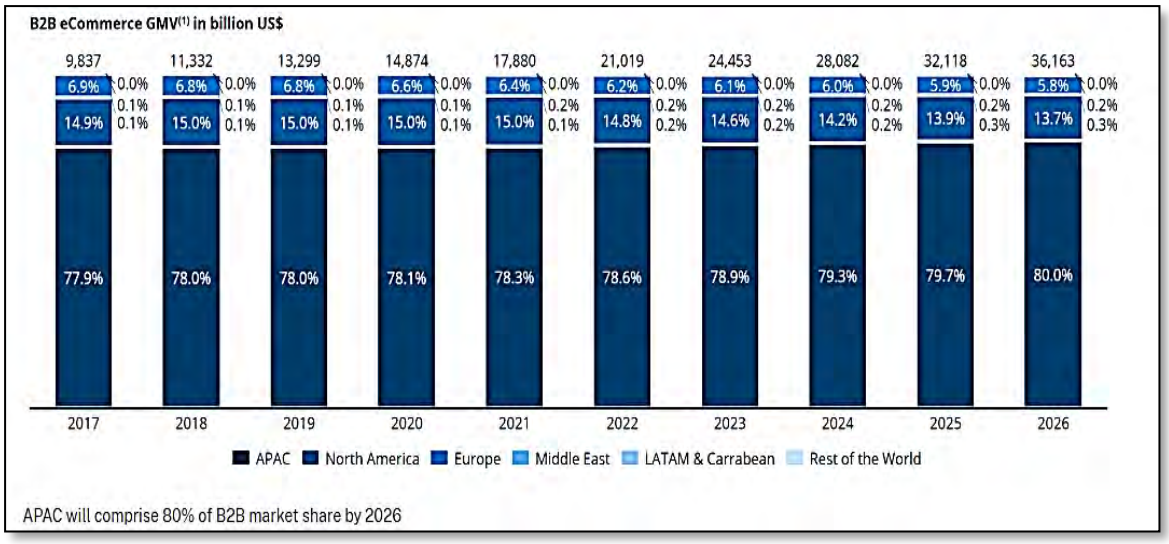

Figure 1.2
2024 ecommerce Size & Sales Forecast
Source: International Trade Administration

Malaysia has witnessed a consistent rise in internet penetration, with a growing number of individuals gaining access through smartphones and other devices. In January 2023, there were 33.03 million internet users in Malaysia (Kemp, 2023), providing them with access to online platforms for purchasing products. Several factors motivate customers to make purchases through online platforms, as outlined below.

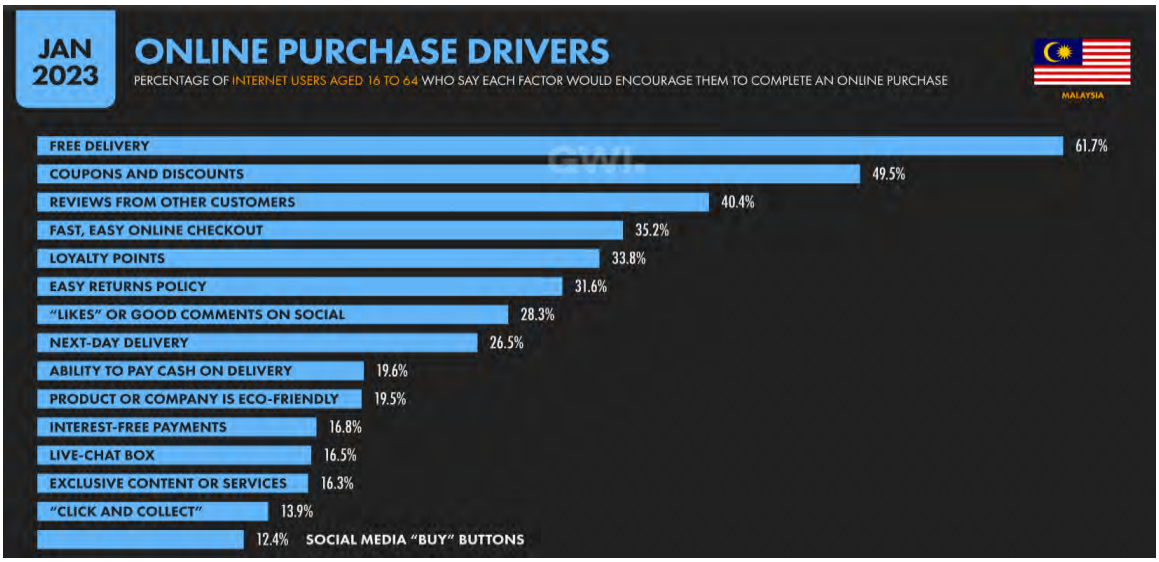

Figure 1.3
Digital 2023: Malaysia
Source: DataReportal

According to Commission Factory (2023), Malaysia's online business is projected to achieve a nearly 10% annual growth rate, reaching $8.75 billion in revenue by the end of 2023. Over the following four years, the sector is anticipated to expand at a rate of 13.26%, potentially reaching a value of $14.40 billion by 2027. In accordance with The Star news, Malaysia's e-commerce revenue rise to RM289.5 billion in the third quarter of 2023 from RM274.6 billion in the same quarter the previous year, marking a 5.4% year-over-year increase, as reported by the Department of Statistics Malaysia (DoSM) (Online, 2023).

Below is the Malaysia e-commerce revenue forecast by Mordor Intelligence.

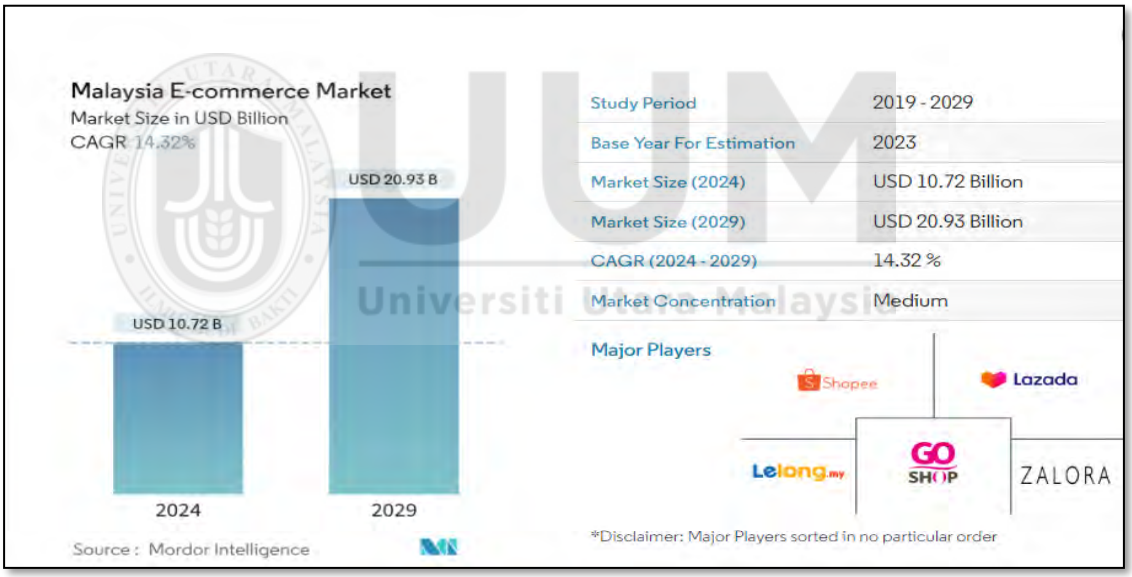

Figure 1.4
Market Size of Malaysia E-commerce Industry
Source: Mordor Intelligence

Customer satisfaction is an important goal for logistics providers in terms of service delivery (Gaudenzi, Confente & Russo, 2020). With the increase of online shopping, the smooth and efficient delivery of items from their source to the customers door has emerged as an important aspect in overall customer satisfaction. The growing usage of smartphones, mobile devices, and the internet has caused a significant shift in consumer

purchasing behaviour. As a result, the profitability of online businesses depends on the reliability of logistics services (Trenz, Veit & Tan, 2020). Currently, customer have more expectation from seller to deliver the goods they bought timely and safely reach the customer location.

As customer become more demanding in delivery of the goods, the importance of efficient logistics services cannot be denied. Logistics services are critical in an era when customers expect not just quality items but also seamless and timely delivery. Delays, inaccuracies, or damages during the shipping process can lead to dissatisfied customers, negatively impacting brand reputation and customer loyalty. The logistics journey from order placement to doorstep delivery is a complicated network of operations, each of which adds to the overall efficiency and reliability experienced by the customer.

1.2 Problem Statement

Despite the growing convenience of online shopping, customers often face significant challenges related to logistics and delivery, impacting their overall shopping experience. Issues such as delayed deliveries, inaccurate tracking information, and damaged goods not only frustrate customers but also undermine their trust in e-commerce platforms. According to the "2024 Online Retail Trends Report" by Celigo, a survey of over 1,500 consumers from the U.S. and U.K. found that a significant majority that 88% in the United State and 79% in the United Kingdom were dissatisfied with online retailers' performance over the past year (Celigo, 2024). Their frustrations centered on issues such as rising prices, delayed deliveries, and high shipping expenses. Survey conducted by Descartes Systems Group released findings showing 21% of online shoppers reported having bad delivery experiences, 20% claimed deliveries are

unreliable, and 17% expressed dissatisfaction with the delivery procedure (Descartes Systems Group, 2024). According to a report by Chubb (2023), a significant majority, 75%, of survey respondents reported experiencing financial fraud. Delivery delays were also prevalent, cited by 61% of participants. Additionally, 42%, reported frequently receiving damaged items.

Furthermore, an iPrice Group meta-search website and Parcel Perform survey found that 43% of Malaysian customers were dissatisfied with their online shopping delivery experience (Bernama, 2019). In Malaysia, the exceptionally high demand from purchases made through e-commerce platforms often leads to challenges for many logistics companies in fulfilling orders. Their limited storage facilities contribute to delays in delivery (Mazlan, 2021). According to Afzainizam, Fahmy, Hanif, Muqri and Firdhaus (2021), customers in Malaysia more increased to use online shopping, but several problems, including delivery delays and product quality, have hindered online shopping from reaching its full potential in this country.

Few factors might quickly influence an e-commerce customer's dissatisfaction with an online purchase. The seller needs to be careful to avoid any situation where the buyer isn't happy with the product they received. There are lots of the factor that able to impact customer experience on online purchasing. This study examined factors as product accuracy, delivery time, product condition, shipping cost, and reverse logistics, which might have impacted customer satisfaction.

Firstly, ensuring the accuracy of products throughout the supply chain is critical for maintaining service quality in logistics services. Customers desire products supplied in the quantity and quality indicated during the order process, with no substitutes delivered (Akıl & Ungan, 2022). According to Gajewska, Zimon, Kaczor and Madzík (2020),

customer discontent may arise from delayed or non-delivery of products, incorrect orders, and damaged items. The right item and quantity are the two factors that we may take into account while measuring order accuracy. Sometime customer receiving the incorrect item or less or more quantity of items. Inaccuracy can be happening several reasons in delivery such as incorrect items being picked during order fulfilment, insufficient checks, and inspections at various stages of the supply chain, discrepancies between the listed product specifications and the delivered items and poor communication between different stages of the supply chain. E-tailers can minimize refunds resulting from product inaccuracies, mostly from discrepancies between product descriptions and real supplies (Jain et al., 2021). Incorrect products diminish customer satisfaction, potentially reducing repeat purchases from the seller.

Next, punctual delivery profoundly influences both customer satisfaction and the overall business of a logistics service provider. Previous research consistently highlights that delivery timeliness stands as the primary determinant of customer satisfaction in e-commerce services. According to Vu, Grant and Menachof (2020), the highest ranked variable in logistics service quality that impact customer satisfaction is on time delivery. Several challenges may impede achieving consistent and reliable delivery times, leading to a decline in service quality. To increase the quality of logistics services, delivery timeliness must be focused to ensure customer receive the items on time (Restuputri, Indriani & Masudin, 2021). Through optimizing last-mile delivery, utilizing real-time tracking technologies, enhancing communication channels, and refining route planning, logistics service providers can enhance their overall delivery performance and elevate customer satisfaction and service quality. In this fiercely competitive environment, sellers must select the most reliable logistics service provider

to ensure timely product delivery to customer for successful business. Seller also must ensure that the product reach the customer timely without any delays.

Thirdly, the quality of product condition during the logistics process is importance to maintain customer satisfaction in e-commerce business. E-commerce business handle many kinds of products, each has unique packaging requirements. Sometime including fragile or sensitive products. Mishandling of such items during logistics operations can result in breakage or damage. Products also may get damaged in transit due to inadequate or generic the packing process. In this sector, return rates are typically higher than those in traditional retail. According to a survey by Invesp (n.d.), approximately 30% of online orders are returned, whereas the return rate in physical stores is around 8.89%. Additionally, research from Citizens Advice (2017) indicates that in 2016, two out of every three online shoppers (69%) experienced issues such as lost, damaged, or delayed deliveries. So, product condition is another important factor need consider during the shipping procedure for ensure the services quality.

Fourthly, shipping cost is played important role in influence purchasing decisions and can significantly affect the competitiveness of logistics service providers. The seller or the retailer makes an effort to provide low-cost shipping charges for deliver the item. Customer will not be preferring to buy the product which is high delivery fee. Winters (2023) informed in the report that buyer behaviour is impacted by concern about delivery expenses. In an effort to save money, 46% of consumers choose longer delivery times, and 36% cancel orders because of expensive shipping charges. Retailers need consider carefully how they price the delivery rates to avoid customer dissatisfaction. High shipping costs can reduce the attraction of businesses, resulting in the loss of business and decreasing satisfaction from regular customers.

Finally, proficiently managing reverse logistics is essential for e-commerce businesses to improve customer satisfaction, streamline operations, and uphold sustainable practices. Customer complaints and return policy is one of the factors important in logistics services quality for e-commerce business. E-commerce businesses often experience a higher rate of product returns compared to traditional retail. According Bigcommerce (n.d) website, the rate of return for e-commerce sales is between 20% and 30%. Online retailers typically hold a higher ranking than traditional stores and should be considered as part of standard business operations. According to a survey by Invesp (n.d.), 79% of consumers expect free return shipping, and 92% indicated they would make repeat purchases if the return process was straightforward. This may conclude that logistics played a significant part in product reverse logistics in order to avoid customer dissatisfaction with the seller.

In conclusion, this study investigated the relationship between logistics service quality and customer satisfaction in e-commerce, collecting data from individuals who made purchases through online platforms in Malaysia. Through this data collection, significant factors influencing e-commerce customer satisfaction in logistics services can be identified.

1.3 Research Questions

Research question for this study:

1. Do factors like product accuracy, delivery time, product condition, shipping cost and reverse logistics impact the e-commerce customer satisfaction?

1.4 Research Objectives

The research objectives of this study are aligned with its research questions to ensure comprehensive exploration and achievement of the study's goals. Regarding the below, these have five research objectives:

1. To examine relationship between product accuracy and e-commerce customer satisfaction.
2. To examine relationship between delivery time and e-commerce customer satisfaction.
3. To examine relationship between product condition and e-commerce customer satisfaction.
4. To examine relationship between shipping cost and e-commerce customer satisfaction.
5. To examine relationship between reverse logistics process and e-commerce customer satisfaction.

1.5 Significance of the Study

By the conclusion of the study, this research provided a deeper understanding of how logistics service quality impacted e-commerce customer satisfaction. Additionally, after this study, the company or sellers gained a better understanding of areas that require more attention and enhancement in terms of logistics services quality.

E-commerce retail sales have increased dramatically in recent years, making it challenging for professionals to meet demands from customers and remain competitive globally (Rejeb, Simske, Rejeb, Treiblmaier & Zailani, 2020). Logistics service providers can identify inefficiencies in their procedures, implement solutions to improve operational efficiency, cut costs, and streamline e-commerce supply chains.

Recognizing how logistics services impact customer satisfaction gives businesses a competitive edge, enabling them to succeed in the fiercely competitive e-commerce market. By comprehensively understanding customer delivery preferences, logistics service providers can develop effective strategies to prevent delivery issues.

Based on this research, sellers can learn how to choose a logistics service provider to ship the goods to their customer. Satisfied customers are significantly more likely to return for more purchases, which contributes to long-term customer loyalty, as well as to recommend the product to others.

This study contributes to the fields of e-commerce, logistics management, and consumer satisfaction by providing a foundation for further scholarly investigation and discourse. The findings from this study can aid academic institutions in refining logistics and supply chain management curricula.

1.6 Scope of the Study

The scope of the study in analysing the impact of logistics services quality on e-commerce customer satisfaction should encompass various dimensions to provide a comprehensive understanding This investigation concentrated only at five elements such as product accuracy, delivery time, product condition, shipping cost and reverse logistics, which can impact the e-commerce customer satisfaction towards logistics service quality. Other factor such are product information, product availability, product information accuracy and few other factors that impacting e-commerce customer satisfaction may not include in this paper because including a wider range of factors could complicate the analysis and potentially detract from a thorough examination of how logistics services specifically impact customer satisfaction. By concentrating on these five key elements, the study aims to provide a detailed and focused analysis on

logistics service quality without becoming overly broad or diluted by additional variables. The study can offer an in-depth investigation of how effective logistics service quality affects e-commerce customer satisfaction, providing useful data for both academic research and real-world commercial uses.

1.7 Definition of Key Terms

In order to make this thesis easier to understand, the following key terms have been described:

Product accuracy: Order accuracy refers to delivering the correct products in the appropriate quantities (Politis, Giovanis & Binioris, 2014).

Delivery time: Delivery time describes to the time it required for a client to receive a product after ordering it (Kaligis, Satmoko, Tahapary, Tawil & Kusnadi, 2024).

Product condition: The product condition refers to whether the customer's orders arrived undamaged (Mentzer, Flint & Hult, 2001).

Shipping cost: Shipping costs are the charges associated with delivering an order to the customer (Rashid & Rasheed, 2024).

Reverse logistics: The management of product transportation from the consumer to the manufacturer is known as reverse logistics (Nogalski, Tien, Kuc, Dung & Anh, 2021).

Customer Satisfaction: Customer satisfaction encompasses happiness, fulfilment, interest, surprise, and other modes of expression (Lai, Jang, Fang & Peng, 2022).

1.8 Organisation of the Study

This study is organized into five chapters to efficiently address the research objectives and present the findings. Chapter 1 introduces the research, presenting the background, problem statement, research questions, objectives, scope, significance of the study, and definitions of key terms. Chapter 2 conducts a comprehensive literature review, concentrating on e-commerce customer satisfaction overview, variable that affecting e-commerce customer satisfaction, issues in e-commerce customer satisfaction, logistics service quality overview, theory associated with logistics service quality, relationship between logistics service quality with e-commerce customer satisfaction and hypotheses development and the associated theories and conceptual frameworks. In Chapter 3, it is discussed the methodology used in this study, which covers research design, population and sample methods, data gathering procedures, analysis approaches, and a pilot test. Chapter 4 offers the data analysis and findings, which include several statistical analyses such as normality, reliability, correlation, and regression. Finally, Chapter 5 summarizes the study's findings, discusses limitations, highlights implications, and makes recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter critically reviews literature on the impact of logistics service quality on e-commerce customer satisfaction. It explores how the variables such as product accuracy, delivery time, product condition, shipping costs, and reverse logistics services influence customer satisfaction. As the final phase in developing the research framework, the chapter reviews the literature related to the research questions and compiles a body of information to support the research hypotheses.

2.2 E-commerce Customer Satisfaction

2.2.1 E-commerce Customer Satisfaction Overview

Consumers' perception of the products and services they have received is known as satisfaction (Miao, Jalees, Zaman, Khan, Hanif & Javed, 2022). When a customer is happy and satisfied with the product they ordered, it's referred to as being satisfaction (Kawa & Światowiec-Szczepańska, 2021). Customer satisfaction is vital for business growth, and it is crucial for a company's credibility and loyalty, particularly in unpredictable online marketplaces (Khan, Salamzadeh, Iqbal & Yang, 2022). One of the key factors now determining an online store's success is customer satisfaction. It has been identified as the main cause for purchase, intent to repurchase, and loyalty among customers (Kumar & Ayodeji, 2021). According to Wattoo and Iqbal (2022), online sellers need aware of how customers view and assess their products and services, which can help them consistently increase customer satisfaction and particularly important aspect of their business. In the meanwhile, online businesses should adjust to

the level of customer satisfaction within their sector. Understanding about factors which impact service quality reduces customer complaints and improves customer loyalty.

2.2.2 Factors Affecting E-commerce Customer Satisfaction

Most of the previous studies indicated that the same factors are influence e-commerce customer satisfaction. Mofokeng (2021) research indicate that customer satisfaction in South African e-commerce market is impacted by product delivery, perceived security, product diversity, and information quality when shipping. Customers need real-time shipment tracking, easy returns, and flexible delivery options (Kawa & Światowiec-Szczepańska, 2021). Liu and Kao (2022) in their study of e-commerce agricultural items emphasize that e-commerce for agricultural products should process orders quickly and give reliable logistics information to consumers.

Table 2.1
Summary of Previous Studies

Author/Year	Research Title	Findings
Vasić et al. (2021)	Satisfaction is a function of users of logistics services in e-commerce.	Product availability is essential for minimizing negative emotions during online purchases. Time of delivery plays a key role in achieving e-customers' satisfaction and information about products plays a key role important on the online purchase and is positively associated with customer satisfaction.
Lai et al. (2022)	Determinants of customer satisfaction with parcel locker services in last-mile logistics.	Five dimensions such as tangibility, responsiveness, security, reliability, and timeliness were found to positively affect customers' satisfaction. Among them, the path coefficient of timeliness was the strongest predictor, higher than the others.

Table 2.1 (Continued)

Jain et al. (2021)	Electronic logistics service quality and repurchase intention in e-tailing: Catalytic role of shopping satisfaction, payment options, gender and returning experience.	The condition of the shipment is identified as the most crucial and the study suggests that e-tailers and their logistics service providers should focus on increasing customer satisfaction. Different payment methods influence customer concerns about the condition of the shipment. Apart from this, females are more concerned than men about the condition of the shipment. The poor condition of the shipment might have triggered returns in e-tailing in the Indian context.
Gajewska et al. (2020)	The impact of the level of customer satisfaction on the quality of e-commerce services.	Customers valued the guarantee/safety dimension the most, indicating that they perceive e-commerce services with increasing trust and consider them increasingly reliable. Reliability is identified as the most important factor in the assessment of the quality of e-commerce services.

2.2.3 Issues in E-commerce Customer Satisfaction

E-commerce consumer satisfaction is heavily influenced by logistical services across multiple aspects. The impact of logistical aspects of services on customer satisfaction in e-commerce remains a market challenge (Vasić et al., 2021). Keeping a customer satisfied is critical for any business, especially in the e-commerce era, when negative reviews, comments, and e-word of mouth quickly damage any businesses (Griva, 2022). According to Chatterjee, Goyal, Prakash and Sharma (2021) the positive and negative opinions coming from consumer feedback and reviews are critical for businesses in evaluating their customer base.

Customers may not repurchase from an online retailer if their order is late, damaged, or the driver's service is unsatisfying. Online retailers face additional challenges with

logistics, including warehousing, picking, and packaging and the effectiveness of the logistics and customer service procedures is impacted when an order contains a high number of products (Kawa & Światowiec-Szczepańska, 2021). Poor logistics infrastructure can lead to longer delivery time and product damage during transportation (Jain et al., 2021). By conclude this, customer satisfaction is critical to the success of both physical and online businesses.

2.3 Service Quality

Quality describes to the features of a product or service, including manufacturing, shipping, marketing, and ancillary activities, that contribute to customer satisfaction and consider the social environment (Gajewska et al., 2020). According to Liu and Kao (2022) the service quality theory suggests that buyers perceive service quality differently in e-commerce versus traditional consumption modes due to the lack of direct contact with firms and products. To ensure a medium perception of service quality, customer should engage with sellers via e-commerce platforms and receive products through logistical distribution. Service quality has been highlighted as an important factor that determines customer purchasing behaviour (Sheu & Chang, 2022).

2.3.1 Logistics Service Quality Overview

According to Huma (2020), logistics service quality is a technique for assessing the perceived value provided by service providers. Enhancing logistics services can strengthen relationships with suppliers and customers by increasing satisfaction, trust, market share, and service efficiency. According to El Moussaoui, Benbba and El Andaloussi (2023), logistics performance is defined as the link between services provided and resources used. Jain et al. (2021) suggest that high logistics service quality (LSQ) tends to increase customer satisfaction by meeting their needs effectively.

In today's globalized supply chain, logistics is crucial for both businesses and consumers. Improved logistics performance boosts a company's competitiveness by enhancing supply chain quality and timeliness, while also lowering coordination costs and risk (El Moussaoui et al., 2023). Logistics represent a significant expense in e-commerce, yet they are essential for fostering online purchasing (Qin, Liu & Tian, 2020). In e-commerce, logistics is considered the paramount aspect of business service quality, alongside marketing, operations, and collaboration (Vasić et al., 2021).

2.3.2 Theory Associated with Logistics Service Quality

Several theoretical frameworks and perspectives are associated with understanding and improving logistics service quality:

i) SERVQUAL model

The SERVQUAL model, formulated by Parasuraman, Zeithaml, and Berry (1988), is a widely adopted survey tool for evaluating service quality. SERVQUAL measures the gap between customer expectations and perceptions across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Customer expectations are pivotal in determining performance and satisfaction, as emphasized by various evaluation frameworks. In the realm of e-commerce logistics, these dimensions are applicable for evaluating service quality aspects such as punctual delivery, accurate order processing, transparent shipment tracking, and responsive customer service.

Several authors have used the SERVQUAL model to measure customer expectation, some examples of which include Restuputri et al. (2021), Lai et al. (2021), Gajewska et al. (2020), and Rashid & Rasheed (2024). SERVQUAL is often applied through surveys that measure customer perceptions and expectations across these dimensions.

The generated data can be used to identify service quality gaps and opportunities for improvement. In the context of e-commerce, effective implementation of the SERVQUAL model enables businesses to understand how effectively they are meeting customer expectations for logistics services, resulting in improved overall service quality and customer satisfaction. Thus, the SERVQUAL model is applicable to this study.

ii) American Customer Satisfaction Index (ACSI)

The American Customer Satisfaction Index (ACSI), introduced by Fornell in 1994, is a widely recognized economic indicator that assesses customer satisfaction across various industries and sectors in the United States. Figure 2.1 depicts the theoretical model, which posits that overall satisfaction is influenced by interconnected causal interactions. This model examines customer satisfaction through a system of interrelated causes and consequences, illustrating how consumption history and overall satisfaction are correlated. It also offers insights into the effects of high or low satisfaction levels, providing a forward-looking perspective.

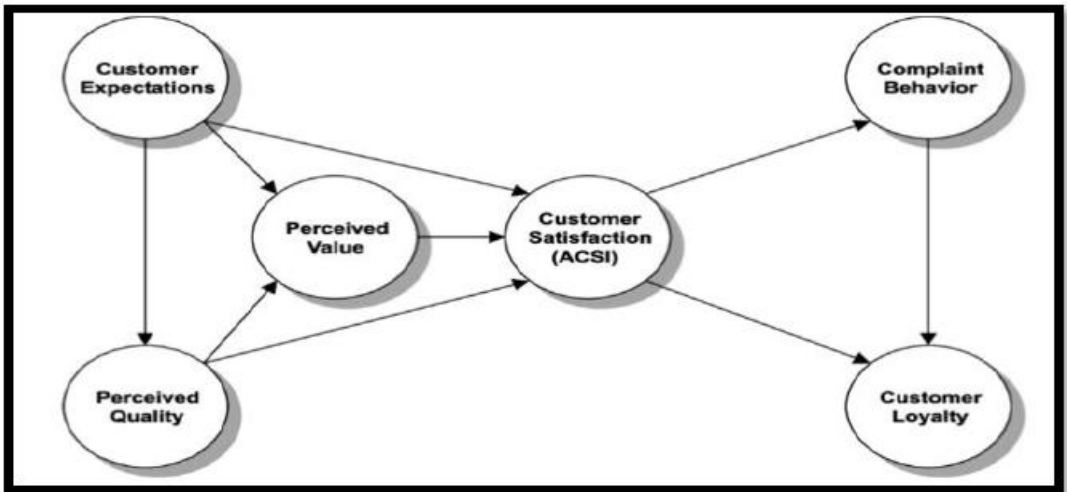

Figure 2.1
American Customer Satisfaction Index (ACSI) Model
Source: Fornell, Johnson, Anderson, Cha, & Bryant (1996)

Researchers, including Wattoo and Iqbal (2022), Liu at el. (2022) and Ali and Kaur (2018), have applied the ACSI methodology to evaluate customer satisfaction with e-commerce logistics services. According to the ACSI model, customer satisfaction directly influences customer loyalty, which in turn affects a company's profitability and competitive position. Utilizing customer satisfaction index data allows for comparisons of satisfaction levels across different regions and industries. From the customer's viewpoint, the American Customer Satisfaction Index reflects the collective sentiment regarding the products and services they purchase or use. Therefore, the ACSI model serves as a suitable framework for supporting hypotheses in this study.

2.3.3 The Relationship between Logistics Service Quality with E-commerce Customer Satisfaction and Hypotheses Development

E-retailers that excel in logistics can improve their competitiveness and overall performance, as logistics performs a vital role in the evolution of e-commerce (Vasić et al., 2021). Poor logistical performance in retail can lead to lower customer satisfaction levels (El Moussaoui et al., 2023). In e-commerce, physical distribution is crucial for customers as the delivery location is their first interaction with the product. Improving customer satisfaction and loyalty in ecommerce requires a focus on logistics and fulfilment services (Jain & Sundstrom, 2021). Customer satisfaction is positively influenced by logistical value, which can be further enhanced by industry-specific requirements for customer service. Without logistical solutions, e-commerce would have limited functionality. Effective internet sales require proper logistics, including procedures and equipment (Kawa & Światowiec-Szczepańska, 2021). We present hypotheses based on the studies discussed above and in the sections that follow.

1. Product Accuracy and E-commerce Customer Satisfaction

In e-commerce fulfilment, order accuracy represents the percentage of orders that are successfully and correctly fulfilled and delivered to customers without issues. Product accuracy is a crucial metric in logistics and supply chain management performance. According to Rita, Oliveira & Farisa (2019) and Gajewska et al. (2020), e-retailers prioritize providing excellent customer service by ensuring that products received are accurate in terms of both the correct product type and quantity. Customers who receive the wrong item or quantity are likely to be dissatisfied and may not purchase at same shop (Gajewska et al., 2020). According to Restuputri et al. (2021) delivering the correct items at the right time is a competitive advantage that enables logistic experts to outperform competitors in innovative ways. Below are the errors that we found in product accuracy:

i) Incorrect item being shipped.

ii) Incorrect quantity being shipped.

To conclude, order accuracy is an important indicator for web-based businesses because it has a significant effect on consumer satisfaction. Based on the above statement, it is proposed that

H1: Product accuracy positively influences e-commerce customer satisfaction.

2. Delivery Time and E-commerce Customer Satisfaction

In the world of e-commerce, delivery time is critical to customer satisfaction. Several studies have demonstrated that elements such as reliability, timeliness, and delivery performance have a beneficial effect on customer satisfaction. Customers want their products to be delivered on schedule, and delays or extended delivery periods might

cause dissatisfaction. It has been shown that providing an accurate estimate and ensure of delivery time might assist manage consumer expectations and satisfaction (Mofokeng, 2021, Gajewska et al., 2020, Vasić et al., 2021, Vu et al., 2020, & Restuputri et al., 2021). Vasić et al. (2021) When delivery times surpass expectations, customers become irate, and businesses may lose one or more transactions as well as customer loyalty. Retailers must prioritize speedy delivery and minimize waiting times. Based on the above statement, it is proposed that

H2: Delivery time positively influences e-commerce customer satisfaction.

3. Product Condition and E-commerce Customer Satisfaction

Product condition has a huge impact on e-commerce customer satisfaction. Good product quality, with no defective products, improves customer satisfaction. Users rely on evaluations from other buyers to make purchasing decisions, and the quality of the product received plays a vital influence in their satisfaction. Based on Mofokeng (2021) research, delivery had the greatest impact on customer satisfaction, implying that seller should guarantee that the products are shipped in undamaged and within the specified time period. Logistics service providers need to modify delivery capacity to prevent damage when items reach customer (Restuputri et al., 2021). Based on the above statement, it is proposed that

H3: Product condition positively influences e-commerce customer satisfaction.

4. Shipping Cost and E-commerce Customer Satisfaction

Shipping costs have been shown to influence customer satisfaction in e-commerce. According to Rashid and Rasheed (2024), the term "shipping costs" refers to the shipping fees that are added to the order and are shipped to the customer and charges

include monitoring, processing, and performing each and every charge associated with air, sea, and road delivery. The amount paid delivery before to purchase effects customer satisfaction and their intention to shop online (Gajewska et al., 2020). Competitive logistics companies offer high-quality services at reasonable prices, favouring customers. Customers frequently associate pricing with quality (Miao et al., 2022). Restuputri et al. (2021) informed that to gain repeat business, logistics service companies should deliver high-quality services that align with their prices and satisfy customers. Based on the above statement, it is proposed that

H4: Shipping cost positively influences e-commerce customer satisfaction.

5. Reverse Logistics Services and E-commerce Customer Satisfaction

Customers have high expectations for e-commerce service businesses to handle returns and provide appropriate services. Online buyers in Malaysia are having trouble returning items, even when their purchase is damaged. Reverse logistics have become important to e-commerce in an effort to raise client satisfaction and online shoppers' confidence in their purchases (Jalil, 2019). After-sales services are crucial for e-commerce, covering shipment modifications or cancellations, replacements, product returns, and reimbursements (Jain et al., 2021). In e-commerce, reverse logistics has a substantial impact on customer satisfaction, with operational timeliness being especially important. The connection between reverse logistics and customer satisfaction in e-commerce is receiving more attention in academic research and industry investigations. Based on the above statement, it is proposed that

H5: Reverse logistics services positively influences e-commerce customer satisfaction.

2.4 Research Framework

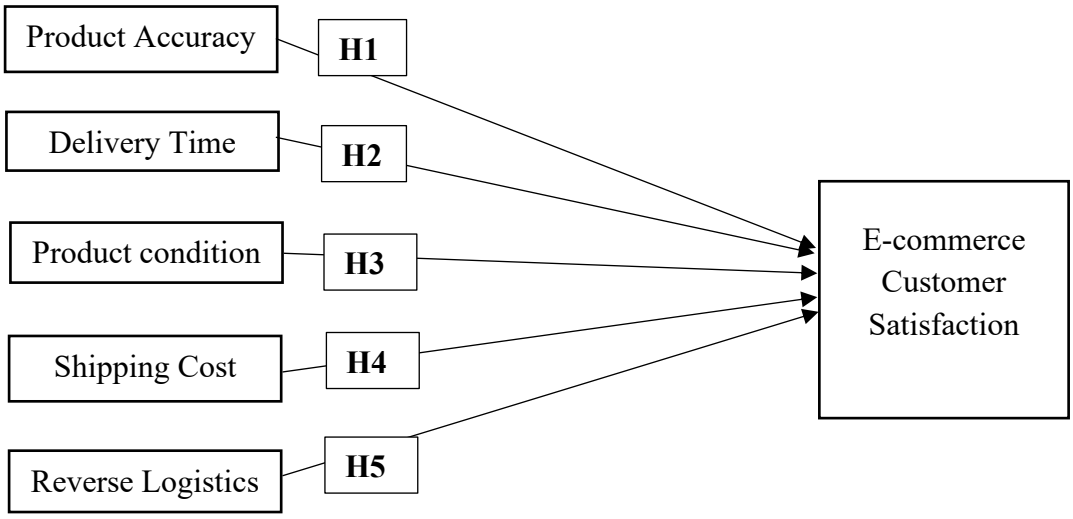

Figure 2.2 *Research Framework*

2.5 Chapter Summary

This chapter offers a thorough analysis of the literature in the areas of logistics services quality on e-commerce customer satisfaction. Customer satisfaction in e-commerce has been determined to be related with product accuracy, delivery time, product condition, shipping cost, and reverse logistics services. Further investigation is required to find out the relationships between the quality of logistics services and the satisfaction of e-commerce customers in Malaysia.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter delineates the methodology of the study, informed by the problem statement, research objectives, and findings from previous studies. It encompasses the study design, population, data sources, and sampling methods. The chapter also addresses the development of data collection tools and metrics, along with the processes involved in gathering data. Finally, it concludes with a discussion on the applied methods for data analysis.

3.2 Research Design

This study uses a quantitative research design to investigate the major influencing elements such as product accuracy, delivery time, product condition, shipping cost and reverse logistics in logistics quality services to e-commerce customer satisfaction. Quantitative methods used for this research because this method allow for the objective measurement of variables associated with logistics services quality and customer satisfaction and more efficient in accordance with gathering and analysing data, particularly when dealing with large sample sizes or complex datasets. Quantitative methods enable the use of statistical techniques to analyse large datasets efficiently. This contains methods such as regression analysis, correlation analysis, and hypotheses testing, which can provide insights into the relationships between variables and the strength of those relationships.

In this study, researchers performed correlational investigations to evaluate whether and to what degree there was a relationship between two or more quantifiable factors

(Hodge, 2020). This methodology allows a discussion of the result from the research questions and the presence of a relationship between the independent and dependent variables.

3.3 Population, sample, and unit of analysis

3.3.1 Research Population

The target demographic comprises all users of e-commerce platforms located in the northern region of Malaysia. This study aims to evaluate customer satisfaction levels regarding the quality of logistics services provided by gathering information from e-commerce platform users in this specific region. With increasing internet penetration and advancements in technology, more customers are opting to make purchases online, highlighting the relevance and timeliness of this research. Commission Factory (2023) reports that, as of the beginning of 2023, 15.63 million Malaysians were making purchases of consumer items online, representing an 8.3% annual growth in internet customers. The overall predicted yearly spending on e-commerce purchases in 2022 was $9.08 billion, divided among fashion ($2.73 billion), electronics ($2.83 billion), toys and hobbies ($1.11 billion), personal care ($1.08 billion), and food/beverages ($202 million). In term of this, e-commerce platform customers northern region of Malaysia is suitable for data collection.

3.3.2 Research Sample

This study employed the multistage sampling method. A multistage sampling strategy is a method that involves a number of steps to gradually reduce a large population into a small sample. This sampling was chosen for this study because it is affordable, and using these strategies is considerably easier for dealing with large sample sizes. Apart

from this, this study was conducted within a short time frame, making it suitable for the time horizon.

First stage in this study separated the states of Perlis, Kedah and Penang into three clusters in the northern part of Malaysia. The population for these three states based on Department of Statistics Malaysia official portal is approximately 4,220,189 peoples. Based on the data, total population for Perlis is 290,280 peoples living in this state, Penang state is 1,748,160 peoples and Kedah is 2,181,749 peoples. Based on broadband subscription report from the Malaysian Communication and Multimedia Commission (MCMC) for the fourth quarter of 2023, the number of fixed and mobile broadband users as below:

Table 3.1
Number of Internet User

States	Fixed-broadband User	Mobile- broadband User
Perlis	25,000	317,600
Kedah	203,700	2,561,100
Penang	340,000	2,942,000

Based on Shen (2019) in The Malaysian Reserve news, many Malaysians own multiple cell phones or lines. These mobile gadgets are also widely used by foreign workers. So, the number of mobile-broadband user is higher than the state's population.

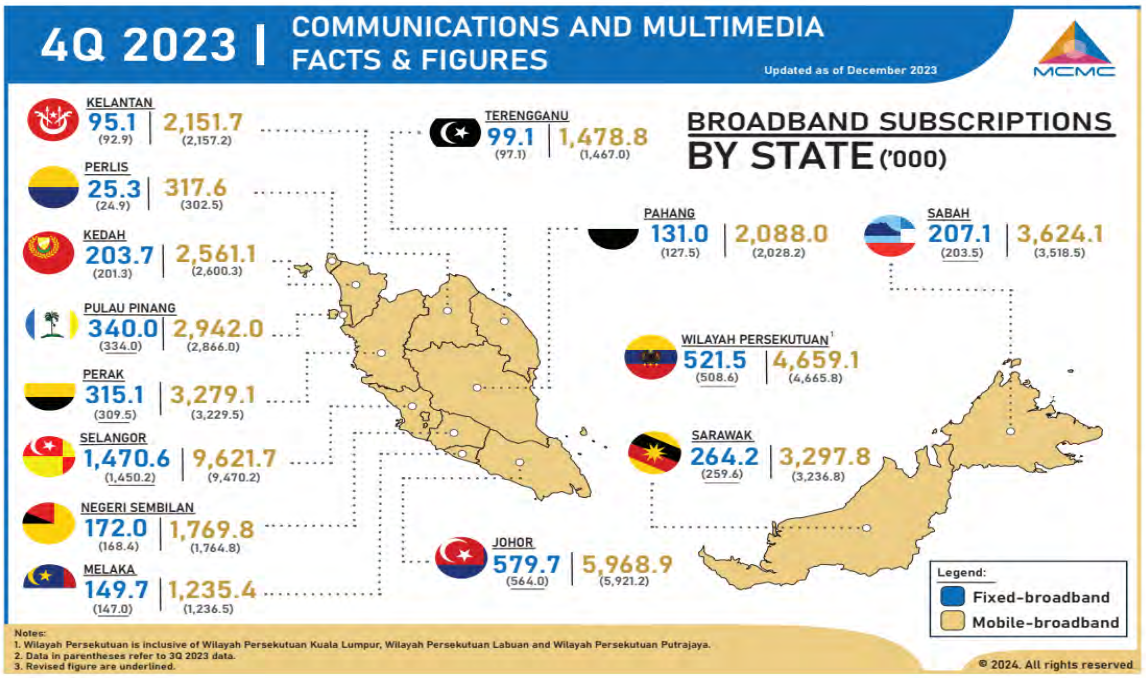

Figure 3.1
Communication and Multimedia Facts and Figures
Source: Malaysia Communication and Multimedia Commission (MCMC)

Apart from this, Perlis, Kedah, and Penang states represent a diverse range of geographical characteristics, including urban, suburban, and rural areas. Analysing these states allows for understand how logistics services impact e-commerce customer satisfaction across different geographic settings. These state's population are sufficient for conduct this study.

In the second stage, clusters within each state are selected at random. These clusters should accurately reflect the state's characteristics. The third stage involved sampling within each cluster. The questionnaire was distributed randomly through the Facebook, WhatsApp, and LinkedIn platforms. The fourth stage in this process involves gathering the data and analysing it using appropriate statistical techniques to figure out how the quality of the logistics service affects e-commerce customers satisfaction. Explore correlations, regression analyses, and other techniques to identify significant relationships and patterns. The final stage is to analyse the results to see how logistics services impacting the satisfaction of online shoppers in Malaysia's northern states.

According to Sekaran and Bougie (2016), sampling design and size are crucial for ensuring representativeness and generalizability. For a population size of 4,220,189, the recommended minimum sample size is 384. Table 3.2 presents a general scientific approach for determining sample size.

Table 3.2
The Table of Sample Size (Sekaran and Bougie, 2016)

Population Size (N)	Sample Size (S)
10 000	370
15 000	375
20 000	377
30 000	379
40 000	380
50 000	381
75 000	382
1 000 000	**384**

Table 3.3
Population and Sample

States	Total Population	Percentage of People Seletion	Sample Size
Perlis	290,280	7%	27
Penang	1,748,160	42%	161
Kedah	2,181,749	51%	196
Total	**4,220,189**	**100%**	**384**

3.3.3 Unit of Analysis

The current study looks into the satisfaction of e-commerce customers. This is the reason for information is collected from e-commerce customers. As a result, the unit of analysis for this study is the customers who have conducted e-commerce transactions in northern part of Malaysia. Data gathered on their demographics, shopping experience, satisfaction levels, and experiences of logistics services.

3.4 Sampling Design

This study's target group is Malaysian e-commerce customers who have completed online transactions. The data for this study was gathered using probability sampling methods. Divide the population into clusters and choose entire clusters at random for inclusion in the study. In this study, data is randomly collected from clusters of Malaysian cities or geographic regions.

3.5 Questionnaire Preparation and Scale Type Used

A questionnaire has been employed in this study to gather primary data from Malaysian states of Perlis, Penang, and Kedah e-commerce customer. This research collected data using the Likert scale because measurement scales are effective for assessing the relationship between variables. The Likert scale determines whether respondents agree or disagree with various statements regarding a perspective, objects, individual, or event. To measure logistics service quality, respondents were asked to indicate their attitude on a five-point Likert scale, starting from 1 as "strongly disagree" to 5 as "strongly agree" (Thai, 2013). The scale has five categories such as 1=Strongly Disagree, 2=Disagree, 3=Average, 4=Agree, and 5=Strongly Agree. By giving respondents multiple ways to react to the questions, this scale will help in enhancing the response rate.

There were two parts to the questionnaire. The research on descriptive statistics is covered in the first section. It contains the private data of each respondent, including their gender, age group, race, education level, occupation, location, and e-commerce shopping experience. The subsequent part of the questionnaire consists of the study's primary variables. These variables include product accuracy, delivery time, shipping cost, product condition, reverse logistics and e-commerce customer satisfaction.

Table 3.4

Questionnaire Preparation

Dimensions	Items	Source
Product Accuracy		
PA1	E-retailer shipped the correct quantity of the items.	Adopted according to: Rita et al. (2019)
PA2	E-retailer shipped the correct item as order in online platform.	
PA3	Parcel rarely contains mistaken products.	
Delivery Time		
DT1	I am satisfied with how quickly the E-retailer delivered the order when it was successful.	Adopted according to: Rita et al. (2019), Mofokeng (2021), Vasić et al. (2021), Vu et al. (2020) and Restuputri et al. (2021).
DT2	I am satisfied with the time it took from ordering to receiving the item.	
DT3	Buyers have the option of choosing between various delivery times.	
DT4	Products are supplied on the specified dates and deadlines.	
DT5	E-retailers supply items within a specific time frame.	
Product Condition		
PC1	The packaging used to transport the supplied items is rarely damaged.	Adopted according to: Rita et al. (2019), Vasić et al. (2021), Jain et al., (2021)
PC2	Products are rarely damaged upon delivery.	
PC3	Product damage rarely occurs as a result of inadequate shipping and handling.	
PC4	The delivered products meet the specifications listed online.	
PC5	Delivered products are functioning well.	
Shipping Cost		
SC1	E-retailer provides the option of free product delivery.	Adopted according to: Vasić et al. (2021)
SC2	E-retailers provide low-cost delivery.	
SC3	There are no additional expenses for product delivery to a home address or store drop-off location.	
SC4	E-retailers provide the option of selecting the delivery agency in the online platform.	

Table 3.4 (Continued)

Reverse Logistics		
RL1	The entire return logistics operation process and return policy is easy and fast.	Adopted according to: Vasić et al. (2021), Thu, Nguyen & Vu (2024)
RL2	Damaged, unwanted, or malfunctioning products are quickly and easily recovered and replaced.	
RL3	After asking for a return process, I am satisfied with the customer service representative's quick response and reply.	
RL4	After requesting for a return operation, the system gives immediate updates on logistical tracking information.	
RL5	I am satisfied with both the e-commerce platform and the business's return policy.	
Customer Satisfaction		
CS1	The e-retailers precisely fulfills my expectations.	Adopted according to: Vasić et al. (2021)
CS2	E-retailer operates in accordance with the terms promised.	
CS3	I am satisfied with the quality of e-retailer customer services.	
CS4	I am satisfied with the price of delivery charges.	
CS5	I am satisfied with the door-to-door delivery services	
CS6	I enjoy online shopping at e-commerce online platforms.	

3.6 Data Collection Methods

This research used questionnaires to gather data. The questionnaire was delivered via Facebook, WhatsApp, and LinkedIn in Google Form format to a randomly selected sample of 384 internet users. It is a simple and quick approach to collect data from respondents. Respondents can have enough time to answer the questions. Google form questionnaire is the cheapest option to reach the maximum number of respondents.

3.7 Statistical Methods

In the research statistical methods play a crucial role in examining and interpreting the data collected. The data collected from the questionnaire underwent coding and analysis

utilizing the Statistical Package for the Social Sciences (SPSS) version 28.0. IBM SPSS provides advanced statistical analysis and ensuring accuracy in results. IBM SPSS is powerful tools for statistical analysis, machine learning, text analysis, and handling large datasets, all with an easy-to-use interface (Milovanovic & Perisic, 2020).

3.8 Pilot Study

Every survey needs to be tested before being used. Pilot studies can improve research validity and help plan and modify larger investigations. The pilot test validated the instrument's reliability, while also allowing for the refinement and modification of the research tool (Gani, Imtiaz, Rathakrishnan & Krishnasamy, 2020). It can help enhance this study by recommending improvements to the questionnaire. The study used 384 respondents as its minimum sample size. Therefore, this study distributes 30 questionnaires as a pilot study. 30 Google Form questionnaires distributed through Facebook to students, family and friends who have online shopping experience. 35 questionnaires were returned because the respondents distributed the question to their family and friends. In 35 questionnaires, four of them are invalid because one respondent stated the person had not used an online platform to purchase the product, and three respondents never answered the questions completely. Thus, 31 questionnaires have been used for this pilot test.

3.8.1 Reliability Test

Cronbach's Alpha was employed in this study to assess reliability. Cronbach's alpha has the obvious advantage of providing a single estimate of the scale's internal consistency or reliability, as instead of a range of other reliability estimates. The reliability assessment undertaken in this investigation aimed to determine the reliability of the measurement scales employed to evaluate various aspects of customer satisfaction.

These categories help to understand how reliable a test or questionnaire is (Reddy, Sengupta, Jackson & Lewis, 2023). Lee Cronbach developed Cronbach's alpha, which is represented as a value between 0 and 1, in 1951 to offer an indication of the internal consistency of a test or scale (Tavakol & Dennick, 2011). In order to prevent indicator redundancy, Hair, Risher, Sarstedt and Ringle (2019) advised a range of 0.70 to 0.90, with a minimum of 0.60 and a maximum of 0.95 in exploratory study.

According to Adeniran (2019), in accordance with the type of research, the acceptable range is 0.70 to 0.90 or higher.

Table 3.5
Reliability Results

Variable	Mean	Cronbach's Alpha	Status
Product Accuracy	4.1613	0.771	Acceptable
Delivery Time	3.5806	0.728	Acceptable
Product Condition	3.8387	0.815	Acceptable
Shipping Cost	3.4355	0.612	Acceptable
Reverse Logistics	3.4	0.762	Acceptable
Customer Satisfaction	3.7903	0.929	Acceptable

The Table 3.5 demonstrates the reliability analysis for this study. The Cronbach's Alpha for product accuracy is 0.771, which is acceptable. Delivery time is 0.728 in Cronbach's Alpha, which is acceptable. The score of Alpha value for product condition is 0.815, which is acceptable. The Cronbach's Alpha for shipping cost is 0.612 which is still acceptable. The reverse logistics for Cronbach's Alpha is 0.762 is acceptable. Finally, the Cronbach's Alpha for customer satisfaction is 0.929 which also consider as acceptable.

3.9 Summary

This chapter detailed the approach used in this study. Every stage has been addressed, from data collection to the tools used for evaluate the data. The outcomes of the data analysis will be given in the next chapter. Depending on the study's needs, the findings or results are explained in the following chapter.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 Introduction

To address the research questions, this chapter analysed the data gathered from the questionnaire survey. It begins with an overview of the response rate and participant demographics and continues with findings related to key variables. Using SPSS for data analysis which is descriptive, correlation, and regression analysis to highlight relationships between variables. Finally, this chapter end with a summary and a discussion of relationship between variables.

4.2 Survey Response Rate

The questionnaire was developed in electronic form and distributed in Facebook, WhatsApp and LinkedIn and data was collected online over an 18-day period. This section indicates the questionnaire's rate of response.

Table 4.1
Response Rate of Surveys

Description	Total	Percentage (%)
Total questionnaire distributed	480	100
Total Received Questionnaires	459	95.6
Other Province Questionnaires	7	1.5
No Online Shopping Experience Questionnaires	14	2.9
Missing Answer Questionnaires	11	2.2
Accepted Questionnaires	427	88.9

480 questionnaire invites were distributed, and 459 responses were collected. As a result, 95.6% of respondents completed this questionnaire. According to Crompton and Tian-Cole (1999), overall response rates of 70% are possible for social activity samples,

response rates of 60% and 55% are more realistic for professional and general interest groups. From 459 questionnaires, 7 respondents choose other states, while 14 respondents had no experience with online purchasing. 11 questionnaires were rejected because respondents did not answer all the questions. Therefore, this study evaluated 427 completed and useful questionnaires. 427 respondents said that they had online shopping experience and were from Malaysia's northern states such as Perlis, Kedah, and Penang. They answered all of the questions in the questionnaire.

4.3 Respondents' Profile

Respondents' demographics were categorized into eight types such as gender, age, race, education level, occupation, location, and year of experience in online shopping experience. Responses from other states and no experience with online shopping has been removed for this data analysis. Missing answer questionnaires also has been removed.

Table 4.2
Demographic Profile of Respondents

Item		Frequency	Percentage (%)
Gender	Male	146	34.2
	Female	281	65.8
	Total	427	100
Age	0-19	19	4.4
	20-25	82	19.2
	26-35	122	28.5
	36-40	130	30.5
	41-50	57	13.4
	Above 50	17	4.0
	Total	427	100
Race	Malay	220	51.6
	Chinese	92	21.5
	Indian	108	25.3
	Others	7	1.6
	Total	427	100

Table 4.2 (Continued)

Education Level	High School Diploma Undergraduate Master and above **Total**	52 79 263 33 427	12.1 18.5 61.6 7.8 100
Occupation	Employed Retired Self-Employed Others **Total**	304 14 58 51 427	71.2 3.3 13.5 12 100
Location	Perlis Penang Kedah **Total**	32 181 214 427	7.5 42.3 50.2 100
Year of Experience in Online Shopping	Less than 1 year Less than 2 years Less than 3 years Less than 4 years Less than 5 years More than 5 years **Total**	15 19 43 38 52 260 427	3.5 4.3 10.0 8.8 12.7 60.7 100

The Table 4.2 showed that there are 146, or 34.2% of males, and there are 281 or 65.8% females in this study. In terms of age, there are six different age groups: 19 respondents (4.4%) are under 19 years old. 82 respondents (19.2%) are between 20-25 years old. 122 respondents (28.5%) are between 26-35 years old. 130 respondents (30.5%) are between 36-40 years old. This is higher percentage of age group because individuals in this age range generally have a stable income, which enables them to make purchases online. 57 respondents (13.4%) are between 41-50 years old, and 17 respondents (4.0%) are over 50 years old.

In addition, there are 4 categories for races in Malaysia. 220 respondents or 51.6% are Malay, 92 (21.5%) respondents are Chinese, Indian is 108 (25.3%) respondents and other races are 7 (1.6%) respondents. In term of educational level, there are 4 categories used for questionnaire. There are 52 respondents in high school, accounting for 12.1%.

Diploma has 79 respondents or 18.5%. Undergraduate has 263 respondents or 61.6%. There were 33 respondents or 7.8%, with a master's degree and above.

For the occupation, there are 4 categories. 304 respondents or 71.2% are employed, retired respondents are 14 or 3.3%, self-employed is 58 respondents or 13.5% and others are 51 respondents or 12%. For this study, 3 states are used. 32 respondents or 7.5% are from Perlis, respondents from Penang are 181 or 42.3% and Kedah is 214 respondents or 50.2%. Year of experience in online shopping also counted in this study. 15 respondents or 3.5% selected less than 1 year, 19 respondents or 4.3% selected less than 2 years and 43 respondents or 10.0% informed less than 3 years. 38 respondents or 8.8% choose less than 4 years of experience in online shopping, 52 respondents or 12.7% is less than 5 years and 260 respondents or 60.7% informed more than 5 years.

4.4 Results of Analysis

Here is a summary of the important findings and their interpretation of how logistics service quality affects e-commerce customer satisfaction.

4.4.1 Normality Analysis

Normality tests assess whether a dataset has a normal distribution, which is important for certain statistical analyses that assume normality. Normality tests evaluate and compare the power of a sample drawn from a normally distributed population (Yazici & Yolacan, 2007). There are several methods to determine if the data distribution deviates from normality. Previous studies have identified skewness and kurtosis as the most common representations.

Skewness is a statistical measure that describes the asymmetry of a distribution of data points around its mean. It indicates whether the data is concentrated more on one side of the mean than the other. Kurtosis is a statistical measure that describes the shape, or

"tailedness," of a distribution of data points around its mean. It indicates whether the data are heavy-tailed or light-tailed relative to a normal distribution. George and Mallery (2010) define normal distributions as having skewness and lowness values ranging from +2 to -2.

Table 4.3
The Result of Normality Tests

	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Product Accuracy	0.98152	-1.472	0.118	1.693	0.236
Delivery Time	0.83896	-1.169	0.118	1.505	0.236
Product Condition	0.82929	-0.925	0.118	0.791	0.236
Shipping Cost	0.88087	-0.978	0.118	0.748	0.236
Reverse Logistics	0.84853	-1.023	0.118	0.894	0.236
Customer Satisfaction	0.95003	-1.387	0.118	1.514	0.236

In this study, the skewness and kurtosis values were tested, and all variables were between +2 to -2. As shown in Table 4.3, the ratios of skewness and kurtosis were within +2 to -2 of the normal distribution. Therefore, the assumption of normality was fully accepted. the ratios of skewness and kurtosis were within +2 to -2 of the normal distribution.

4.4.2 Descriptive Statistics Analysis

Basic statistics for both independent and dependent variables were calculated in this study using descriptive statistics, including means and standard deviations.

Table 4.4
Descriptive Statistics of Each Variable

Variable	Mean	Std. Deviation	N
Product Accuracy	3.8626	0.98152	427
Delivery Time	3.8464	0.83896	427

Table 4.4 (Continued)

Product Condition	3.8131	0.82929	427
Shipping Cost	3.7681	0.88087	427
Reverse Logistics	3.8843	0.84853	427
Customer Satisfaction	3.8568	0.95003	427

The Table 4.4 presents descriptive statistics for five key variables such as product accuracy, delivery time, product condition, shipping cost, reverse logistics and customer satisfaction. In research, the Mean (average) and Standard Deviation (spread) are key to understanding data. The mean is considered a measure of central tendency because it reflects the central or middle point of a distribution (Arkkelin, 2014). To analyse the study indicators, data were converted into mean scores on a scale from 1.00 to 5.00, where scores from 1.00 to 2.90 represent low levels, and scores from 3.00 to 5.00 represent high levels (Ampadu, 2017).

On the other hand, the standard deviation serves as a measure of variability, indicating the extent to which scores deviate from this central point (Arkkelin, 2014). A high standard deviation indicates that data points are spread out over a wide range, meaning there is more variability in the data. Conversely, a low standard deviation means that data points are closer to the mean, showing less variability (Andrade, 2020).

Based Table 4.4 it can be concluded that reverse logistics had the highest mean score of 3.8843. This is followed by product accuracy with mean score of 3.8626, customer satisfaction with mean score of 3.8568, delivery time with means score of 3.8464 and product condition with mean score of 3.8131. Meanwhile, shipping cost had lowest mean score which is 3.7681.

Regarding standard deviation, all the instruments used scored below 1.00, indicating minimal variability in respondents' evaluations (Sekaran & Bougie, 2013). In this study, product accuracy has highest standard deviation and product condition has lowest standard deviation.

4.4.2 Reliability Analysis

Reliability is an important measure of research findings from surveys data and project assessment data, primarily related to the data's credibility. The reliability test determines if the collected data accurately reflect the objective phenomenon. According to Adeniran (2019), in accordance with the type of research, the acceptable range is 0.70 to 0.90 or higher. The Table 4.5 shows the values of Cronbach's Alpha of the variable being analysed. In this study, product accuracy, delivery time, product condition, shipping cost, reverse logistics and customer satisfaction were tested.

Table 4.5
The Result of Reliability Tests

Variable	Cronbach's Alpha	N of Items	Result
Product Accuracy	0.847	3	Acceptable
Delivery Time	0.844	5	Acceptable
Product Condition	0.834	5	Acceptable
Shipping Cost	0.823	4	Acceptable
Reverse Logistics	0.856	5	Acceptable
Customer Satisfaction	0.921	6	Acceptable

The reliability analysis for a real study is displayed in the table above. The number of the items for product accuracy is 3 and Cronbach's Alpha value is 0.847 which is acceptable. There are 5 items for delivery time, and the Cronbach's Alpha value is 0.844, which is acceptable. Number of items for product condition is 5 and Cronbach's Alpha value is 0.834 also showed acceptable. Cronbach's Alpha value for shipping cost is

0.823 and number of items is 4 which is acceptable. The result for reverse logistics is acceptable with number of items is 5 and Cronbach's Alpha value is 0.856. Lastly, the customer satisfaction with number of items is 6 and Cronbach's Alpha value is 0.921 also showed acceptable. All the variables are acceptable for this study.

4.4.3 Correlation Analysis

Correlation analysis is a commonly used method in research to assess the strength of the connection between study variables. Pearson correlation has been used in this study. The Pearson correlation coefficient (often denoted as *r*) is a measure of the linear relationship between two continuous variables. Sedgwick (2012) informed that a perfect correlation (correlation coefficient of 1 or −1) would have existed if every point on the scatter plot was on a straight line. Table 4.6 presents the interpretive relationships boundaries between the independent variable and dependent variable based on the r coefficient calculated by Dunn (2001).

Table 4.6
Pearson Correlation Coefficient Interpretation by Dunn (2001)

Coefficient Value	Relation Between Variables
0.00 to 0.19	Very Weak Relationship
0.20 to 0.39	Weak Relationship
0.40 to 0.59	Moderate Relationship
0.60 to 0.79	Strong Relationship
0.8 and 1.00	Very Strong Relationship

Table 4.7 shows the Pearson correlation results of this study.

Table 4.7
The Result of Correlation analysis

		Customer Satisfaction
Product Accuracy	Pearson Correlation	.785**
	Sig. (2-tailed)	<.001
Delivery Time	Pearson Correlation	.722**
	Sig. (2-tailed)	<.001
Product Condition	Pearson Correlation	.699**
	Sig. (2-tailed)	<.001
Shipping Cost	Pearson Correlation	.683**
	Sig. (2-tailed)	<.001
Reverse Logistics	Pearson Correlation	.771**
	Sig. (2-tailed)	<.001
Customer Satisfaction	Pearson Correlation	1
	Sig. (2-tailed)	

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

Table 4.7 shows Pearson correlation coefficients and their interpretations for the variables related to customer satisfaction. Pearson correlation between product accuracy and customer satisfaction is 0.785. There is a strong relationship between product accuracy and customer satisfaction. Pearson correlation Pearson correlation between delivery time and customer satisfaction is 0.722 and the correlation between delivery time and customer satisfaction is strong relationship. The correlation between product condition and customer satisfaction is 0.699, which has strong relationship. The correlation between shipping cost and customer satisfaction is 0.683 and there is a strong correlation. The Pearson correlation between reverse logistics and customer satisfaction is 0.771. There isa strong relationship between reverse logistics and customer satisfaction. The significance value (all correlation <0.001) indicate that these correlations are statistically significant.

4.4.4 Multiple Regression Analysis

Multiple Regression is a method used to model and examine how a dependent variable is influenced by multiple independent variables (Tyagi et al., 2022). In addition, regression analysis can also be used for estimation and forecasting.

Table 4.8
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.868[a]	0.753	0.75	0.47457

a Predictors: (Constant), RL, PA, SC, PC, DT

The table above that is $R^2 = 0.753$, meaning that 75% model is good in customer satisfaction (dependent variable) can explained an acceptable regression model for reverse logistics, product accuracy, shipping cost, product condition and delivery time (independent variables).

Table 4.9
Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	289.67	5	57.934	257.233	<.001b
	Residual	94.818	421	0.225		
	Total	384.488	426			

a Dependent Variable: CS
b Predictors: (Constant), RL, PA, SC, PC, DT

The ANOVA table showed it can be concluded that there was a statistically significant interaction at the significance level of 0.01 ($p<0.05$). Thus, predictor variables such as reverse logistics, product accuracy, shipping cost, product condition, and delivery time are significant with customer satisfaction.

Table 4.10
Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.147	0.12		-1.23	0.219
	PA	0.425	0.036	0.439	11.847	<.001
	DT	0.068	0.049	0.06	1.387	0.166
	PC	0.05	0.049	0.044	1.028	0.305
	SC	0.108	0.044	0.1	2.481	0.013
	RL	0.387	0.047	0.346	8.183	<.001

a Dependent Variable: CS

In the multiple regression analysis, each predictor variable's impact on the dependent (e-commerce customer satisfaction) is examined. The p-values and t-values are crucial for determining their statistical significance. P-values should ideally fall within the range of P (0.000) < α (0.05) for a statistically significant result. The decision criteria are that if the p-value is < 0.050, the relationship is significant; if it is more than 0.050, the relationship is not significant (Purwanto, 2021). Regarding t-value decision criteria are if the t-value is greater than >1.96, the relationship is considered significant; if the t-value is less than 1.96, the relationship is not considered significant (Purwanto, 2021).

The relationship between product accuracy and customer satisfaction is significant with p=0.001 and t=11.847. Delivery time has a t-value of 1.387 and a p-value of 0.166, which is not statistically significant. Product condition has a t-value of 1.028 and a p-value of 0.305, indicating that it is not statistically significant. Shipping cost has a t-value of 2.481 and a p-value of 0.013, indicating that it is statistically significant at the p-value 0.05 level. This suggests that shipping cost has a significant impact on the customer satisfaction in the model. Reverse logistics has a very high t-value of 8.183

and a highly significant p-value of less than 0.001. This indicates that reverse logistics is a strong predictor of the dependent variable in the model.

The product accuracy and reverse logistics variables show very significant t-values and p-values, indicating that they impact the dependent variable. Shipping cost has a moderate t-value and a significant p-value, indicating it has a measurable impact on the dependent variable. Delivery time and product condition have a t-values and p-values suggesting they are not statistically significant predictors of the dependent variable.

4.5 Summary

Chapter four had presented all the findings from respondents in studying the relationship and impact of independent variable on e-commerce customer satisfaction. The reliability analysis shows that the Cronbach's Alpha value for each variable is greater than 0.6, which seems acceptable. The result of correlation between the independent variables showed that each of the variables had strong correlation with e-commerce customer satisfaction. In addition, regression analysis was conducted to measure the relationship between the variable showed that product accuracy, reverse logistics and shipping cost only positively influence e-commerce customer satisfaction and delivery time and product condition not positively influence e-commerce customer satisfaction.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses the findings on the impact of product accuracy, delivery time, product condition, shipping cost and reverse logistics on e-commerce customer satisfaction. This chapter is segmented into three parts. The initial section focuses on the study's outcomes, followed by a summary that aligns these findings with the research objectives. Following this, limitations of the study are addressed, followed by recommendation for future research.

5.2 Overview of Study Findings

The purpose of the study is to examine the relationship between product accuracy, delivery time, product condition, shipping cost and reverse logistics with e-commerce customer satisfaction.

In general, the study's objectives were evaluated using the following research question:

1. Do factors like product accuracy, delivery time, product condition, shipping cost and reverse logistics impact the e-commerce customer satisfaction?

To address the research topics, this study used statistical analysis-descriptive statistics, normality analysis, reliability analysis, correlation analysis, and multiple regression to answer the research questions. Table 5.1 shows that only three independent variables have a statistically significant relationship with the dependent variable.

Table 5.1
Summary of All Tested

Hypothesis	Description	Result
H1	Product accuracy positively influences e-commerce customer satisfaction	Significant
H2	Delivery time positively influences e-commerce customer satisfaction.	Not Significant
H3	Product condition positively influences e-commerce customer satisfaction.	Not Significant
H4	Shipping cost positively influences e-commerce customer satisfaction.	Significant
H5	Reverse logistics services positively influence e-commerce customer satisfaction.	Significant

First, the relationships between product accuracy and e-commerce customer satisfaction were investigated, and the results showed a positive influence with a higher t-value and a strong correlation. It is evident that product accuracy, such as the correct item and quantity play an important role in determining overall e-commerce customer satisfaction. Second, e-commerce customer satisfaction was positively influenced by the independent variable that shipping cost, which had a strong correlation with the dependent variable. Third, the relationship between reverse logistics and e-commerce customer satisfaction was examined and the findings revealed that reverse logistics positively influences e-commerce customer satisfaction. As a result of this study, hypotheses 1, 4, and 5 were accepted.

Meanwhile, the most unexpected finding in this study was that delivery time and product condition have no positive influences on e-commerce customer satisfaction, as indicated by a low t-value and a strong correlation. Considering these results, Hypotheses 2 and 3 were not accepted in the present study. Each of the five findings

will be investigated in further depth in this study, drawing on relevant literature and past research findings.

5.2.1 Research Objective 1: To examine relationship between product accuracy and e-commerce customer satisfaction.

The first research objective is to examine the relationship between product accuracy and e-commerce customer satisfaction. The study revealed that there is a significant relationship between product accuracy and e-commerce customer satisfaction which indicated highest beta coefficient value (β= 0.439, t= 11.847, sig.= <.001). According to the findings, there is a statistically significant relationship between product accuracy and e-commerce customer satisfaction, which is consistent with previous studies. Based on Rita et al. (2019), companies need to guarantee that deliveries are on time, orders are accurate, and delivery conditions are optimal to offer excellent service quality to customers. Gajewska et al. (2020) also informed that inaccuracy of the order is sources of customer dissatisfaction arise.

Online customers pay close attention to product delivery because they have invested in it (Ziaullah, Feng & Akhter, 2014). Customer satisfaction is impacted by an online retailer's ability to provide accurate products on time and as promised. Blut (2016) also enforce that fulfilment encompasses tasks aimed at ensuring customers receive their orders correctly and on time, with attention to order accuracy and delivery conditions. When customers receive exactly what they ordered, it enhances their overall experience and builds trust in the online shopping platform. Therefore, ensuring product accuracy is essential for fostering positive customer relationships and encouraging repeat business.

5.2.2 Research Objective 2: To examine relationship between delivery time and e-commerce customer satisfaction.

The second research objective is to examine the relationship between delivery time and e-commerce customer satisfaction. The study revealed that there is no significant relationship between delivery time and e-commerce customer satisfaction which indicated beta coefficient value (β= 0.06, t= 1.387, sig.= 0.166).

This result is contrast with previous studies, which delivery time give impact on e-commerce customer satisfaction (Hu et al., 2016, Vasić et al., 2020, Gajewska et al., 2020 & Restuputri et al., 2021). This study's finding of no significant relationship between delivery time and e-commerce customer satisfaction might be the delivery times are relatively consistent or within an acceptable range for most customers, variations might not significantly impact satisfaction levels. Advances in logistics and shipping might have reduced the variability in delivery times, leading to a diminished impact on satisfaction.

Enhancing the quality of logistics services requires prioritizing timely delivery to ensure customers receive goods within specified timelines (Restuputri et al., 2021). The importance of delivery time in e-commerce cannot be overstated when it comes to customer satisfaction. Customers should receive clear and timely information about delays to help manage expectations and minimize disappointment when delivery times are not met (Mofokeng, 2021).

In the digital age, customers expect quick and reliable service. Fast delivery times align with their expectations of convenience and efficiency. Mofokeng (2021) informed that customer satisfaction with e-commerce depends on providing accurate information and

fast delivery. Timely delivery enhances the overall customer experience. It reduces uncertainty and frustration, leading to higher satisfaction levels.

5.2.3 Research Objective 3: To examine relationship between product condition and e-commerce customer satisfaction.

The third research objective is to examine the relationship between product condition and e-commerce customer satisfaction. The result showed that there is no significant relationship between product condition and e-commerce customer satisfaction which indicated beta coefficient value (β= 0.044 t= 1.028, sig.= 0.305). There is strong correlation between product condition and e-commerce customer satisfaction, but significant value showed more than 0.05.

This result is also contrast with previous studies, that product condition give impact on customer satisfaction (Vasić et al., 2020, Rita et al., 2019 & Mofokeng, 2021). The lack of a significant relationship between product condition and e-commerce customer satisfaction in the study could be due to other factors such as product accuracy, shipping cost and reverse logistics might play a more significant role in influencing customer satisfaction, overshadowing the impact of product condition. If the e-commerce platform has a strong and hassle-free return policy, customers might be less concerned about product condition because they feel they can easily address any issues.

The condition of the product upon arrival significantly influences the customer's initial impression. E-commerce relies heavily on trust between the seller and the customer. A product arriving in good condition reinforces the customer's perception of the seller's reliability and professionalism, leading to higher satisfaction. Akıl and Ungan (2022) informed that all the parties that involved in delivery must ensure that customers' orders are securely and adequately handled throughout the multiple stages of transfer and

processing required until they reach the customer, as products are susceptible to damage during these processes.

Customer dissatisfaction arises when a product is damaged or faulty, leading to either returning the product or cancelling the order (Vasić et al., 2020). Sellers required to ensure products are well-packaged and protected during shipping can foster loyalty and encourage customers to return for future purchases. Maintaining high standards of product condition not only meets customer expectations but also contributes to long-term business success through positive customer experiences and enhanced reputation.

5.2.4 Research Objective 4: To examine relationship between shipping cost and e-commerce customer satisfaction.

The fourth research objective of this study is examine the relationship between shipping cost and e-commerce customer satisfaction. The result of this study is revealed that there is a significant relationship between shipping cost and e-commerce customer satisfaction which indicated high beta coefficient value (β= 0.1, t= 2.481, sig.= 0.013).

As previous studies, shipping cost give significant impact on e-commerce customer satisfaction (Vasić et al., 2020). Logistics service providers must provide high-quality services that align with price they paid for delivery services (Restuputri et al., 2021). Customer may be more sensitive to changes in transportation charges than to the product prices (Muljono & Setiyawati, 2019). Unexpected or high shipping fees can lead to dissatisfaction, especially if they are perceived as unreasonable or disproportionate to the value of the goods. Offering reasonable shipping rates, free shipping thresholds, or expedited shipping options can attract customers and enhance satisfaction compared to competitors. Balancing reasonable shipping charges with high-quality service is essential for maintaining positive customer relationships.

5.2.5 Research Objective 5: To examine relationship between reverse logistics process and e-commerce customer satisfaction.

The fifth research objective of this study is examining the relationship between reverse logistics process and e-commerce customer satisfaction. The result of this study is revealed that there is a significant relationship between reverse logistics process and e-commerce customer satisfaction which indicated high beta coefficient value (β= 0.346, t=8.183, sig.= <.001).

This result is consistent with previous studies and suggests that reverse logistics process played important role in e-commerce customer satisfaction (Jalil, 2019, Thu et al., 2024 & Vasić et al., 2020). In the current highly competitive market, businesses need to accept that product returns are unavoidable. Furthermore, effective return management not only saves costs but also identifies opportunities for enhancement, strengthens customer relationships, and fosters long-term business growth (Chen, Anselmi, Falasca & Tian, 2017).

When a customer initiates a return, online retailers are responsible for managing the retrieval, assessment, and subsequent shipping of any replacement product to the customer (Jalil, 2019). A positive return experience can encourage customers to shop again with the same retailer, boosting customer satisfaction. A smooth reverse logistics process, including easy-to-follow return instructions and options for return shipping, improves convenience for customers, leading to higher satisfaction.

5.3 Implication of Study

The findings of this research will provide insight into the factors that impact e-commerce customer satisfaction in Malaysia, including product accuracy, delivery time, product condition, shipping cost and reverse logistics. The study found that this

logistics service quality affect customer satisfaction. This study benefit to the logistics and transport companies, shipper, and sellers. When logistics service providers (LSPs) enhance these quality aspects, it leads to higher customer satisfaction. Positive customer experiences contribute to customer retention and acquisition, strengthening market position.

Thus, logistics operation needs to be more efficient for avoid dissatisfaction of customer. Efficient logistics operations can lead to cost savings through optimized inventory management, reduced shipping costs, and minimized returns due to improved delivery accuracy and reliability. Accurate delivery of products minimizes the need for returns and exchanges due to incorrect or damaged items. This reduces operational costs and logistical complexities associated with handling returns, contributing to overall cost savings. More than this, efficient logistics services can help e-commerce businesses manage shipping costs more effectively. Shipping costs significantly influence customers' perception of value when making purchasing decisions online. E-commerce platforms that effectively manage shipping costs while maintaining service quality gain a competitive advantage.

Based on this study's result, reverse logistics aspect also played important role in e-commerce customer satisfaction. Customers appreciate hassle-free and convenient return procedures. Positive experiences with returns contribute to overall satisfaction and increase the likelihood of repeat purchases. Effective handling of product returns builds trust and confidence among customers. When customers know they can easily return items that do not meet their expectations or are defective, they are more likely to trust the e-commerce platform.

Investing in efficient logistics processes not only improves customer satisfaction but also enhances overall operational efficiency. This includes streamlined order fulfilment, reduced lead times, and improved supply chain management. Analysing the impact of logistics services quality on customer satisfaction provides valuable insights for strategic decision-making. Businesses can use data analytics to continuously improve service levels and meet evolving customer expectations.

5.4 Limitation of Study

When analysing the impact of logistics services quality on e-commerce customer satisfaction, several limitations in research are arise. This research only concentrates three northern states in Malaysia such as Perlis, Kedah and Penang. A small sample size from only three states may not adequately represent the diversity of e-commerce customers across different geographic regions, cultural backgrounds, or economic conditions. Findings may not be applicable to customers in other states, limiting the generalizability of the study.

For this study only five factors such as product accuracy, delivery time, product condition, shipping cost and reverse logistics selected as independent variable. By focusing on a limited number of variables, the study may overlook other significant determinants of customer satisfaction related to logistics services. Factors like product availability, information quality and quality of staff service could play crucial roles but are not accounted for in the analysis. E-commerce environments are multifaceted, and customer satisfaction is influenced by a variety of contextual factors. Limiting the study to five variables may not capture the full range of factors that vary across different e-commerce platforms, industries or customer segments.

5.5 Recommendation for Future Research

Based on the limitation of the study, this study suggests few recommendations for future research. Future studies need to be expanded to include a larger and more diverse sample across multiple states or regions. This enhances the study's external validity and allows for comparisons across different demographic groups and geographical areas. This study used quantitative approach, so future studies conducted with mixed-methods approach. Qualitative methods can provide deeper contextual understanding of how logistics services impact e-commerce customer satisfaction in specific regional contexts.

Future research needs to consider expanding the number of variables to include additional factors that are known or hypothesized to impact logistics services quality and customer satisfaction. This could involve adding variables related to like product availability, information quality and quality of staff service. Data need to be analyse based on customer segmentation to understand how different customer groups perceive and respond to logistics services quality. Other than this, customize the analysis to identify specific factors that drive satisfaction among different segments, such as frequent buyers, first-time customers, or demographically distinct groups.

5.6 Conclusion

This study has examined the relationship between several factors such as product accuracy, delivery time, product condition, shipping cost and reverse logistics and e-commerce customer satisfaction. This study showed contrast result that delivery time and product condition not statistically significant to e-commerce customer satisfaction. Further studies need be conduct with involved all the states in Malaysia and the sample size need increased to enhances the depth and validity of study findings, providing

actionable insights for improving logistics strategies and enhancing customer experience in online retail environments.

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Appendix 1: Questionnaire

A STUDY ON E-COMMERCE CUSTOMER SATISFACTION

Dear Respondent,

Thank you for agreeing to participate in this research titled: Analysing the Impact of Logistics Services Quality on E-commerce Customer Satisfaction.

I am a Master of Science (Logistics and Transportation Management) (By Coursework) student, and I would appreciate it if you could carefully answer the questions because the information you provide will affect the accuracy and effectiveness of this research. The questionnaire should take no more than 30 minutes to complete. All responses will be kept strictly confidential and used solely for the purposes of the study. If you have any questions about this research, please contact me using the information provided below. Thank you for your cooperation and the time you took to complete this form.

Your Sincerely,

Sivasangari Balakisnan

School of Technology Management and Logistics

University Utara Malaysia (UUM)

Email: sivasangari31@yahoo.com

Section 1: Personal Information

1. Gender

Mark only one oval.
- ⬭ Male
- ⬭ Female

2. Age

Mark only one oval.
- ⬭ 0-19
- ⬭ 20-25
- ⬭ 26-35
- ⬭ 36-40
- ⬭ 41-50
- ⬭ 50 and above

3. Race

Mark only one oval.
- ⬭ Malay
- ⬭ Chinese
- ⬭ Indian
- ⬭ Other:

4. Highest Education Level

Mark only one oval.
- ⬭ High School
- ⬭ Diploma
- ⬭ Undergraduate
- ⬭ Master and above

5. Occupation

Mark only one oval.
- ⬭ Employed
- ⬭ Retired
- ⬭ Self-Employed
- ⬭ Others

6. Location

Mark only one oval.
- ⬭ Perlis
- ⬭ Penang
- ⬭ Kedah
- ⬭ Other:

7. Have you use online shopping platform for purchase?

Mark only one oval.
- ⬭ Yes
- ⬭ No

8. How long have you been purchasing online?

Mark only one oval.
- ⬭ Less than 1 year
- ⬭ Less than 2 years
- ⬭ Less than 3 years
- ⬭ Less than 4 years
- ⬭ Less than 5 years
- ⬭ More than 5 years

Section 2: Logistics Service Quality
Please, rate LOGISTICS SERVICE DIMENSIONS related to the following statements, as follows: 1 - strongly disagree, 2 - disagree, 3 - average, 4 - agree, 5 - strongly agree.

Product Accuracy

9. E-retailer shipped the correct quantity of the items.
Mark only one oval.

1	2	3	4	5
⬭	⬭	⬭	⬭	⬭

10. E-retailer shipped the correct item as order in online platform.
Mark only one oval.

1	2	3	4	5
⬭	⬭	⬭	⬭	⬭

11. Parcel rarely contains mistaken products.
Mark only one oval.

1	2	3	4	5
⬭	⬭	⬭	⬭	⬭

Delivery Time

12. I am satisfied with how quickly the E-retailer delivered the order when it was successful.
Mark only one oval.

1	2	3	4	5
⬭	⬭	⬭	⬭	⬭

13. I am satisfied with the time it took from ordering to receiving the item.
Mark only one oval.

1 2 3 4 5

14. Buyers have the option of choosing between various delivery times.
Mark only one oval.

1 2 3 4 5

15. Products are supplied on the specified dates and deadlines.
Mark only one oval.

1 2 3 4 5

16. E-retailers supply items within a specific time frame.
Mark only one oval.

1 2 3 4 5

Product Condition

17. The packaging used to transport the supplied items is rarely damaged.
Mark only one oval.

1 2 3 4 5

18. Products are rarely damaged upon delivery.
Mark only one oval.

1 2 3 4 5

19. Product damage rarely occurs as a result of inadequate shipping and handling.
Mark only one oval.

1 2 3 4 5

20. The delivered products meet the specifications listed online.
Mark only one oval.

1 2 3 4 5

21. Delivered products are functioning well.
Mark only one oval.

1 2 3 4 5

Shipping Cost

22. E-retailer provides the option of free product delivery.
Mark only one oval.

1 2 3 4 5

23. E-retailers provide low-cost delivery.
Mark only one oval.

1 2 3 4 5

24. There are no additional expenses for product delivery to a home address or store drop-off location.
Mark only one oval.

1 2 3 4 5

25. E-retailers provide the option of selecting the delivery agency in the online platform.
Mark only one oval.

1 2 3 4 5

Reverse Logistics

26. The entire return logistics operation process and return policy is easy and fast.
Mark only one oval.

1 2 3 4 5

27. Damaged, unwanted, or malfunctioning products are quickly and easily recovered and replaced.
Mark only one oval.

1 2 3 4 5

28. After asking for a return process, I am satisfied with the customer service representative's quick response and reply.
Mark only one oval.

1 2 3 4 5

29. After requesting for a return operation, the system gives immediate updates on logistical tracking information.
Mark only one oval.

1 2 3 4 5

30. I am satisfied with both the e-commerce platform and the business's return policy.
Mark only one oval.

1 2 3 4 5

Customer Satisfaction

31. The e-retailers precisely fulfills my expectations.
Mark only one oval.

1 2 3 4 5

32. E-retailer operates in accordance with the terms promised.
Mark only one oval.

1 2 3 4 5

33. I am satisfied with the quality of e-retailer customer services.
Mark only one oval.

1 2 3 4 5

34. I am satisfied with the price of delivery charges.
Mark only one oval.

1 2 3 4 5

35. I am satisfied with the door-to-door delivery services.
Mark only one oval.

1 2 3 4 5

36. I enjoy online shopping at e-commerce online platforms.
Mark only one oval.

1	2	3	4	5
⬭	⬭	⬭	⬭	⬭

-End of Questions-
Thank you for your time and cooperation in completing this questionnaire.