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Exploring last-mile delivery opportunities and challenges in the E-commerce market Vietnam

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Abstract

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Embark on a journey into the dynamic context of Vietnam's e-commerce market, exploring a landscape transformed by technological integration and shifts in consumer behavior. The research began by unveiling the resilience of the e-commerce sector in the post-COVID-19 pandemic, highlighting its remarkable growth and adaptability. With a specific focus on the intersection of e-commerce and last-mile delivery, the study identified the potential and difficulties of last-mile logistics. In the end, data collection helped provide insightful recommendations for enhancing final-mile delivery based on customer experiences.

Employing a deductive approach, the study has drawn on academic literature to unveil the complex facets of last-mile logistics in Vietnam's e-commerce market. The theoretical framework included B2C e-commerce models, final-mile delivery processes, last-mile distribution channels, and selection, as well as the critical aspect of end-consumer satisfaction. The theoretical foundation was meticulously researched from printed and electronic books, academic research websites, and journals, ensuring a thorough quality assessment from multiple sources.

The first empirical part of the thesis vividly portrayed key aspects such as e-commerce growth, market drivers, notable last-mile logistics providers in Vietnam, and the operational model of last-mile distribution and delivery. Crucially, the study highlighted the opportunities and challenges inherent in last-mile logistics in Vietnam.

Methodologically, the survey design captured the quantitative essence of end-consumer experiences in Vietnam. The quantitative method was applied and analyzed by collecting customer experiences with last-mile delivery through e-commerce platforms. The utilization of primary sources, derived from participants' responses, heightened the realism and reliability of the data. Leveraging Webprobol 3.0 and Microsoft Excel, the data was organized and visually presented for a comprehensive analysis.

In the summary and discussion chapter, the key findings from the features of the e-commerce market, the driving factor for market growth, dynamic players in last-mile logistics, notable challenges faced by logistics providers, and potential opportunities on the horizon are briefly concluded. Ultimately, suggestions are provided for improving last-mile delivery performance to enhance customer satisfaction.

Keywords

Last-mile delivery, customer satisfaction, e-commerce market, e-logistics, Vietnam.

Contents

1 Introduction

1.1 Background Knowledge

In the digital age, the commerce landscape has undergone a profound transformation, giving rise to a new phenomenon known as e-commerce. E-commerce has impacted how companies run and how customers shop. It represents the fusion of technology, business, and consumer behavior, enabling transactions, exchanges, and interactions across virtual platforms. Overall, the revolution of e-commerce has given birth to models for new types of businesses, allowing consumers to shop quickly and conveniently, offering to diversify the options available to both consumers and businesses.

In the market in Vietnam, e-commerce was impacted adversely by the COVID-19 pandemic, which slowed down Vietnam's economy in 2019 and 2020. However, the value of e-commerce merchandise (GMV) rose by 5 billion USD from 8 billion USD from 2020 to 2021, which is a positive development for the digital economy. This became an impressive milestone and demonstrated that the Vietnamese economy successfully overcame the tough time, developed more impressive than in the pre-pandemic period (Hai 2022.) With the incredible development, it is sufficient reason for the author to dig deeper into researching this market.

Furthermore, the advent of the COVID-19 pandemic has brought a profound transformation in the expenditure patterns of Vietnamese consumers during online shopping. Within the pandemic period, numerous e-commerce categories such as food and personal care observed the most significant surge in consumer spending, reflecting an emphasis on personal well-being and healthier lifestyles. With the serious regulation of safe distance during COVID-19, the preference for safety and convenience for contactless transactions has led to the growth of online shopping among Vietnamese consumers. Gradually, this emergent trend stayed even after the pandemic, implying the sustained expansion of the e-commerce sector in Vietnam (Statista 2023.)

The study focuses on "last-mile delivery," which refers to the last step in the supply chain, which holds an essential role in concluding the last stage of the e-commerce purchase journey. E-commerce and last-mile delivery are interconnected components of the modern retail ecosystem. E-commerce drives the need for convenience and dependability in final-mile delivery services. Furthermore, the efficiency of the delivery process significantly impacts customer satisfaction and the overall viability of e-commerce enterprises. Overall, the last-mile delivery market size is associated with the e-commerce market (Fast Forward

Advisors.) Following this, the author delves into researching the opportunities and challenges associated with conducting final mile delivery to end-users in this industry.

Lastly, the development of e-commerce and the expansion of last-mile delivery are all aimed at satisfying customers. Customer satisfaction is a key metric that reflects how well companies perform their services. As usual, well-performed services lead to higher customer satisfaction and the outcome is customer loyalty (Oliver 1999, according to Ngo 2015).

The research is implemented by drawing upon the market of Vietnam by analyzing and researching through multiple sources towards the outcomes of an advanced understanding of the Vietnamese e-commerce market associated with last-mile delivery operations.

1.2 Purposes and Limitations

As mentioned in the introduction part, the e-commerce market has shown a potential contribution to Vietnam's economy in the period of recovery after the pandemic 2019. According to Google's e-Conomy SEA 2022, Vietnam was predicted as one of the top three nations drawing the most e-commerce field investors. Another, according to 2022 Vietnam e-commerce data, the online shopping value per user is increasing continuously. These reasons demonstrate the potential points of researching Vietnamese e-commerce. Also, these contributed to the motivation of the author to gain insights into this topic (Truong 2023.)

To achieve the core objective of this research, an overview of final mile delivery within the online shopping market is researched, concentrating on the e-commerce sector in Vietnam. Specifically, the study aims to explore the challenges and opportunities faced by logistics companies in Vietnam. Lastly, it explores customers' experiences to enhance satisfaction with the final mile delivery services provided.

The report focuses on final-mile delivery, which involves the transportation of products from the distribution center or hub to the destination, typically a residential address. The study is limited to the B2C relationship, which involves the interactions and transactions between e-commerce businesses and individual customers.

As stated in the thesis objective, it is the Vietnamese e-commerce area, so the geographical scope is limited to the selected country. If there is other information about other nationals or regions, these have been used as supporting sources or references for emphasizing the main country, Vietnam.

1.3 Research Question(s)

It has been stated that creating research questions can open new research topics, address controversial issues, and turn conventional thinking around by changing old beliefs (Campbell et al., 1982: 21; Astley, 1985; Davis, 1986, 1971; Bruner, 1996; Abbott, 2004).

Creating research question(s) and sub-question(s), helps the author enable discussion, pose interesting questions before starting researching. Depending on the objective of this research, the author applies one main research question and three sub-questions (SQ) that explore the final leg of delivery in the e-commerce industry and observe the customer experiences in Vietnam:

Primary Research Question: In the context of the e-commerce market in Vietnam, what are the challenges and opportunities of final mile delivery?

- **The first SQ**: What are some key features of the e-commerce market and last-mile logistics market in Vietnam?
- **The second SQ**: What are the challenges and opportunities of final mile delivery in the Vietnam e-commerce market?
- **The third SQ:** What could be improved in last-mile delivery to fulfill customer satisfaction?

Developing a research question is important because it helps narrow the broad topic into a certain subject area (Creswell 2014). The main research question serves as a guiding framework, sets boundaries, provides direction for the whole research. This research is about the challenges and opportunities of final mile delivery in e-logistics in Vietnam. The first sub-question narrows the main research question into a specific area, about the characteristics of last-mile delivery and the big picture of Vietnamese e-commerce. The second sub-question goes further into the topic's essence, about the opportunities and challenges. The third sub-question is about collecting data related to consumer satisfaction with last-mile delivery services, which subsequently summarizes specific suggestions for enhancing these services.

1.4 Theoretical Model

Within the constraints of important limiting assumptions, theories are formed to explain, forecast, interpret, and advance existing knowledge. The background knowledge that may support the theory of the study is known as the theoretical framework. The theory that clarifies the sub-research points occurring, is also introduced and described (Abend 2008, 173-199.) A literature review is built up by the concepts, definitions and references to relevant papers that are used for the study. In this research paper, the theories and literature of e-commerce, last-mile delivery structure, and end-consumer satisfaction have been used to break down the academic terms into understandable terms and explain the glossary so that the reader can become familiar with the academic theories.

According to Knoblauch (2008), theory and statistics are interrelated in research papers since data are the primary source for evaluating theories and theoretical frameworks serve as the basis for the selection and interpretation of data. The validity of the study is assessed by the connection between theories and statistics (Baur 2009, 7-21.) This paper starts to identify from broader terminology components of e-commerce in Vietnam, narrowing down to the last stage of delivery. As satisfaction from customers and the quality of service play pivotal roles in shaping the customer experience, the research is inclined to incorporate theories related to customer satisfaction into its framework. Finally, this survey collects the customer experience on using last-mile delivery, analyses figures and emphasizes how customers experience the service, what problems customers experienced, and then concludes with potential suggestions to increase satisfaction.

There are few explanations of the important terms which are core concepts in the study. According to Mourya and Shalu Gupta (2015), Electronic commerce is commonly known as e-commerce. Services, products, and information are traded through computer networks, including the Internet. Overall, it can be simply understood that e-commerce is the concept of a sales cycle making use of electronic means on the Internet.

In the context of final mile delivery, it indicates the last step in the supply chain process. In the delivery process from a warehouse to a customer’s home, last-mile delivery is the last step as well as an essential part of the delivery process (DHL Express 2022).

The last step in the supply chain, encompassing the journey from the distribution center to the client’s front door, can significantly influence customers' reactions. According to “The Handbook of Logistics and Distribution Management” (2022), they concluded that there are eight ‘rights’ of customer service. There is the right to quantity, product, cost, time, place, condition, customer, ethics, and environmental standards. All of these are considered requisites of a good customer service offering (Rushton et al., 2022, 34.) To be more specific, the service expectations of internet customers in e-commerce platforms often expect rapid home delivery (or fixed schedule), regular updates on the order status, 100% accuracy and damage-free (Rushton et al., 2022, 175).

1.5 Methodological Approach and Data Gathering

To conduct the study and produce accurate and valid results, a research methodology is required. It includes the overall design for a research study, from the approaches, strategies, techniques, tools used to gather and analyze data. Research methodology helps a researcher to reach the study's goals, test hypotheses and formulate for the study issue. Research methodology guides on how to collect appropriate data during the study period to address the main issue, how to analyze the collected data, which techniques are applied. As a result, it presents how the study outcome at the end will be aligned with the accomplishment of the research objectives (Jilcha 2019.)

1.5.1 Methodological Approach

In this study, the author applies a deductive approach to research the topic. The deductive approach begins with the academic literature, and then to test the theory, the data is collected in the empirical part (Saunders et al. 2016, 145). In the study, the key theories about the e-commerce market, last-mile delivery and customer satisfaction are presented by researching reliable sources. In the empirical part, a researcher provides characteristics about the e-commerce market, coupled with insights into the last-mile delivery market, highlighting key operations with the last-mile distribution system in Vietnam. Subsequently, the opportunities and challenges of last-mile delivery are outlined and concluded with the data collection from participants regarding their experiences with last-mile delivery services in Vietnam.

A research strategy acts as a guide, defines the plan of how the researcher can answer the study question. The study question is a connection between philosophy and the methods used for collecting and analysing data (Denzin and Lincoln 2011, 1-19). In this research paper, the author uses survey design as the main strategy. The survey strategy is a common strategy that answers 'what,' 'who,' 'where,' 'how much,' and 'how many' questions. Survey strategies facilitate gathering standardized data from a large population regarding a specific issue, making it relatively simple to comprehend and explain. By using a survey, the author can collect quantitative data, and analyse the association between elements (Saunders et al. 2016, 182.) According to the objective of the research, the survey is delivered to the targeted respondents who have experienced the final mile delivery from the Vietnamese e-commerce platforms. To do so, the author can collect the assessment of end-consumers' satisfaction.

1.5.2 Data Gathering & Analysis Techniques

After clarifying the research approaches, it comes to empirical data which provide insights for analysis. A quantitative method is chosen to collect and analyse the data. Quantitative research can approach by emphasizing data collection and subsequently using that data to reassess theories. Saunders et al. (2016, 166) pointed out that quantitative research explores connections between elements, utilizing numerical measurements and employing a variety of statistical methods for analysis. In this section, the questionnaire form is created to collect the experience of final consumers in using last-mile delivery service. In the survey, the list of questionnaires is expressed clearly to respondents. This quantitative method helps the author analyse the issue objectively and realistically of how customers feel by using final mile delivery and what makes them satisfied.

Regarding the data collection, the author creates a survey with a list of several types of questions, which is published widely on social media. The targeted respondents are a wide range of customers who over experiencing the online purchase process, especially in the final delivery. Hence, the survey gathers empirical data about the experiences using last-mile delivery of end-users. Based on the collected data, the author intends to use Webropol 3.0 and Microsoft Office Excel, which are powerful tools for organizing and presenting data with visually appealing, colourful charts.

With the diversity of sources of information, including the Internet, electronic documents from government institutions, companies, organizations, and many other data. It has the potential to grant access to a diverse array of data sources. While gathering information, there are two common data types, primary source, and secondary data source. Primary data source refers to the original, first-hand source of data, collected from its origin. In contrast, secondary data source means a collection of data that has been gathered previously not by the researcher (Douglas 2015, according to Ajayi Victor 2023.)

Firstly, primary data is real-time data that appears in surveys, personal interviews, observations, questionnaires and to name but a few (Ajayi Victor 2023). Applying this thesis, the data from the author’s survey is presented as the primary data because it is the first time collected by the author. This type of data provides specific needs to the author - collects the experience of respondents towards last-mile delivery. In addition, it helps the author solve the problems at hand, provides more accurate and reliable data for the research. However, it takes longer collection time than secondary data (Ajayi Victor 2023.)

The secondary data is already existing data from other researchers in the past. Secondary data is rapid and easy access to. For example, in the diversity of publications such as websites, books, journals, articles, and so on (Ajayi Victor 2023.) Especially, this study collects the Vietnamese e-commerce market in revenues, GDP, online platform usage, collocation of payment methods and mode of delivery usage and so on. It takes a brief time to collect but the author invests time in considering the reliability and trustworthiness of the sources.

1.6 Research Structure

This thesis structure is divided into five main parts, which are an introduction, a theoretical framework, two empirical research parts, a summary and a discussion are shown in Figure 1.

Figure 1. Thesis framework

The introduction section starts with an overview of the e-commerce industry in Vietnam, highlighting its current landscape and overall market growth. There, the author builds up the study's objectives, research questions, theoretical framework, research methodology, and data collection techniques. The author briefly outlines the contents and purposes of each component.

In the second chapter, the author provides a theoretical framework, and key concepts, explaining the terminology of e-commerce, the e-commerce model, the delivery process, and customer satisfaction. These explanations provide both readers and the author with an overview of the academic literature, laying the groundwork for the empirical section.

The third and fourth chapters provide a summary of the Vietnamese e-commerce market including the growth revenues, growth market drivers, the notable e-commerce platforms, and an analysis of the last-mile delivery status in opportunities and challenges and the outstanding service providers. Lastly, the chapter explores customer satisfaction with last-mile delivery services, concluding with suggestions for enhancing customer retention for service providers.

In the last chapter, the summary section addresses the resolution of research questions, evidence of meeting objectives, justification for the assertion of validity and reliability, and recommendations for further research.

2 Overview of E-commerce, Last-mile delivery, Customer satisfaction

2.1 Electronic commerce (E-commerce)

In the key theories part, the overview delves into defining e-commerce and outlines its several types. Following this, it proceeds to the last-mile delivery, which encompasses the definition of the last mile, the last-mile process, and the last-mile distribution and selections.

2.1.1 Interpretation and Dimensions of E-commerce

Electronic commerce or e-commerce refers to the conduct of business functions consisting of buying, selling, transferring, exchanging goods, services, and information by making use of electronic means as well as technologies. When it comes to services, e-commerce serves to reduce service costs while improving product efficiency and expediting service delivery. Overall, e-commerce is used to describe the process of selling products or services from ordering to transacting over the Internet (Jain et al. 2021.)

Commercial transactions refer to e-commerce with digitally facilitated exchanges of values – products, and services between and among businesses and individuals, mostly mediated by digital technology, taking place through the Internet, websites, and mobile devices (Laudon & Traver 2022, 45).

With the revolution of digitalization, the e-commerce form depends on products, services, processes as well as intermediaries. A dimension of the e-commerce framework shown in Figure 2, explains the relevancies between a product, process, and delivery agent. These possibilities create eight scenarios, each with three dimensions, these dimensions can be digital or physical form. For traditional commerce, the product, process, and delivery occur physically – in person. If the product is purchased, processed via the Internet, then it is called e-commerce. These scenarios can be mixed between physical and digital forms (M Luciano & Freitas 2023.)

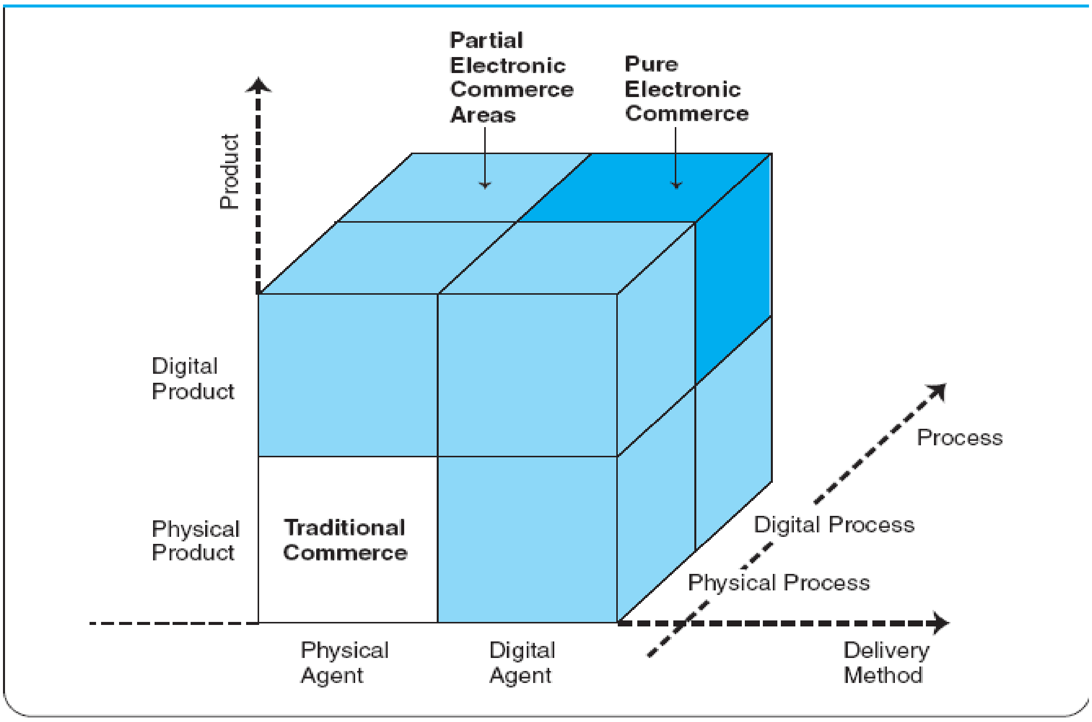

Figure 2. Dimensions of e-commerce (Choi et al. 1997, according to M Luciano & Freitas 2023)

2.1.2 E-commerce models

E-commerce comes in various forms; it can be categorized in numerous ways. This research defines the e-commerce type by identifying the parties involved in a transaction. Within this classification, mobile, social, and local e-commerce can be considered subcategories of these broader e-commerce types.

First, common e-commerce is the transaction between business and consumer (B2C), in which an e-commerce venture targets to single consumer. This mode of business includes the purchases of trading products such as travel, money-related, property and any modes of services; and digital information or media (Laudon & Traver 2022, 58.) B2C is the exchange of goods or services from businesses to final consumers via virtual e-commerce platforms. The most popular B2C e-commerce model is direct selling, which means customers purchase directly from online retailers, manufacturers, and department stores, without physical visits to brick-and-mortar stores (Designveloper 2023.) Also, this is the main model that the researcher focuses on because it relates to the main subject – final mile delivery in e-commerce logistics, the final shipping from businesses to end consumers.

The other type is business-to-business (B2B), in which e-commerce ventures target to sell products, services to other businesses, designating B2B e-commerce as the dominant sector within the e-commerce industry, signifying its vast potential for significant growth (Laudon & Traver 2022, 59).

Consumer-to-consumer (C2C) means a transaction in which consumers sell to consumers with the help of a digital platform, service provider. On the C2C platform, the consumer takes the initiative to prepare their products for sale, setting them up for auctions or listings. They depend on the platform, offer essential features like cataloging, search functions and transaction processing. These platforms provide capabilities that make it convenient for the product to be showcased, easily discovered, and securely transacted. Recently, several new entrants have concentrated on the C2C industry, providing a platform for consumers to sell items or on-demand services to consumers (Laudon & Traver 2022, 60.) Moreover, when collaborating with e-commerce platforms, sellers do not need to concern themselves with the logistics and delivery process.

Mobile e-commerce (M-commerce) allows users to make online transactions on mobile devices. The common characteristic of M-commerce is connecting cellular and wireless networks on mobile devices to the Internet which allows users to purchase goods, make reservations for flights, travel, enjoy online content, among other activities. There are several factors influencing the increased usage of M-commerce. Including the rising amount of time people spend on mobile devices, the proliferation of smartphones with fit screens, the improvement in mobile checkout and payment processes, the up-to-date functions, and the adoption of responsive design – all are user-friendly (Laudon & Traver 2022, 61.)

Social e-commerce is a platform in which social forums and electronic relationships are maintained. Social e-commerce is connected between mobile devices and social network accounts. The growing popularity of social sign-on (using social network IDs to log in), together with online collaborative shopping tools and social search features are notable. it allows users to take an order, join marketplace groups, and virtual shops within social media platforms, which is a significant trend in the digital landscape. All these above factors are influencing increasingly the purchase decision, driving sales and so on (Laudon & Traver 2022, 62.)

Local e-commerce, the final component of mobile e-commerce, social e-commerce, and local e-commerce wage, resolves around connecting with consumers based on their current geographical area. It utilizes online marketing strategies to attract customers to visit the store in person. This trend is primarily driven by the surge in interest in local on-demand services (Laudon & Traver 2022, 62.)

2.2 The final stage of delivery (Last-mile delivery)

E-commerce, driven by the rise of online shopping, has revolutionized retail and consumer behaviour, resulting in a significant surge in demand for last-mile delivery services. As consumers increasingly prefer the convenience of shopping from their homes and receiving products at their doorstep, the pressure on logistics companies to provide efficient and timely last-mile deliveries has intensified. There are three things that customers prioritize, the flexibility of scheduling delivery, the quality of purchase and the cost of service in door's step (Phuong 2020.)

2.2.1 Interpretation of Last-mile delivery

Regarding "Last-mile logistics," logistics means the movement of goods from their source to the end-users (forward logistics) and the reverse movement, such as returns, exchanges (reverse logistics). And information flows are the close connection from the points of origin to the points of consumer's needs. Typically, in supply chain includes five major segments – Supplier, Plant (Manufacturer), Distribution centre, Retailers and Customers as exhibited in Figure 3. And last-mile logistics, in essence, means the last step in the supply chain, involving the delivery of products to customers' hands. The result of the last stage of delivery is delivering things in the shortest time while maximizing profit and reaching the highest customer satisfaction (Gevaers et al. 2011, 56-71.)

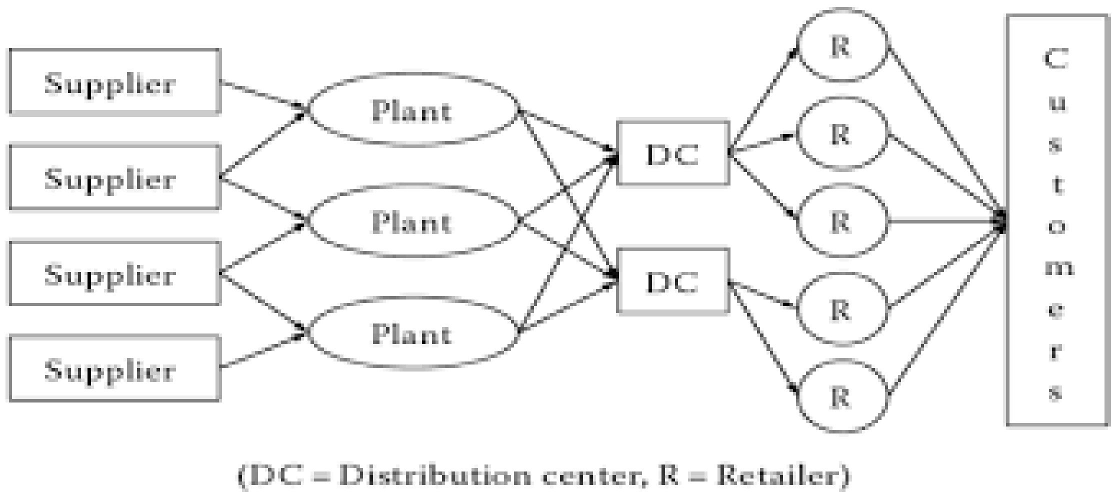

Figure 3. A typical e-commerce Delivery Supply Chain (Oliveira et al. 2017)

The last step of the shipment process is final mile delivery. It encompasses a range of actions and essential processes ensure to the delivery of products from the end transit location to the ultimate destination to the end customer efficiently. In short, last-mile delivery is the final stage of shipment from business to final (B2C). It starts from fulfilling orders point to the shipping destination of the end recipient, which could be their home, collection point, reception boxes, and so on to receive their goods (Lim et al., 2015).

To be specific on the B2C last-mile logistics, it means that in any transactions between business-to-consumer, the last-mile logistics is the journey of shipment to hand products over to the recipient, where the customer can pick up or receive the goods (Gevaers et al. 2009).

Based on the above definition, there is no true or wrong definition. It can be defined and understood in several ways depending on the context and industry. The difference between these definitions is the position of goods, it could be the last transit point, the last dispatch point, or the order penetration point (Nghiep et al. 2023.)

2.2.2 Last-mile process

Campbell and Savelsberg (2006) stated that there are three steps in fulfilling customer orders, which are presented in Figure 4. The process starts with orders being placed via various methods, including online, by phone or physically (Motavallian 2019, 105). After that, the products from each order are checked in stock, gathered, and packed before these are allocated to the respective customer order area. In the next step, the orders may be transferred through many places, which could be a distribution center, hub, or warehouse before being delivered to the client (Castillo & Jain 2019). The "delivery point" here implies the location where delivery takes place (Motavallian 2019, 105.)

Figure 4. Customer order fulfillment (Campbell and Savelsbergh 2006)

According to BESTUFS Good Practice Guide on Urban Freight Transport by Allen and Browne at the University of Westminster in 2007, the common supply chains in final-mile operations are demonstrated in Figure 5 below.

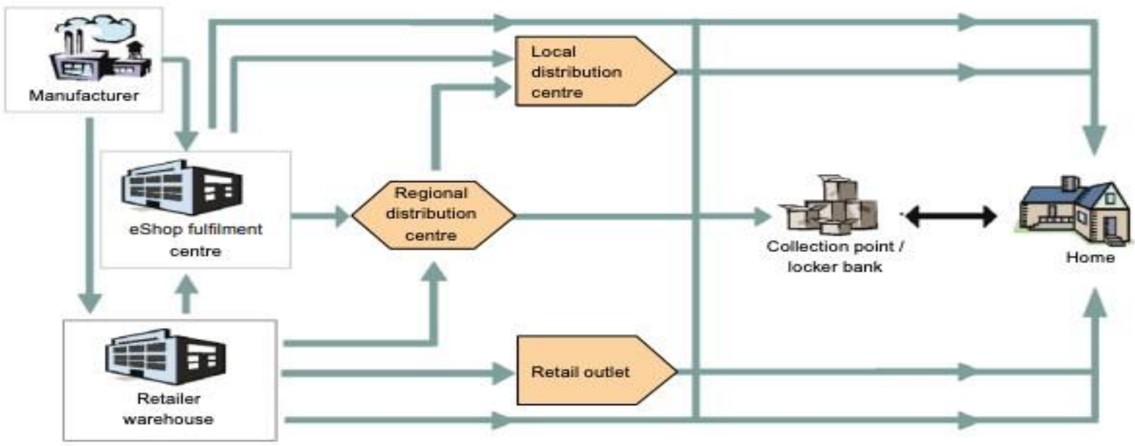

Figure 5. Last-mile operations in common supply chains (Allen et al. 2007, 43)

In Figure 5, this map represents the common supply chains in last-mile operations. This process is conducted by internal logistics with their transport or by external third-party logistics providers (3PL). Goods from manufacturer process to 2 points: eShopfulfillment Centre or retailer warehouse. From these points, many supply chain options decide which types are used for delivering goods. From the eShop fulfillment center, goods can be transferred to a regional distribution center or local distribution center to home. From the retail warehouse, goods can also be delivered to retail outlets or regional distribution centres or the eShop fulfillment center. Both sides can ship directly to the customer's home or indirectly via intermediaries such as a collection point or locker bank before going customer's home. (Allen et al. 2007,43.)

2.2.3 Last-mile distribution channels and selections

The last-mile distribution system is the step-by-step progression of goods' mobility from their source to consumers. This structure has three basic forms based on the efforts of vendors and consumers. There are "Push-Centric," "Pull-Centric" and "Hybrid-Centric" systems. A "Push-Centric system" must fully take orders from the manufacturer to deliver the ordered products to the customer's doorsteps. On the other hand, in a "Pull-Centric" option, the customers must fully manage the act of collecting and delivering by themselves. Lastly, in the "Hybrid" option, both vendor and consumer must exert effort in transporting, it may be varied depending on the distance from the preparation point to the destination (Lim et al. 2015.)

Moreover, to dig deep into details, Figure 6 as a breakdown chart below shows 3 types of distribution structure.

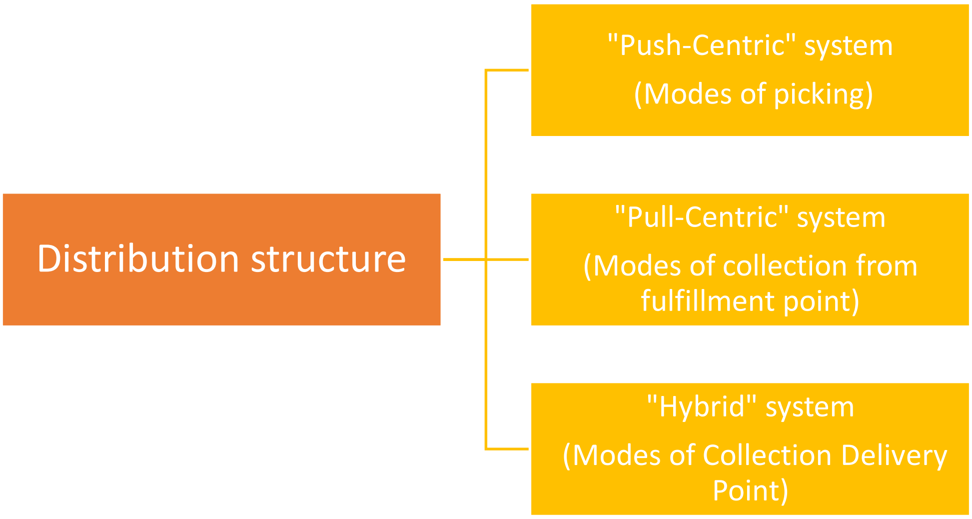

Figure 6. Distribution structure (Lim et al. 2015)

At first, the “Push-centric system” indicates the merchandise flow that is sent to the customers by someone other than the customer. The delivery journey starts with the products from picking points: manufacturer or customer fulfillment center, distribution center and local brick-and-mortar store directly to the consumer (Lim et al. 2015.)

There are some characteristics of this distribution model: inventory, transportation, facilities and handling, information, service factors such as response time, product variety, product availability, customer experience, order visibility and returnability. The nearer the pick-up point to the customer’s address, the lower the transportation costs. In contrast, it turns into less product variety and product availability. As a result, the business firms may face a situation of high inventory and high product demand rate (Lim et al. 2015.)

According to Chopra (2003), there are two manufacturer network designs solely for products stored at manufacturers as follows:

1. Direct shipping from the manufacturer's warehouse

This method refers to products being sent directly from the manufacturer to the end consumer, bypassing retailers, or distributors. By centralizing inventory at the manufacturer’s location, the model allows for reduced inventory levels which leads to lower inventory costs. However, direct shipping results in higher transportation costs because it involves shipping individual orders rather than in bulk. Response time for direct shipping can be relatively high, sometimes taking one to two weeks, due to the distance from the manufacturer to the customers and the need for multiple stages of order processing. Product availability is high due to centralized inventory and this model supports a wide range of products directly. Customer experience may be affected by partial shipments when orders contain items from multiple manufacturers. Returnability is challenging but critical for customer service and requires robust systems (Chopra 2003, 6-9.)

Direct shipping influences last-mile delivery by potentially increasing the complexity and cost due to the need for individualized parcel delivery from disparate locations. However, it also offers the advantage of reducing lead time for items that can be quickly shipped.

2. Direct shipping from manufacturer warehouse with in-transit merge

As stated in the title, this shipping process is from manufacturer storage to the end consumer directly. In-transit merge acts as combining all individual items in each order from various sources into one package. It can be merged in the carrier hub before delivery to the customer. As a result, receiving a single delivery not only lowers transportation expenses but also increases customer satisfaction. The customer just receives their packages at once, which lowers the receiving costs for the customer, but in-transit merge may face greater facility storage expenses. Moreover, it may combine many parties, and manufacturers, retailers and carriers are all involved in, it turns out the sophistication exchange information infrastructure. In terms of response times, this model is better than drop shipping, instead of receiving many partial shipments, customers can save time by receiving all their packages in one single delivery. Another is, that order visibility is a crucial prerequisite in pursuing customer satisfaction. The integration of the production, carrier and merchant is complex during the first setup, but tracking is made simpler by merging at the carrier hub. For transiting to merge, the manufacturer is well-suited for high-value products and moderate demand due to its requirement for a limited number of storage facilities and stable production. It is notable that if there are too many sourcing locations and product locations, it is difficult to coordinate effectively (Chopra 2003, 10-12.)

In previous parts, it is about the journey from manufacturer storage directly to end consumers. Moving on to the next two types of distribution networks, it aims for products from distributors/ retailers in intermediate warehouses directly to final customers.

3. Carrier delivery from distributor warehouse

This type of storage offers storing inventories under the distribution or retailers' areas instead of manufacturers. Products are delivered from intermediate warehouses with package carriers to the final customer. Since distribution warehouses are closer to the end customer compared to manufacturer locations, response time can be faster. In terms of transportation, the strategy allows for the use of full truckloads and brings inventory closer to customers. Moreover, since all items are shipped from the distributor warehouse, this reduces the number of shipments and can lower the cost and complexity of the last-mile delivery. From an inventory aspect, the distributor is well-suited for an elevated level of inventory of high-demand, medium to fast-moving products because it aggregates demand uncertainty. This availability of products allows for continuous delivery flows without waiting for manufacturer production cycles. Moreover, the whole package is combined and merged in the warehouse, so it is easier to process returnability. Products can be sent back to the distribution warehouse regardless of the manufacturer. This mode offers simple exchange information infrastructure because it is only essential to have a connection between customers and warehouse or between warehouse and manufacturer (Chopra 2003, 12-15.)

Overall, distributor storage with carrier delivery proves to be a fitting approach for optimizing the last-mile process. This strategy offers quicker response time, lower transportation costs, and consolidated deliveries with the ease of returnability.

4. Final mile delivery from distributor warehouse

In this model, the distributor or retailer take on delivery services instead of package carrier by in-house facilities. If the package carrier is in use, it does not matter the location of the warehouse. However, the distributor takes care of home delivery, so it is advisable to locate a closet in the customer's area. Last-mile delivery in distributor storage requires higher inventory levels than retail stores, which suits fast-moving goods with a low level of aggregation. Then, it turns to cost-consuming in several required facilities and all processing costs because last-mile delivery covers picking and transporting goods to end-consumers without the customer's participation. Transportation costs as well as picking and delivering are significant but it may be reasonable to deliver bulky items to customer's homes. Even though this model has some limitations and weaknesses, customer satisfaction is achievable by helping with bulky and hard-to-carry goods. In addition, purchasing order is usually completed within 24 hours so order visibility is important for late or incomplete orders or return orders. In terms of return policy, it is the most convenient model to return easily since the delivery in the last mile also receives returns for customers. Nevertheless, return costs will be charged more inexpensively than returns in retail stores themselves (Chopra 2003, 15-17.)

Secondly, move on to the "Pull-Centric" system which refers to customer self-help. It means that customers collect orders by themselves instead of getting delivery from distributors or package carriers. This method differs from the "Push-Centric" mode in the processing time because it was used in delivery service to customers' doorsteps previously but not now (Lim et al. 2015). On the one hand, this network can reduce transportation costs and provide fast response time. Specifically, transportation just makes costs from the manufacturer or distribution storage to the retail store; from there, customers must take over the last-mile delivery by themselves. Since the local storage is the pick-up site, the response time is possible for same-day pick-up for their purchase. Moreover, it is a good method for handling return items in retail stores, easier than other options. On the other hand, this model is pricey in terms of inventory, facilities, information investment, and product availability. For example, the retailers must handle high inventory to ensure the fast-moving products are available at the store for pick-up. It is difficult to store all available products in store, so it decreases the chance of having all needed products in store immediately. Another method, customers to place orders online or via phone, it is crucial to invest in information structures to ensure the needed information about products, pick-up location, and available time as well. As a result, the customers have self-assessment about the service whether it is negative or positive by themselves (Chopra 2003, 21-22.)

In the pull-centric system, a similar concept is encapsulated in the functionality known as "click-and-collect." This entails an alternative sales format, particularly for online grocery retail. The "click-and-collect" method allows customers to make purchases online and retrieve their orders in-store, offering cost-effective shopping (Galante et al. 2013).

Lastly in Hybrid-centric system, it indicates to the delivery system that both customers and manufacturers participate in the delivery process. For example, the process starts with delivering massive quantities of items to the distribution center by the full truckload, then distribution sorts orders, followed by using smaller vehicles to deliver goods to the collection delivery point. (Lim et al. 2015.) According to Chopra (2003, 18-20), for this model, inventories are placed in a distribution warehouse, when customers place the order, then come to the collection pick-up point to retrieve the orders. Order can be shipped from storage sites to pick-up sites if necessary. In this way, since trucks are already delivering goods to the stores, customers place new orders, it is only needed to add new orders in the shipping, which would increase the efficiency of those trucks and save transportation costs. Nevertheless, this method requires high processing costs because it requires appropriate storage and information systems. Otherwise, orders would not match with customer's purchases. It turns out that it burdens the information system because of the high requirement for accuracy and appropriateness of information. Crucial to provide a connection between the retailer, storage areas and pick-up locations which influences the customer's orders and order available pick-up time. From the customer's point of view, this method brings a convenient shopping experience since it is flexible with no need to depend on delivery services. Another, it is somehow easier to handle returnability since customers can drop off orders at a physical location.

According to Gevaers and other researchers (2011), last-mile delivery starts with storage where the pick-up location of the supplier and goods are delivered to end-consumers' homes or customers collect from a distribution or manufacturer pick-up points. The previous parts discover how goods are delivered to customers in two ways: delivery to the customer's home and customers collect from different beginning points. This part below focuses solely on collection and delivery points: attended and unattended delivery systems. Figure 7 describes two types of delivery systems and these sub-types.

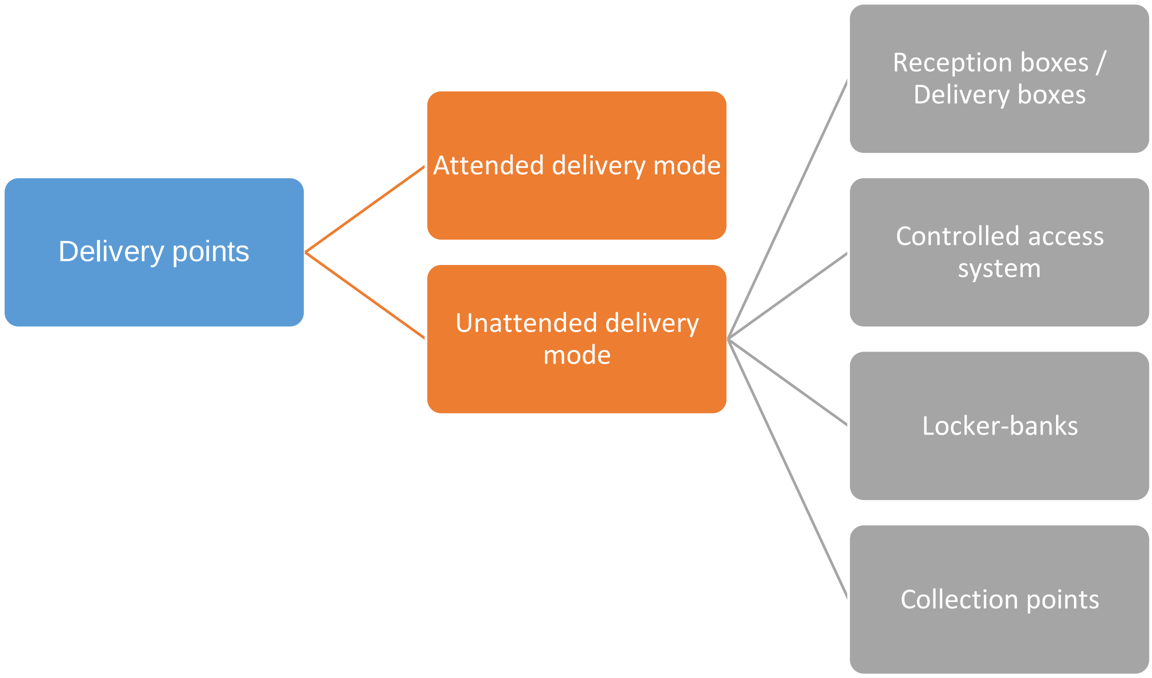

Figure 7. Attended and unattended delivery systems (Allen et al. 2007)

At first, collection and delivery points are divided into two types, attended delivery mode refers to the necessity of customers' attendance to receive packages. Another one is the unattended delivery mode, which implies unnecessary customer presence.

Especially in attended delivery systems known as customer's doorstep deliveries where the customers must show off to receive the delivery from the delivery crews within the selected time limit. This mode of delivery is suitable for perishable food deliveries which should be pre-arranged at a selected time-window to ensure the quality of goods. Another benefit is that ordering home delivery for bulky things like furniture or enormous quantities of goods is more convenient for the customer. However, it will be charged more shipping fees since it always requires more than one helper from the delivery crew (Allen et al., 2007, 44.) Nevertheless, following Hubner and co-researchers' study, this concept is complicated for customers as well as retailers. From one angle, the customer is under constraint waiting for the delivery, at the same time, the transportation is under pressure under time restriction to ensure the delivery comes to the destination on time. Another scenario is if the customers do not show off to receive the packages, the delivery man must return the packages to the fulfillment points. As a result, it not only costs an additional amount for transportation but also increases inventory for storing undelivered products. In addition, it is time-consuming and cost-consuming when retailers must contact customers to reschedule the shipping time and complete additional shipment routes (Hübner et al. 2016, 14.)

About unattended delivery implies the delivery without the presence of the customer. This method is more flexible than attended delivery since the packages can be delivered to the customer's house or somewhere near their residence, or office where reachable for the customer is. If small products do not require proof of delivery, the delivery man can put them in the mailbox or letter boxes whether matter customer is at home or not. However, if products require proof of delivery, delivery can be made on another date or left to the neighbor. To be specific, unattended delivery can be divided based on the customer's home's location: at the customer's home or away from the customer's home. Reception boxes are one of the options without customer's attendance. Talking about reception boxes, it is installed on the outside wall of the customer's residence with an electronic code or key. The packages can be placed there, and the customer will receive a notification of shipping by phone or email. Next, the delivery boxes are owned by a delivery company or retailer and are installed at the residence using a locking mechanism in a secure area. From this box, the returned goods can be placed there, and the delivery company is responsible for taking them back. The more secure way is controlled access systems, which allow driver access to the controlled areas to drop off the goods at the designated location, using a sealed key and an access code. Secondly, "unattended delivery away from home," which does not involve direct home delivery. Instead, it established multiple collection points for customers retrieving their packages such as collection points or locker-banks. The collection points are chosen near the customer's home by either the customer or retailer offer. It can be the postal service, or convenience shops which are flexible opening hours. Packages are delivered to the collection points and the customer will be sent a notification message for goods arrival and ready-to-collect. Then, the customer can either physically retrieve the goods or plan with a collection point for home delivery. The remaining one is locker banks – which are the same as collection points in terms of not being sited at individual premises. It may be sited in railway stations, a small shop near the car park, petrol station or supermarkets to name but a few. The locker banks do not belong to the individual company or person, the same lockers are useful usage for various customers even at various times. The locker banks are used by many different delivery companies. The difference thing compared to the collection points is the locker opening – which is notified by messages to customers via email or phone about the arrival date, the available pick-up duration, the box number with code, and the location of the box. Each locker is reserved for each order, the customer is only permitted to use the locker and accessible code within the time limit. By doing so, it is more secure and convenient for customer to retrieve their packages as desired (Allen et al. 2007, 44-47.)

2.3 Customer satisfaction

Bachelet (1995) explained that customer satisfaction is the reaction of customers after using the products or services. Kotler and Keller (2006) assert that customer satisfaction can be evaluated across three levels not satisfied, satisfied, and very satisfied. These levels reflect the variance between customer expectations and the actual experiences consumer receives (Le et al. 2020.)

Among many competitors across sectors, service quality is determined via customer satisfaction and customer satisfaction determines customer retention. Customers all over the world have grown awareness of quality, resulting in increasing customer demand for higher-quality services. Service operations are affected by how to deliver high service quality to satisfy customers (Sakataka and Wandera 2015.) In the customer's opinion, if the product or service is suitable for use and meets customer satisfaction, then it is quality (Parasuraman et al. 1985, according to Fadaka 2023).

In delivery, Jiang and Rosenbloom (2005) suggested that throughout the purchase process, the critical phase is the delivery stage, and it significantly influences customer satisfaction. Several factors come into play here, including pricing, punctual delivery, the overall time taken for delivery, and the quality of customer service. These factors collectively impact how satisfied customers are and whether they become loyal to the brand or product. When customers are content with their experience, they tend to share their positive views with others and are more inclined to make repeat purchases (Hague & Hague 2016.)

In the context of logistics, which takes part in pursuing the purchase activity of customers by providing the final mile delivery. Satisfaction after experiencing last-mile delivery by customers acts as an essential aspect to determine the achievement or failure of the business (Nguyen et al. 2022). The deep research on customer satisfaction with last-mile delivery is covered in Chapter 4.

3 Vietnamese e-commerce market and Last-mile delivery

3.1 Vietnamese e-commerce market

According to the General Statistics Office (2022), with an annual report about the economic growth in the fourth quarter of 2022, the GDP (gross domestic product) is expected to show a 5,92% growth in contrast with the corresponding period in the previous year, with higher growth rate than the same period in 2020 and 2021 of 4,7% and 5,17% respectively.

In comparison to the preceding year, there was an 8,02% surge in GDP, marking the most substantial increase within the 2011-2022 timeframe, primarily attributed to the ongoing economic recovery (GDP growth rate for the period 2011-2022 was 6,41%; 5,50%; 5,55%; 6,42%; 6,99%; 6,69%; 6,94%; 7,47%; 7,36%; 2,87%; 2,56%; 8,02%, respectively). Added value to the whole economy, the agriculture, forestry, and fishery sectors contributed 5,11%, while industry and construction allocated 38,24%, and lastly service sector contributed 56,65%. In 2022, the GDP at current prices was projected to attain a scale of 9,513.3 trillion VND, which is equivalent to 409 billion USD (with average central exchange rate in December 2022 of the State Bank of Vietnam 1 USD= 23,271.9 VND). In 2022, the estimated GDP per capita stood at 95,6 million VND and 4,110 USD, reflecting a notable increase of 393 USD from the previous year. Furthermore, the labor productivity across the entire economy in 2022 reached 188,2 million VND per employee and 8,083 USD, demonstrating a substantial rise of 622 USD compared to 2021. In addition, labor productivity increased by 4,8% in 2022 due to rising qualifications of the workforce. While the trained laborers with diplomas or certifications reached 26,2% in 2022, making a slight uptick of 0,1% from previous years. With a significant boost in GDP per capita, it becomes evident that the Vietnamese will have greater financial resources to spend on items beyond necessities, on average (General Statistics Office 2022.)

Emerging as one of the most rapidly expanding internet economies in Southeast Asia, Vietnam is predicted for substantial growth in its e-commerce market, with a projected market value of 60 billion USD by 2030. This estimation situates Vietnam in the second position only behind Indonesia. The current landscape in Vietnam is characterized by a digital population and escalating internet penetration, establishing conducive conditions for the flourishing of e-commerce enterprises (Statista 2023.)

As mentioned in the 2018 EU-Vietnam Business Network (EVBN) Vietnam Retail Market Study, it pointed out that Vietnam has three main channels: traditional, modern, and online as shown in Figure 8. Nevertheless, this study is only dedicated to the overview of online retail, and B2C e-commerce channels.

Figure 8. Structure of the retail market in Vietnam (EU-Vietnam Business Network 2018, 15)

Decree 52/2013/ND-CP defined e-commerce activity as involving performing commercial activities through electronic channels linked to the Internet, mobile telecommunications, and other accessible networks (EU-Vietnam Business Network 2018, 15).

The Vietnam E-commerce White Book 2022 developed by the Ministry of Industry and Trade (Vietnam E-commerce and Digital Economy, 3) was built to provide a comprehensive overview of the situation in e-commerce in 2021, about the recovery of the economy, e-commerce applications under the impact of post-COVID 19, along with the new regulations taking effect. This annual report was collected from the results of the surveys of 5,000 consumers and about 10,000 businesses, together with the aggregate data from reputable organizations around the world. Figure 9 shows the records of B2C Vietnam's e-commerce revenue in the period 2017-2022 and the growth of its. The column chart presents the e-commerce revenue, and the line chart shows the growth percentage. It is noted that the data in 2022 is prediction.

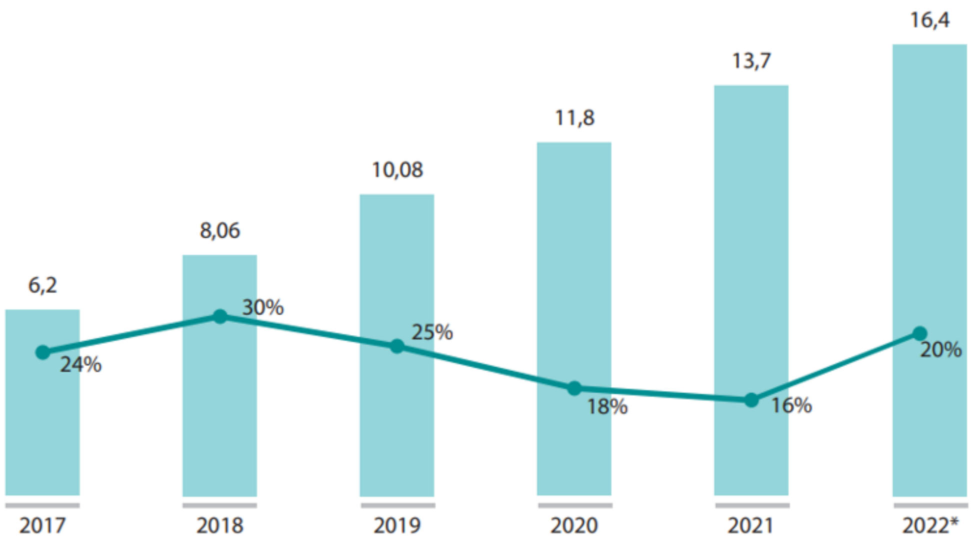

Figure 9. B2C e-commerce revenue in the period 2017 – 2022 (in billion USD) and forecast data in 2022 (Viet Nam E-commerce and Digital Economy 2022, 34)

B2C revenue of the Vietnamese e-commerce market includes revenue from all goods and services sold through e-commerce channels (excluding transactions related to the fields of finance, banking, insurance, and online games). To sum up, Vietnam's e-commerce continued a consistent growth of 16% and reached 13,7 billion USD in retail revenue in 2021. This market was predicted to rise to 16,4 billion USD with an extreme growth rate of 20%. Moreover, it estimated that in 2021, there were 54,6 million people consumed online shipping, which was 5,3 million people higher than the previous year. Also, the report predicted that the value of online purchasing per user would continue to rise. This year it was 251 USD and is expected to reach 260-285 USD per person (Viet Nam E-commerce and Digital Economy 2022, 34.)

E-commerce websites and apps serve as the platforms for online shopping from more popular to less popular, as demonstrated by the number of monthly customer visits. Figure 10 shows the most visited e-commerce sites in 2022 in Vietnam, according to the mean monthly visit statistics.

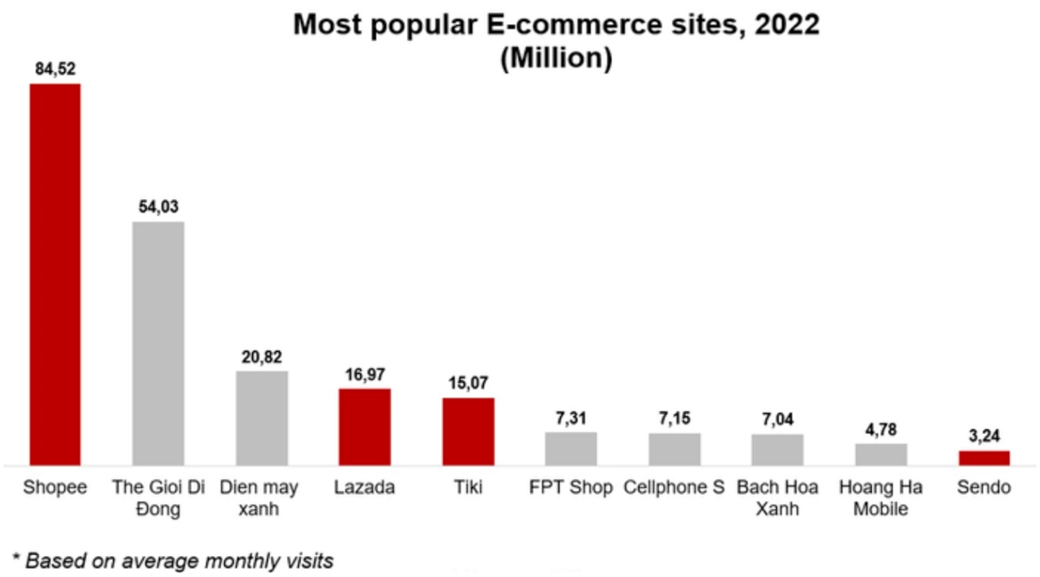

Figure 10. Most popular E-commerce sites in 2022 (Ho 2023)

The e-commerce landscape in Vietnam is primarily dominated by well-established players in traditional online retail. As of 2022, Shopee emerged as the most prevalent e-commerce platform in the country, registering an impressive 84,5 million visits per month. Following Shopee's popularity was The Gioi Di Dong, which averaged nearly 54,03 million visits per month, and Dien May Xanh with 20,82 million visits. In contrast, Lazada held the fourth position with 16,79 million visits per month, representing approximately one-fifth of Shopee's visits and one-third of The Gioi Di Dong. Tiki secured the fifth position in this ranking, with a monthly visit count of 15,07 million. It is worth noting that Sendo, although a prominent player, occupied the tenth position with 3,24 million monthly visits. This data illustrates the competitive landscape of e-commerce in Vietnam, with Shopee leading the market by a significant margin. Nevertheless, it is important to note that even established industry leaders may face potential challenges from the emergence of social e-commerce platforms. An example of this shift was the merger of TikTok Shop in Vietnam, launched from the popular social media platform Tiktok. This innovative platform leveraged livestreaming to drive sales enabling users to conduct transactions within the app, without the need to click on external links. This trend highlighted the dynamic nature of the e-commerce landscape, where new, socially driven models could disrupt the traditional players (Ho 2023.)

The remarkable growth in the e-commerce sector is attributed to several factors. Among these, a digitally proficient and tech-savvy younger population including Millennials and Generation Z, refers to individuals who were born and raised in the age of Internet and digital technology, which has played a pivotal role. This demographic's increasing access to the Internet and extensive smartphone usage have created a conducive environment for e-commerce. Moreover, Vietnam's shift from traditional physical retail to virtual shops has been a significant driving force. These dynamics collectively reflect the purchasing power and spending behavior of e-commerce users in the country underscoring the substantial revenue opportunities.

Drivers toward the fast growth of the e-commerce market

1. The government policies

As stated by the Vietnam E-commerce Association, the robust growth includes many drivers from progressive government policies, increased middle-income class together with the acceleration of the internet and digitalization economy. It is critical to emphasize that government policies are one of the primary forces that affect the entire economy.

The Vietnamese Government approved the Master plan in May 2020 on e-commerce during 2021-2025 integrating the current strategies and regulations on the 4th Industrial Revolution to promote national digital transformation and developing digital economy. In detail, the plan targeted to promote the adoption of e-commerce in running businesses, narrow the bridge between urban and rural areas, promote online trading, boost domestic production, and increase cross-border online trade after approving the master plan for national e-commerce development in the period to 2025. It acted as a supportive plan for improving the digital economy, taking advantage of, and boosting the Vietnamese economy the exports. In interviews with the reporters, Minh Nguyen, a member of the Executive Committee of the Vietnam E-commerce Association, commented that COVID-19 was a global challenge prompting a re-evaluation of the world's economic structure. The uncertainty surrounding the end of COVID-19 makes e-commerce an effective solution. Under this situation, e-commerce is not merely a directional choice but a definitive solution for national economic development (Trang 2020.)

Another, Dang Hoang Hai, who serves as the Director General of the Ministry of Industry and Trade's Department of E-commerce and Digital Economy, emphasized several key points. He mentioned the need to expand e-commerce beyond major cities and into more remote areas. Additionally, he emphasized the significance of integrating innovative technologies to improve product quality and minimize expenses within the e-commerce industry. Another vital aspect was the development of domestic products. Developing domestic products has had the potential to enhance the living conditions of rural residents, subsequently stimulating national economic growth. To promote a more holistic advancement of e-commerce, there were intentions to amend the e-commerce decree and cooperate with other governments to establish stringent penalties aimed at deterring violations related to product quality (Trang 2020.) Upon implementation of the plan, added to the significant COVID-19 epidemic situation, these have changed the consumption habits of Vietnamese as well. The related professionals have an agreement with the plan of developing the e-commerce industry. One of them is Nguyen Tri Hieu – an Economist who told to the interviewer that he agreed with the Master Plan, he believed that e-commerce is an unavoidable trend, prevalent in developed nations. He also believed that the government should accelerate the adoption of cashless payment systems and build a trustful infrastructure that would drive the changes in customers' habits (Trang 2020.) The epidemic of COVID-19 has influenced the consumption habits of the citizens both in rural and urban areas. It has raised the changes and developed the entrants of the e-commerce business model to the Vietnamese economy.

2. Internet penetration and mobile usage

Vietnam's e-commerce is forecasted to continue growing in 2023, aided by a series of drivers such as the wave of digital transformation, consumers' habits and technology, and infrastructure (VNA 2023). The statement can be shown by the statistics presenting the waves of digital and the enormous number of internet users in the Vietnamese region. According to the WeAreSocial records (2023), The Vietnam Digital Report in the first quarter of 2023 was published, which revealed the changes in internet users, active social media users in Vietnam, and how digital trends influence consumer behaviors. Firstly, there are notable figures of internet users by the Vietnamese population in Figure 11 (Vnetwork 2023).

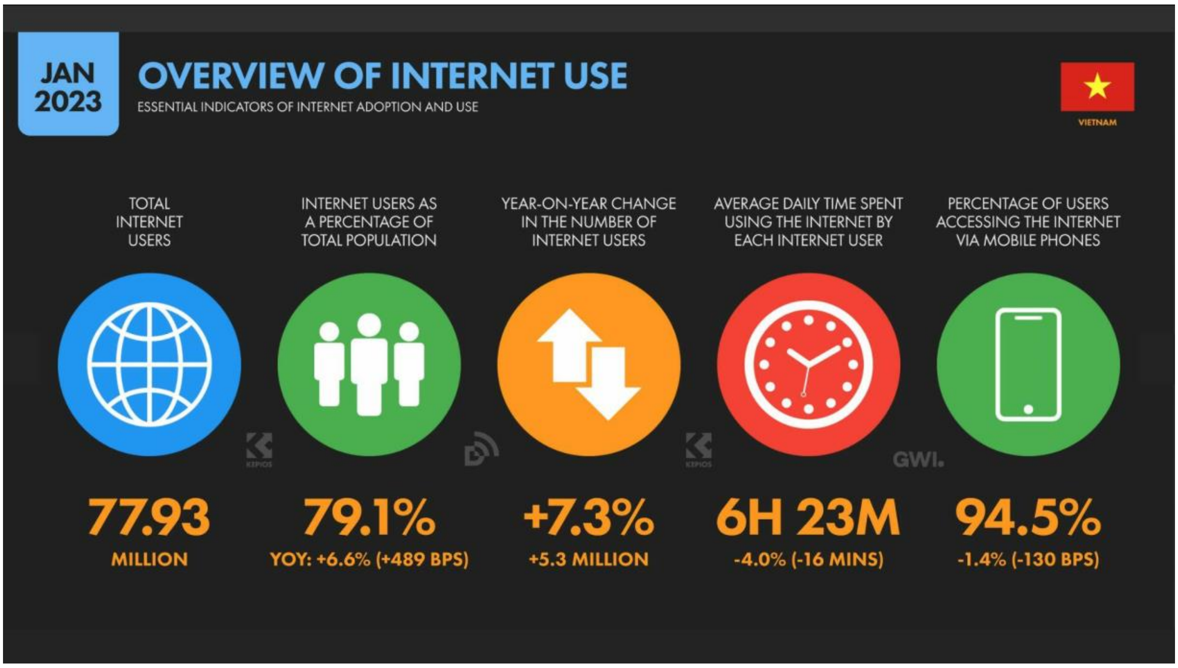

Figure 11. Overview of Internet use (Vnetwork 2023)

Vietnam's internet user population reached 77,93 million in January 2023, accounting for around 79% of the total population, which was 98,53 million. This means that 20,9% of the remaining population was offline at the beginning of the year. The more smartphones are in use, the greater the adoption of the Internet. With 94,2 million individuals using smartphones and 82,2 million people subscribed to mobile broadband, Vietnam's mobile technology adoption reaches 74,3% of Vietnamese citizens (Ministry of Information and Communications 2022). Since most people primarily use phones for making purchases and online payments, the increase in smartphone usage significantly affects the e-commerce visit's platforms.

According to the report, the daily time spent on the internet by each internet user is 6 hours 23 minutes and most of them access the internet via mobile phones. And according to Deputy Minister of Information and Communications Pham Duc Long, he said that a decision made 25 years ago to connect a country to the global internet, was a courageous decision. The government of Vietnam recognized the potential benefits of integrating with the global internet and the positive impact it could have on the country's development and progress overall. Furthermore, the introduction of the Internet has brought changes in how people communicate, access information, do business, and transform various aspects of their daily lives (Ministry of Information and Communications 2022.) Therefore, based on these data, many factors such as improved connectivity, expanding internet infrastructure, and the integration of digital technologies into daily life contributed to the steadily increasing of internet users. Mobile phones have become the favored device for accessing the internet due to the convenience that has driven this shift.

3. Online shopping activities

The increase in internet users is a positive signal for the e-commerce market. Since it is a tool for consumers approach to the digital platform of online shopping. Figure 12 presents the overview of consumer goods in e-commerce.

Figure 12. The use of consumer goods e-commerce (DataReportal 2023, 83)

According to the statistics in Figure 12 about the number of purchasers, it is noted that the statistics are based on B2C e-commerce and there are 57,62 million people purchasing goods via the internet, which generated 12,81 billion USD in 2023. On average, each customer spends 222 USD to shop online, a decrease of 10% compared to 2022. Based on the data, there is a sizeable number of people engaging in online purchases. And 49,7% of online shopping transactions are done through mobile devices. This indicates a growing trend of consumers using mobile phones to make online transactions. When compared to 2022, the percentage of online shopping increased by 2,3%. This suggests a rising preference for mobile shopping among consumers. Overall, these data show us the large consumer use and growing preference for mobile shopping. The decrease in average spending could be attributed to several factors such as changing consumer behavior, increased competition, or economic conditions.

When it comes to the consumer goods categories in Vietnamese e-commerce, Figure 13 figures out the frequent goods that Vietnamese people prefer to purchase online.

Figure 13. E-commerce: consumer goods categories (DataReportal 2023, 84)

It is collected that the most spending in e-commerce is electronics, which generates 4,52 billion USD spending in 2022. This indicates a significant demand for electronic devices and gadgets in Vietnam. It suggests that consumers are actively purchasing smartphones, tablets, laptops, and other electronic products. The electronics sector is likely to highly competitive, with various brands and models that can easily be watched, reviewed, and purchased on e-commerce platforms. The next level is fashion which received 2,23 billion USD in spending in 2022. This means that people are likely to have an interest in online fashion, spending a significant amount on clothing, footwear, and accessories. Offering diverse functions, features, and in-app purchases, contributed to the high amount of spending and shopping in e-commerce platforms. The remaining prominent online categories include toys and homemade items (1,78 billion USD), furniture (1,55 billion USD), and home and personal care (1,21 billion USD).

4. Payment methods

In the realm of e-commerce, providing seamless and secure payment options is paramount to ensuring a smooth and satisfactory shopping experience for customers. This part aims to explore the recent payment methods used in the realm of e-commerce. Figure 14 explores the most used payment methods, such as digital and mobile wallets, debit and credit cards, bank transfers, cash-on-delivery (COD), and other payment methods.

Figure 14. Payment methods used for e-commerce (DataReportal 2023, 86)

As in Figure 14, it noted that 25% of transactions by consumers prefer the convenience and security offered by digital wallet services. It is a considerable method since Vietnam also offers many popular digital wallets that customers frequently use. There 24% of the transaction volume was bank transfers. This suggested that many customers prefer the familiarity and security of transferring funds directly from their bank account for online purchases. Vietnamese consumers typically use online banking systems or make direct transfers via Internet banking. For the third place, 23% of transactions belonged to debit and credit cards, also 23% were the COD payment method. This signifies that a substantial number of customers are comfortable with using their cards for online purchases. Major credit card providers such as Visa, Mastercard, and local bank debit cards were commonly used. Also 23% of transactions, there was the COD method, stay popular in Vietnam. This implies that a significant of customers prefer paying for online purchases in cash upon delivery. COD provides a sense of security and trust for customers who may be worried about sharing their financial information online. The remaining 5% presented for the alternative or less commonly used payment options. This may include options like installments, or digital payment vouchers. Overall, these numbers reflect the diverse preferences of Vietnamese consumers when it comes to payment methods in e-commerce.

According to Visa study, they conducted a study to emphasize the shift in payment habits of Vietnamese. There were 65% of Vietnamese kept fewer banknotes in their bag, and 32% said they have started quitting using cash after the pandemic. This was accompanied by significant advances in electronic or digital payments. It was reported that 76% of consumers currently use a wallet app on their phone, while an even higher percentage (82%) utilized physical cards in payment (Visa.) In terms of frequent usage, post-COVID-19, a significant majority (80%) of individuals currently employed their physical cards, quick response (QR) codes, and digital wallets weekly. Simultaneously, almost half of the Vietnamese population has upped their card usage, with a 64% increase in mobile contactless usage and a 63% boost in mobile wallet usage. Convenience is the forefront factor influencing consumer preferences when it comes to digital payment systems, with infection prevention and transaction security being the subsequent priorities (Visa.)

In recent years, financial technology (Fintech) companies in the Vietnamese market have fiercely competed for market share by launching electronic wallet brands such as Momo, ZaloPay, FPT Wallet, ViettelPay, AirPay, and so on (Iris 2022).

Decision Lab and Mobile Marketing Association Vietnam (MMA) have concluded "The Connected Consumer Q1 2023" in Figure 15, in the context of consumer's online use including in social media, entertainment services, online shopping, and e-commerce market (Trong 2023).

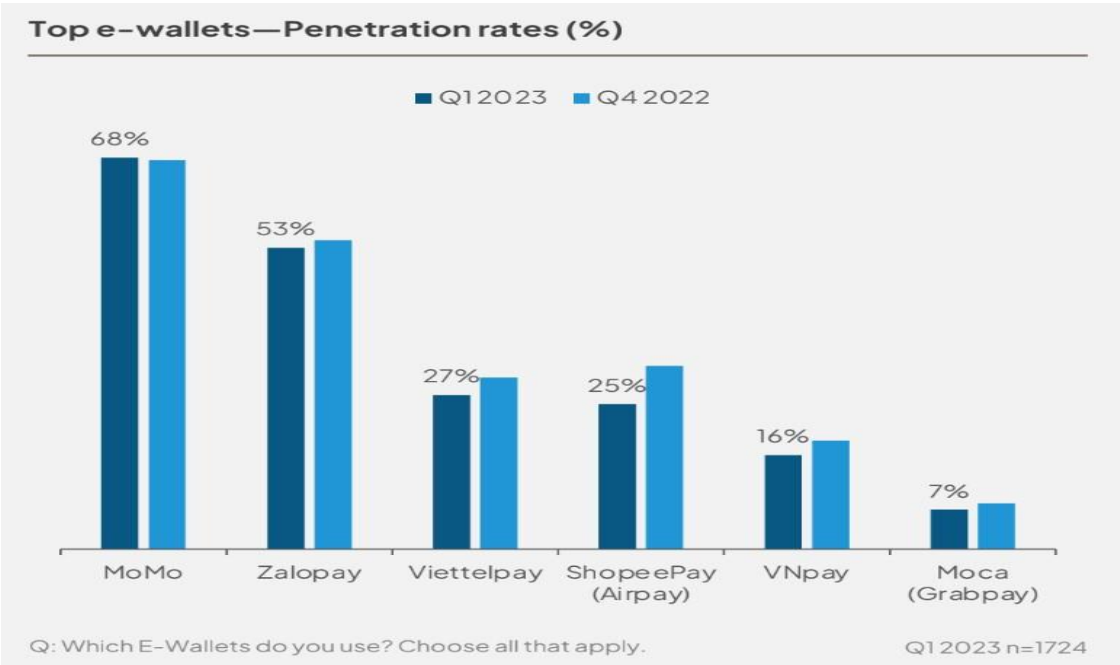

Figure 15. Top e-wallets – Penetration rates (%) (Decision Lab, according to Trong 2023)

According to a collection by Decision Lab of the most favorite E-wallets in Vietnam, it pointed out that MoMo is the leading market with a penetration of 68%, 2% higher than in the fourth quarter of 2022 (Trong 2023). Afterward, ZaloPay (53%), with the third place was Vietnam's fintech – Viettel Pay (27%), ShopeePay (Airpay, 25%), VNPay (16%) and Moca (Grabpay, 7%). Also, the favorable users belong to the generation X, Y (millennial), Z.

Depending on the statistic, there is no denying that non-cash transaction is gradually decreasing in the Vietnamese market. Experts said that non-cash payment methods would develop strongly in Vietnam soon. Mobile money, together with e-wallets would be the collaborator that helps popularize non-cash payments widely (Trong 2023.) Indeed, even Apple Pay first launched in 2014 in the United States, until now in July 2023, a prominent Vietnamese bank announced that Apple Pay allows user to link their bank's credit and debit card to the Apple Pay platform via Apple Wallet or a dedicated app. These major banks in Vietnam are working on launching updated versions of their mobile banking to facilitate Apple's contactless payment system. The launch of Apple Pay in Vietnam has marked a notable advancement in the country's digital payment landscape providing customers with a convenient, secure alternative to traditional card-based purchases (VIR 2023.)

3.2 Last-mile delivery in the Vietnam e-commerce market

The last-mile delivery has become a pivotal element in concluding the various stages of e-commerce transactions. It directly influences customer experience and the competitiveness of businesses. Despite constituting a relatively small segment of the entire e-commerce process, last-mile delivery plays a decisive role in determining the success or failure of a delivery. Customers are particularly concerned about factors such as delivery costs, speed, timing, and notification throughout the delivery process (Le et al. 2023.) By understanding the role of last-mile delivery and its effect on customer satisfaction, the company can unlock the solution for improving and competing with the diversity of e-commerce platforms.

In Vietnam's e-commerce scenario, there are two main types of logistics services in-house logistics and third-party logistics (3PL). In-house logistics refers to big e-commerce platforms, like Lazada and Tiki, creating and managing their own logistics systems, called Lazada E-logistic Express and Tiki Now, respectively. They handle everything from storing products in their warehouses, packing orders, and shipping them to customers, all within their own company. Besides, e-commerce platforms in the electronics sector such as The Gioi Di Dong, Dienmayxanh, FPT shop and Nguyen Kim, established logistics services themselves by leveraging large store networks. Although giant players like Lazada have in-house logistics – handle up to 60% of orders, they still collaborate with other 3PL providers. This dual strategy allows them to ensure excellent customer service, leverage promotional campaigns and optimize overall shipping costs. Among the major players in the field, Shopee and Sendo, which are highly visited e-commerce platforms, have opted to partner with 3PL delivery partners for shipping services. This approach allows them to efficiently handle the delivery aspects of e-commerce operations while focusing on other aspects of their business (B&Company Vietnam.)

In the realm of e-commerce logistics in Vietnam, the traditional system of sending mail and packages through mail carriers or post offices such as VN Post (VietNam Post), EMS and Viettel Post has adapted to the changing market, they leverage their strength in an extensive nationwide network of post offices, making them especially influential in rural areas. In contrast, in urban areas, where the demand for convenient and express delivery services is high, there is a significant opportunity for logistics startups. These startups leverage technology solutions to enhance the quality of services and optimize their operations. Over the past few years, several e-commerce entrants have entered the market, namely Giao Hang Nhanh (GHN), Giao Hang Tiet Kiem (GHTK), NinjaVan and so on. These companies have become key partners for major e-commerce platforms in Vietnam (B&Company Vietnam.) Table 1 below shows the delivery companies collaborating with e-commerce platforms.

Table 1. Key delivery companies and e-commerce platform partners (B&Company Vietnam)

Delivery companies	Size and capacity	E-commerce platform partners
GHN (Giao hang nhanh)	More than 200 post offices, 800 service points, 63 provinces coverage…	Lazada, Shopee, Sendo, Tiki
GHTK (Giao hang tiet kiem)	63 provinces coverage, 99% districts & communes nationwide, 20 center points…	Shopee, Vatgia.com
Ninja Van	63 provinces coverage, 5 warehouses	Lazada, Tiki, Sendo

The well-known international courier DHL has recently unveiled the DHL Parcel Metro Same Day, which provides delivery services with up-to-the-minute tracking and easy-to-reschedule shipping dates via the customized application. DHL has partnered with Sendo as an e-commerce logistics provider to account for shipping services to its customers (B&Company Vietnam.)

On-demand delivery, a recent addition to e-commerce logistics, is gaining popularity among a massive portion of the Vietnamese population. The primary challenge with this concept is its time-sensitive nature, as it requires immediate action when a new order is placed such as food and beverages. However, this remains a new playground for e-logistics companies, including Ahamove, LalaMove, Delivery Now, Grab, Goviet, and others (B&Company.)

3.2.1 Last-mile distribution structure in e-commerce Vietnam

In the dynamic landscape of e-commerce in Vietnam, companies employ various logistics systems, including push-centric, pull-centric, and hybrid models.

The first model of push-centric used in e-commerce Vietnam is direct shipping from the seller's warehouse. In the context of Vietnam's B2C e-commerce, Tiki launched this delivery model which involves shipping directly from the seller's location to the customer's home. In this scenario, goods are stored at the seller's warehouse. Upon receiving a customer's order, the seller validates the transaction on the e-commerce platform and packs the items according to instructions provided by Tiki. Subsequently, Tiki assumes responsibility for the process by collecting the packages from sellers and directly shipping them to end customers. Tiki plays a pivotal role in managing post-purchases such as returns, and exchanges and addressing customer complaints or service inquiries (Tiki University 2023a.) Within the push-centric system, Tiki is employed as distributor storage with last-mile delivery. Tiki operates its warehouses as the central hub for product storage. The responsibility lies with Tiki for the transportation of goods from the seller's location to Tiki's warehouse, either through Tiki's logistics networks or by having the seller bring their goods to the designated Tiki warehouse. When the goods arrive at Tiki's warehouse, Tiki takes charge of the storage, protection, and overall management of the inventory. Upon customer orders placed, Tiki initiates the packing process and transfers items directly to customers. Moreover, Tiki manages post-purchase operations, ensuring a holistic approach to customer service and satisfaction (Tiki University 2023b.)

The second model, known as the pull-centric system, involves the option for customers to pick up their orders from retail storage locations. "Click-and-collect" exemplifies this approach. E-commerce platforms integrate with retail stores that allow customers to place orders online and collect their purchases at a designated retail store (Galante et al. 2013.) In the Vietnamese e-commerce landscape, The Gioi Di Dong has partnered with e-commerce platforms such as Shopee, Lazada and Tiki. This collaboration enables users to make purchases directly at online retail stores or through channels from e-commerce platforms. Moreover, in The Gioi Di Dong platforms, customers have the convenience of placing orders online and then choosing to collect their purchases in person from a designated store. This multi-channel approach offers customers flexibility in choosing the preferred mode of the transaction and a mode of collection (Dan Viet 2021.)

In the hybrid distribution system, collection pick-up points and locker banks serve as primary options, offering a solution for the last-mile delivery challenge. Smart lockers and collection points are particularly effective in optimizing the last-mile delivery system, with parcel lockers placed in densely populated cities such as Hanoi and Ho Chi Minh City, where an abundant volume of packages is delivered daily. Unattended home delivery preferences, Lazada Express Vietnam has launched the “collection point” and “iLogic Smart Box.” Lazada shoppers can opt to pick up their goods at 300 collection points located in convenience stores or smart lockers (VNS 2020.) The “iLogic Smart Box” was developed in collaboration with the iLogic joint-stock company. This innovative approach reduces waiting times, and streamlines the process of sending and receiving products, enhancing user experience with a cost-effective and time-saving solution. Lazada Express Vietnam has implemented iLogic smart lockers in 31 stations, situated in three provinces Hanoi, Ho Chi Minh, and Hung Yen (Tran & Bui 2020). These stations are in shopping malls, large apartments, and university areas, ensuring accessibility and convenience for a broad user (VNS 2020). Furthermore, in 2021, VN Post initially introduced Post Smart in Hanoi and Ho Chi Minh, subsequently extended to other cities such as Da Nang, Hai Phong, Binh Duong and more. Previously, VN Post only offered home delivery or pick-up at collection points. Automatic Post Smart empowers users to proactively pick up their orders 24/7 from smart lockers of their choice. This innovation significantly enhances the flexibility and accessibility of the pick-up process as well as reduces transportation costs (VietNam Post 2022.)

Following a comprehensive exploration of the Vietnamese e-commerce landscape and the last-mile distribution system in the country, the focus now shifts towards an exploration of the potential advantages and obstacles that may confront last-mile logistics in Vietnam.

3.2.2 Opportunities

In Chapter 3.1, the market drivers in Vietnamese e-commerce are shown through 4 main points government policies, internet penetration and mobile usage, online shopping behaviors, and payment methods. These identified drivers are linked to the prospective opportunities within the Vietnamese last-mile delivery sector, establishing a coherent relationship between them.

Competitive landscape

Competition drives innovation. Companies strive to differentiate themselves by introducing, developing new features, services, product lines and so on. As a result, attracting and retaining customers creates a dynamic and fair playground in a specific field. As occurred the same in e-logistics Vietnam, a diversity of firms - from local to international, from old to start-up companies, with the same purpose of bringing the best experience in delivery to customers.

During the early 20th century, the e-commerce logistics sector in Vietnam was primarily controlled by a prominent company because of geographical and infrastructure obstacles. There are VN Post and Viettel Post, which is a national postal service provider in Vietnam and a large Vietnamese military-run telecommunications company, respectively. These challenges necessitated significant capital investment to establish a viable logistics network. However, the game changed after a decade, in the 2010s, with the emergence of tech-savvy startups entering the market, leveraging the growth of digitalization, leading to fragmentation of the market. Notable players entering the field such as Giaohangtietkiem (GHTK), AhaMove, SuperShip, and so on (Fast Forward Advisors). Moreover, this landscape includes international players such as DHL eCommerce, Grab Express and Lazada Express making this landscape grow competitively (EU-Vietnam Business Network 2018, 18).

With the necessity of delivering goods in the e-commerce market to the customer, many big players have developed their own logistics networks for their platforms such as Lazada, Shopee, Tiki and to name but a few. Lazada is known as the pioneering e-commerce company in Vietnam and has its in-house delivery called LEX- Lazada Express (EU-Vietnam Business Network 2018). Besides, some e-commerce platforms have used external logistics providers, known as third-party logistics. They can use these external logistics services even if they have had logistics services themselves. For example, Giao Hang Nhanh (GHN) operates as a company providing services in e-commerce delivery and logistics, catering to 800 online retailers, 20 of which are B2C e-commerce sites such as Tiki. Their primary objective is to enhance the overall e-commerce experience for both businesses and customers by providing efficient delivery services (Le 2019.) Besides GHN and GHTK, the most prominent are the “big four pillars” which also include Viettel Post, VN Post. Currently, these third-party logistics companies hold a market share of 60% to 65%. However, with the emergence of fresh players – giants from the region and the world, such as BEST Inc. from China, J&T from Hong Kong, and DHL from Germany, it is likely that the market needs to be reshuffled in the future (Giaohangtotnhat 2020.)

In the competitive world of e-commerce logistics, Lazada Vietnam stands out. According to Mr. Vu Duc Thinh, Lazada's Logistics Director, the biggest challenge is balancing speed, quality, and cost-effectiveness in shipping orders. Typically, fast, and cheap do not align with high quality, but Lazada Logistics aims to make all three work seamlessly. Mr. James Dong, General Director of Lazada Vietnam and Thailand, highlighted Lazada's robust logistics system, handling over 80% of Lazada's orders in-house. This strategy shortens delivery times, meeting customer needs more efficiently. Additionally, Lazada introduced multi-channel logistics services, allowing them to handle orders from various e-commerce platforms. They have also set up sorting centers in different districts for flexibility and employ AI technology to optimize courier routes, ensuring the quickest deliveries (Thanh Van 2020.)

Undeniably, the increasing demand for this field attracts more entrants, prompting companies to focus on development, innovation, and long-term strategy to stand out from the competition. This competitive environment encourages e-logistics companies to continually improve their services and create unique value propositions to distinguish themselves in the market.

Surging customers' demand

In 2021, the e-commerce sector in Vietnam was in fourth place in Southeast Asia, with a scale of 13 billion USD. However, in forecasts from Google, Temasek and Bain & Co, it said that by 2025, the Vietnamese market size would increase to 39 billion USD, securing the second place in Southeast Asia (Pham 2023.) The scale of e-commerce forces the logistics company to change to meet the increasing demand. According to the Vietnam Logistics Business Association (VLBA), 20-25% of the GDP is the logistics industry, with the forecast to grow around 12% every year soon. E-commerce is the target market for investing in logistics services and express delivery, it is a potential market with many opportunities for logistics companies (Le 2019).

The flourishing of e-commerce, followed by online retail logistics (e-logistics), is proving that the increased demand by customers is the biggest opportunity for e-logistics. According to Duy Anh (2023), it noted that the growth of online shopping will continue increasing even after COVID-19. One of the foremost trends is the emergence of crowdsourcing services. This concept is the delivery of products immediately after the purchase is placed. For example, in the food industry, when a customer orders food via a mobile app, the application suggests restaurants near the provided customer's address. After that, randomly assign a shipper for delivery from the chosen restaurant to the customer's door. This service requires rapid delivery, advanced technology for precise address detection, and real-time data to keep customers informed. As this demand continues to soar, it has paved the way for many players to enter the arena. Now, Loship and Grab's food in Vietnam has several sign-in members, who prefer to use last-mile delivery for food products (Phuong 2020.) Especially, this trend is widely used in crowded areas, in the capital (Ha Noi) and Ho Chi Minh City. Notably, the ongoing urbanization in Vietnam's major cities presents opportunities for last-mile delivery services. Especially, as analyzed in Economy and Forecast Review, the adoption of final mile delivery services is on the upswing and has become pervasive, particularly in the Hanoi region. This trend is dominated by the food and beverage e-commerce industries. This robust utilization of last-mile delivery services is highlighted by the young population and their habits (Nguyen et al. 2021.)

In addition, in 2021, the annual document provided statistical data on Vietnam's e-commerce by the Vietnam E-commerce and Digital Economy Agency. It was pointed out that the country had around 50 million people using shipping on e-commerce platforms. With the high and incredible number of users, it allowed firms to have strategies to meet the surging demand for last-mile delivery. Many firms have launched specialized services to meet the demands of various groups of customers, especially embracing new technologies to enhance the quality of service and satisfaction of customers. It is notable that Tiki- is the leading e-commerce platform in Vietnam with nearly 30 diverse categories, with their retail units (Tiki Trading) supply chain department (Tiki NOW Smart Logistics), and 20 Operation Centers and Warehouses in Vietnam. Tiki is a notable example of adapting the newest technology, bringing a better purchase experience as quickly as possible in the realm of significant growth of e-commerce. In 2021, Tiki made use of robots in the logistics process, supporting the transportation of goods in warehouses. After implementation, it is noted that the strength, precision, and agility of robots can help take on heavy, repetitive tasks. In the meantime, humans can take care of other tasks, making the order processing faster, the picking speed increases two times compared to usual (these statistics have been recorded at the Nha Be warehouse) (Cong Thuong 2021.)

In terms of customer demand, it is notable that the ongoing urbanization in Vietnam's major cities presents opportunities for last-mile delivery services. Urban consumers increasingly rely on online shopping, creating demand for efficient logistics solutions.

Investors

With the dynamic market, as it is in Vietnam, it has attracted not only domestic investors but also foreign-invested businesses. According to Vietnamnet Global, the landscape of logistics enterprises in Vietnam is predominantly characterized by small and micro-sized companies lacking both technology and capital resources. In contrast, foreign investors have been allocating substantial financial resources to the Vietnamese market, perceiving themselves as having a distinct edge over their domestic counterparts. Foreign companies prefer investing in Vietnam because they believe that they have an edge due to their ability to enter the market using advanced technology and efficient operations. Furthermore, the article underscores that the primary driving force for foreign investment in the Vietnamese logistics sector is the nation's dynamic population, surging consumer demand, and the ongoing growth of its economy. One of the practical examples is WHA Corporation PCL in Thailand has unveiled a plan to boost its revenue by investing $1,51B over the next five years. A portion of this investment will be allocated to expanding its operations in Vietnam. More precisely, WHA intends to grow a 352-hectare industrial park in Nghe An province (Mai Lan 2022.)

Despite encountering some barriers entering new market areas, the logistics sector in Vietnam is poised for a promising future, thanks to the country's advantageous position in various free trade agreements. Notably, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has recently been enforced, while the European Union Free Trade Agreement (EVFTA) is expected to be ratified soon. These trade agreements are expected to encourage foreign direct investment (FDI) in Vietnam's infrastructure and information systems. Moreover, the Vietnamese government has taken proactive steps to alleviate regulatory hurdles faced by the logistics industry. Decision No.1012/QD-TTg, which outlines plans for the establishment of logistics centers across the nation by 2030. Decision No.200/QD-TTg, which is geared towards enhancing the competitiveness and development of logistics services in Vietnam by 2025 (Le 2019.)

By easing regulations in the logistics sector, Vietnam can make itself more appealing to international investors looking to promote the growth of the country's logistics industry. As the investment environment becomes more favorable and regulatory reforms persist, it is expected that existing investors will increase their capital expenditure in the upcoming years. Additionally, fresh players are planning to explore these opportunities in the Vietnamese market because of their potential. Success for both current and potential investors in e-commerce logistics would depend on their ability to grasp the unique difficulties in the Vietnamese market to discover efficient and affordable solutions to tackle these challenges (Le 2019.)

3.2.3 Challenges

Following the COVID-19 pandemic, Vietnam's e-commerce industry experienced significant acceleration and reached remarkable milestones. However, within the thriving environment, the industry also grapples with certain challenges, particularly in E-logistics. In detail, this research aims to focus on four key points that hinder the efficiency of last-mile delivery: barriers to entry, inadequacy of infrastructure, patterns in consumer behavior and the role of technology.

Barriers to entry

The rise of e-commerce in recent times has created opportunities for numerous newcomers to enter this dynamic market. Nevertheless, it also presents a double-edged sword, as it can be challenging to compete with many big players in e-commerce and e-logistics. For example, in early October, Giao Hang Nhanh (GHN) inaugurated and put into operation a cross-border transfer center with an area of over 40,000 square meters, with a total processing capacity of nearly 6 million orders. This is currently the largest and most advanced automated sorting center in the southern region of GHN. At the same period, big e-commerce companies like Lazada, Shopee and Tiki significantly ramped up their investments in logistics. Lazada Logistics just established 20,000 square meters; the new sorting center can process up to 1 million parcels per day. Through various partners, Lazada also operates thousands of drop-off points, hundreds of collection points, and a system of smart lockers to enhance its delivery and logistics services. On the other hand, Tiki was the pioneer among e-commerce retailers to launch a two-hour shipping service. Meanwhile, Shopee last year launched a delivery service within 4 hours (Shopee Express Same Day), guaranteeing delivery within a maximum of four hours on the same day by optimizing shipping routes (Duc Huy 2023.) The examples mentioned above clearly illustrate that major players are taking the lead in allocating significant funds for investments and reshaping their businesses to promptly meet customer demands. This sentiment aligns with the statement made by the CEO of IME Vietnam – a consultant business. She implied that companies offering a wide array of services are better positioned in this competitive landscape. They can subsidize express delivery using profits generated from other sectors, allowing them to sustain their operations for an extended period. The advantage indeed lies with big players capable of mobilizing substantial capital investments, while smaller businesses with limited financial resources may eventually face elimination (Phuong 2020.)

Infrastructure

Transportation infrastructure is a critical foundation for the development of logistics services. However, infrastructure in Vietnam remains inadequate, resulting in costly logistics services due to its inferior quality and frequent traffic congestion. The country's roads are often short, narrow, and low quality but with numerous intersections. Most of the traffic intersections are at the same level, small, and poorly designed, exacerbating the problem of congestion at these points. Vietnam's transportation system has not met the demands of economic development. Currently, Vietnam has developed a diverse network of transportation systems in terms of quantity, and density but the quality is still lacking (Nguyen 2018). It is reported that a sizable portion, 75%, of e-commerce deliveries are concentrated in metropolitan areas such as in the capital of the South and the main city of the North, which are known for heavy traffic congestion. This situation makes the competition regarding daily speed and cost a persistent concern for all E-logistics players (B&Company Vietnam).

Secondly, Vietnam is a country with high motorcycle usage, resulting in limitations on transportation. Motorcycles are not purpose-built for delivery, prompting last-mile logistics companies to make modifications by adding boxes with limited capacity for carrying (Phuong 2020.) The road infrastructure has seen some development, but it has yet to meet the market's demands. Localized traffic congestion is still prevalent, with many roads in poor condition, featuring potholes. This significantly impacts logistics operations in terms of costs, time, and route planning, thereby complicating the movement of goods (Nguyen 2018.)

Dominance of COD payment method

One of the biggest challenges that logistics service providers must contend with is the cash-on-delivery (COD) payment method. COD entails a scenario where customers desire to buy products online and only settle the payment after they have received the goods. This method brings a sense of trust and security to customers. However, it can indeed lead to higher operational costs and increased labor intensity. As e-commerce transactions continue to rise, logistics providers are faced with the challenge of efficiently handling the corresponding surge in returned, exchanged, and damaged goods (B&Company Vietnam). For instance, customers may opt for the COD method, and upon delivery, they refuse to accept the goods. Consequently, shipping costs and labor expenses increase, and the items need to be returned to the manufacturer. Accepting such actions is reasonable when the issue pertains to damaged goods, incorrect purchases, or manufacturer-related faults. However, when these circumstances are not applicable, a single action by a customer can have a cascading impact on the entire process. In Vietnam, a concerning trend has emerged in which customers choose COD payment when placing orders. However, when the shippers attempt to deliver purchased products, a considerable number of customers either decline to accept the delivery or abruptly sever all communication channels with delivery companies and online retailers. This problematic behavior not only causes financial losses for return-related expenses but also impacts the overall quality of products, especially those that are perishable such as food products (Phuong 2020.)

As shown in Figure 13, chapter 3.1, mentioned that 23% of customers choose the COD method while purchasing online, lower than 63% of transactions were made in 2015. This payment method is not preferred by both retailers and delivery personnel for a couple of reasons. From a retailer's perspective, it will make a big loss if customers order many items but only make a payment for one. In such cases, retailers are still responsible for covering the shipping costs of all the products. Secondly, delivery personnel tend to prefer non-COD payments. With online payments, they can efficiently complete the shipping task by leaving goods with the buyer's neighbors or colleagues if the buyers are not available at the given period. Meanwhile, with COD, delivery personnel can only complete the shipping tasks if they can physically meet the buyers, as they need to collect payments on behalf of the retailers (Chi Nam 2016.)

Technology

With the booming growth of Industrial Revolution 4.0, some technology applications have been applied to logistics companies such as E-logistics, green logistics, and big data. The integration of artificial intelligence with IoT (Internet of Things) networks and modernization tools is beginning to transform labor-intensive warehousing and distribution services. Currently, Vietnamese logistics service providers employ technology in their business activities at a limited scale, using customs declaration software, insufficient capital, and a shortage of in-depth human resources (Giaohangtotnhat 2021.)

According to VITIC Synthesis (2018), Vietnam's level of technology is moderate and uneven. This situation makes it challenging for the country to fully embrace and participate in the 4th Industrial Revolution. Moreover, it is crucial to highlight that not all customers in Vietnam are proficient in technology, particularly the older generation. Some people are more comfortable and skilled with technology while others are not, which can pose additional barriers for e-commerce companies applying technology in applications or delivery systems.

Following by Phuong (2020), implied that the implementation of e-logistics to serve e-commerce is still restricted. Implementing automation systems such as robots in last-mile logistics poses significant challenges to companies due to the high initial investment costs. Adopting innovative technologies implies a transformation of the existing working system, which takes time and resources for employee training and adaptation to the technology. Furthermore, it is essential to prioritize the safety of shipments such as in secure packaging, surveillance systems, secure transportation methods and quality control measures. In summary, the substantial investment costs are the barriers for small e-logistics businesses.

In summary, the barriers to entry in the last-mile logistics market encompass a complex interplay of competitive dynamics, infrastructure limitations, reliance on traditional payment methods and technological challenges. While there are additional challenges in the

Vietnamese last-mile logistics landscape, the ones highlighted above consolidate the critical obstacles that industry entrants must contend with.

4 Customer satisfaction analysis

In this empirical section, the author has designed a survey to explore Vietnamese consumers' experience and expectations of last-mile delivery services. The target respondents for this survey are those who have used or are currently using delivery services from e-commerce platforms in Vietnam.

To distribute the survey, the author uses social media platforms to share the survey with the author's followers and friends. Additionally, the survey is sent to a Facebook group of Vietnamese students in Lappeenranta, who have experienced these delivery services. Impressively, within a week, the responses were collected from a total of 144 participants.

The survey is structured thoughtfully and contains sixteen questions, written in both English and Vietnamese. It is designed to be completed in around 10 minutes with four distinct sections. These questions encompass a variety of formats such as text fields for open-ended questions, multiple-choice questions with single or multiple selections, and scale-based questions to capture a wide range of detailed responses. These questions provide information, data to the author to answer the third sub-question "What could be improved in last-mile delivery to fulfil customer satisfaction?"

To collect data that matches the purpose of the author. The survey includes demographic questions, questions about consumer behavior, consumer experience and questions to gather opinions.

Table 2. Structure of the survey

Part one: Demographic questions	There are two multiple-choice questions with single-selection options related to participant information.
Part two: Behavior questions	There are four questions in this part. These questions consist of a combination of single-choice and multiple-choice options, along with open-ended questions. These questions pertain to consumers' preferred delivery method, the frequency of their online purchases and bought products.
Part three: Experience questions	There are nine questions, including multiple-choice questions with single and

	multiple selection options. There are some free-text boxes provided for participants to express their reasons. Scale-based questions ranging from "Totally Dissatisfied" to "Totally Satisfied" to assess customer's experience.
Part four: Opinion question	In the closing section, there is one open-ended question with a free-text field. This question is designed to gather suggestions and recommendations regarding delivery services. Its purpose is to collect a diverse perspective on satisfaction and retention by consumers.

The data is collected using the web-based survey tool called Webropol 3.0. Subsequently, the results are visualized and presented using various chart types, including column charts, pie charts, and bar charts with filters within the Webropol platform. Additionally, the author has utilized Microsoft Office Excel to enhance the visualization of the charts with color.

4.1 Results of the survey

Part one: Demographic questions

Figure 16 shows the demographic distribution of respondents' age in a survey, comprising 144 participants. Notably, major respondents, constituting 85% of the sample, fell within the age range of 18 to 24 years old, representing Generation Z in the context of Vietnam. The second age group consists of individuals aged 25 to 34 years old, accounting for 11% of the participants' proportion. Finally, the smallest demographic category comprises respondents under 18, with 6 people participating in the survey.

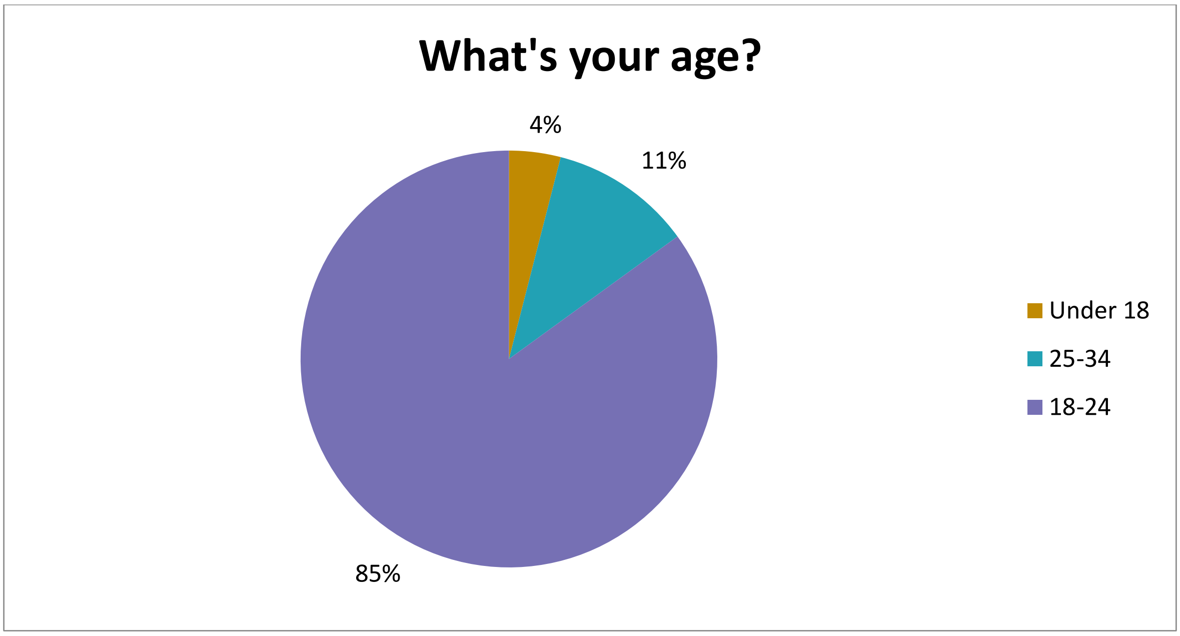

Figure 16. The age of respondents.

The second and last question in the demographic part pertains to respondent's current occupations. The data in Figure 17 reveals that a significant majority are students, specifically 77% of the respondents. The second category belongs to individuals engaged in full-time employment, accounting for a modest 13% of the responses. A smaller fraction, representing 5% and 4% of the participants, are people with part-time jobs and freelance work, respectively. Notably, 1% of respondents is reported being unemployed, with no individuals identifying as business owners or having alternative occupational titles within the sample.

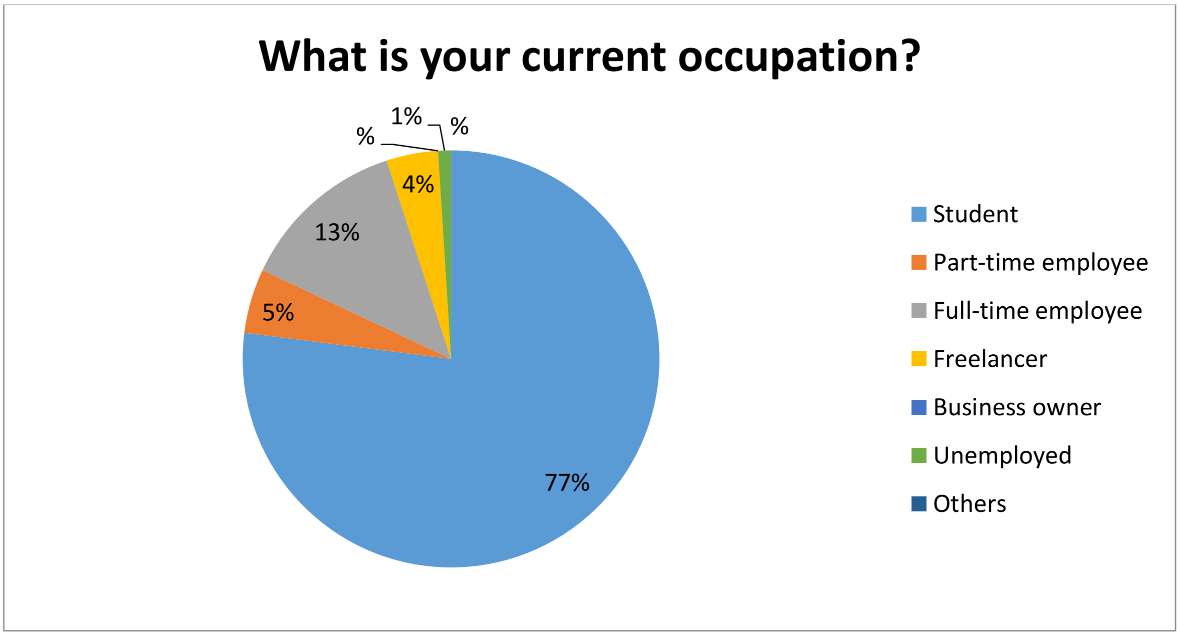

Figure 17. The current occupation of respondents.

The above two questions collect information on respondents' age and occupation which more or less impact their behaviour on shopping online.

Part two: Behaviour questions

In Figure 18, the author goes deeply into analyzing the participants' frequent shopping time on e-commerce platforms.

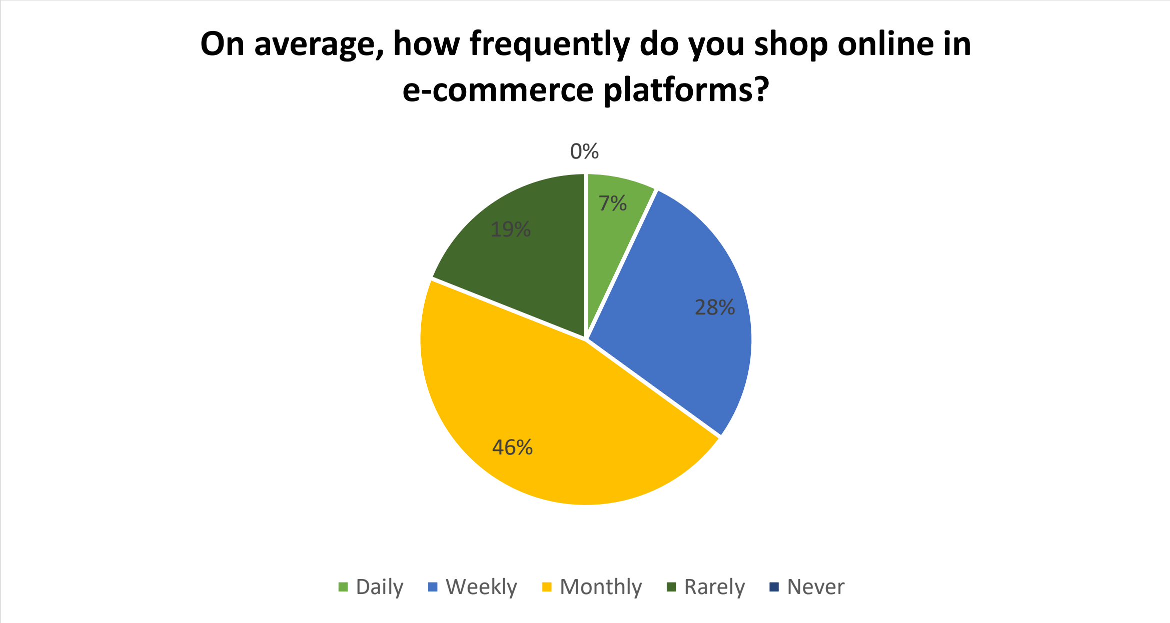

Figure 18. The frequent shopping time by respondents.

As illustrated, individuals who engage in monthly online shopping on e-commerce platforms constituted the largest proportion, accounting for 46% of the sample. Following closely are those who have made online purchases weekly, representing 28% of the respondents. Moreover, only 7% have made online shopping daily, while no respondent ever engages in online shopping and 19% rarely shop on e-commerce platforms.

Next, in Figure 19 the question is presented in check-box format, which allows participants opt to the multiple selections. The figure shows the data collection about the frequent products that customers have purchased.

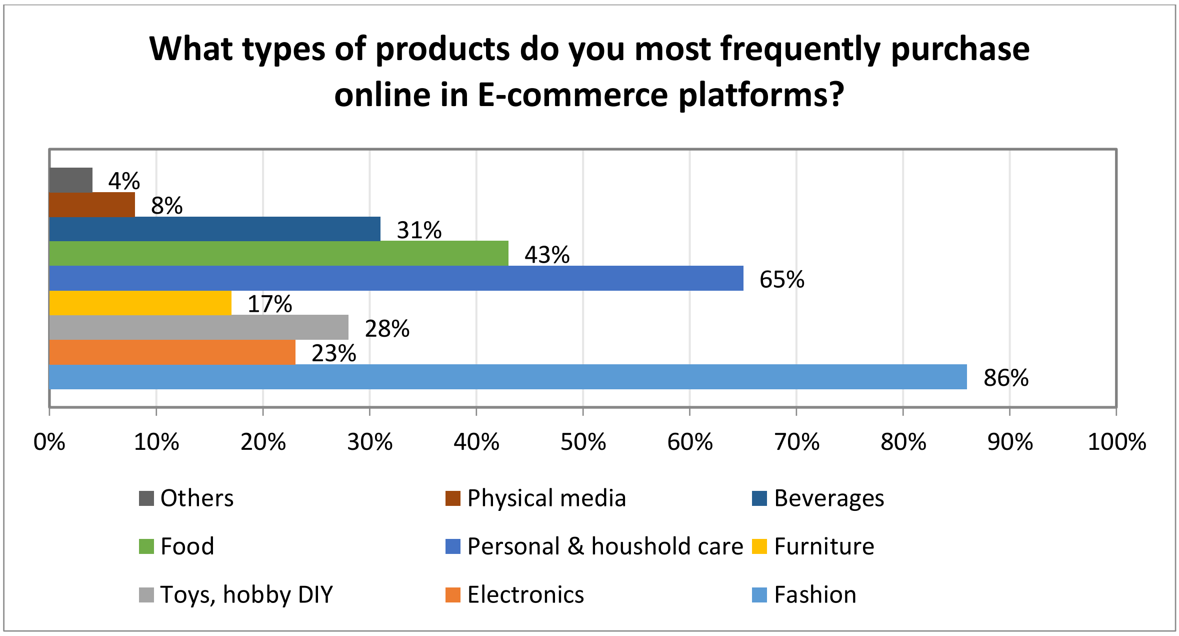

Figure 19. The products that consumers purchase frequently.

Fashion items are the most popular category among these options. With 86% of them indicating that they have made purchases frequently. Following are personal and household care, which have a high percentage of respondents (65%) making purchases. Then, food and beverages account for 43% and 31%, respectively. The data suggests that customers are increasingly favoring the convenience of ordering food and beverages from home rather than dining out. Next, 28% prefer toys, and hobby DIY products that have been made purchases online and it is an impressive number. Electronic products with 23% of responses making purchases in this category. While not as dominant as fashion, it still represents a sizeable portion of the respondents. It indicates that despite the high value of items, people continue to place their trust in online purchase platforms. Furniture purchases are 17% indicating a moderate level of interest in this category. Another, 8% indicated that they have bought physical media such as CDs, DVDs, and books online. This category has seen a decline because of the rise of digital media. The section “others” is 4% suggested by participants, while they suggest adding pet products, and cosmetics to the survey.

Moving on to exploring customers’ experiences with buying products online, the next question addresses the preferred delivery method by participants. The question allows respondents to select multiple options based on their favorites and the results are shown in Figure 20.

Figure 20. The preferable delivery methods by participants.

Overall, the smallest percentage is the reception boxes delivery method, relatively less popular among the surveyed individuals. It indicates that a small fraction of respondents opts for the use of reception boxes for receiving their items. Eight percent of responses are chosen to pick up their purchases directly from physical stores. This suggests that participants are less likely to physically visit a store to collect their items. More than the pick-up store option, 9% is the percentage of receiving their orders in collection points. This method is slightly popular because it is usually placed near the residents' area. The most preferred method is home or workplace delivery, which contributed to the largest proportion of 96% responses. This indicates that most respondents find a home or office delivery as the most convenient for receiving their orders at any time.

To facilitate a comprehensive exploration of participants' preferences and to gain a deeper understanding of the rationale behind their choices, a text field question is thoughtfully incorporated into the survey, shown in Figure 21. Firstly, among these delivery methods, home or office delivery becomes the most preferable option. From participants' answers, it reveals that many individuals find home or office delivery to be the most convenient and time-efficient approach. Another, some participants express that they perceive home delivery as a safer option because it allows them to inspect the products, ensure that the items are in proper condition. Additionally, participants also point out that the home delivery services are rapid and cost-effective in terms of shipping expenses, which further influenced their choice. Secondly, some participants prefer the collection points method, stating this approach makes them feel more proactive, as it allows them to personally collect their ordered products. Additionally, it offers flexible pick-up times, usually 24/7, enabling them to align their product retrieval with their schedules. Lastly, a small number of respondents said that they favor physically picking up orders from stores. It is noted that this method provides a sense of security, particularly for electronic products or high-value items.

Can you please state the reason for your preferable delivery method?
Number of respondents: 144

Showing 144 out of 144 responses Show less or see all text answers in Word or PDF

Responses
It is very convenient for me because i do not need to go out to buy them.
Không phải mất công di chuyển
tiện lọi
vì sự tiện lợi
I prefer the post office and convenience store pick-up methods because of the flexibility that they provide. Since home delivery requires me to be at home at the delivery time, which mostly doesn't match with my schedule, the post office is open 24/7, plus it is close to my house. Moreover, home delivery has certain risks and scenarios that I don't like. Firstly, sometimes they put the package in front of your house, which can be stolen. Secondly, if you forget and/or are not there in the delivery time, they will bring it to the closest post office, which takes so much longer to be processed, causing delay.
Tiện lợi
Tiện lợi
Tiện lợi
Thuận tiện hơn trong việc nhận hàng
rất tiện lợi

Figure 21. The reasons for a favourable delivery method.

Part three: Experience questions

When it comes to part three, the author desires to dig deep into the experience and the specific satisfaction of end-users. Figure 22 displays the result of the question “Which factor do you think is important and brings satisfaction when using e-commerce last-mile delivery?”

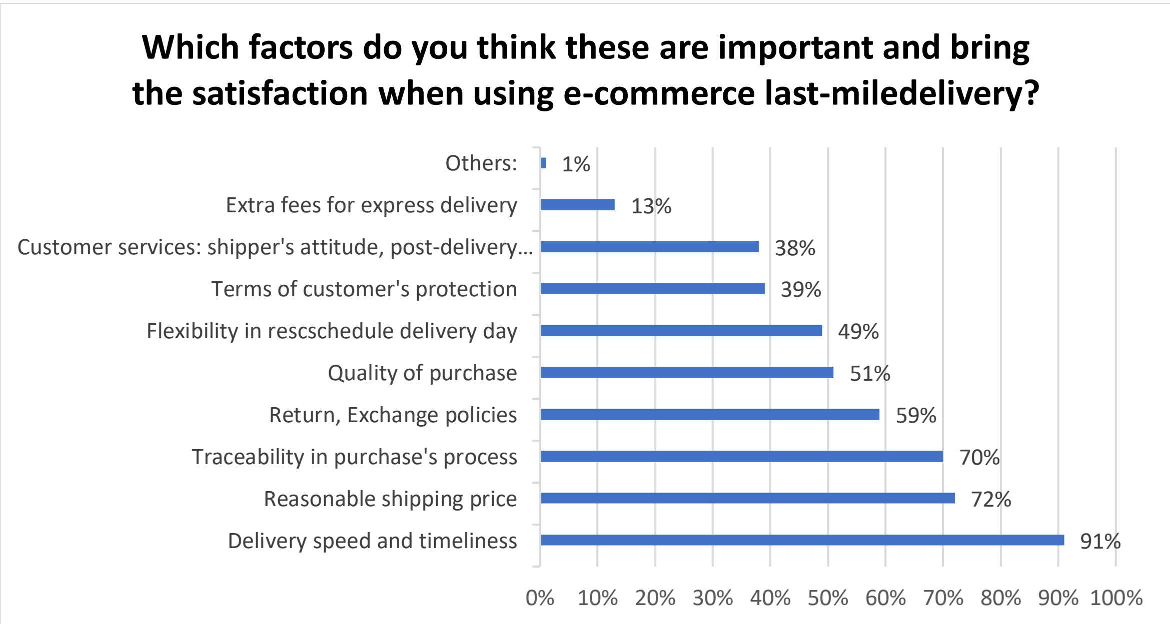

Figure 22. Factors are important and bring satisfaction when using e-commerce last-mile delivery.

This check-box question receives 693 answers from 144 respondents. The most key factor for final delivery is delivery speed and timeliness, contributing to 91% of the total answers, underscoring the importance of rapid and punctual delivery services. Following is reasonable shipping fees and traceability in purchase process, both at around 70% of total responses, emerge as the second most influential factors for satisfaction. Next, return and exchange policies also play a vital role with 59% of total answers, implying that customers needed to provide clear and straightforward instructions when the need arises. The quality of purchased items is chosen by 51% of responses, highlighting the importance of product quality during delivery process. Additionally, 49% of total responses value the flexibility of being able to reschedule delivery, emphasizing the convenience of having control over the delivery timing. Terms of customer protection, demonstrating the importance of customer rights, accounting for 39% of total answers. Meanwhile, 38% of responses acknowledge the influence of customer services, including the shipper's attitudes and post-delivery feedback. Conversely, the smallest percentage of respondents' express concern regarding extra fees for express delivery. It suggested that delivery speed is important, cost considerations still play a role in their decision making. Lastly, the survey receives one suggestion in the "others" category, emphasizing the importance of inspecting orders before accepting them, somehow impact the satisfaction.

The next question is more specific on last-mile delivery service providers who a partner of e-commerce platform is, responsible for delivering for e-commerce platforms. Figure 23 presents many popular service providers in Vietnam recently and the percentage of which companies' participants have used the most.

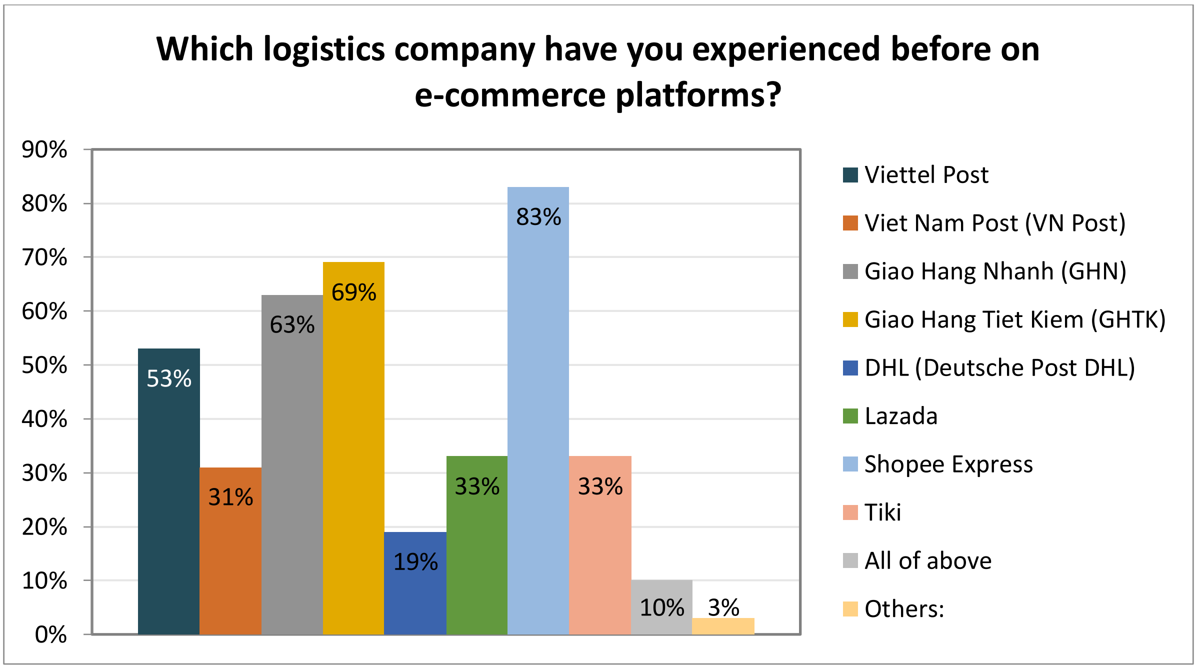

Figure 23. Last-mile delivery companies that participants have used before.

For this question, participants are given the option to select multiple logistics companies as their choices. As illustrated in figure 23, it is observed that only 10% of the respondents used all logistics companies mentioned. DHL, being recognized as an international courier and express mail service, is chosen by 19% of total responses, being less familiar with Vietnamese. VN Post, on the other hand is selected with 39% of responses, signifying as a reliable choice among participants. Both Lazada and Tiki receive 33% of total answers. These companies, equipped with their own logistics departments, have gained recognition and popularity due to their reliable delivery options. Viettel post secures a share of 53%, indicating that it is a trusted delivery provider with a significant user base. Surpassing Viettel Post, Giao Hang Nhanh (GHN) emerges as the third preferred choice, with 63% of responses. The second-place gains 69% of total answers, is Giao Hang Tiet Kiem (GHTK). The most impressive result is Shopee Express, with 83% preference. The important level of preference attributes to Shopee's prominence as a leading e-commerce platform and its popularity delivery services. Lastly, some participants mention other companies which they have used before such as Ninjavan, J&T, Amazon and Fado.

There are number of logistics companies responsible for delivering products from e-commerce platforms in Vietnam. When being asked "Will you continue use these above logistics companies," most of them said "Yes" because of the convenience. Additionally, some participants highlight specific delivery companies. Some participants show a preference for Shopee due to their discount campaigns, another favor Viettel Post for their punctual delivery, while another has a strong preference for Tiki because of their speedy delivery and exceptional customer service. And GHN has more expensive fees, but it offers high quality while VN Post offers cheapest price and is popular. Importantly, many participants mention that if their initial experience with a delivery service is positive and meet their expectation continuously, then they are loyal to that company in the future.

There are three main compulsory questions and three optional sub-questions in Likert scale section, discover the level of participants satisfaction based on their experience on using last-mile delivery from e-commerce platforms (which participants have used and selected in previous question) in Vietnam. Figure 24 presents the level of satisfaction by participants.

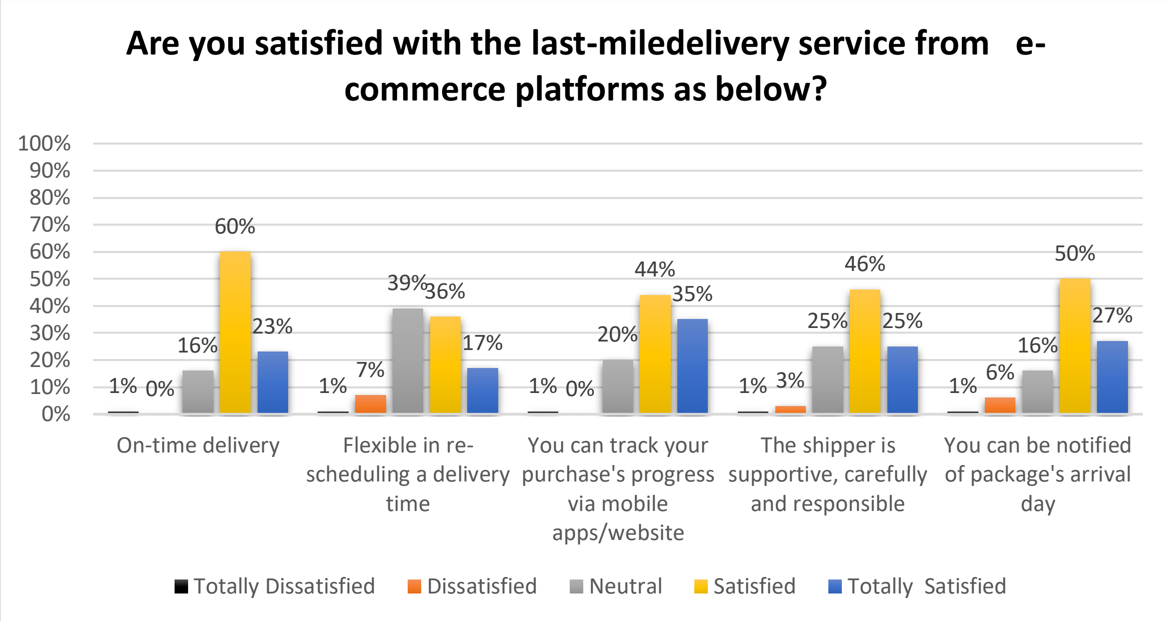

Figure 24. Respondents' satisfaction on last-mile delivery service in e-commerce platforms.

In terms of "On-time delivery" point, a significant 60% of them feel satisfied with what e-commerce platforms provided. Among them, 23% of them feel totally satisfied with punctual delivery time. Sixteen percent of them feel neutral, indicating a balanced sentiment. Importantly, there are no participants feel dissatisfied with the punctuality. Only a minimal of 1% of respondents felt totally dissatisfied with this aspect. When it comes to "rescheduling a delivery time," 39% of respondents neither feel positively or negatively about the flexibility of rescheduling delivery times. Thirty-six percent of them feel satisfied on this feature. A moderate 17% of them feels totally satisfied, indicating not many people satisfied with it. Only 7% of them feel dissatisfied with changing delivery time and 1% of participants feel wholly dissatisfied. In terms of delivery services, the traceability of purchase's progress is one of key factor. It is notable that 44% of participants feel satisfied and 35% of them feel totally satisfied with the enable of tracking purchase's progress in e-commerce apps. Twenty percent of them expresses a neutral sense. Impressively, no respondents report feeling dissatisfied with this feature. Only 1% of respondents feel dissatisfied with the tracking feature. Regarding to the attitude of shipper, it is reported that 46% of them satisfied, 25% feel totally dissatisfied, 25% feel neutral. However, 3% of them feel dissatisfied, 1% totally dissatisfied, indicating sometimes shippers are not supportive and carefully. About the notification for packages' arrival day, 77% of them satisfies and totally satisfied because customers are notified in the apps, email, messages about the arrival day of their orders. Sixteen percent of them express neutral standpoint. However, 7% of them indicate that they are not satisfied.

In this question, one additional question is added to respondents explain more detailed insights into the reasons behind their choices. It shows that people encounter various issues, and their satisfaction and their dissatisfaction reason differ. For those who express satisfaction with the mentioned features, it is highlighted that the delivery aligns with the scheduled time displayed through the e-commerce applications. Customers value the proactive approach of shippers in providing advance information to customers to avoid the need for rescheduling delivery dates. In contrast, for those feel dissatisfied with those above features, find that the information is presented in the e-commerce applications does not consistently align with the actual delivery process. It mentions that some platforms such as Lazada and Shopee do not always provide an accurate time for shipment, resulting in inconvenience for both shipper and receiver. Regarding rescheduling, it often depends on the shipper. When customers attempt for changing date due to incorrect shipment information, the shipper turns out difficulty on rescheduling.

Then, it is the level of satisfaction with delivery fees from e-commerce platforms. Figure 25 presents three criteria, free delivery, reasonable delivery fees and extra fees for express delivery.

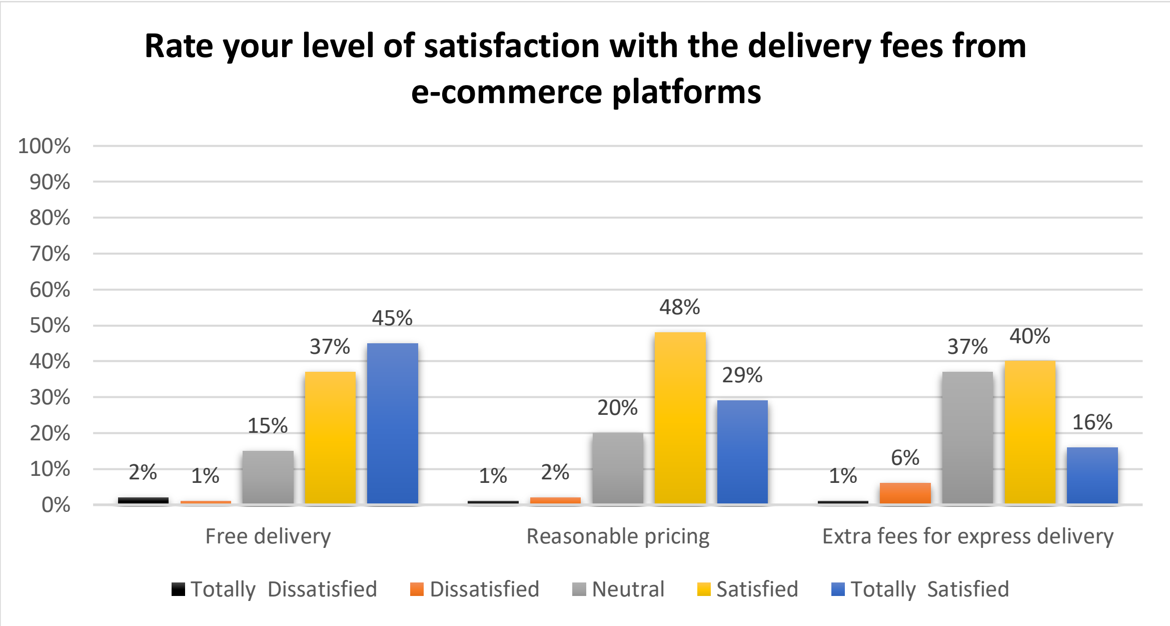

Figure 25. The level of satisfaction with the delivery fees.

Free delivery has the most satisfaction, with 45% of respondents totally satisfied, 37% of them satisfied, 15% feel neutral. It reports that only small percentage of respondents dissatisfied with the free delivery option. The second one is “reasonable pricing,” collecting 48% of satisfied and 29% of totally satisfied with this feature. Twenty percent feel neutral while 3% are not feel satisfied with offer delivery fee from some e-commerce platforms.

When it comes to “extra fees for express delivery,” the data reflects a more varied set of responses. Around 7% reported as dissatisfied with the additional fees for rapid delivery. Thirty-seven percent of them have a neutral sense, indicating a mix balanced between satisfaction and dissatisfaction. The highest percentage is 40%, implying that participants satisfy with paying more for express delivery. However, only 16% of them feel totally satisfied with the concept of paying extra for express delivery.

In additional question about the reasons behind their choices. Many respondents' express satisfaction with the shipping fees offered by e-commerce platforms. It encompasses convenience, reasonable pricing, and the frequent availability of free delivery options. It is notable that a segment of respondents is not eager to pay extra for immediate delivery, highlighting a preference for cheap shipping fees. However, others express that imposing higher delivery fees based on factors such as extended distances and peak hours are understandable.

In the final question of experience part, Figure 26 illustrates four criteria to assess the level of satisfaction related to exchange or return policies in case of damaged or wrong products.

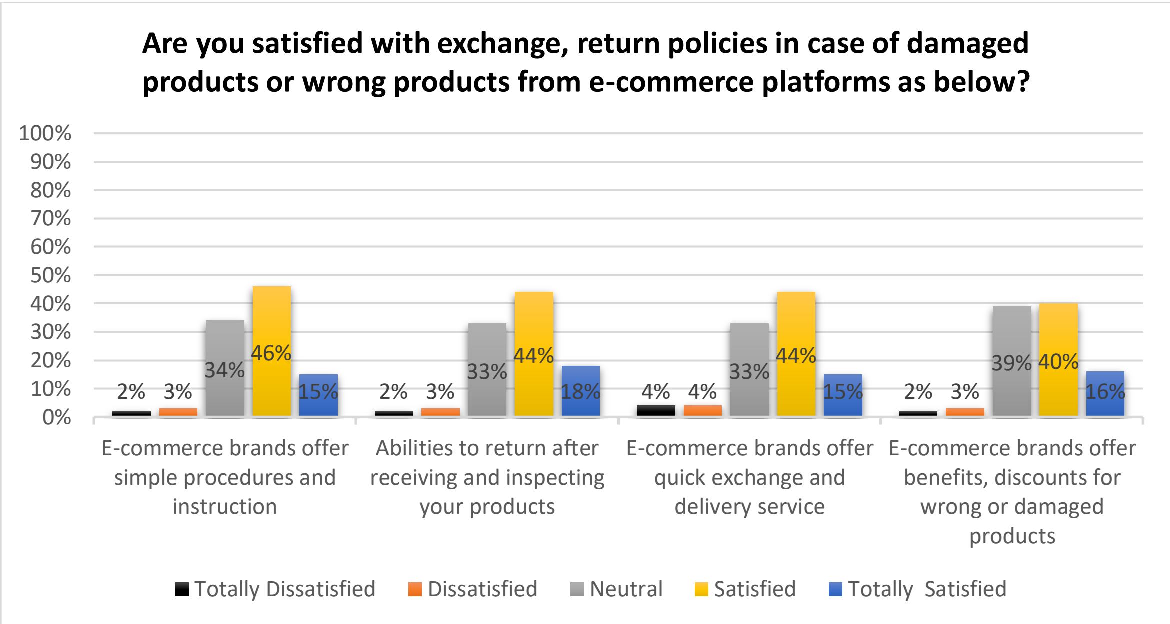

Figure 26. The level of satisfaction with exchange and return policies in case of damaged products or wrong products from e-commerce platforms.

The most satisfying fraction is 46%, indicating that e-commerce brands offer simple procedures and instruction on how to return or exchange incorrect products. Forty-four percent of respondents can return after inspecting products and receive quick exchange services from e-commerce platforms. Forty percent of respondents are satisfied with the benefits or discounts offered from e-commerce brands, particularly for wrong or damaged products. It notes that the level of totally satisfied for all features are ranged around 15-18% of participants. Similarly, 33% to 39% of respondents feel neutral with those features. Two percent of participants express extremely dissatisfied with e-commerce brands on three areas: simple exchange or return instruction, abilities to return after inspection and discounts for wrong products. In the same way, 3% of participants feel dissatisfied with these same aspects. Eight percent of participants feel dissatisfied, with some (4%) feel extremely dissatisfied regarding the offering of quick exchange delivery services.

Regarding to exchange and return policies, a sizeable number of respondents conveys satisfaction with the return procedures implemented by e-commerce platforms, emphasizing the platforms' prioritization of customer satisfaction. However, some participants also express dissatisfaction, citing additional fees and lacking support when exchange products. Another common sentiment is frustration with the complexity of return processes, extended durations due to unclear instructions.

Part four: Opinion question

A survey regarding recommendations for raising customer satisfaction on last-mile deliveries in e-commerce platforms is conducted to broader opinions. Out of the 144 participants, 59 people share their viewpoint. A few of them stated that they are pleased with the delivery based on their experiences. Otherwise, many of respondents offer suggestions for enhancing and raising consumer retention. All suggestions are compiled and displayed in Figure 27.

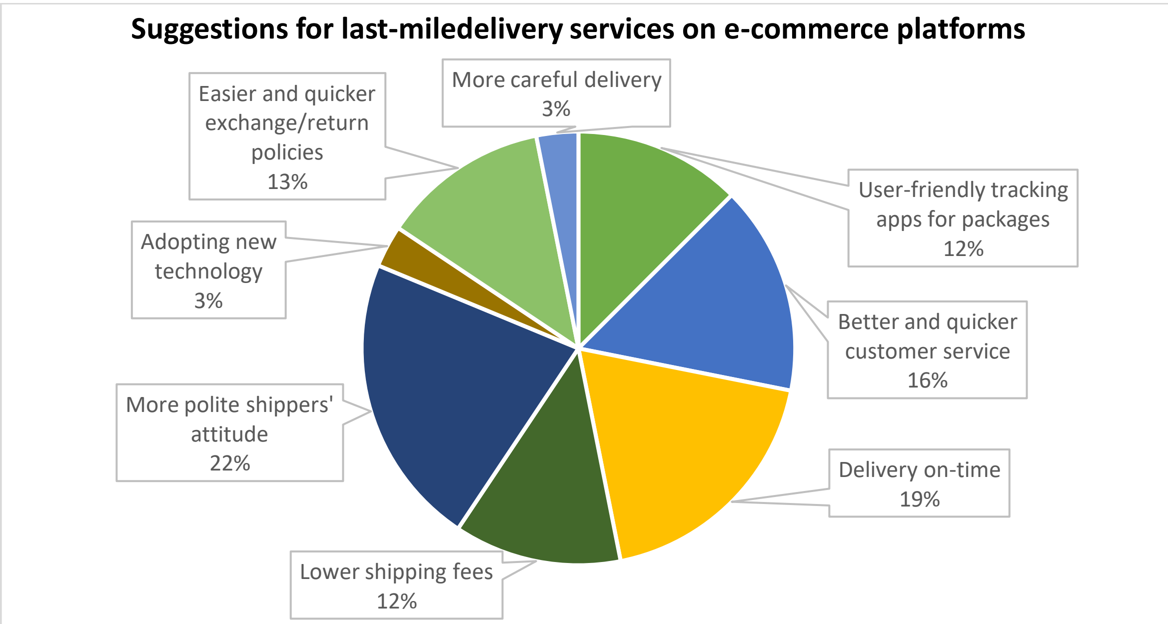

Figure 27. Suggestions for last-mile delivery services on e-commerce platforms

As demonstrated, a substantial number of participants expresses concern regarding the attitude of shippers when interacting with customers and deliver goods. When delivering and communicating with consumers, 22% of respondents suggested that the shippers are supportive, kind, and helpful. For example, respondents mention that "in many cases, the good shipper's attitude is going to keep customer retention," "there are a plus point if shipper is kind and friendly." The punctuality is the next factor that raise overall customer satisfaction. Participants as well as customers are more likely to be delivered products on time and follow to schedules. Customer service is thus a successful strategy for retaining customers. 16% of respondents said they hope for improvements in customer service, such as giving clients small gifts as a show of appreciation. And in urgent situation, customers desire that the service employee measure it speedily. In terms of return or exchange service, 13% of respondents suggested that the service should be clearer, quicker, and helpful. Participants also propose that a new exchange method can improve the entire experience. 12% are the respondents of suggestion for more user-friendly tracking applications. It means that customers value easy-to-use apps enabling them track and manage their packages and notification for shipping time. Therefore, customers could be able to present at the specified delivery address without any delays or the need to reschedule. 12%, also prefer to have lower shipping fees. Cost-effective shipping options are important to customers. They tend to express satisfaction when shipping fees is free, but when additional shipping costs are involved, it may not be as well-received. Few of them prefer that the shipper should be more carefully when carrying their fragile products to prevent package damage or denting. Also, a limited of respondents suggests the launch of new delivery approach such as utilizing robots for delivery or incorporating new transportation technologies. All are suggestions from consumers who have had a great deal of experience in last-miledelivery service in Vietnam.

4.2 Conclusion and suggestions from the analysis

The survey results provide valuable insights into the demographic profile of the respondents in Vietnam, revealing a predominant representation from Generation Z age group. This prominence not only signifies a youthful demographic but also suggests a tendency towards active engagement in online shipping, indicates proficiency in internet utilization. Furthermore, despite the diversity in employment statuses, a noteworthy observation of substantial contribution to the online shopping. This confluence of demographic attributes and consumer behavior underscores the dynamic contribution of Generation Z in shaping and driving e-commerce trends in Vietnam.

For participants' behavior, it concludes that participants have regular engagement with e-commerce platforms for purchasing monthly, weekly, and daily basis. However, a minority exhibits infrequent shopping habits. The products most frequently purchased on e-commerce pertain to fashion, personal items, and household care, characterized by their medium to low values. Conversely high-value items such as electronics or furniture are less frequently purchased through e-commerce channels. In terms of preferred delivery methods, a dominant of participants favor home or office delivery. In contrast, options such as in-person pick-up, collection points and reception boxes are less favored. These insights highlight the specific preferences and concerns of Vietnamese consumers of online purchasing and pick-up modes. While there is a tendency for purchasing distinct items online, there is hesitancy for expensive products. This caution may arise from concerns about the security of online transactions and the quality of high-value items. Moreover, customers in Vietnam have lesser familiarity with collection points options, suggesting a feasible strategy could involve the establishment of collection points near residential areas, thereby encouraging greater utilization of this option.

To gain insights into participants' experiences, a set of factors has been presented to receive evaluations from respondents. Three overarching factors that are crucial to customer satisfaction are delivery speed and timeliness, reasonable shipping prices and the ability to track purchase processes. Impressively, popular platforms are assessed based on their performance in terms of adapting to customer satisfaction. Shopee is commended for its satisfaction with discount campaigns on shipping fees. Viettel Post receives praise for its punctual delivery services, Tiki for its fast delivery coupled with customer service, GHN for providing high-quality shipment service and VN Post offers cost-effective shipping options. These collective criteria contribute to understanding of customer preferences when it comes to e-commerce delivery services.

To assess the last-mile delivery in the e-commerce market overall, three criteria are used to rate satisfaction levels. The first criterion is the delivery services provided by e-commerce platforms. Participants express satisfaction with features such as on-time delivery, flexibility in rescheduling deliveries, the ability to track the progress of their purchases, support from delivery personnel, and notifications regarding the arrival date of their packages. Many participants are satisfied, outweighing those who are dissatisfied. The second criterion is delivery fees, categorized into three aspects free delivery, reasonable pricing, and extra fees for express delivery. Participants express totally satisfied when e-commerce platforms offer free delivery. Additionally, many companies provide delivery services at a reasonable price, resulting in widespread agreement among customers regarding the fairness of these pricing structures. However, opinions are more varied regarding paying extra fees for express delivery, with participants reporting a mix of neutral and satisfied sentiments. The final criterion involves the satisfaction level with exchange or return policies, especially concerning instructions for damaged or incorrect products. This evaluation is based on the simplicity of procedures and instructions, the ease of returning of exchanging items after inspection, the promptness of exchange or return services during delivery, and whether e-commerce platforms offer benefits or discounts in such situations. E-commerce delivery departments do not consistently address exchange or return issues adequately, resulting in lower levels of total satisfaction. Responses vary from neutral to satisfied, suggesting that there may be instances of insufficient support and prolonged or delayed returns, accompanied by additional charges for exchange.

Collecting opinions from participants is crucial for enhancing customer satisfaction and retention. The top three areas identified for improvement are shipper attitude, on-time delivery, and customer services. The essential factor in evaluating the success of final mile delivery is the behavior of the shipper, as they are the primary communicators and interactors with customers. A supportive and kind demeanor can mitigate concerns even if there is an unavoidable situation. Additionally, punctual delivery holds significant importance in boosting customer satisfaction. Lastly, efficient customer service functions as an instructor, addressing customer issues or inquiries. Rapid responsiveness in this regard directly contributes to higher satisfaction levels.

5 Summary and discussion

In conclusion, the last chapter serves as a synthesis of the entire research report, highlighting the key findings achieved from the research questions. Next, it gains insights into the practical application of the study's outcomes, assessing the reliability and ethical considerations inherent in the research process. Lastly, the chapter puts forth suggestions for future research.

5.1 Research questions outcomes

When it comes to the main research question "In the context of e-commerce market in Vietnam, what are the challenges and opportunities of final mile delivery?" The study employs three sub-questions to guide the exploration and analysis process. The first sub-question seeks to identify key features of both electronic commerce market and last-mile logistics market in Vietnam.

- **The first SQ**: What are some key features of the e-commerce market and last-mile logistics market in Vietnam?

In chapter 3.1, the economic growth of Vietnamese economic is initially presented, revealing a notable of 5,92% increase in GDP in the fourth quarter of 2022. This growth signifies the post COVID-19 development of the country. In specific, the Vietnam e-commerce White Book provided comprehensive overview of the sector, highlighting market growth by 16% compared to 2021 in retail revenue with expectation of continuous upward trends. The widespread presence of e-commerce in Vietnam is emphasized by a significant consumer base, reaching 54,6 million consumers in 2021, each spending an average of 251 USD.

There are several drivers related to the growth market of e-commerce Vietnam, including government policy support examined by Master Plan on e-commerce for 2021-2025, aimed at fostering online and cross-border trading and digital economic development. Furthermore, the widespread adoption of the internet and smartphone usage reflects the digital readiness of the market. The third factor is online shopping behavior shows that regular engagement with e-commerce platforms with a preference for home delivery. Fashion, personal items, and household care products are mostly bought online categories, while high-value items are bought less often. Figure 10 illustrates some notable e-commerce platforms such as Shopee, The Gioi Di Dong, Dienmayxanh, Lazada, Tiki, Sendo and so on. The emergence of TikTok Shop which has begun to influence traditional e-commerce because it enables customers purchase via livestreaming and conduct transaction within the app. Various payment methods are embraced by these e-commerce platforms, including digital wallets, bank transfers, debit and credit cards, and cash-on-delivery. Despite the 23% utilization of cash-on-delivery methods, there is a noticeable shift towards non-cash payments. Survey data collected from 1724 individuals in the first quarter of 2023 by Decision Lab and the Mobile Marketing Association Vietnam indicated a preference for e-wallets such as MoMo, ZaloPay and ViettelPay for online purchases.

Chapter 3.2 and sub-chapter 3.2.1 presents that Vietnam's e-commerce market has seen tremendous growth and changes in customer behavior that have an impact on last-mile logistics. The shift in the population, mostly due to the tech-savvy Generation Z, has raised expectations for faster and less expensive shipping, making last-mile delivery a critical component in ensuring customer satisfaction during the shipping process. Two main logistics strategies are used in the market: internal logistics used by major e-commerce platforms like Lazada and Tiki, which handle their logistics from warehousing to delivery. The second method is third-party logistics, which is favored by online platforms such as Shopee and Sendo that collaborate provided by external shipping companies to handle deliveries. Within logistics market, numerous logistics businesses contribute to the dynamic market, categorized by traditional, start-up, international and on-demand providers. Traditional carriers including VN Post and Viettel Post, have transformed their operations to stay relevant and utilized their strength in national networks, serving rural areas. In urban regions have witnessed the emergence of logistics startups that incorporate technology to enhance service quality and delivery speed. Moreover, the international logistics company DHL also joined the journey. Besides three main logistics providers, there is the emergence of on-demand delivery, which issued the need of immediate need for online purchase. Recently, in terms of last-mile structure, there are three main modes of delivery which serve customers with diverse needs. Direct shipping from sellers represents Tiki’s mode of shipping, which accounts for shipping directly from seller’s warehouse to end-user. Pull-centric model especially click-and-collect mode, which allows customers to collect online orders from retail stores, as The Gioi Di Dong. The last one is hybrid model of Lazada Express Vietnam and VN Post, which have implemented smart lockers and collection points for customer’s pick-up of their choices.

This comprehensive overview provides a foundation for gaining insights the dynamics of the e-commerce market, last-mile logistics service providers and their shipping methods, setting stage for further exploration of challenges and opportunities in final mile delivery.

- **The second SQ**: What are the challenges and opportunities of final mile delivery in the Vietnam e-commerce market?

Chapter 3.2.2 and 3.2.3 are the answers to questions of opportunities and challenges of final mile delivery service providers in the online market. The opportunities of last-mile delivery driven by market drivers such as government policies, penetration of internet and mobile usage, online shopping behaviors, and diverse payment methods. These factors combined with the competitive landscape of e-logistics, are fostering innovation and service differentiation. Initially, traditional poster services such as VN Post and Viettel Post dominated the e-logistics market, but the rise of digitalization paved the way for tech-savvy entrants such as GHTK, AhaMove and SuperShip. International players such as DHL, Grab Express and Lazada Express also contributed to the competitive growth of the sector, making it more dynamic and competitive. Moreover, the surging demand highlighted by forecasts of the Vietnamese e-commerce market size growing to 39 billion USD by 2025, has compelled logistics firms to innovate and expand their capabilities. It is also noted that there were 50 million consumers purchasing in e-commerce platforms, bringing the surge demand for e-logistics market. Resulting in the advent of on-demand delivery services and the rapid urbanization in major cities such as the capital Hanoi and Ho Chi Minh City, which opens new avenues for final mile delivery services, particularly in food and beverage industry. Furthermore, investors are the potential opportunities for this service, with both domestic and foreign investors. These are drawn by the vibrant economy, growing consumer market and government facilitation. Regulatory reforms and international trade agreements are making Vietnam an even more attractive destination for logistics investments.

Come up with the challenges in last-mile logistics, it is no denying that the barriers to entry in this market may face challenges. The competitive landscape is dominated by major players such as Giao Hang Nhanh (GHN), Lazada, Shopee and Tiki, which have made substantial investments in innovative logistics facilities and services. The sheer scale and capabilities of these industry leaders pose a formidable challenge for newcomers, particularly those with limited financial resources. Another, infrastructure inadequacies in Vietnam, notably the state of its transportation network and heavy reliance on motorcycles for last-mile delivery, further compound the challenges. The road infrastructure, narrow and poorly designed, and riddled with traffic congestion, poses obstacles for efficient logistics operations. Another challenge stems from the prevalent use of the Cash-on-Delivery (COD) payment method. While it fosters customer trust, it then significantly increases operational costs and labor intensity for logistics providers. The COD payment method contributes to a surge in returned and exchanged goods impacting the efficiency of logistics operations and creating financial burdens for service providers. Lastly, the technological landscape in Vietnam, while experiencing growth, remains uneven and moderate. The integration of artificial intelligence with modernization tools into logistics services faces difficulty of older generation, high initial investment costs, large resources for human training and time for adopting innovative technologies in existing working systems.

- **The third SQ:** What could be improved in last-mile delivery to fulfill customer satisfaction?

Chapters 4.1 and 4.2 highlight key factors from survey results that consolidated customer expectations for improving last-mile delivery services. The primary areas identified for enhancement include customer service, delivery personnel attitude, exchange procedures, punctuality, and tracking applications.

Among these keys is the imperative of customer service. Investing in comprehensive customer service training is essential to ensure the delivery of responsive and helpful support, promptly addressing customer inquiries and concerns. It is essential to ensure synchronized employee efforts within the customer service framework. Especially, as in Figure 27, the survey underscores the need for delivery personnel to behave positively and supportively.

Punctuality in adhering to delivery schedules emerges as another key aspect requiring improvement. Customers express a powerful desire for enhanced timeliness, emphasizing its direct influence on overall customer satisfaction. Additionally, transparent communication regarding any delays or disruptions during shipment is crucial to satisfy customers.

The exchange and return services present as one of the challenges, as customers expect clear instruction and announcement pertaining to these processes. Clarity in explaining the duration of case processing and other relevant details is vital to addressing customer concerns in this domain. For instance, in the case of return, it is crucial to provide official announcements detailing the timeframe when customers can receive their refunds.

The tracking system, as highlighted in the survey, is a significant point for improvement. Customers prefer user-friendly applications that facilitate easy management and monitoring of deliveries. Timely notifications and a streamlined process contribute to an enhanced customer experience, minimizing complications in the delivery process.

In summary, addressing these key aspects, including robust customer service practices, improved delivery personnel performance, punctuality, transparent communication, and enhanced tracking systems, are essential to meet and exceed the customer satisfaction on last-mile delivery services in Vietnam.

5.2 The applicability, reliability, and ethicality of the research

In assessing the thesis's applicability, it delves into the e-commerce market, specifically focusing on the last-mile delivery processes involving e-commerce companies. The outcomes brought into practical recommendations for e-commerce operations seeking insights from a customer-centric perspective to enhance final mile delivery services in Vietnam.

Regarding reliability, the study employs a deductive approach, initially exploring academic literature on e-commerce markets, models, last-mile delivery processes and distribution systems, and customer satisfaction. Subsequently, this literature is applied to real-world issues in the Vietnamese market, incorporating both primary and secondary sources. The empirical data is gathered from official websites and credited sources, ensuring a robust foundation. To enhance reliability, the data searches from recent years, ensuring its relevance. Nevertheless, it is acknowledged that certain official journals or reports for the year 2023 may not have been published during the research period. The primary data is collected from a survey analyzed with sample sizes of 144 respondents. While providing valuable insights and maintaining high accuracy, the sample size may limit the generalizability of results.

Ethically, participants in the survey provide voluntary and informed consent. Participants' data is ensured to be kept confidential and anonymous. Importantly the survey data is exclusively used for this research.

5.3 Suggestions for further research

Subsequent investigation in the realm of last-mile delivery within the e-commerce industry could benefit significantly from involving cross-cultural comparative studies. By broadening the scope to integrate various countries or regions, a comparative analysis could give valuable insights into the distinctive influences of cultural factors and consumer behaviors on final-mile delivery outcomes.

Moreover, there is a potential for more focused investigations, such as in-depth analysis of different modes of last-mile delivery. Examining the effectiveness of each delivery method would provide a detailed point on optimizing last-mile logistics. Additionally, further research could strategically prioritize specific perspectives, either from a customer or business standpoint. This targeted approach aims to deliver more profound insights, ensuring that research outcomes are suitable for distinct needs and appropriate readers.

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Appendices

Last mile delivery in Vietnamese E-commerce towards fulfilling customer satisfaction

Mandatory questions are marked with a star (*)

Thank you for taking time filling out my survey!

My name is Hoai Tran, who is going to graduate soon at LAB University of Applied Science, Finland. My bachelor's degree is International Business with specialization in Supply Chain Management. I'm now at the final stage in finishing my Bachelor's thesis. Therefore, I would very appreciated when you help me complete this survey.

This survey aims to explore the last-mile delivery experience on Vietnamese E-commerce platforms, with the goal of enhancing customer satisfaction in last-mile delivery services. Once the data is collected, it will provide valuable and practical insights to help improve customer satisfaction in E-commerce deliveries.

The survey consists of 16 questions and takes maximum 10-12 mintues to finish. All of your information are confidental, and will only be used as data for analysing my research.

Once again, thank you for your participation and your time on this survey!

If you would have any questions/comments, you can contact me via my email at Hoai.Tran@student.lab.fi.

Thank you very much!

Part 1: Demographic questions

1. What's your age? *

- Under 18
- 18-24
- 25-34
- 35-44
- 45-55
- Older than 55

2. What is your current occupation? *

- Student
- Part-time employee
- Full-time employee
- Freelancer
- Business owner
- Unemployed
- Others ____________

Part 2: Behavior questions

3. On average, how frequently do you shop online in E-commerce platforms? *

- Daily
- Weekly
- Monthly
- Rarely
- Never
- Others ____________

4. What types of products do you most frequently purchase online in E-commerce platforms? *

- [ ] Fashion
- [ ] Electronics
- [ ] Toys, hobby DIY
- [ ] Furniture
- [ ] Personal & houshold care
- [ ] Food
- [ ] Beverages
- [ ] Physical media
- [ ] Others ________

5. When buying products in Vietnamese E-commerce platforms, which delivery methods do you prefer to receive your products? *

- [ ] Home/Office delivery
- [ ] At seller's brick-and-mortar stores
- [ ] Collection points (Post offices/ Convenience stores)
- [ ] Reception boxes (fixed permanently outside the consumer's house or department)
- [ ] Others ________

6. Can you please state the reason for your preferable delivery method? *

____

Part 3: Experience questions

7. Which factors do you think they are important and bring the satisfaction when using E-commerce last mile delivery ? *

- [ ] Delivery speed and timeliness
- [ ] Flexibility in rescschedule delivery day
- [ ] Traceability in purchase's process
- [ ] Customer services: shipper's attitude, post-delivery feedback
- [ ] Reasonable shipping price
- [ ] Extra fees for express delivery
- [ ] Return, Exchange policies
- [ ] Quality of purchase
- [ ] Terms of customer's protection
- [ ] Others: ________

8. Which logistics company have you experienced before on E-commerce platforms? *

- [ ] Viettel Post
- [ ] Viet Nam Post (VN Post)
- [ ] Giao Hang Nhanh (GHN)
- [ ] Giao Hang Tiet Kiem (GHTK)
- [ ] DHL (Deutsche Post DHL)
- [ ] Lazada
- [ ] Shopee Express
- [ ] Tiki
- [ ] All of above
- [ ] Others: ________

9. Will you continue use these above logistics companies? Can you state the reason shortly? *

____

These questions below aim to discover the level of your satisfaction based on your experience on using last mile delivery from E-commerce platforms (which you have used and selected in previous question) in Vietnam

10. Are you satisfied with the last mile delivery service from E-commerce platforms as below? *

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
On-time delivery *	○	○	○	○	○
Flexible in re-scheduling a delivery time *	○	○	○	○	○
You can track your purchase's progress via mobile apps/website *	○	○	○	○	○
The shipper is supportive, carefully and responsible *	○	○	○	○	○

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
You can be notified of package's arrival day *	○	○	○	○	○

11. Can you please explain your choices briefly? Why are you satisfied/dissatisfied?

12. Rate your level of satisfaction with the delivery fees from E-commerce platforms *

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
Free delivery *	○	○	○	○	○
Reasonable pricing *	○	○	○	○	○
Extra fees for express delivery *	○	○	○	○	○

13. Can you explain your choices briefly? Why are you satisfied/dissatisfied?

14. Are you satisfied with exchange, return policies in case of damaged products or wrong products from E-commerce platforms as below? *

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
E-commerce brands offer simple procedures and instruction *	○	○	○	○	○
Abilities to return after receiving and inspecting your products *	○	○	○	○	○
E-commerce brands offer quick exchange and delivery service *	○	○	○	○	○
E-commerce brands offer benefits, discounts for wrong or damaged products *	○	○	○	○	○

15. Can you explain your choices briefly? Why are you satisfied/dissatisfied?

Part 4: Opinion question

16. Do you have any suggestions for logistics services (specially on last mile delivery) on E-commerce platforms to increase customer satisfaction and customer retention? (For example: new delivery methods, new technology applications on transporting, etc).