

LAB University of Applied Sciences
Faculty of Business Administration, Lappeenranta
International Business Degree Programme
Specialization in Logistics and Supply Chain Management

Thong Dang

**Thesis Topic: E-commerce and Order Fulfillment
Operations towards customer satisfaction in the
Vietnamese market**

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Abstract

Thong Dang

E-commerce and Order Fulfillment Operations towards customer satisfaction in the Vietnamese market, 89 pages, 1 appendix

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The major purpose of the study was to review the situations of inventory management and last-mile delivery in the Vietnamese market. In brief, in the study, several views from e-commerce in the Vietnamese market were majorly discussed. Subsequently, the order fulfillment operations in the e-commerce, particularly inventory management and last-mile delivery, of the Vietnamese e-commerce enterprises were also demonstrated to assess their operational models which they operated in the market. At last, one of the most important elements of the study was to gain insights into how the Vietnamese consumers expressed their attitudes and opinions in e-commerce experiences, especially in a stage when the consumers experienced picking up their parcels from online purchases.

In the study, a theoretical part encompassed numerous considerable theories and concepts. There were three primary themes in this part and from these, the key concepts and theories were accordingly indicated. Theoretical sources from books, scientific articles, and articles on certain academic websites were used to refer to these theories and concepts. Then, in an empirical part, there were two different directions. Precisely, the former aimed at reviewing the Vietnamese e-commerce market qualitatively by using a qualitative research method with a secondary-data analysis. The latter assessed customer satisfaction in real-world experiences by collecting and analyzing empirical data from surveys quantitatively.

The results of the study show several imperative theoretical and empirical findings to get insights into the situations of e-commerce in general and the operations of two major stages in order fulfillment, inventory management and last-mile delivery, in specific in the Vietnamese market. Customer perspectives are also reviewed to evaluate how delivery services are performed and provide feasible improvements.

Keywords: E-commerce, order fulfillment, inventory management, last-mile delivery, customer satisfaction.

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 Appendix 1 a questionnaire

1 Introduction

For this part, first and foremost, it comes to an overview of a study, which is followed by the objective of the study, research questions, delimitations, and a thesis framework.

1.1 Overview of the study

In the study, there are three main elements to take into account in figure 1 as below.

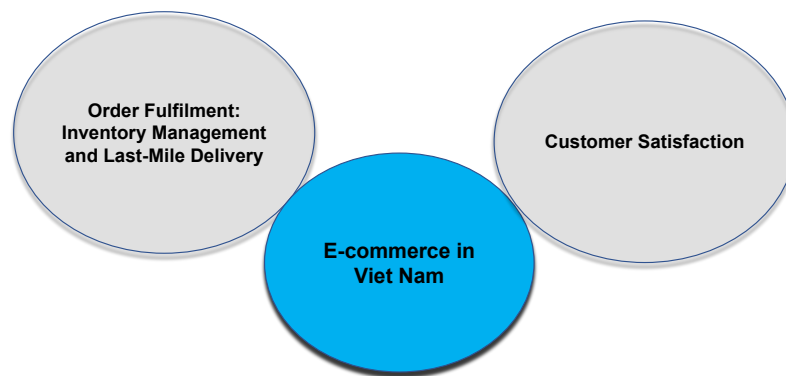


Figure 1. The main points in the study (Thong Dang 2020)

E-commerce is considered as the main factor to take into account and numerous surrounding aspects of e-commerce in the Vietnamese market are reviewed in a detailed manner. The main reason is that this market has countable great prospects of huge growth rates. In other words, according to the Ministry of Finance in Viet Nam (2015), Viet Nam was considered as one of the most important cornerstones in worldwide e-commerce development in an ASEAN group in specific and in the world in general. In the future, this market seemed to compete with many other prominent international markets due to opportunities of e-commerce revenue increases. Therefore, based on the aforementioned evidence, there are sufficient motives to increasingly research this market and provide many more valuable learnings at last.

Subsequently, the study focuses mainly on order fulfillment, which plays an integral role in an e-commerce process. E-commerce, an important factor, boosts the emergence of order fulfillment and logistics activities, particularly inventory management and last-mile delivery, two major notable stages to focus on in this study. Trang Le (2019) from Vietnam Briefing stated that e-commerce development boosted great concentration and certain investments in e-commerce from e-commerce companies, logistics firms, and those majorly operate the order fulfillment. Then, according to Tap Chi Tai Chinh (2019), the annual logistics growth rate of the Vietnamese market still remained at a stable level with the increasing participation of various domestic and foreign enterprises in diverse scales. In 2019, Viet Nam had an outstanding position in logistics development and logistics contributed significantly to the total GDP of this market, with approximately 15 percent. Therefore, logistics services were considered as the important factors in the Vietnamese economy and there were many high prospects for the logistics services on a long-term basis.

Eventually, in the study, all the aforementioned aspects are reviewed from the enterprises' perspectives. Subsequently, customer experience, an important measurement, determines whether e-commerce is effectively performed and able to meet customer needs, especially during a delivery process. In addition, based on customer ideas, hidden weaknesses and plausible solutions to overcome can be revealed. It is undeniable that practical responses can enhance current situations and tackle certain problems. When comments and feedbacks from the Vietnamese consumers are reviewed, the Vietnamese e-commerce enterprises can identify inefficiencies, particularly in order fulfillment that can impact significantly on the delivery process and purchasing experiences via online platforms.

1.2 Objective of the study

Based on the previous part, it can be seen that e-commerce has many strong development prospects, especially in the Vietnamese market. Furthermore, it also enhances the development of logistics activities in online trading businesses, especially inventory management and last-mile delivery. In this study, the main objective is to gain insights into the practical operations in order fulfillment,

particularly in two major stages, inventory management and last-mile delivery, of the business firms in the Vietnamese e-commerce market towards fulfilling customer requirements.

1.3 Research questions

Based on the topic, there is one main research question formed to find answers to review the situations of an issue with details.

- **The Main Research Question:** What are the situations of inventory management and last-mile delivery in the Vietnamese e-commerce market?

Even though this question is quite broad, it is considered as a general image to cover more detailed issues. Therefore, apart from the main research question, there are several minor sub-questions to get the answers in each particular aspect.

- **The First Sub-Question:** What are the characteristics of the Vietnamese e-commerce market in brief?
- **The Second Sub-Question:** How are the outbound stages, inventory management and last-mile delivery, of order fulfillment of e-commerce conducted in the Vietnamese market?
- **The Third Sub-Question:** How is customer satisfaction over experiences in e-commerce in the Vietnamese market?

Overall, each answer to each sub-question can contribute significantly to finding the final answer to the main research question.

1.4 Delimitations

In the study, there are several notable matters to be included and not to be included. Importantly, delimitation plays a vital role in narrowing the ideas and demonstrating only the key ones.

To include	Not to Include
Order Fulfillment Operations: Inventory Management and Last-Mile Delivery	Other functions in order fulfillment
E-commerce Background Information in brief	B2B segment
Customer Satisfaction Evaluation	The perspectives in other international markets
B2C segment	Intangible Products
Tangible products	
All perspectives in the Vietnamese market only	

Figure 2. Delimitations (Thong Dang 2020)

From the above figure 2, there are various important and unimportant aspects. In terms of the key ideas to be included, the key perspectives of the study relate to order fulfillment operations, particularly inventory management and last-mile delivery. Hence, the viewpoints and aspects of these important stages in order fulfillment are demonstrated in the study since the main objective is to get a clear view of these points. Then, e-commerce backgrounds are also important and should be taken into considerations in brief. Then, it is important to evaluate customer satisfaction as customer feedbacks and comments are essential for assessing whether the e-commerce companies have been performing well to fulfill their needs. Then, the study puts a high emphasis on the end consumers and a B2C segment is included in the study. In the study, physical products are demonstrated in the study as these are critical elements in an order fulfillment process. Eventually, the Vietnamese market is only a primary target to review all aforementioned aspects.

With regard to exempted perspectives from this study, there are several matters to highly concentrate. First of all, there is a wide range of functions in order fulfillment and it is profoundly broad to cover all of those. Hence, except for inventory management and last-mile delivery, there are no functions to be encompassed in this study. As the study concentrates significantly on the final

consumers and there is no concentration on relationships between business entities, a B2B segment is not indicated in this study. Then, in the study, all the perspectives are indicated in the Vietnamese market only and those in other foreign markets are not indicated. Lastly, the intangible products are not included in the study since they cannot be used to reflect how inventory management and last-mile delivery are implemented.

1.5 Research methods

Research methods contribute significantly to a data-review process, which focuses mainly on how data are collected, analyzed, and summarized to indicate and review the different perspectives. In addition, the research methods are powerful tools to collect, interpret the data, and make conclusions for reviewing and assessing the key theories in the study. Besides, these are also used for illustrating the alignments and strategies of the research and study implementations. To review all aspects pertaining to research instruments, approaches, and strategies in the study in a clear and coherent structure, a research onion is a considerable concept.

The research onion, which is known as the model developed by Saunders et al. (2007), provides a major overview of research implementations in each stage of a research process. It is clear that the initial stages of the research process commence from points in the first two outermost layers of the research onion. To be precise, those illustrate philosophies and approaches, which the study encompasses in the study to determine the alignments of the research process at an initial and impact significantly on research paths. To continue the following stages, the process must get insights on deeper layers. The following layers demonstrate strategies, research selections, time dimensions in the research process, and ways how these are formed are strategically aligned by the research questions. (Saunders et al. 2007, p.138.)

There are only a few layers of the research union to take into account in below Figure 3.

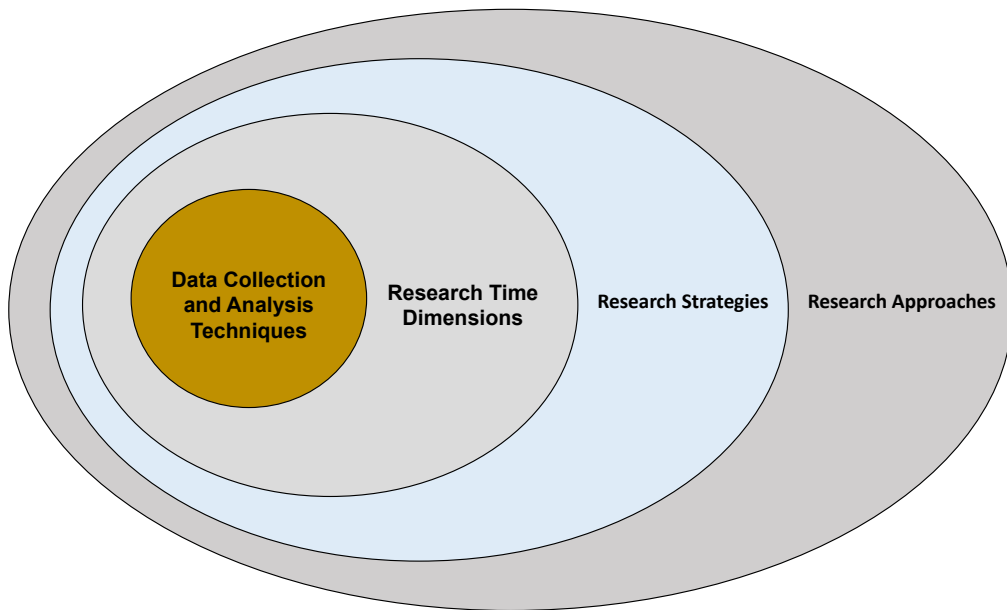


Figure 3. The compressed research union in the study (Saunders et al. 2007, p. 138)

Then, it comes to the first layer of this research union, research approaches.

1.5.1 Research approaches

In terms of the research approaches, a deductive approach is majorly applied to form the orientation of the research process. This refers to the approach that theoretical concepts and models in the theoretical framework are preliminarily consolidated from other sources and referred towards building hypotheses. To test these, empirical data collection, analysis, and summary are conducted (Saunders et al. 2007, p. 124).

Similarly, according to Research Methodology (2019), the deductive approach is the process in which the hypotheses are built and inspected by the final results of practical researches.

In the study, the key theories and hypotheses pertaining to e-commerce, order fulfillment with two major focused stages, inventory management and last-mile delivery, are consolidated from many different trustworthy sources and demonstrated. Then, in the empirical part, the overview of the Vietnamese e-

commerce market, operational models of inventory management and last-mile delivery, and customer perspectives over e-commerce experiences, particularly in the delivery process in this market are reviewed with reliable data sources to inspect the theories.

Then, it comes to the second layer of the research union, research strategies.

1.5.2 Research strategies

In terms of the research strategies, there are two particular directions to review the main issues and in this study, survey strategy and archival research strategy are majorly focused.

On the one hand, the archival research strategy refers to the alignments of the data collection and analysis on a certain amount of data from recorded, existed data sources in archives and administrative systems of organizations (Saunders et al. 2007, p. 150). This strategy aligns how the research methods are used to collect, gather, and interpret the data from certain publications or context sources of organizational entities. The outcomes are provided at last (Mohr et al. 2002, pp. 805-808).

Based on this strategy, the backgrounds of the Vietnamese e-commerce market and the overview of the operational models of inventory management and last-mile delivery are qualitatively reviewed with the data from trust-worthy archival publications, articles, and newspapers of prestigious entities.

On the other hand, the survey strategy focuses mainly on the collected-data sources from surveys and a questionnaire with many types of questions such as multiple-choice or Likert-scale questions sent to the targeted population or sampled groups (Saunders et al. 2007, p. 144). When researching, depending on research purposes, qualitative strategies, quantitative ones, or even both of these can be appropriately devised (Ponto 2015).

In this study, the surveys which are delivered to a group of respondents experiencing online shopping in the Vietnamese market play an integral role in the assessment of customer satisfaction.

Then, it comes to the third layer of the research onion, research time dimensions.

1.5.3 Research time dimensions

With regard to time dimensions, cross-sectional research is focused and aims at only going in-depth into one certain matter, issue, or phenomenon, and measuring certain groups of variables during one specific period of time (Saunders et al. 2007, p. 155). In the cross-sectional research, groups of populations and characteristics of variables can be selected based on the research purposes and demands (Cherry 2019).

In this study, the perspectives of inventory management and last-mile delivery in e-commerce in Viet Nam, a brief overview of the Vietnamese e-commerce market, and customer satisfaction assessments at particular timepoints are clarified.

Then, it comes to the fourth layer of the research onion, data collection and analysis techniques.

1.5.4 Data collection and analysis techniques

The research methods and types of data are illustrated in figure 4 as below.

	Research Methods	Types of Data
To briefly describe the situations of the Vietnamese e-commerce market and notable operational models of inventory management and last-mile delivery.	Qualitative-Oriented Researches	Secondary Data
To review and evaluate the satisfaction of the Vietnamese consumers.	Quantitative-Oriented Researches	Primary Data

Figure 4. Research methods and types of data (Thong Dang 2020)

At first, the main purpose is to briefly describe the situations of the Vietnamese e-commerce market and notable operational models of inventory management and last-mile delivery. In this case, a qualitative research method directs how this issue is reviewed and clarified based on qualitative-oriented data collection, analysis, and summary. This is known as a method of research that particular research issues or questions are clarified by the main answers based on previous knowledge, know-how, evidence, ideas of individuals, and entities, which used to experience those specific issues on research. (Mack et al. 2005, p. 1.) In terms of the data sources, the amount of secondary data from various credible sources such as academic books, scientific articles, and published articles on official websites are utilized to be qualitatively analyzed towards research-issue reflections. To analyze this type of data, a secondary analysis is used and this is the method that much collected data from existed data sources or contexts with relevant meanings are consolidated and interpreted. (Heaton 1998.)

Subsequently, to review and evaluate consumer satisfaction in the Vietnamese market, a quantitative research method is majorly applied and it refers to quantitative-oriented researches in which the characteristics of targeted variables are analyzed and reviewed based on collected numerical data with the support of statistical instruments and measures (Apuke 2017). With regard to the data collection, the surveys with a list of different types of questions are sent to a group of customers, who used to have the purchasing experiences via the online platforms. Then, Excel and SPSS are used to analyze the data, present the values in proportion, and convert them into charts or graphs.

1.6 Thesis framework

The structure of the study is illustrated in the below figure 5. To be precise, there are five major parts to take into account.

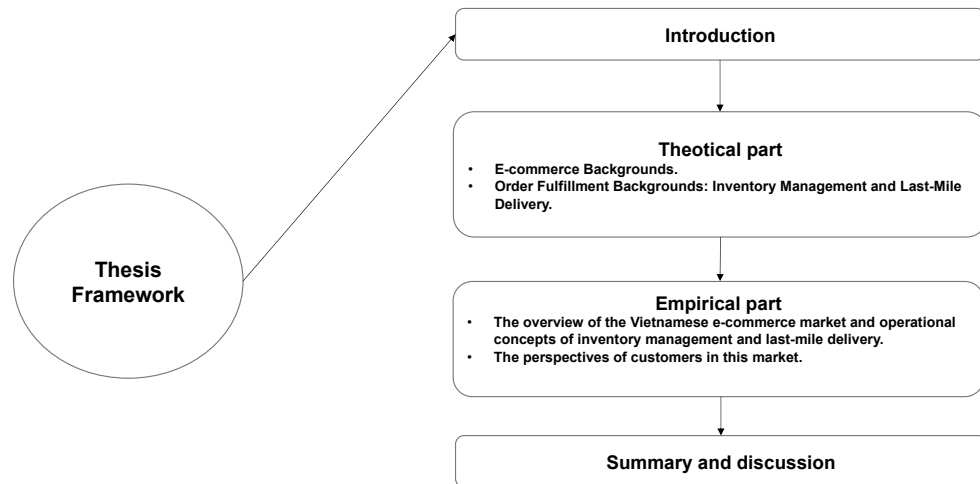


Figure 5. Thesis framework (Thong Dang 2020)

In the first part, introduction, several major titles of the study are indicated to broaden the horizons and gain insights into the key aspects of the study. To be precise, this part encompasses the fundamental backgrounds of the study, for example, the overview, the key objectives, the research questions, the research methods, the delimitations as well as the thesis framework.

In the second part, theoretical part, the key theories and concepts of the study are demonstrated. There are two primary themes in this part, e-commerce backgrounds and order fulfillment backgrounds. Then, these are followed by various minor parts in which the main theoretical models are rigorously demonstrated.

The third part, empirical part, entails two main themes to go in-depth. To be precise, the overview of the Vietnamese e-commerce market and operational models of inventory management and last-mile delivery, and the perspectives of customers in this market are primarily demonstrated based on the key findings from the data review process.

In the final part, summary and discussion, the outcomes of the study are indicated. Then, several limited points are also indicated in this part to witness notable restrictions in the study. At last, proof for the reliability and validity of the

study are indicated and several imperative recommendations for further researches are also suggested in this part.

1.7 Conclusions for introduction part

In this part, the backgrounds of this study are briefly demonstrated. At first, the overview of the study is indicated to provide a brief overview of prime issues in this study. Then, the objectives are set and based on these, the research questions are made to search the answers towards achieving these objectives. Subsequently, the delimitations are necessarily involved to demonstrate the perspectives to include and exclude in this study. Then, it comes to the research methods, which are considered as effective instruments to do researches. Lastly, the thesis framework is indicated to illustrate the layouts of this study. After this part, it comes to the theoretical part, which demonstrates the key theories.

2 E-commerce backgrounds

For this part, the definition of e-commerce is firstly demonstrated and then, several crucial e-commerce perspectives are indicated. Subsequently, it comes to demonstrations of transaction relationships in e-commerce and e-commerce advantages.

2.1 Definition

According to Turban et al. (2003, p. 3), e-commerce, an eminent virtual trading method, majorly supports the business exchanges and transactions of the tangible, intangible products, and even information based on interaction and communication of computer hosts in a common network. In the e-commerce process, a virtual transaction is important as it indicates a considerable electronic measure to exchange monetary sources virtually between organizational and personal entities (Toppr n.d.).

The establishment of e-commerce derived from the development of several state-of-the-art technological systems. At first, emerging applications of several modern technologies during the period of the 1970s were the main reasons for the inauguration of e-commerce. To be specific, the appearance of e-commerce was firstly viewed from the applications of a so-called system, "Electronic Funds Transfers (EFT)", which indicated significant usage of monetary-source transfers and was majorly applied in the organizational structures of the business firms with a large-sized scale or those majoring in a financial sector. Subsequently, e-commerce implementation could be significantly reflected through the applications of "Electronic Data Interchange (EDI)". Based on this system, not only the monetary sources but also transaction-related documents could be electronically exchanged between corporations and other partners. In more details, customer requests are sent from customers' places to the business firms, and then, they could have adequate information to commence requesting direct materials from strategic vendors for production. (Reynolds 2010, p. 254.) It was well-known for being applied in finance-related, huge-scaled firms, and even wholesaling, service, or production businesses. Then, e-commerce was raised as an official and widespread term during the period of the 1990s when the

Internet applications were commercially popular with a huge number of participants. (Turban et al. 2003, p. 9.)

2.2 E-commerce perspectives

There are several notable perspectives of e-commerce that are needed to take into considerations.

E-commerce, which is reflected from the first perspective, “a communications perspective”, is known as the term in which the transactions are electronically conducted or the tangible, intangible products, and even the information are electronically distributed by the computer hosts in the common network with the sake of electronic instruments and methods (Mourya et al. 2014, p. 25).

Then, E-commerce, which is reflected from the second perspective, “an online perspective”, is well-known for offering Internet-based conditions to the exchange flows of the products or information (Turban et al. 2003, p. 3).

Subsequently, e-commerce, which is reflected from the third perspective, “a collaborations perspective”, is considered as the notable method to support and improve the internal, external communication, and cooperation of the business firms (Turban et al. 2003, p. 3).

Then, e-commerce, which is reflected from the fourth perspective, “a community perspective”, plays an integral role in delivering common platforms to the individuals in a common community and enhancing the activities of them in these community platforms (Turban et al. 2003, p. 3).

Then, e-commerce, which is reflected from the fifth perspective, “a service perspective”, helps the business firms to get insights on the demands of them or their customers and devises appropriate strategies for cost minimization, and quality and rapidness optimization towards effective customer-service administration (Mourya et al. 2014, p. 3).

Subsequently, e-commerce, which is reflected from the final perspective, “a business process perspective”, is known as a vital technological element applied into a business process since it enables countable indispensable functions in the

business process as well as the transactions to be automatically operated (Mourya et al. 2014, p. 25).

2.3 Buy-side e-commerce, sell-side e-commerce, and the roles of Intranet and Extranet

Figure 6 as below is essential for illustrating the roles of Buy-side e-commerce, Sell-side e-commerce as well as the roles of Intranet and Extranet.

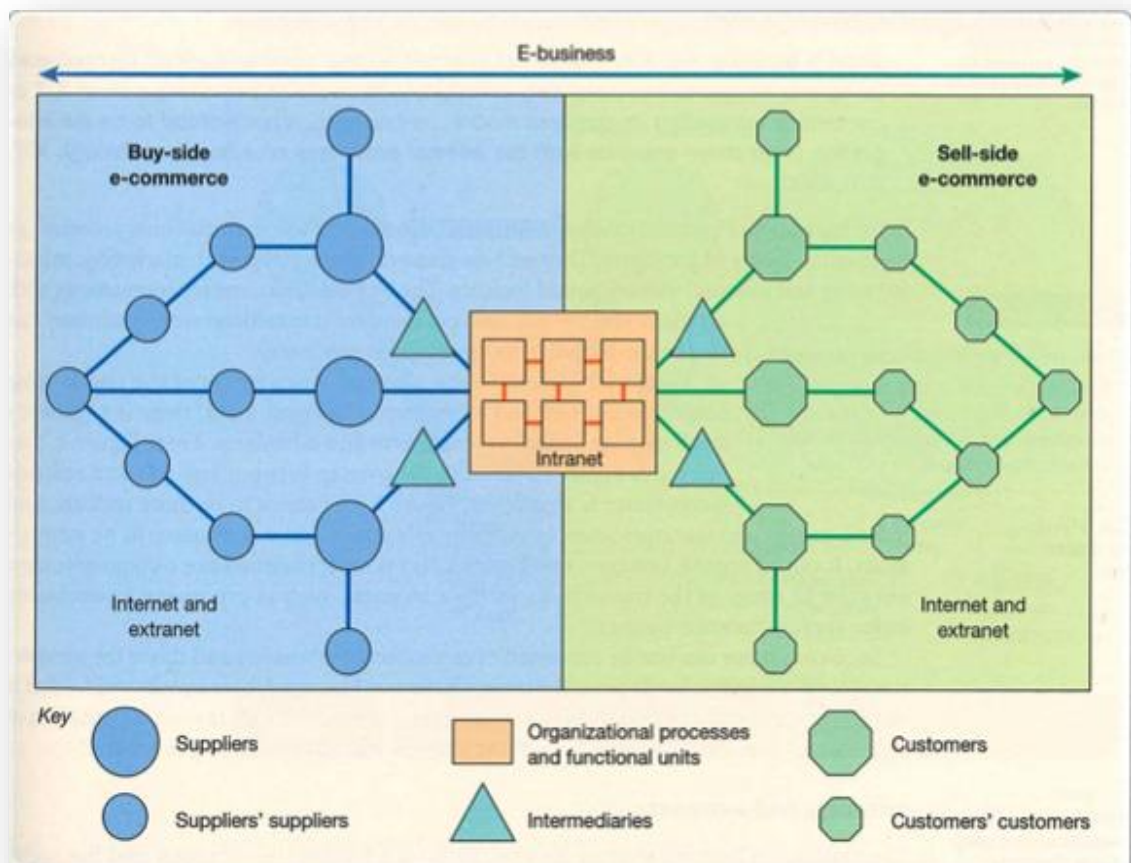


Figure 6. The overview of buy-side and sell-side e-commerce (Chaffey 2015, p. 11)

Based on figure 6, it is clear that in the e-commerce process, there are not only purchasing and selling activities but also other purchasing-related and selling-related ones. Therefore, the transactions of e-commerce can be reflected from two different aspects in one certain business organization.

Buy-side e-commerce is considered as the vital stage of e-commerce since it encompasses various relevant procurement activities and records when the

business firms transact with their vendors and purchase direct, indirect materials from them (Chaffey et al. 2015, p. 12).

Sell-side e-commerce is known as another essential stage of e-commerce and entails a plethora of business firms' activities, which pertain to product deliveries and distributions to the customers (Chaffey et al. 2015, p. 12).

Based on figure 6, the applications of Intranet and Extranet play an integral role in the functions of the buy-side and sell-side e-commerce. Basically, a common point is that these have several restrictions on accessible authorities. To be precise, not all personal or business entities are allowed to access the common business networks and there are only permissions for those, which are considered as authorized and vital stakeholders (Chaffey et al. 2015, p. 12). Besides, Intranet and Extranet are still different from each other.

"Intranet" refers to a particular organizational Internet-based system network in which subordinates are involved and authorized to join, collaborate, and communicate with each other, and information flows are promoted to stream smoothly across this network with the sake of web-based technological methods. Based on Intranet, organizations can minimize costs and save resources for other business purposes. Nevertheless, significant investments are the notable requirements of Intranet for the business firms since these may impact significantly on capital-financed issues and returns. (Turban et al. 2013, p. 273.)

"Extranet" is well-known for being a wider concept in which Intranet is further developed to provide accessible abilities to the organizational system, to not only employees but also other stakeholders with the huge usage of web-based technological measures (Turban et al. 2003, p. 274).

2.4 Transaction relationships in e-commerce

In e-commerce, the roles of relevant business parties are worth taking into account since those are the main elements that the virtual transactions can be conducted and the products can be electronically distributed. Depending on business relationship concepts, characteristics and factors in e-commerce

transactions can be accordingly categorized. Then, there are several notable relationship concepts as below.

2.4.1 “Business-to-consumer (B2C)”

This concept can be briefly illustrated in an image as below to witness the relationships of both sides in the transactions in a clear manner.

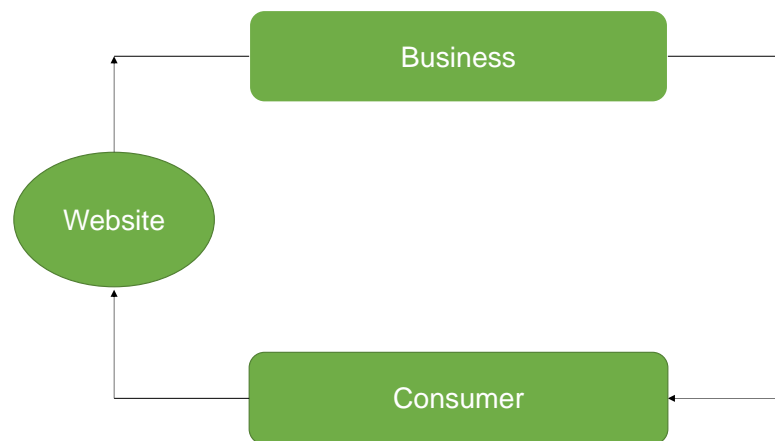


Figure 7. The model of B2C (D’Errico 2019)

Based on figure 7, in this concept, the products are mainly sold via the Internet-based platforms, website services and rarely available for sales at the brick-and-mortar stores. Obviously, the business sellers and purchasers are two main elements in the virtual transactions (Turban et al. 2003, p. 7). On these fundamental platforms, a number of available products are demonstrated and the customers can search and purchase their favorite products. The tangible products are frequently distributed via a B2C marketplace. Nonetheless, services such as consultation or subscription can also be distributed in this kind of marketplace. (D’Errico 2019.)

2.4.2 “Customer-to-customer (C2C)”

This concept can be briefly demonstrated in this image as below to witness the connections of the sellers and buyers in the transactions.

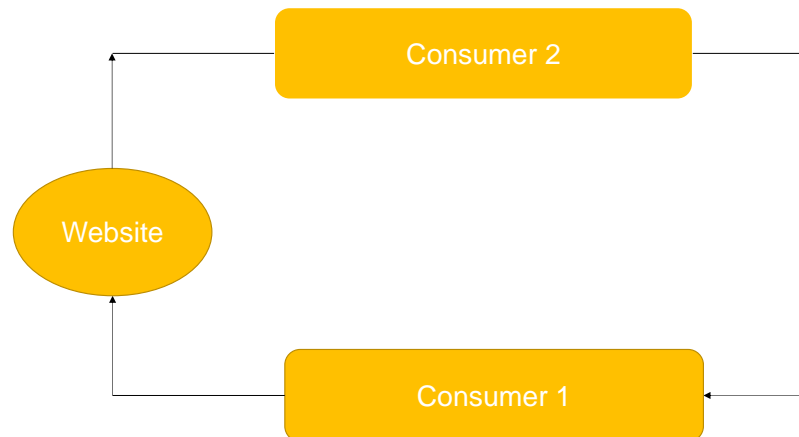


Figure 8. The model of C2C (D'Errico 2019)

Based on figure 8, in this concept, personal buyers can distribute own special or second-hand products, properties, or services to others based on the Internet-based platforms, networks, or website services without complex requirements, for instance, opening own stores or registering as selling organizations to authorities (D'Errico 2019). Therefore, it is obvious that in this concept, the virtual transactions are only made between the end consumers (Turban et al. 2003, p. 7).

2.4.3 “Government-to-citizens (G2C)”

This is known as the relationship concept in which non-financial and financial transactions are made between the national authorities and citizens. In this relationship, the citizens have sufficient rights to request official information, assets, monetary sources, or public documents from governments. (ManagementMania 2016.) Then, it comes to a term named “E-government” in which the national authorities utilize state-of-the-art technologies and information systems to reveal and deliver what the citizens want to achieve from them (Turban et al. 2003, pp. 8).

2.4.4 “Business-to-employee (B2E)”

This is well-known for being the relationship concept in which intra-organizational transaction activities are made between the business firms and their subordinates. To be precise, in this model, the organizations can fulfill their responsibilities and support their employees by providing them with their own tangible or intangible products, information, and several incentives such as in-house training. (Turban et al. 2003, p. 8.) In addition, the business firms can exploit the Intranet for other purposes within organizational frameworks towards better coordination. For instance, by Intranet, a management board can frequently notice their employees virtually and manage employee policies effectively. (Mourya et al. 2014, p. 45.)

2.5 Advantages of e-commerce

There are many advantages of e-commerce that raise a high awareness of consumers. Based on these, the consumers can benchmark, consider this with other shopping styles, and select the most suitable ones, which can match their demands, time, locations, and affordability. E-commerce can be greatly considered as the most effective method and provide the consumers with countable benefits. Those advantages can be seen in figure 9 as below.

Advantages of E-commerce	24/7 Shopping
	Rapidness
	Widespread Market
	Convenient and safe virtual payment methods
	Less employee recruitment
	Possibilities to upgrade business scales

Figure 9. The advantages of e-commerce (Mourya et al. 2014 & Ferreira 2019)

First and foremost, it is clear that based on the e-commerce platforms, the consumers can go shopping and make the virtual transactions in a constant manner regardless of the time and location obstacles (Mourya et al. 2014, p. 30).

Secondly, rapidness is known as the key feature of e-commerce. By e-commerce, there are many virtual linkages from the sellers to buyers with the Internet connection. These help to improve the quality, effectiveness, particularly speed of communication and made transactions when going shopping. (Mourya et al. 2014, p. 30.)

Thirdly, thanks to the e-commerce platforms, there are many convenient and effective ways for selling individuals and organizations to reach the consumers around a globe (Mourya et al. 2014, p. 30).

Fourthly, convenient and safe virtual payment methods are known as the notable beneficial features of e-commerce. When making the virtual transactions, the payments can be conveniently done via bank cards, transfers, or e-wallets. (Mourya et al. 2014, p. 31.)

Fifthly, to operate e-commerce businesses, there is no high need for employee recruitment. Depending on own business scales, the firms can decide to operate by themselves or hire a small number of employees. Moreover, with a web-based business concept, the companies can recruit freelancers all around the world, especially low-income countries. Thus, savings can be spent on other core businesses. (Ferreira 2019.)

Finally, with e-commerce, the business firms can reduce the costs since they do not need to spend a huge amount of budget on many business activities as the physical stores do. Thus, they can invest in core business activities for online shopping and easily enhance the business scales against other opponents. (Ferreira 2019.)

2.6 Conclusion for the part of e-commerce backgrounds

In this part, the theories of e-commerce are briefly indicated in different perspectives. To be precise, the definition of e-commerce is firstly demonstrated to get insights into the simple meanings of e-commerce. The important e-

commerce perspectives are then demonstrated to witness how e-commerce is reflected in different multiple aspects. Then, the transaction relationships in e-commerce are demonstrated to gain insights into the key parties, who are involved in the e-commerce transactions. Lastly, the e-commerce advantages are demonstrated to witness the potential benefits, especially for the business firms in an e-commerce market. After this part, the theories of order fulfillment, particularly inventory management and last-mile delivery, are then indicated.

3 Order fulfillment backgrounds

The definition of order fulfillment is firstly demonstrated in this part. Then, it comes to two other minor parts, inventory management and last-mile delivery.

3.1 Definition

In e-commerce, order fulfillment is an important element since it contributes significantly and encompasses various relevant stages to promote product flows when the products are picked up from the vendors or a production stage, stored, and processed prior to the final deliveries to the consumers (Bulger 2013). According to Joelynych (n.d.), order fulfillment is considered as the important process of various companies since it describes the reactions of the business firms to the customer requirements and practical actions to ensure that the products are always available. As order fulfillment includes many stages, it is quite hard to cover all of those. In the study, there are two major notable focused stages to take into account, inventory management and last-mile delivery. These play an essential role in processing the product flows from the original points to the final places in an on-time manner to meet the customer needs.

3.2 Inventory management

For this part, the definition of inventory management is firstly demonstrated and followed by other key theoretical aspects, for example, the objectives of inventory management, motives, and types of storing facilities.

3.2.1 Definition

Inventory management refers to the notable concept in which the products and non-capital assets of the business firms are monitored, managed, and controlled in storage places, for instance, warehouses or fulfillment centers. Besides, this term is considered as the vital part of logistics and supply chain management since it is responsible for the smooth finished-inventory flows and stable current situations of the merchandise in the middle storing points after they are transferred from authentic locations and before the deliveries to the final destinations. (Rouse n.d.) From a financial perspective, inventory management

is a notable factor and may have certain impacts on the financial situations of the enterprises. Thus, it should be highly concentrated to ensure that the inventories can be kept at a suitable level to have the least effects on corporate financial health. (Management Study Guide n.d.)

3.2.2 Objectives

In terms of inventory management, the strategies and alignments can be appropriately devised to gain certain business achievements and outcomes. In addition, when there are certain disruptions or problems in the business process, the objectives can be flexibly adjusted to suit business conditions.

The first key objective of inventory management is to monitor, manage, and control a number of available inventories in balance. To be precise, on the one hand, when the market demands are quite higher than supply capacities and there are no adequate inventories, the goals of sales cannot be gained as planned and lead to the following bad consequences, for instance, revenue and profitability reduction. In addition, this issue may also damage brand images when the consumers cannot feel satisfied. On the other hand, when there is a high amount of inventory in stock, it is also not a good situation as the inventories request huge capitals to be financed and the significant utilization of production capacity. Therefore, many inventories staying in the storage places may limit organizational resources, which can be used for other development of core business functions and departments. (Sinha n.d.)

The second key objective is to seek comprehensive solutions for the cost minimization and investment offset of inventory management. To achieve this goal, ensuring the constant availability of the inventory for business purposes is considered as the most optimal solution. Then, limiting the long stay of the inventory in the storage places is also another comprehensive measure to lower the costs of inventory management to the lowest feasible levels. When the inventories cannot be processed, a blocked-cash situation takes place and results in scarce capital sources for other key functions and departments. Subsequently, with lower inventories in the storage places, the costs for storing the inventory can be minimized. (Sinha n.d.)

The third main objective is to avoid a huge amount of wastes and losses when managing the inventories. When handling, damages, or breakages can happen, especially with perishable or vulnerable items, and many items can be missed due to an incorrect count or thefts. Therefore, in the storage places, each item should be constantly tracked to ensure that when being handled, the items are still valid for use and there are sufficient volumes and good quality standards. (Jane 2019.)

3.2.3 Motives

For inventory management, carrying the inventory is considered as a negative action since it can bring high costs to the business firms. However, this action has been being conducted and from a corporate perspective, it is still highly important. There are several notable motives that urge the enterprises to carry a certain amount of inventory in the storage places in figure 10 as below.

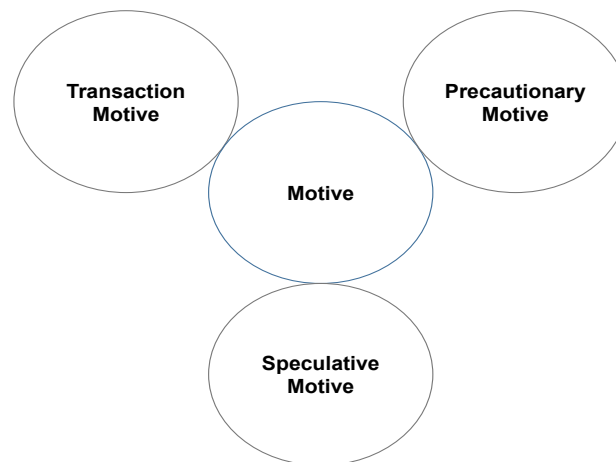


Figure 10. The motives of inventory management (Sinha n.d. & Business Marketing 2018)

The first notable motive is “Precautionary Motive”. To be precise, due to constant fluctuations in market situations, it is quite difficult to measure and ensure the right availability of products for sales to capture the market demands promptly. Hence, from the corporate perspective, carrying a certain amount of inventory in

the storage places is a comprehensive back-up plan for the business firms to deal with unforeseen situations when the demands are higher than the supply capacities as they can avoid the risks of customer dissatisfaction and gain greater results in the revenues and profitability. (Sinha n.d.)

The second motive is “Speculative Motive”. To be precise, the enterprises often make various purchases in bulk to benefit the discounts, obtain more opportunities for higher returns, and avoid price fluctuations of incoming resources, which can bring many higher costs to the business firms (Business Marketing 2018).

The third motive is called “Transaction Motive”. Basically, this refers to the motive that the business firms strive to store the inventories for a sales purpose and ensure the satisfaction for the markets and consumers with a seamlessly adequate number of offered products (Business Marketing 2018).

3.2.4 Types of storing facilities

The utilization of organizational infrastructure, equipment, and techniques is also the important factor to improve the performances of inventory management. One of the most key factors is storing and warehousing facilities since these are the vital places where the inventories can be stored and inventory management can be conducted.

The first type is called “cross-dock centres” and this concept is created to optimize the speed of the product flows towards meeting customer and partner requirements. It is majorly used to collect labeled and perishable products from many different sources, consolidate, and deliver them to other business parties in a short period of time, usually, in only one day. This storage type is usually located in suburbs, outskirts, or somewhere far away from city centers to distribute the products effectively within local and radial areas. (Richards 2014, p. 10.)

The second kind is called “reverse logistics centres” and created to assist the business firms to deal with the returned products. Sustainability is considered as the main target in these centres. To be precise, the returned products are

returned to these centres from the customers, sorted according to the categories, and inspected before they can be recycled or reused. (Richards 2014, p. 11.)

The third kind is known as “consolidation centres” and it is the notable middle point where the finished products or materials are temporarily placed prior to continuous transfers to other business parties or the consumers. Moreover, this concept is majorly applied when supplying the sources to the “Retail Distribution Centres”. To be precise, the “consolidation centres” consolidate manufactured products from one production party to others and pass them as one package to the “Retail Distribution Centres”. Besides, this kind of warehouse is important for many business firms as it can help them consolidate raw materials and deliver to factories or plants for a manufacturing purpose. In the “consolidation centres”, the merchandise or raw materials can stay in a certain period of time until there are requests from points of sales, consumers, or manufacturers. (Richards 2014, p. 9.)

The fourth kind is named “fulfillment centres” and these centres are highly focused and developed with sufficient and modern technologies, facilities, and equipment to process a huge number of orders from the virtual transactions on a daily basis. Furthermore, the “fulfillment centres” can also be used to operate a reverse process when the orders are returned. (Richards 2014, pp. 10-11.)

The fifth type is called “bonded warehouses” and these places are used to place the items of cross-border deliveries and delivered to the customers until customs clearance and duty payments are made. There are no charged fees and limited durations for these items to stay in these warehouses. (Jules 2019.)

The final type is known as “government warehouses” and considered as the assets of the governments. The national authorities have the rights to manage, control these warehouses and private companies can place the merchandise in these storage places in the certain period with affordable fees. (Jules 2019.)

3.2.5 Conclusion for the part of inventory management

In this part, the theories of inventory management are indicated in different perspectives. Specifically, the definition of inventory management is indicated to

get insights into the fundamental meanings of inventory management. Then, it comes to the objectives, which are set towards gaining the greatest outcomes in inventory management. Lastly, the motives are then demonstrated to get the reasons why it is important for the business firms to carry a huge amount of inventory in stock. Then, it comes to the theoretical concepts of last-mile delivery.

3.3 Last-mile delivery

For this part, first and foremost, it comes to the definition of last-mile delivery. It is followed by the theoretical aspects of the delivery process, delivery systems, and several key delivery concepts with customer participation in the delivery process.

3.3.1 Definition

Last-mile delivery is the vital stage in order fulfillment in specific and e-commerce in general and refers to the major activities of transportation in which the products are delivered to the final destinations from the middle points, for instance, the warehouses and fulfillment centres (Janio 2019). To meet the customer needs promptly, last-mile delivery should be rapidly performed with the lowest costs as possible. From an e-commerce perspective, last-mile delivery may impact significantly on customer satisfaction when their requirements for prompt deliveries cannot be met and satisfied. In addition, the costs for the delivery sector in a business framework also accounts for the huge proportion of the total business costs. Hence, last-mile delivery raises much more awareness for the e-commerce enterprises to offset the costs while provide the most comprehensive delivery solutions to the consumers. Recently, more and more consumers prefer free-shipping service. From the corporate perspective, free-of-charge shipping for the customers is known as a competitive edge for the e-commerce enterprises to compete with other opponents. Consequently, it is important for the e-commerce companies to seek the appropriate solutions to simultaneously offer additional necessary delivery services and balance the costs. (ShipHero 2019.) Furthermore, additional services may provide greater experiences to the customers, for instance, the traceability and visibility during the delivery process, which enable the customers to keep in touch with their products until they can

receive. Then, leaving surprises in each shipment is also a feasible way to gain much more loyalty from the customers. (Janio 2019.)

3.3.2 Process

The delivery process includes several notable stages in a methodical order in figure 11 as below.

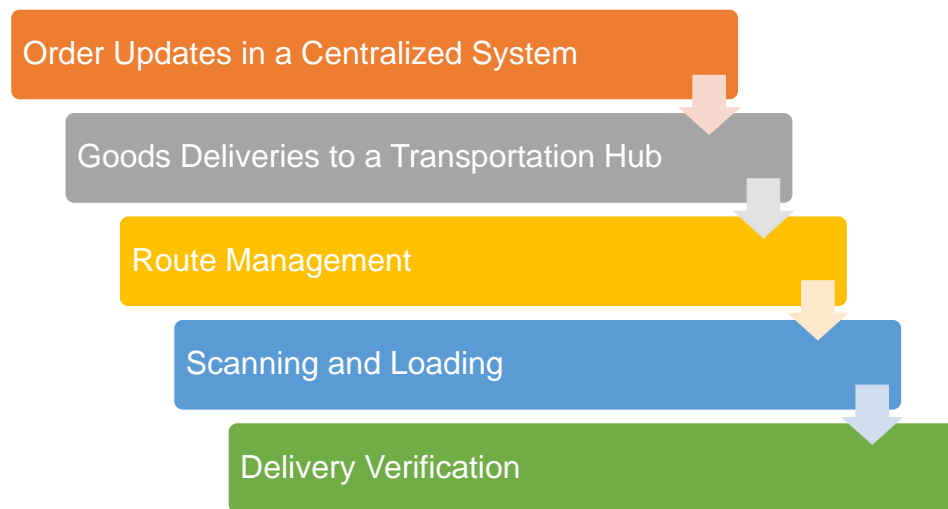


Figure 11. Last-mile delivery process (Smith 2018 and Onfleet 2020)

Last-mile delivery is known as a methodical process that encompasses many important functional stages to ensure that the products can be delivered to the final destinations in a precise and timely manner. Based on figure 11, it can be seen that there are five major steps in the delivery process to be conducted towards promoting the movement of the product flows to the customers smoothly and effectively.

First and foremost, the requested orders from the customers are updated into common computer networks for the following supervision, management, and controlling. By this method, the business firms, outsourced organizations, and even the consumers can witness the journeys of the merchandise in a clear, precise, and on-time manner. (Smith 2018.)

Secondly, then, based on these requested orders, the business firms can make the orders from the vendors or produce by themselves from their own factories and plants to ensure the availability of the products in the storage places. Then, when the products are sent to the storage places such as the warehouses or fulfillment centres, they are stored, processed, and sorted. (Onfleet 2020.)

Thirdly, then, route management is majorly implemented. In other words, with the sake of state-of-the-art technological systems and instruments, the business firms can organize and tailor the most suitable journeys for their deliveries to arrive at the customers' places in a timely manner and reduce the costs. (Smith 2018.)

Fourthly, then, prior to the final deliveries, scanning is the last major stage in the storage places to ensure that the products can be tracked and traced during the delivery process and there are no losses (Onfleet 2020).

Finally, when the products arrive at the customers' places, order verifications must be done before the products are on the hands of the customers (Smith 2018).

3.3.3 Delivery systems

In last-mile delivery, the delivery processes are not similar and depending on own strategies, alignments, and objectives, the enterprises may tailor and develop the most appropriate delivery models to deliver the products to the customers promptly. There are several notable delivery systems to take into account. With each system, there are also several notable considerable concepts.

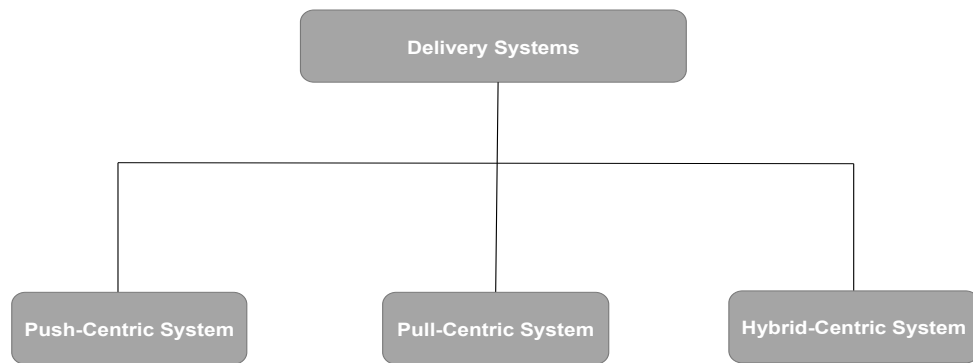


Figure 12. Delivery systems (Lim et al. 2015)

Based on figure 12, delivery systems encompass three major delivery concepts to take into account, “Push-Centric System”, “Pull-Centric System”, and “Hybrid-Centric System”.

First of all, the “Push-Centric System” refers to the system in which the requested orders are processed and directly delivered to the customers’ places. In this system, the original departures of the orders vary, ranging from the physical stores to the fulfillment centres or even producers. (Lim et al. 2015.)

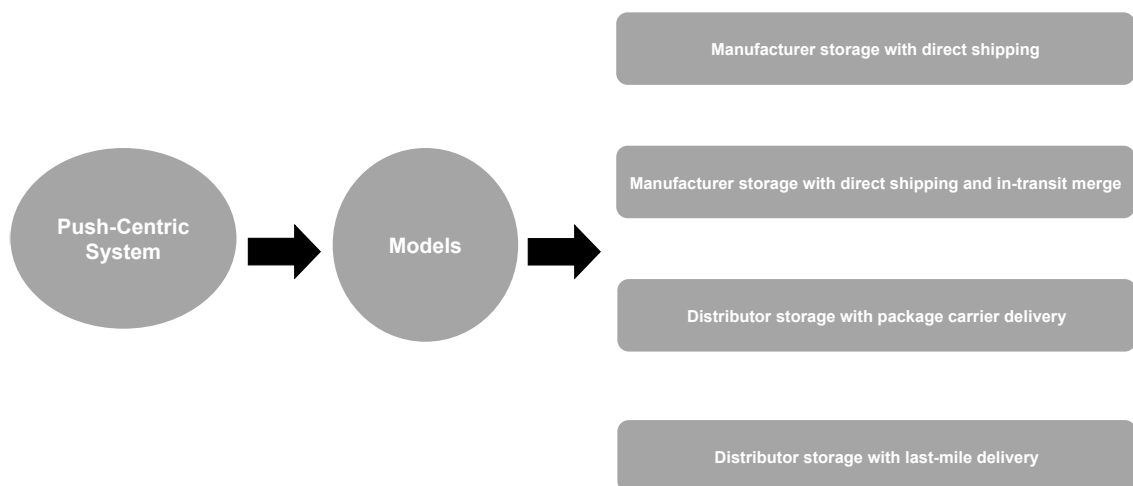


Figure 13. “Push-Centric System” (Lim et al. 2015 & Chopra 2003)

Based on figure 13, in terms of the models, there are four major delivery models to take into account.

- The first model refers to the storage at manufacturing places with direct delivery. To be precise, it has also another name called drop shopping and by this method, the products are directly delivered to the customers' places when there are certain requests. The wholesalers or retailers play an integral role in gathering the requests of the customers and sending back to the manufacturers for the production. The business firms can save a significant amount of inventory costs since the products are directly transported to the customers' places and only temporarily placed in the plants or factories. Nevertheless, the delivery costs seem to be quite high as the locations of the manufacturing places are often far away from residential areas and there is a high need for carrier outsourcing with huge rental costs. The far locations may impact significantly on prompt responses to the customers as the information flows take time to stream backward from the wholesalers or retailers. For this concept, the investments in the technological systems or tools are important to enhance the speed of the information flows and traceability. Besides, drop shopping enables the customers to go shopping with diverse product categories. Nonetheless, customization selections may be restricted in this model. Then, a reverse process is a notable matter since it causes significant costs to process the returned products, whose origins vary. (Chopra 2003.)
- The second model refers to the storage at the manufacturing places with the direct delivery and in-transit combination. This refers to the concept in which the total orders of the customers combined from various smaller orders from many different sources are sent to the final destinations. By this method, the consumers may get better purchasing experiences since they can receive an array of merchandise in one delivery. The diverse categories of the available products are the advantages of this model to deliver greater experiences. In this model, the business firms can place the inventories in manufacturing locations but with a low number. From the aspects of carriers, since they can consolidate numerous orders in a single

delivery package to the consumers, they can reduce business costs and charge lower fees for the customers. There is another pressure for the carriers as the in-transit combination is known as a complex process with the involvement of various functional stages and collaborations of many business parties. Due to these reasons, the abilities to respond to the customers may be significantly impacted. Hence, to operate this process effectively and promote the information flows smoothly, significant investments in the infrastructure, equipment, facilities, and information systems are highly required. Then, in this model, the reverse process is also known as an expensive stage. (Chopra 2003.)

- The third model refers to the storage at distributor places with the following deliveries by the carriers. In other words, this model refers to the concept in which the distributors place the products from other manufacturers in their own storing places, and then, external package carriers deliver the products from these locations to the customers' places. In this model, the delivery costs seem to be low since the total orders are aggregated and delivered to the final destinations as one single shipment. Thus, the availability of the inventory seems to be profoundly high in the storage places. Due to this reason, overall costs for the operations and management in the storage places of the distributors are quite significant. Nevertheless, with a lower business scale and short distances to the customers' places, the information flows may stream quickly. Thus, there are no high needs of huge investments in the infrastructure and information systems to expedite the information flows. In addition, the customer requirements can be promptly met and satisfied since, with the near locations of the distributors' storage places to habitant areas, the orders may be rapidly delivered. Besides, the reverse process may be well-performed in this model since those storage places majorly collect and process the returned products. (Chopra 2003.)
- The fourth model refers to the storage at the distributor places with the following deliveries by in-house transportation teams from the storage places. In this case, the distributors collect and place the products from other producers in their own storage places and then, the infrastructure, vehicle fleets, equipment, and human resources of these places are

utilized to deliver. Usually, the deliveries are made in a short period of time and the requested orders are promptly fulfilled. Then, due to a huge amount of inventory in the storage places, the business firms may incur high costs of warehousing operations, facility usage, and utilities. Additionally, transportation costs are also significant in this model but these costs are not the matters to affect revenue and profit margins significantly due to certain notable returns from express delivery services organized by the distributors. Then, the categories of the products offered to the customers are relatively restricted. In this concept, the reverse process does not cause high costs as the products can be collected and returned to the storage places in the return journeys of the delivery process. (Chopra 2003.)

Secondly, the “Pull-Centric System” refers to the important role of the customers in purchasing processes when they have to travel, make purchases at the brick-and-mortar stores, wholesalers, or retailers, and deliver the products by themselves to homes. This system can save significant costs for the business firms but it is difficult to obtain the greatest customer satisfaction as the customers have to perform by themselves during the purchasing processes. (Lim et al. 2015.)

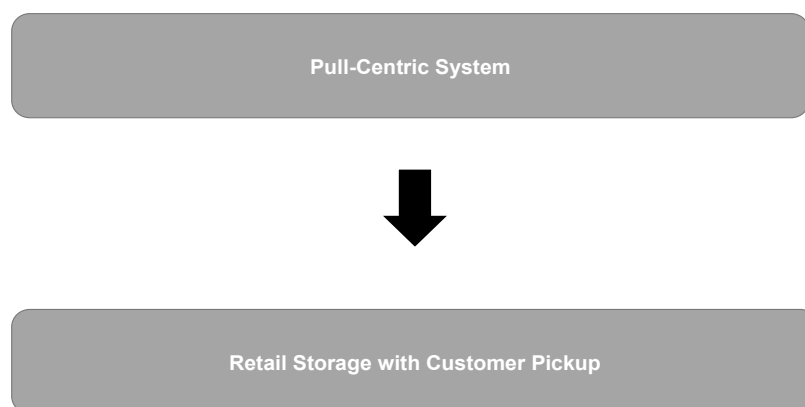


Figure 14. “Pull-Centric System” (Lim et al. 2015 & Chopra 2003)

Based on figure 14, the notable delivery model of the pull-centric system refers to the storage at the retailers with direct customers' collection. To be precise, the wholesalers and retailers have available inventories in all the brick-and-mortar stores for sales. For the customers, they have to travel or make the virtual orders beforehand and then, pick up these products at the stores and deliver by themselves to own houses. In this method, the high costs are considered as notable issues. To be precise, the retailers or wholesalers have to incur the high costs of carrying a huge amount of inventory. Then, operational costs to monitor, manage, and control the activities at certain stores are also high and considerable. Nevertheless, the delivery costs can be saved since the customers have to deliver the products by themselves and this kind of cost may be caused by the transportations for the replenishments. By this method, the needs of the customers can be promptly met but options for customer selections are still limited. Importantly, when the customers make the online orders at first, full and accurate information is sufficiently offered. The reverse process is quite easily operated since these local stores are also responsible for collecting and processing these returned products. (Chopra 2003.)

Lastly, the "Hybrid-Centric System" refers to the system in which the product flows move through several parties before the customers can pick up the products. A huge number of the finished products are transported by large-sized vehicles from the manufacturing places to the distributors' storage. Then, in these places, the products are stored and sorted before they can be sent to certain collection points where the customers can come to pick up. (Lim et al. 2015.)

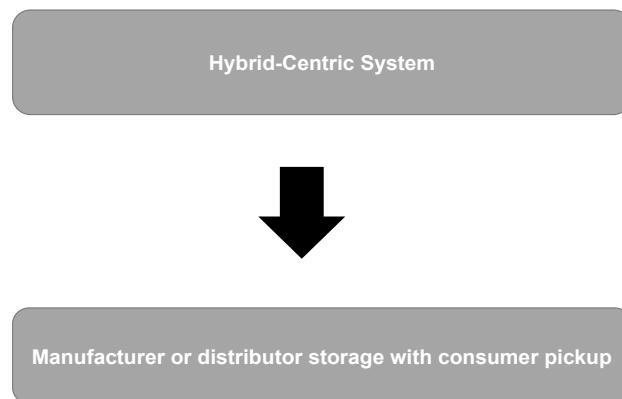


Figure 15. “Hybrid-Centric System” (Lim et al. 2015 & Chopra 2003)

Based on figure 15, the delivery model of the hybrid-centric system refers to the storage at the production or distributor places with customers’ collection at the middle points. To be precise, when the customers order, the products are manufactured and sent to the distributors’ storage places for sortation. Then, these are transported to certain collection points and the customers come to pick up. Usually, the inventories are placed in the storage places with a low level. Therefore, the costs for carrying the inventories and delivery costs can be minimized. Usually, the collection points cause the highest operational costs. From the customer perspective, this method offers them with convenience as the customers can come to drop-off locations whenever they get free time and do not need to be available once the deliveries arrive at the requested places. In addition, the traceability is important in this method for the customers to keep track of their deliveries. Besides, the reverse process is also easily performed since the customers can return the products to the drop-off locations, and then, these products can be returned to the distributors or manufacturers in the return journeys. (Chopra 2003.)

3.3.4 Delivery concepts with the customer participation in the delivery process

There are two major types to take into account, attended deliveries and unattended deliveries. Regarding the unattended deliveries, these can be conducted at the customer houses or other public locations.

First and foremost, the attended deliveries involve the engagements of the customers to pick up their products (BESTUFS n.d.). Usually, according to certain agreements, lengths of delivery days vary and the products must be placed at the customers' places in a timely manner (Hungerländer et al. 2019). In certain particular cases, the deliveries of grocery items are made in a short period of time as they are easily perishable. In addition, high-value or large-sized items such as electronic appliances or furniture are also quickly delivered with the supports of delivery workers to unload and handle. (BESTUFS n.d.) Besides, the products requiring installations also highly need customer presence (Agatz et al., 2007).

Then, regarding unattended deliveries at the customers' places, when the deliveries arrive at the final destinations, the products can be placed without customer presence. Usually, small-sized items such as the letters or parcels are considered as notable items to be delivered and placed at the customers' places without their presence. (BESTUFS n.d.) Delivered items are placed in traditional mailboxes named "Reception boxes", which are temporarily located in one certain area of consumers' houses. With the emergence of modern technologies, they can be designed and developed in an automatic and modern way to be electronically accessed and respond automatically to the customers once there are available items inside them. In several circumstances, delivery workers are allowed to go inside customers' houses and place the products there. (Femie & Sparks 2014, p. 228.)

Subsequently, it comes to unattended deliveries away from the customers' places. To be precise, for this concept, the products are transferred from the manufacturing locations or the distributors' storage places to the middle points, for instance, the collection points and drop-off locations in public places, and the customers can come there to pick up the products. Thus, the customer presence is not necessary for proof of delivery. (BESTUFS n.d.) To open electronic lockers located in these locations and pick up the products, the customers are offered confidential codes by the delivery companies (Femie & Sparks 2014, p. 228).

3.3.5 Conclusion for last-mile delivery

For this part, as aforementioned, the theories of last-mile delivery are indicated and there are several notable delivery concepts indicated. To be specific, to obtain the understanding of last-mile delivery, the definition is firstly indicated. Then, it comes to the demonstration of the delivery process to witness the whole landscape of last-mile delivery. The delivery systems are then indicated to get insights into how various business firms implement these in their delivery operations and there are several notable concepts to take into account, for instance, as previously mentioned, the “Push-Centric System”, “Pull-Centric System”, and “Hybrid-Centric System”. Finally, it comes to some key delivery concepts with the customer participation in the delivery process such as attended deliveries, unattended deliveries at the customers’ places, and unattended deliveries away from the customers’ places to gain the understanding of several prime roles of the customers in the delivery process. Last-mile delivery is also the final point in the theoretical part and then, it comes to the empirical part in which empirical data, figures, and information are indicated.

4 E-commerce backgrounds and the overview of inventory management and last-mile delivery in Viet Nam

For this first empirical part, the main objective is to get insights on the overview of e-commerce situations in Viet Nam and consumer behaviors in online shopping in Viet Nam in brief. Then, how e-commerce companies devise appropriate strategies for inventory management and last-mile delivery and implement towards great deliver-service offers to the consumers is also demonstrated in this part. In addition, the main purpose is to find proof for two main sub-questions as below.

- What are the characteristics of the Vietnamese e-commerce market in brief?
- How are the outbound stages, inventory management and last-mile delivery, of order fulfillment of e-commerce conducted in the Vietnamese market?

To get the answers, the empirical data and information are collected and gathered from various trust-worthy and reliable publications, reports, practical statistics, and journals. Then, those are combined and interpreted to give the key answers to the main sub-questions.

Besides, for this part, as not similar to the theory parts, statistics are majorly used to indicate the situations in the real-world experiences.

First of all, it comes to several notable figures illustrating the Internet-based activities of the Vietnamese consumers.

4.1 Consumer activities

According to Nguyen (2020), in 2019, there were several notable figures in e-commerce to take into considerations in figure 16 as below.

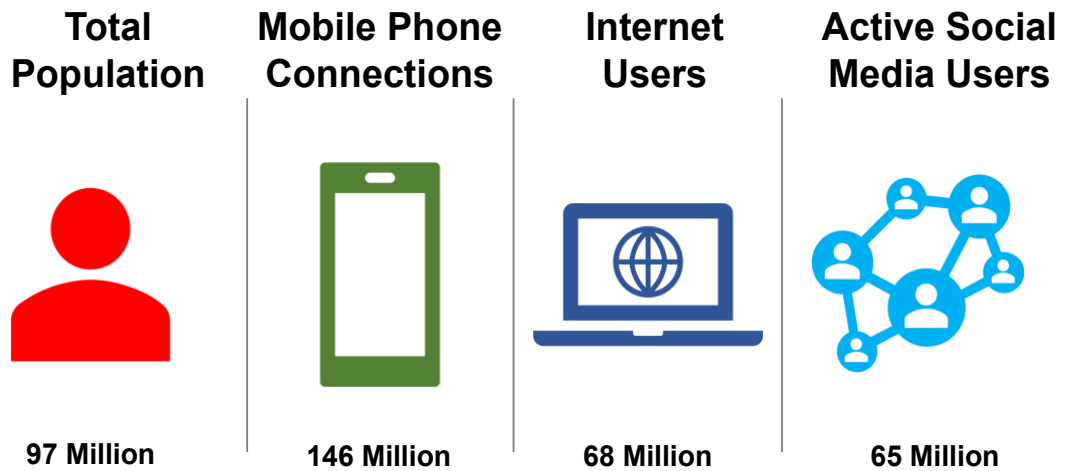


Figure 16. Figures of internet activities in Viet Nam in 2019 (Nguyen 2020)

First and foremost, in 2019, a number of Vietnamese inhabitants reached nearly 97 million and created 146 million mobile-connection views. Subsequently, roughly 68 million Vietnamese people, used the Internet as a powerful and effective tool to access the common networks. Nearly 65 million Vietnamese citizens, exploited the Internet connection to participate in social media and these are considered as highly active participants. (Nguyen 2020.) Therefore, based on these figures, it can be seen that Vietnam had a huge number of populations and the usage of the Internet connection was highly preferred in this market, especially via mobile phones. In addition, their participation in social media networks was also significant.

Then, it comes to several figures indicating the online-shopping activities of the Vietnamese customers in 2019.

**Searched online
for a product or
service to buy**



**84% of Internet users
from 16 to 64 years old**

**Made an online
purchase via a
laptop or desktop
computer**



**35% of Internet users
from 16 to 64 years old**

**Made an online
purchase via a
mobile device**



**59% of Internet users
from 16 to 64 years old**

Figure 17. Figures of online-transaction activities (Nguyen 2020)

According to figure 17, first of all, in 2019, nearly 84 percent of customers using the Internet, in the range of age from 16 to 64 years old, exploited the Internet connection to make virtual researches for the products and services and made direct virtual purchases afterward. Subsequently, it was reported that 35 percent and 59 percent of these Internet users had made the virtual purchases via electronic computer devices and cell phones, respectively. (Nguyen 2020.) Hence, based on these figures, it can be witnessed that the online stores were notable preferable places for the Vietnamese customers to make the purchases and there were various successful online transactions made by most Vietnamese people via personal electronic devices, for example, computers or mobile phones.

4.2 E-commerce index in the Vietnamese market

Based on statistics from Statista (2020), there were several key e-commerce indexes to take into account when indicating e-commerce situations in the Vietnamese market.

4.2.1 Revenue

The figures of the revenues gained from certain product categories in the Vietnamese market are firstly indicated and described in a bar chart as below.

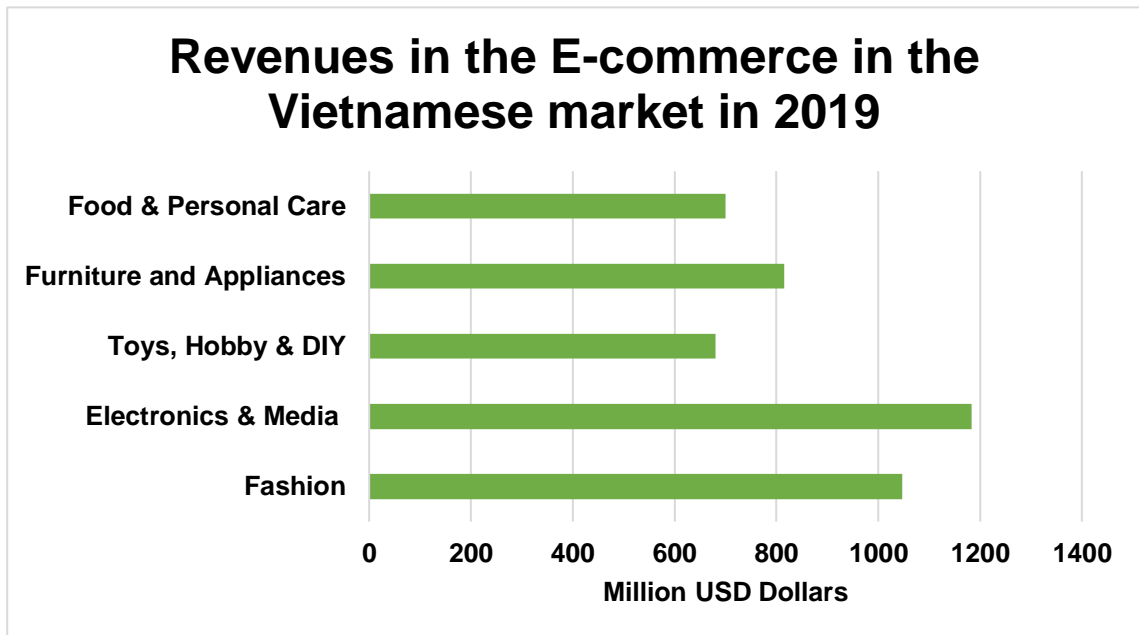


Figure 18. E-commerce revenues in Viet Nam in 2019 (Statista 2020)

According to figure 18, it can be seen that in 2019, the Vietnamese consumers spent a huge amount of personal budget on the virtual purchases. Specifically, electronic and media products were known as the highest consumed goods since the consumers spent nearly 1185 million US dollars on this type of product. Then, fashion product sales also contributed significantly to the total e-commerce revenue in 2019, with approximately 1050 million US dollars, and were followed by the sales of household products, and grocery and body-care products, with nearly 815 million US dollars and roughly 700 million US dollars, respectively. Toys and hand-made products were considered as the least consumed products, with only around 680 million US dollars. (Statista 2020.)

Then, it comes to the figures relating to revenue per user in the Vietnamese market and these are described in three years in a line chart as below.

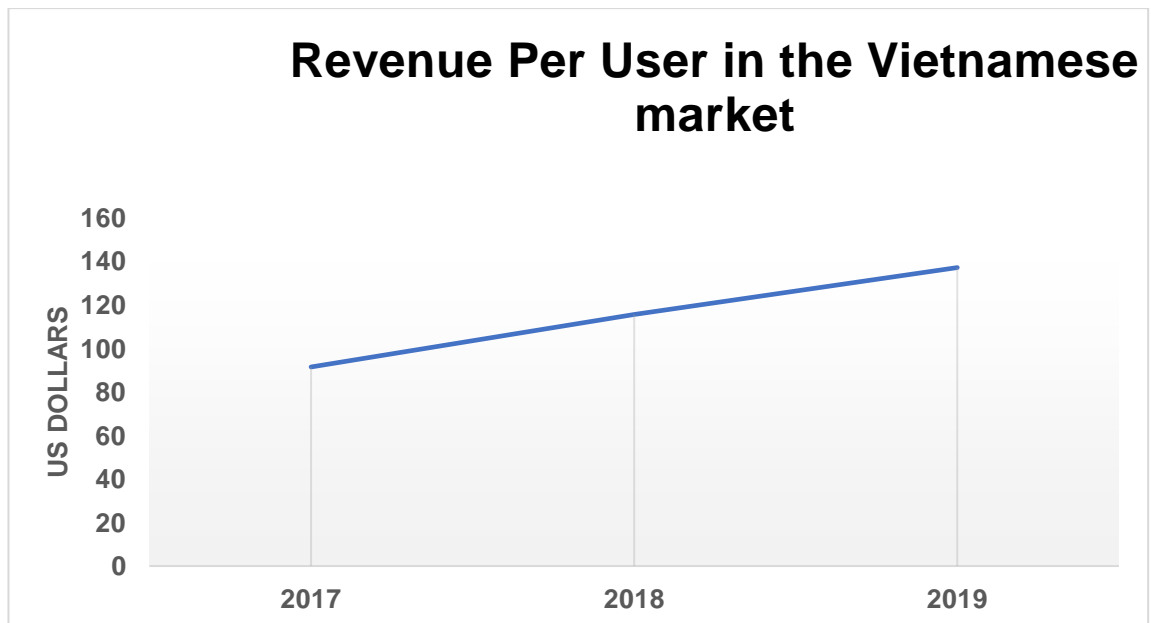


Figure 19. The growth of revenue per user (Statista 2020)

Based on figure 19, it can be seen that there was a significant increase in revenue per user. In 2019, each individual contributed roughly 137 US dollars to the total revenue in 2019. This amount was steadily higher than the ones in previous years. In more details, in 2017 and 2018, each consumer only contributed around 91 US dollars and nearly 115 US dollars to the total e-commerce revenue in the Vietnamese market, respectively. (Statista 2020.)

After fundamental e-commerce information is reviewed, several notable figures pertaining to the demographic information of consumers are then demonstrated.

4.3 E-commerce operational models in the Vietnamese market

In the Vietnamese market, each e-commerce company has its own operational strategies and alignments towards gaining planned objectives. In terms of inventory management and last-mile delivery, the operational models of the Vietnamese e-commerce enterprises are different. In the study, there are several notable concepts to take into account as below.

4.3.1 Online platforms and direct deliveries to the consumers

Typically, this concept focuses majorly on a C2C segment. For this concept, the e-commerce companies exploit the virtual platforms for sales, communicating with the customers, advertising, and processing the orders and payments. These companies assist the sellers to approach to the buyers by providing the online platforms, where both parties can interact and transact. The sellers can register and post their product information on these companies' platforms. When there are purchasing requests, the sellers are assisted to complete the transactions. Typically, the companies do not have the warehouses or fulfillment centres and the deliveries are usually made by the third parties. (Vietnambiz 2019.) Before the deliveries, the products must be stamped and packaged (Sendo Ban n.d. & Vat Gia Help n.d.). There are two primary examples, Sendo and Vat Gia, to take into considerations. About Sendo, the company does not have the warehouses and in-house delivery teams. Most of its deliveries are made by the third parties such as Viettel Post, Giao Hang Nhanh, Grab, and J&T Express (Sendo Ban n.d.). Vat Gia has the same operational models and also allows the sellers to make direct deliveries to the customers (Vat Gia Help n.d.).

4.3.2 Online platforms, and both outsourced and in-house inventory management and last-mile delivery

This concept concentrates mainly on the B2C segment and indicates that the companies have their own online platforms, where the individuals are enabled to sell the products. Frequently, the orders are processed at these companies' warehouses or those of third parties. Then, the firms use their own delivery teams or outsource to other delivery companies. (Vietnambiz 2019.) Lazada and Tiki are the two primary examples in this case.

In order words, for Lazada, Giao Hang Nhanh is known as a vital partner since this company has countable fulfillment centres with high capacity to deliver the products to the consumers of Lazada in various regions in Viet Nam in a short period of time (Vu 2019). Furthermore, there are many other delivery companies taking responsibility for the delivery process of the company, for example, Ninja Van, VNC Post, Netco Post, and Vietnam Post (Ma Giam Gia Lazada 2017). Besides, Lazada has its own delivery unit and its name is Lazada Express, which is responsible for the delivery process of Lazada and outsourced by many other

different enterprises (Dang 2016). Lazada Express has many modern fulfillment centres in Viet Nam, particularly in several big cities Ha Noi, Ho Chi Minh City, and Da Nang. Lazada Express has been assisting Lazada to capture increasingly changing consumer demands, enhance the delivery rapidness, lower the costs, and improve the customer experiences. With the high investments, Lazada Express has a wide range of modern automation systems and robotics to perform all the activities of order fulfillment and reverse process. Thus, the products can be delivered to the customers in a prompt and precise manner. (Thuong Gia & Thi Truong 2019.) In addition, Lazada Express has a huge team to operate the delivery process and has been developing electronic bikes for the deliveries towards sustainability and the greatest effectiveness (Cafebiz 2018). It also opens the express delivery service within one or two days with extra fees. By this method, the customers can receive their orders in a rapid, precise, and convenient manner. Nevertheless, this service is only applied in certain selected cities and there are several requirements of the product sizes and weights. (Ma Giam Gia Lazada 2017.)

Then, Tiki is the following notable example in this case. As similar to Lazada, Giao Hang Nhanh is known as the strategic partner of Tiki. Obviously, due to its modern fulfillment centres and high capacity to sort a large number of products accurately in a short period of time, Giao Hang Nhanh can make the rapid deliveries and help fulfill the needs of Tiki' customers promptly (Brands Vietnam 2019). Moreover, UniDepot is also another key partner of Tiki. Unidepot can provide to Tiki with larger areas for order fulfillment, thereby reinforcing and expanding order fulfillment and delivery capabilities on a long-term basis (Unidepot 2020). There are also several notable delivery partners of Tiki to take into considerations, for instance, Ninjavan and Kerry Express. Besides, apart from these partners, Tiki has its own teams to perform the activities of order fulfillment and delivery. In more details, Tiki has many huge fulfillment centres in the cities with a huge density of populations, for instance, Da Nang, Ha Noi, and Can Tho. Owing primarily to the ideal locations of these order fulfillment centres, the orders may be promptly fulfilled and delivery journeys are shortened. The largest fulfillment centre of Tiki is located in Ho Chi Minh city and it is named Top Center. This centre has huge storage areas and can satisfy the daily large

demands of the customers in this city and nearby regions. As Lazada, Tiki also offers the express delivery service with the extra fees. By this method, it is fast and convenient for the customers to receive the products within only two hours. (Duong 2019.)

4.3.3 Both physical stores and online platforms, both outsourced and in-house inventory management, and both outsourced and in-house deliveries

For this concept, the companies have both the virtual platforms and brick-and-mortar stores for the sales, communicating with the customers, promotions, consultations, and processing the transactions. The products of these companies are supplied by prestigious vendors and well-known brands. Therefore, the products are high-quality and have origins. Subsequently, these companies usually place the inventories in their own stores or other official warehouses. For the delivery, the companies have the in-house delivery teams to make the deliveries or outsource to other delivery companies. (VietNamNet 2019.) There are three primary examples, in this case, to take into account, for instance, Phong Vu, Nguyen Kim, and FPT. First and foremost, the customers can make the orders at Phong Vu's stores or order virtually on this company's website. Usually, the products can be placed in the Phong Vu's stores and the main warehouses across Viet Nam. Deliveries and installations are frequently made by the in-house delivery teams or other strategic partners, for instance, Tran An or Adidi. (Phong Vu n.d.) Then, as similar to Phong Vu, MediaMart, a well-known store chain in the north of Viet Nam, has various physical stores with the huge areas and the online store in Viet Nam. These large-sized stores are considered as notable shopping places for the customers and also used as the warehouses to store the products. MediaMart has one big store in Viet Tri city and this is also known as the main storage hub in northern Viet Nam. (Dan Tri 2016.) This company is responsible for the deliveries in the center or suburbs of the cities and the delivery partners are outsourced to deliver the products to the customers in further regions (MediaMart 2007).

4.4 Conclusion for e-commerce backgrounds and the overview of inventory management and last-mile delivery in Viet Nam

In the first half subset of the empirical part, Vietnamese e-commerce backgrounds in different perspectives and the implementations of inventory management and last-mile delivery in this market are qualitatively reviewed based on secondary data sources. Subsequently, it comes to the other one of the empirical part and this small part aims at reviewing the customer satisfaction to evaluate how the customers in this market are satisfied with online shopping, especially the delivery services.

5 Consumer perspective analysis

For this second empirical part, the main objective is to analyze, review the practical feedbacks and comments of Vietnamese customers. In other words, the consumers who used to experience online shopping in Viet Nam are the main targets to get the empirical data, information and there are around 202 participants. Market groups for people, who go online shopping, and groups for the Vietnamese e-commerce community on well-known social media platforms, particularly Facebook and LinkedIn, are the main places to reach the participants. Designed surveys with different kinds of questions such as multiple-choice questions and Likert-scale questions are sent to certain groups of respondents with different demographic backgrounds in the Vietnamese community. Furthermore, the main purpose is to find the answers to the main sub-question as mentioned previously.

- How is customer satisfaction over experiences in e-commerce in the Vietnamese market?

To get the answers, the empirical data and information are directly collected from the Vietnamese consumers. To reach these consumers, the surveys are sent to many market groups on social media and the Vietnamese customers via emails. The structure of the survey encompasses four main parts as below.

- Part one includes two multiple-choice questions and one check-box question to collect the demographic information of the customers.
- Part two encompasses several multiple-choice questions, Likert-scale questions, check-box questions, and drop-down questions to collect the information, which pertains to the consumer behaviors in online shopping in Viet Nam in brief.
- Part three also includes several multiple-choice questions, Likert-scale questions, and check-box questions to collect the customer perspectives when they experience the delivery services, which are offered by the e-commerce companies in Viet Nam.

- Part four includes only one check-box question to collect recommended solutions for the improvements of the delivery services, which are offered by e-commerce companies in Viet Nam, from the respondents.

Then, to analyze these data and seek the final answers, Excel or SPSS tools are the effective instruments and majorly used to illustrate the data in the form of charts or graphs.

5.1 Background information

First of all, the main target is to collect fundamental information. Respondents in this survey have diverse demographic characteristics, ages, and also job backgrounds.

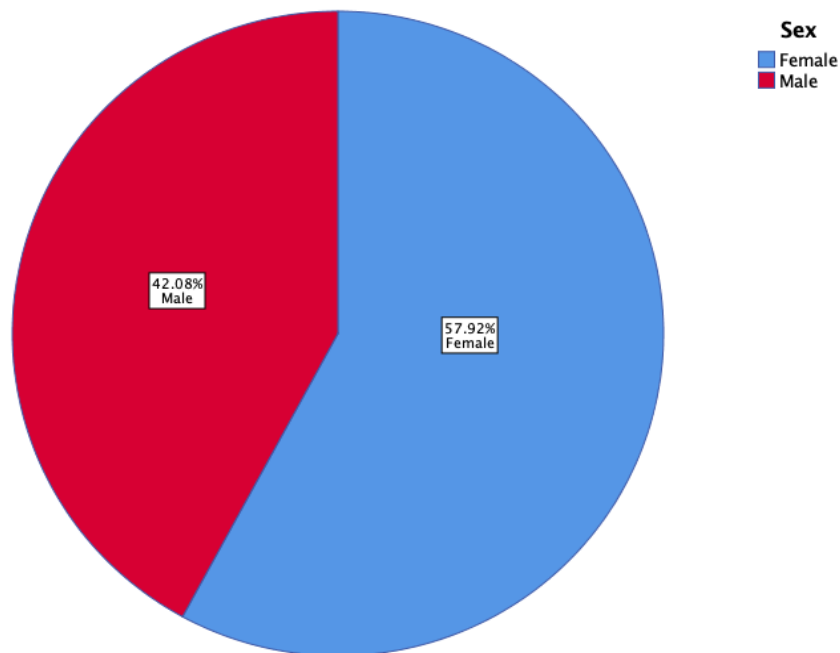


Figure 20. Respondents' gender

Based on figure 20, it can be seen that female and male respondents account for around 58 percent and 42 percent of the total respondents, respectively. Then, it comes to the illustration of respondent ages.

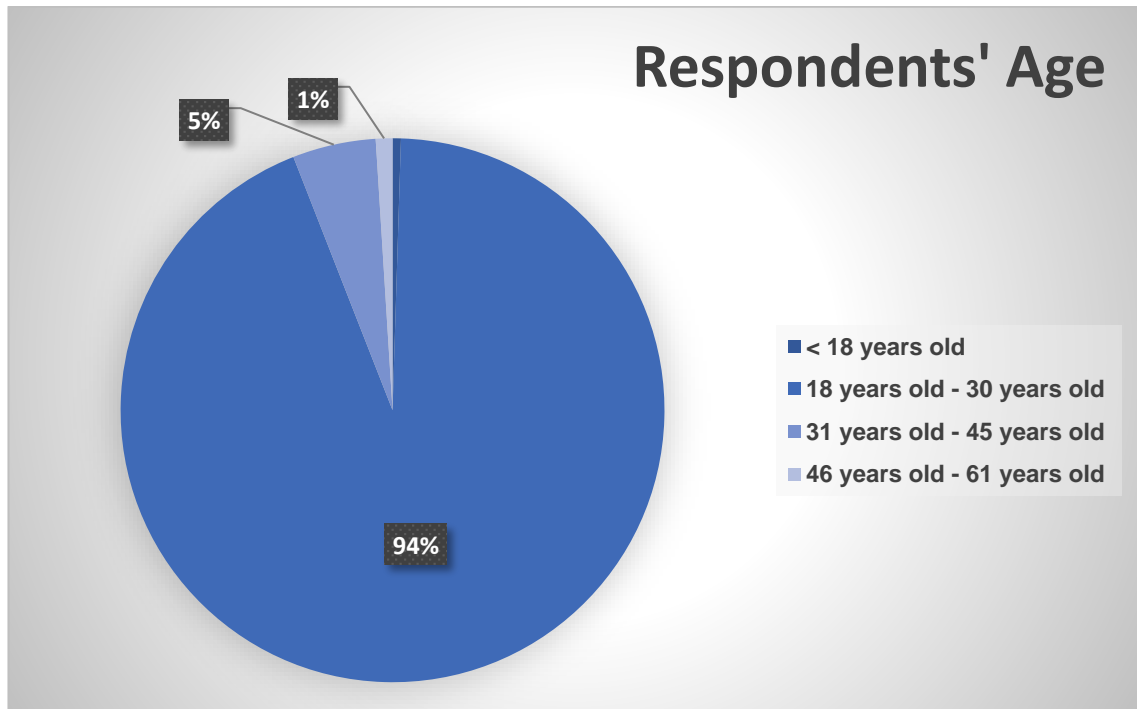


Figure 21. Respondents' age

Subsequently, in terms of age, according to figure 21, it can be seen that a majority of respondents are in an age range from 18 years old to 30 years old, around 94 percent of the total respondents. Then, other age ranges only constitute small proportions. Around 5 percent and 1 percent of the total respondents are in the age range from 31 years old to 45 years old and from 46 years old to 61 years old, respectively. There was a steadily small proportion of a respondent group below 18 years old as only one person in this age range participates in this survey. Then, it comes to the demonstration of the respondents' occupation.

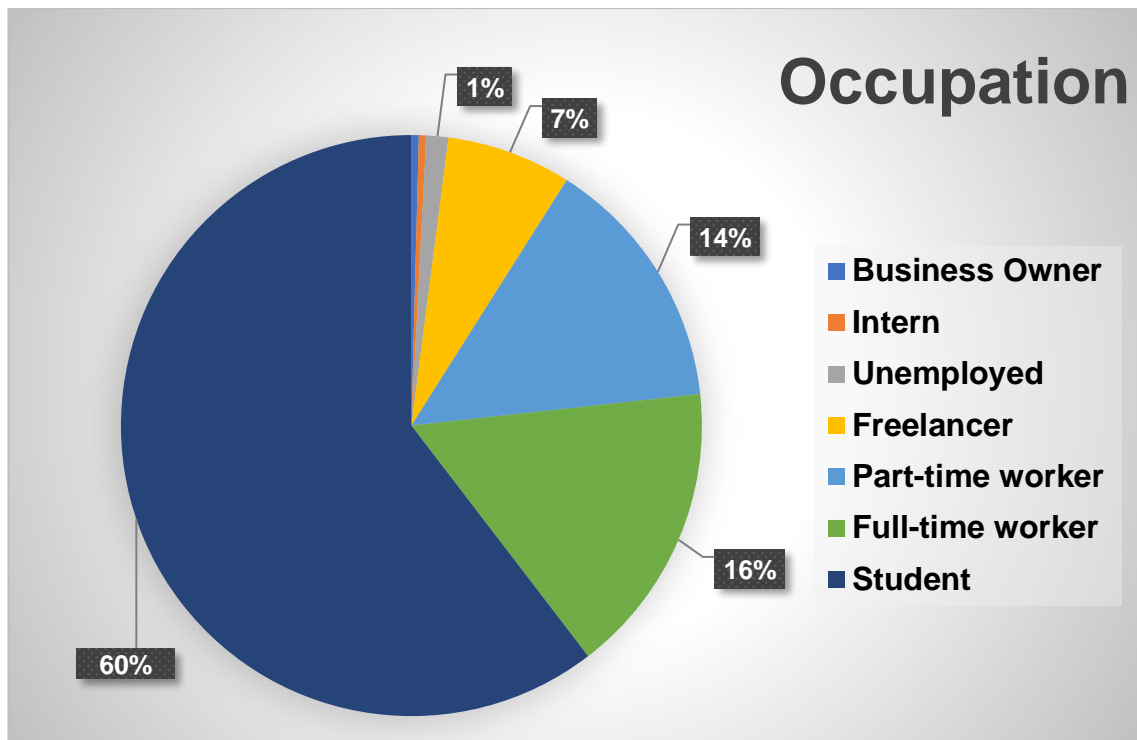


Figure 22. Respondents' occupation

Then, in terms of occupation, based on figure 22, many participants are students and this job title's selections account for around 60 percent of the total selections. Then, various people who are currently working also join this survey. Roughly 16 percent, 14 percent, and 7 percent of the total selections demonstrate that full-time, part-time workers, and freelancers are participants' job positions, respectively. Several participants are unemployed and this job situation's selections comprise around 1 percent of the total selections from the participants. Intern and entrepreneur are two other minor job titles, whose selections only account for below 1 percent of the total selections in total.

Then, after this part, it comes to the analysis of the consumer behaviors in online shopping in the Vietnamese market in brief.

5.2 Consumer behaviors in online shopping in the Vietnamese market in brief

In terms of consumer behaviors in online shopping in the Vietnamese market, first and foremost, it comes to the demonstration of online-shopping frequency based on the answers of respondents in the survey.



Figure 23. Online-shopping frequency

According to figure 23, it can be seen that many Vietnamese respondents, around 27 percent of the total respondents, tend to go online shopping once a month. Subsequently, there are a similar number of respondents, approximately 16 percent of the total respondents, who go online shopping once a week and many times a year. Then, around 13 percent, 10 percent, and 6 percent of the total respondents tend to purchase products virtually many times a month, many times a week, and once a year, respectively. There are around 4 percent of the total respondents, who have never purchased the products on the online sites. Then, there are a similar number of respondents, around 3 percent of the total respondents, who go online shopping daily and weekly. Finally, there are a few respondents, around 2 percent and 1 percent of the total respondents, who buy online products monthly and annually, respectively.

Then, it comes to the illustration of preferable e-commerce brands in Viet Nam based on the answers of the respondents.

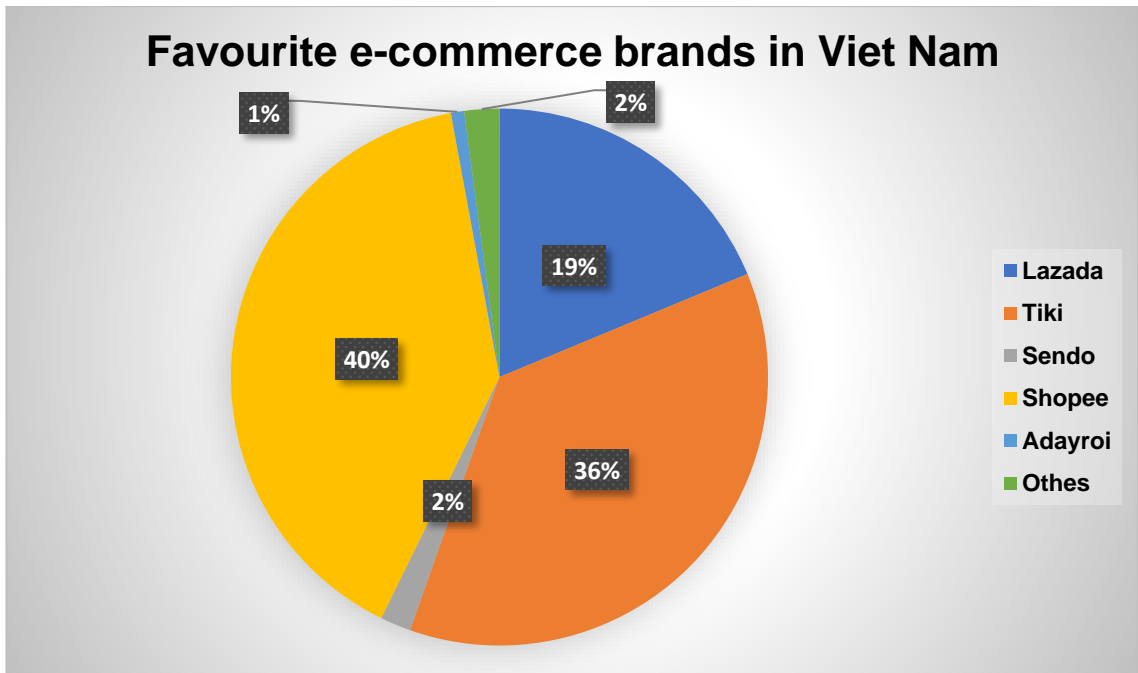


Figure 24. Preferable e-commerce brands in Viet Nam

Based on figure 24, in the Vietnamese market, Shopee is known as the most prestigious brand for Vietnamese consumers as this brand's selections account for around 40 percent of the total selections from the participants. Then, Shopee is followed by Tiki and Lazada, other well-known e-commerce brands in Viet Nam. The selections for Tiki and Lazada account for approximately 36 percent and 19 percent of the total selections from the members of this survey, respectively. Other famous brands such as Sendo and Adayroi are steadily preferred as the potential place to buy online products since these companies' selections comprise around 2 percent and 1 percent of the total selections, respectively. Other well-known e-commerce sites such as Amazon, Fahasa, Adidas, and Facebook are also preferred and the selections of these account for about 2 percent of overall selections.

Then, the following figure demonstrates the budget sizes that the Vietnamese respondents want to spend on online shopping.

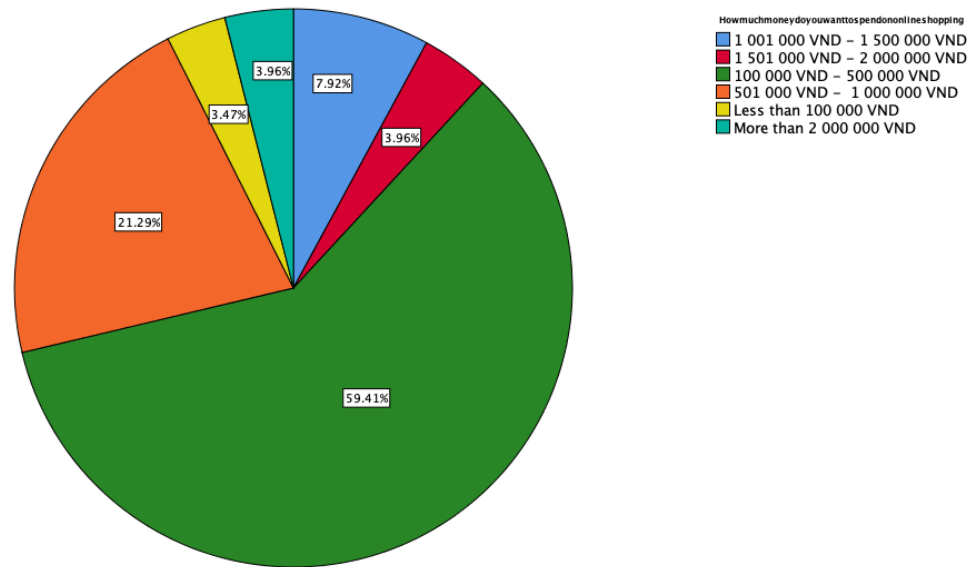


Figure 25. Budget sizes for online shopping

According to figure 25, it can be seen that approximately 59,4 percent of the total respondents desire to spend from 100 000 VND to 500 000 VND (around from 3,64 euros to 18,20 euros) on online shopping. Subsequently, around 21,3 percent of the total respondents desire to spend more on the online purchases, from 501 000 VND to 1 000 000 VND (nearly from 18,24 euros to 36,41 euros). Then, around 7,9 percent of the total respondents want to spend from 1 001 000 VND to 1 500 000 VND (approximately from 36,45 euros to 54,61 euros) on online shopping. There are a similar number of respondents, around 4 percent of the total respondents, tending to spend each budget size, from 1 501 000 VND to 2 000 000 VND (around from 54,65 euros to 72,82 euros) and more than 2 000 000 VND (more than around 72,82 euros), on purchasing online products. Finally, approximately 3,5 percent of the total respondents spend less than 100 000 VND (less than roughly 3,64 euros) on the online purchases.

Then, it comes to the indication of preferable pick-up locations after online orders.

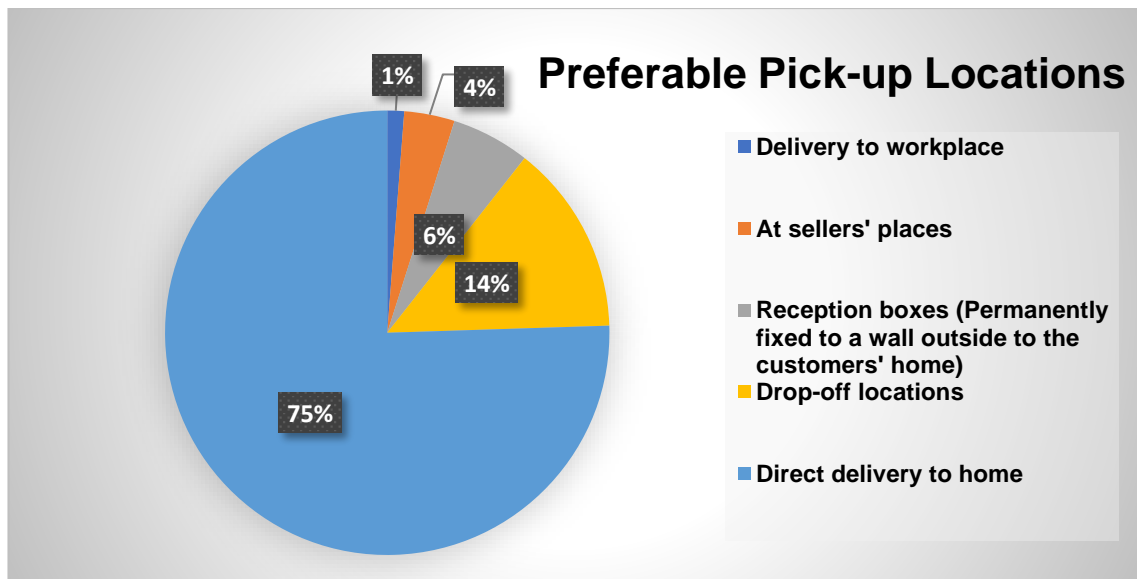


Figure 26. Preferable pick-up locations

Based on figure 26, many respondents prefer their products to be delivered to the home and this delivery option's selections account for around 75 percent of the total selections. Then, picking up the products at the drop-off locations is also highly preferred and this delivery method's preference can be seen through wide selections from the participants, around 14 percent of the total selections. Around 6 percent of the total selections indicate that the products are greatly preferred to be delivered to reception boxes, which are usually located in the surrounding areas of the customers' houses. Only 4 percent of the total selections from the respondents demonstrate that picking up at sellers' places is preferred and there is a low percentage of selections for the deliveries to the workplace, only around 1 percent of the total selections.

Then, it comes to the illustration of appropriate periods that the customers want to pick up the products.

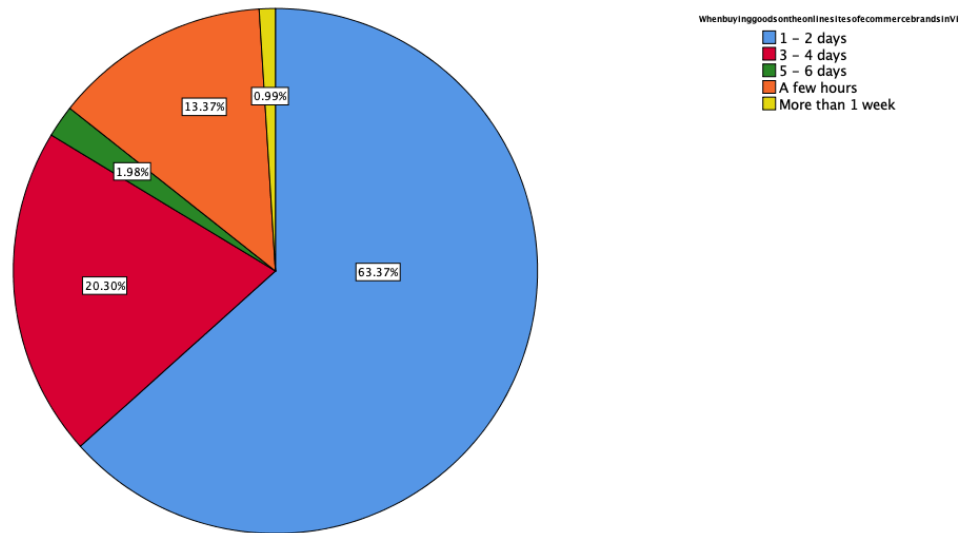


Figure 27. Preferable pick-up time

Based on figure 27, around 63,4 percent of the total respondents want to pick up ordered products in only 1 or 2 days. Then, nearly 20,3 percent of the total respondents prefer products to be available within 3 or 4 days. Subsequently, around 13,4 percent of the total respondents desire to pick up the products in a few hours. Approximately 2 percent and 1 percent of the total respondents want to pick up in 5 or 6 days and more than 1 week, respectively.

Then, it comes to customer-satisfaction analysis in terms of delivery time.

5.3 Customer satisfaction in the delivery services of e-commerce

First and foremost, it comes to the analysis of customer satisfaction in delivery time.

CUSTOMERS ARE SATISFIED WITH DELIVERY TIME WHENEVER THEY PURCHASE PRODUCTS FROM CERTAIN E-COMMERCE BRANDS IN VIET NAM BECAUSE OF ANY CHARACTERISTICS.

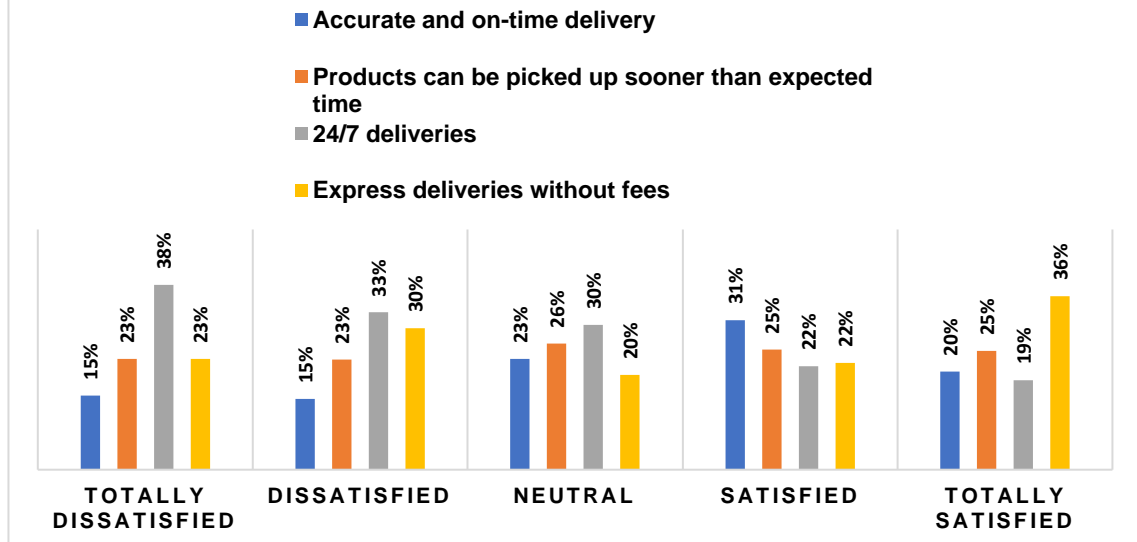


Figure 28. Customer satisfaction in delivery time

In figure 28, there are four criteria to take into considerations.

- Accurate and on-time delivery.
- Products can be picked up sooner than expected time.
- 24/7 deliveries.
- Express deliveries without fees.

First and foremost, it can be seen in this figure that there are a few answers, around 2 percent of the total answers, from the respondents, who are totally dissatisfied with the above criteria of the delivery time. A criterion called “24/7 deliveries” gains the most answers, around 38 percent of the total answers for extreme dissatisfaction. Then, approximately 8 percent of the total answers demonstrate that these criteria are dissatisfied and once again, the criterion relating to 24/7 deliveries still gets the most answers, roughly 33 percent of the answers for dissatisfaction. Subsequently, around 33 percent of the total answers are neutral answers and the “24/7 deliveries” criterion still obtains the most answers for neutrality, nearly 30 percent of neutral answers. Then, around 37 percent of the total answers indicate that these criteria are satisfied and the

“Accurate and on-time delivery” criterion gains the most answers, roughly 31 percent of answers for the satisfaction. Finally, approximately 21 percent of the total answers indicate that the mentioned criteria of the delivery time are totally satisfied and the “Express deliveries without fees” criterion gains the most answers, around 36 percent of answers for extreme satisfaction.

Then, it comes to the analysis of customer dissatisfaction in damaged or lost products.

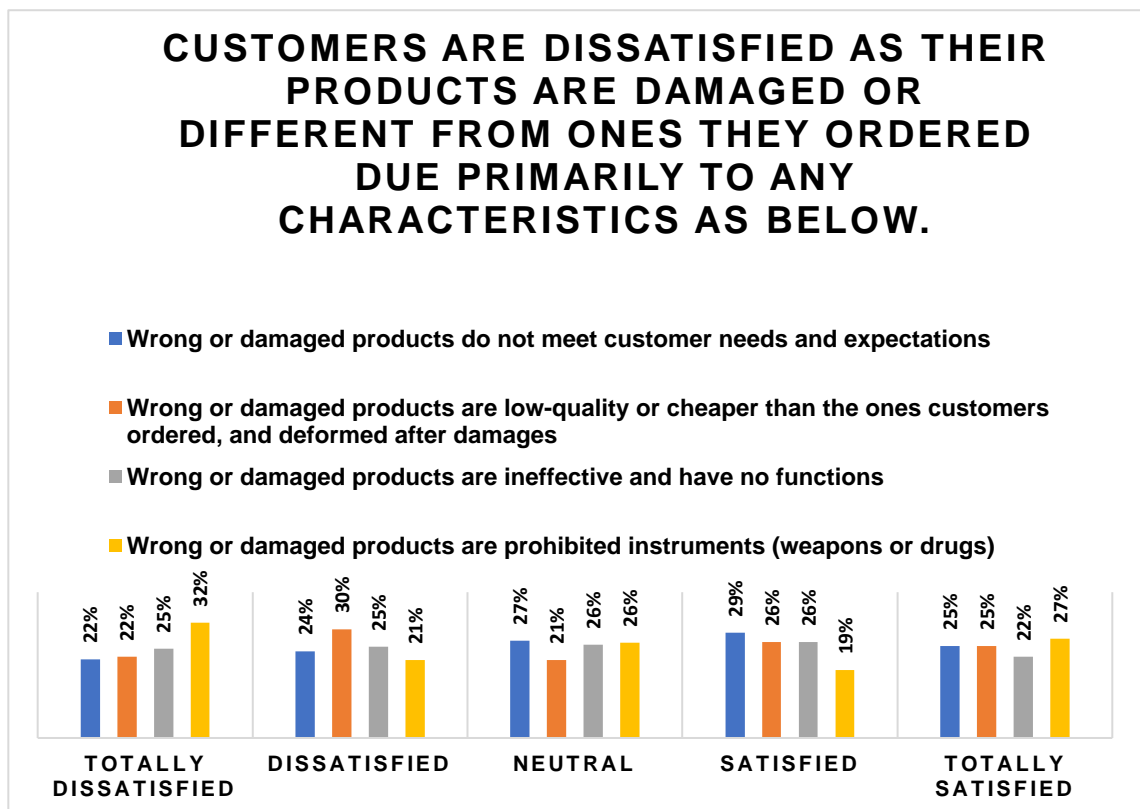


Figure 29. Customer dissatisfaction in damaged or lost products

Based on figure 29, it can be seen that there are also four key criteria to evaluate satisfaction and dissatisfaction.

- Wrong or damaged products do not meet customer needs and expectations.
- Wrong or damaged products are low-quality or cheaper than the ones customers ordered, and deformed after damages.
- Wrong or damaged products are ineffective and have no functions.

- Wrong or damaged products are prohibited instruments (weapons or drugs).

It can be seen that there are many answers, around 22 percent of the total answers, from the respondents, who are totally dissatisfied with these criteria, and the criterion named “Wrong or damaged products are prohibited instruments (weapons or drugs)” gets the most answers, around 32 percent of answers for the uttermost dissatisfaction. Then, approximately 21 percent of the total answers show that the above criteria are dissatisfied and “Wrong or damaged products are low-quality or cheaper than the ones customers ordered, and deformed after damages” is the most dissatisfied criterion due to many selections, approximately 30 percent of answers for dissatisfaction. Roughly 24 percent of the total answers are the neutral answers and the criterion named “Wrong or damaged products do not meet customer needs and expectations” gains the highest percentage of the neutral answers, about 27 percent. Subsequently, around 20 percent of the total answers indicate that these mentioned criteria are satisfied and it can be seen that the criterion “Wrong or damaged products do not meet customer needs and expectations” accounts for the highest percentage of answers for the satisfaction, roughly 29 percent. Eventually, about 13 percent of the total answers demonstrate that these negative criteria are satisfied and the criterion “Wrong or damaged products are prohibited instruments (weapons or drugs)” constitutes the highest percentage of answers for the utmost satisfaction, about 27 percent.

Then, it comes to the analysis of customer satisfaction in traceability in the delivery process.

CUSTOMERS ARE SATISFIED WITH TRACEABILITY IN A DELIVERY PROCESS OFFERED BY E-COMMERCE BRAND SITES IN VIET NAM DUE TO ANY CHARACTERISTICS AS BELOW.

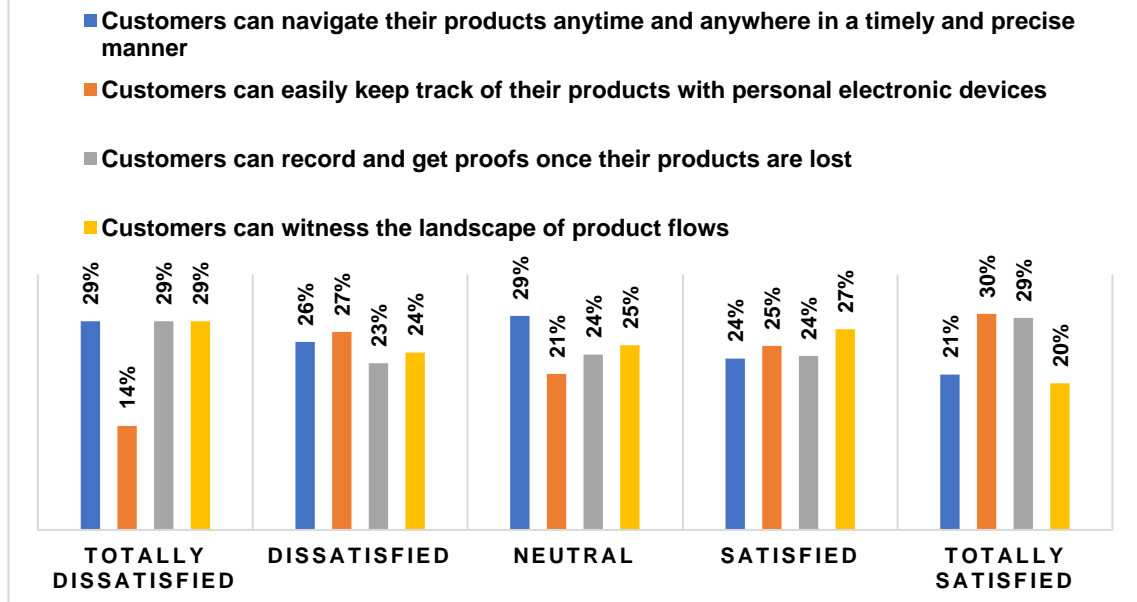


Figure 30. Customer satisfaction in traceability in a delivery process

Based on figure 30, there are three main criteria as regards traceability in the delivery process.

- Customers can navigate their products anytime and anywhere in a timely and precise manner.
- Customers can easily keep track of their products with personal electronic devices.
- Customers can record and get proof once their products are lost.
- Customers can witness the landscape of product flows.

It can be seen that there are only a few answers, around 2 percent of the total answers, from the respondents, who are totally dissatisfied with these criteria regarding traceability. Then, around 9 percent of the total answers demonstrate that the above criteria are dissatisfied and the ability to keep track of products by individual electronic devices gets the most answers for dissatisfaction, about 27

percent. Subsequently, approximately 29 percent of the total answers are the neutral answers and the ability to navigate their products anytime and anywhere in a timely and precise manner gains the highest proportion of the neutral answers, nearly 29 percent. Then, there is a huge proportion of answers, about 39 percent, from the respondents, who satisfy these criteria, and the ability to witness the landscape of product flows gains the most answers for the satisfaction, around 27 percent. At last, there are around 22 percent of answers from participants, who are totally satisfied with the aforementioned criteria, and the ability to use personal electronic devices for tracking still gains the highest answers for the extreme satisfaction, around 30 percent.

The following analysis refers to customer satisfaction in the attitudes and behaviors of the deliveryman.



Figure 31. Customer satisfaction in shippers' attitudes and behaviors

Based on figure 31, there are also three major criteria to take into account.

- Shippers are friendly, polite, and responsible.
- Shippers handle customers' products rigorously.
- Shippers are supportive in certain circumstances.

There are a few answers, about 2 percent of the total answers, from the respondents, who are totally dissatisfied with these criteria. Around 5 percent of the total answers demonstrate that the mentioned criteria are dissatisfied. Then, around 28 percent of the total answers are the neutral answers and the criterion “shippers handle customers’ products rigorously” gets the most neutral answers, roughly 39 percent. Subsequently, around 38 percent of the total answers present that these criteria are satisfied and the criterion “Shippers are friendly, polite, and responsible” gets the most answers for the satisfaction, about 36 percent. Lastly, about 26 percent of the total answers indicate that these particular criteria are satisfied and once again, the friendliness, politeness, and responsibility of the shippers get the highest answers for the greatest satisfaction, around 40 percent.

Then, it comes to the analysis of customer satisfaction in guarantees of faulty goods and return policies.

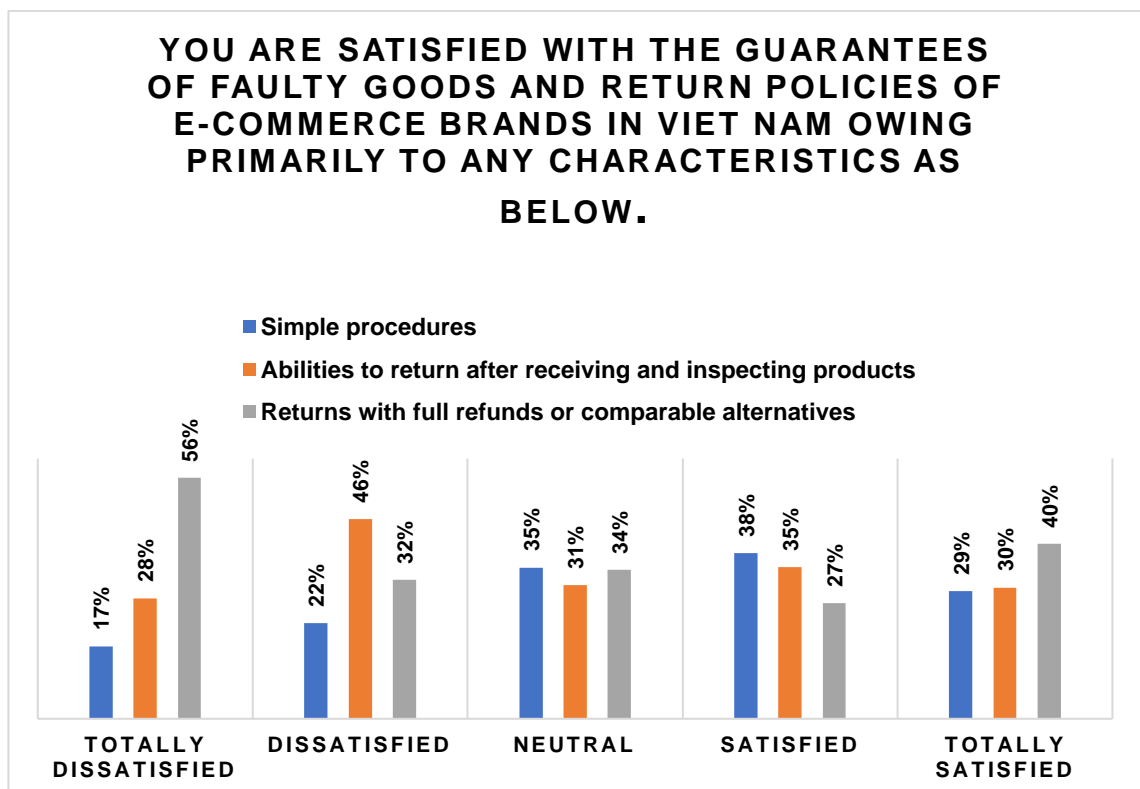


Figure 32. Customer satisfaction in the guarantees of faulty goods and return policies.

There are three prime criteria regarding the abilities of the enterprises to cover faulty and returned products towards satisfying the customer requirements.

- Simple procedures.
- Abilities to return after receiving and inspecting products.
- Returns with full refunds or comparable alternatives.

Based on figure 32, it can be seen that around 3 and 9 percent of the total answers demonstrate that these mentioned criteria are dissatisfied and totally dissatisfied, respectively. Then, approximately 30 percent of the total answers are the neutral answers and the criterion “Simple procedures” gets the most neutral answers, about 35 percent. Subsequently, about 37 percent of the total answers present that these criteria are satisfied and once again, the criterion “Simple procedures” still gains the highest answers, around 38 percent. Eventually, around 21 percent of the total answers come from the participants, who are totally satisfied with the aforementioned criteria, and the criterion “Returns with full refunds or comparable alternatives” obtains the most answers for the extreme satisfaction, about 40 percent.

After this part, it comes to the final analysis of feasible solutions towards improving the standard delivery services of e-commerce.

5.4 Solutions for standard delivery services

Plausible solutions to enhance the standard delivery services are recommended based on practical answers in this survey from the respondents, who have many experiences in online shopping, particularly the delivery services when purchasing online products.



Figure 33. Solutions for standard delivery services

Based on figure 33, there are many answers, around 16 percent and 15 percent of the total answers, that to improve the customer experiences in the standard delivery services, customers should be provided with the ability to return products with full refunds and receive green packages to cover their products, respectively. Then, around 15 percent and 13 percent of the total answers demonstrate that towards the greatest customer experiences in the standard delivery services, the products should be rapidly and accurately delivered to the customers' places and shippers should be friendly and professional in their tasks, respectively. Subsequently, around 12 percent and 11 percent of the total answers indicate that affordable fees for the deliveries and an increasing number of state-of-the-art pick-up points are the main solutions to enhance the delivery services towards meeting customer needs, respectively. Finally, around 10 and 8 percent of the answers indicate that better traceability in the delivery process and an increasing number of modern methods for payments seem to be effective measures to

increasingly satisfy customer needs and expectations for the standard delivery services when making the online purchase, respectively.

5.5 Conclusion for the analysis of consumer perspective

Based on this survey, there are various key data and figures to indicate the customer satisfaction in online shopping, particularly the delivery services.

First and foremost, based on sub-chapter 5.1, in the Vietnamese market, it can be seen that women and the customers in the age group from 18 to 30 years old are the main targeted customers for many e-commerce companies since they tend to often go online shopping. Additionally, most of them are also students.

Secondly, in terms of their behaviors in online shopping, according to sub-chapter 5.2, the customers have the tendency to make the online purchases once a month, once a week, and many times a year. Subsequently, when selecting the places to go online shopping, Shopee, Tiki, and Lazada, which are three reliable and prestigious online sites, are highly preferred by most customers. Then, most customers tend to spend a medium budget on online shopping, from 100 000 VND to 500 000 VND, and few of them spend less than 100 000 VND on online shopping. Subsequently, regarding the delivery services, many customers desire to pick up their products at their houses within a short time, in only 1 or 2 days.

Thirdly, according to sub-chapter 5.3, customer satisfaction in various major indicators of delivery services is analyzed. The first indicator demonstrates that many customers are satisfied with delivery time whenever they purchase the products from certain e-commerce brands in Viet Nam as they are provided with accurate and on-time deliveries, early deliveries, 24/7 deliveries, and express deliveries without fees. The second indicator shows that a majority of customers are neither dissatisfied nor satisfied when their products are damaged or different from the ones that they ordered. The third indicator shows that there are still many customers, who are neutral, satisfied, and totally satisfied with the traceability during the delivery process as they are offered the abilities to navigate the products in different time zones and locations, keep track of the products by personal electronic devices, get proof when the products are lost, and witness the entire views of product flows. The fourth indicator demonstrates that various

customers are satisfied with the positive attitudes and behaviors of shippers, who deliver the products to them. Eventually, most customers who are invited to the survey are satisfied with the guarantees of faulty goods and return policies.

Finally, based on the survey, according to sub-chapter 5.4, there are several appropriate recommended practical solutions. Specifically, a majority of customers suggest that to enhance customer experiences in the standard delivery services, they should be provided with the ability to return products with full refunds when they do not satisfy the ordered products, get the environmental packages, and receive the products in a rapid and accurate manner. Then, the customers also suggest that they should also get more hospitality from the shippers, get the delivery services without high fees, and receive the products in many more convenient and modern pick-up points. At last, many of them also desire to be offered better traceability and pay for the products in many state-of-the-art and convenient ways.

6 Summary and discussion

There is one main research question to answer in this study: “What are the situations of inventory management and last-mile delivery in the Vietnamese e-commerce market?”. To answer this question, there are three minor sub-questions to take into considerations at first. Based on the collected theoretical and empirical data, there are sufficient information and evidence to answer.

In this study, theoretical findings play an integral role in providing the fundamental meanings and definitions of certain key relevant concepts. These are also essential for assisting the progress of empirical data collection, analysis, and summary. In addition, the key theories also contribute to providing the final findings towards obtaining the main study objective. Then, the empirical data from the above empirical parts are also exploited to provide the answers to the previous research questions, which are mentioned at the initial of this study, and also the findings to the study.

6.1 Answers to sub-questions

Based on the key findings from both the theoretical and empirical part, each sub-question is answered.

6.1.1 An answer to the first sub-question “What are the characteristics of the Vietnamese e-commerce market in brief?”

Based on figure 16, in 2019, it can be seen that there was an increasing number of Vietnamese people, who exploited the Internet connection to access the common network with others for different purposes. Then, according to figure 17, it can be witnessed that one of the main purposes of Internet usage was to search and purchase online products. The age group for online shopping was diverse and there were many people in the Vietnamese market, from young to elderly people, who highly went online shopping and made the online purchases via own electronic devices, for instance, laptop or mobile phones. Subsequently, according to figure 18, in 2019, it can be seen that Vietnamese consumers spent a huge amount of money on buying the products virtually, approximately 4430 million US dollars in total. Product segment varied and when going online shopping, Vietnamese consumers preferred certain merchandise, for instance, electronic and media products, fashion products, household products, and grocery and body-care products. Last but not least, based on figure 19, it can be seen that through three years, from 2017 to 2019, the consumers tended to spend more on e-commerce. Revenue per user increased annually by approximately 23 US dollars.

Based on figures 23 and 24, Vietnamese consumers tend to go online shopping once a month and Shopee, Tiki, and Lazada are three popular online sites for them to buy the products. According to figure 25, when they make the online purchases, they tend to spend from 100 000 to 500 000 VND on online shopping. Based on figures 26 and 27, many Vietnamese consumers want to pick up their products at their homes in only 1 or 2 days.

According to sub-chapter 2.1, it can be seen that e-commerce is known as a notable trading method with a great reliance on technological tools to progress the transactions. Through this theory together with the above figures, it can be seen that in the Vietnamese market, the exploitation of e-commerce seems to

increase significantly when technological instruments are known as core elements when the transactions are virtually made.

6.1.2 An answer to the second sub-question “How are the outbound stages, inventory management and last-mile delivery, of order fulfillment of e-commerce conducted in the Vietnamese market?”

According to sub-chapter 4.3, it can be seen that Vietnamese e-commerce companies have diverse models to operate inventory management and last-mile delivery towards the greatest business outcomes. As aforementioned, there were three major concepts to take into considerations.

The first model is applied by those companies, which have only virtual selling platforms to deal with all particular issues involved in the transactions. Then, the enterprises play a vital role in bridging a gap between the sellers and buyers and do not possess warehousing and delivery systems. The third parties are majorly responsible for delivering the products from the sellers' places to the customers' places. As previously mentioned, Sendo and Vat Gia are two typical examples of this model. These companies' online websites are exploited to advertise the products of certain sellers and progress the transactions between them and the customers. Then, prominent delivery companies such as Viettel Post and Giao Hang Nhanh are major third parties to deliver the products from these sites.

The second model is applied by those firms, which possess the online platforms to enable the sellers to show their product information towards customer attraction, and then, these sites also assist to progress the transactions. The products are subsequently delivered to the warehouses of certain e-commerce companies or strategic third parties. These are stored in the certain period, and then, delivered to the customers by the in-house delivery teams of e-commerce firms or outsourced companies. As aforementioned, Tiki and Lazada are two primary examples of this model. Regarding the warehousing system, both companies cooperate with Giao Hang Nhanh, an eminent company with many modern fulfillment systems across Viet Nam, and also have their own warehousing facilities. Concerning the delivery issue, these companies have their

own in-house teams and several strategic partners, for instance, Ninja Van and Vietnam Post.

The third model is applied by those enterprises such as electronic-household wholesalers or retailers, which have both online platforms and large brick-and-mortar stores to support each other for the purpose of the sales. Due to available premises, these companies can place the inventories in their own stores or other nearby official warehouses. Regarding the delivery system, these companies have their own in-house delivery teams in urban areas and for further regions, third-party companies are outsourced to perform instead. For these companies, in certain circumstances, delivery tasks are more complicated as product installations are required. As previously mentioned, Phong Vu and MediaMart are two typical examples. To be precise, while Phong Vu company has many stores and nearby prime warehouses in certain cities for a warehousing purpose, MediaMart also has many huge stores to store, sell, and distribute the products. Then, both Phong Vu and MediaMart have the in-house delivery teams and several strategic partners to perform the deliveries, and then, install the products at customers' premises.

Through the mentioned statements, it can be seen that in the Vietnamese market, there are diverse types of sellers such as the business entities, governments, and even individual persons. This kind of seller which is stated in sub-chapter 2.4 is the important factor in the online transactions. Then, the above Vietnamese e-commerce companies have many different models to store their inventories. The fulfillment centres, one type of storing facility in sub-chapter 3.2.4, are known as one of the most popular storing facilities in the Vietnamese market and widely used by the aforementioned firms to process incoming and returned orders. Besides, in terms of last-mile delivery, the "Push-Centric System", which is stated in sub-chapter 3.3.3, is considered as a major applied delivery system in the Vietnamese market as based on the mentioned statements, many e-commerce companies such as Tiki, Lazada, or Sendo have been cooperating with several major domestic couriers such as Giao Hang Nhanh or Viettel Post. Furthermore, figure 26 shows that the consumers prefer their products to be directly delivered to their houses. Therefore, the direct delivery to the customers' places seems to be a typical delivery method in the Vietnamese market.

6.1.3 An answer to the third sub-question: “How is customer satisfaction over experiences in e-commerce in the Vietnamese market?”

According to sub-chapter 5.3, it can be seen that whenever the customers go online shopping, they feel satisfied or dissatisfied with several key indicators in the Vietnamese e-commerce market.

When going online shopping, the customers feel satisfied with the delivery time. Overall, the main reason is that they satisfy several key criteria whenever they make the online purchases on certain sites. When buying the online products, they are satisfied as they can pick up the products in a timely manner and their products can be early delivered. Besides, they can be offered the 24/7 deliveries and get the express deliveries without high-fee payments.

Then, when going online shopping, various customers are totally dissatisfied with wrong or damaged products during the delivery process. These products cannot meet their needs and this is one of the main reasons why they are totally dissatisfied. Besides, these wrong or damaged products, which are bad, cheap, or deformed, impact negatively on customer satisfaction. Subsequently, the wrong or damaged products sent to the customers bring no effectiveness, thereby influencing their satisfaction. Lastly, the key reason to damage customer satisfaction is that the customers receive illegal products but their desirable products.

Then, the traceability is also the notable issue to take into considerations. Typically, the customers feel satisfied when they are enabled to navigate their products accurately regardless of time and locations with their electronic devices. Besides, based on the traceability, the customers can record and provide the evidence to the delivery companies once their products are lost. Then, with the traceability, the customers can get an entire image of product movement.

Subsequently, shippers' attitudes and behaviors play a vital role in enhancing customer satisfaction. Obviously, the shippers who are friendly, polite, and responsible can attract much positive attention from the customers. Then, the customers are fond of the shippers, who handle the products carefully. In several

circumstances, the shippers who are immensely supportive of the product installations can attract much customer attention.

Last but not least, the guarantees of the faulty goods and return policies are also essential factors to improve the satisfaction in their experiences. The customers are satisfied with simple procedures to claim and the abilities to return immediately after receiving and checking the products. Then, the abilities to get full refunds or other alternatives after returning also satisfy the customers.

Based on the mentioned insights, to gain the greatest customer satisfaction, it is necessary for e-commerce and delivery companies to offer better solutions for the returned products and greener packaging measures. Then, the customers also desire faster and more precise delivery solutions, more supports from friendly and high-skilled shippers, delivery options without the high fees, and more convenient drop-off locations. They also want to be offered greater traceability and more modern payment methods to complete the transactions.

6.1.4 Conclusion for the answers

Based on the above answers to sub-questions, it is clear that in the Vietnamese market, the tendency to go online shopping increases significantly and the consumers tend to spend a huge amount of personal income on purchasing the products virtually. Obviously, their requirements are much stricter, especially for delivery issues, for instance, the on-time delivery, traceability in the delivery process, shipper attitudes, return policies, and shipping without damages. Countable Vietnamese e-commerce firms take delivery matters into considerations and depending on own resources, they have different ways and strategies to develop. To be specific, they can use own in-house teams, facilities, and instruments, or outsource to other business entities to perform the tasks of inventory management and last-mile delivery. Based on the empirical data, the consumers who used to buy the products from many well-known e-commerce companies such Tiki, Lazada, or Sendo mostly feel satisfied with the delivery services when going online shopping. However, their demands constantly change and to fulfill their requirements, there should be more customer-centric and comprehensive service solutions.

6.2 Reliability and validity

In the study, both qualitative and quantitative research methods provide particular high-quality data, figures, and information in a specific point of time to this study. Thus, there is a possibility of reliability.

In the empirical part with the use of the qualitative research methods, secondary data from certain sources of prestigious publishers are specific and not consistent as they are annually published. Hence, there are many different contents in every publication. Then, in another empirical part with the use of the quantitative research methods, primary data are mainly collected from the survey and the collected answers may constantly change in the following time as variable sizes may be different or the values may also change. Therefore, as aforementioned, this research seems to be reliable but immensely weak since the outcomes of this study cannot be kept as the same in the following researches.

In the study, all the findings in the study are valid enough to provide comprehensive answers to the main research questions. Therefore, this research is valid. Then, internal and external validity can be also indicated. At first, internal validity is presented in the whole empirical part as when collecting and analyzing the collected data by the qualitative and quantitative methods, the findings directly link with the final results. Subsequently, external validity is only presented in the empirical part with the use of the qualitative research methods. To be precise, the secondary data are generalizable as they can represent the characteristic of the whole population. In the empirical part with the use of the quantitative research methods, the primary data are not generalizable since the findings are collected from a small sample size, around 202 respondents, and it is impossible to reflect the characteristics of the whole population with this small group. Overall, the validity is quite strong but not in a comprehensive manner.

6.3 Recommendations for further researches

Generally, this study encompasses a plethora of key findings to indicate the situations of e-commerce and the important roles of inventory management and last-mile delivery towards enhancing e-commerce performances. The situations constantly change and further researches can focus mainly on the same

situations in the same markets, regions, and areas in different periods. Besides, as order fulfillment is quite broad and includes many stages, not only inventory management and last-mile delivery. Further researches can concentrate on other stages of order fulfillment and analyze the linkages of these to e-commerce. At last, further researches in logistics and supply chain management can refer to this study due to many key valuable findings in this domain.

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Appendix 1 – a questionnaire

E-commerce and Order Fulfillment Operations in the Vietnamese market

Hello everyone, my name is Thong Dang, a student at LAB University of Applied Sciences, campus at Lappeenranta, Finland. I am pleased to create this survey form to collect empirical data for my final thesis. Your experiences in online shopping and particularly delivery services are collected, consolidated and interpreted. Subsequently, based on your answers, I can find out the final outcomes for my study. I hope that all of you can help me answer all questions in this form and it just takes you a short amount of time to complete.

Sex *

- Male
 Female

Age *

- < 18 years old
 18 years old - 30 years old
 31 years old - 45 years old
 46 years old - 61 years old
 > 61 years old

Occupation *

- Student
 Full-time worker
 Part-time worker
 Freelancer
 Unemployed
 Mục khác: _____

How much money do you want to spend on online shopping?

- Less than 100 000 VND
- 100 000 VND - 500 000 VND
- 501 000 VND - 1 000 000 VND
- 1 001 000 VND - 1 500 000 VND
- 1 501 000 VND - 2 000 000 VND
- More than 2 000 000 VND

When buying goods on the online sites of e-commerce brands in Viet Nam, where do you want to pick up your products?

- Direct delivery to home
- Drop-off locations
- Reception boxes (Permanently fixed to a wall outside the customer's home)
- At sellers' places
- Mục khác: _____

When buying goods on the online sites of e-commerce brands in Viet Nam, what is an appropriate period that you want to pick up your products?

- A few hours
- 1 - 2 days
- 3 - 4 days
- 5 - 6 days
- More than 1 week

You are satisfied with delivery time whenever you purchase products from certain e-commerce brands in Viet Nam because of any characteristics as below.

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
Accurate and on-time delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Products can be picked-up sooner than expected time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24/7 deliveries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Express deliveries without fees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You are dissatisfied as your products are damaged or different from ones you ordered whenever you order products from certain e-commerce brands in Viet Nam due primarily to any characteristics as below.

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
Wrong or damaged products do not meet your needs and expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wrong or damaged products are low-quality or cheaper than the ones you ordered, and deformed after damages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wrong or damaged products are ineffective and have no functions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wrong and damaged products are prohibited instruments (weapons, drugs, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You are satisfied with traceability in a delivery process offered by e-commerce brand sites in Viet Nam whenever you order products from these sites due to any characteristics as below.

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
You can navigate your products anytime and anywhere in a timely and precise manner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can easily keep track of your products with personal electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can record and get proofs once your products are lost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You can witness the landscape of product flows	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You are satisfied with shippers' attitudes and behaviours whenever you order products from e-commerce brands in Viet Nam due primarily to any characteristics as below.

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
Shippers are friendly, polite and responsible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shippers handle your products rigorously	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shippers are supportive in certain circumstances (product installations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You are satisfied with the guarantees of faulty goods and return policies of e-commerce brands in Viet Nam owing primarily to any characteristics as below.

	Totally Dissatisfied	Dissatisfied	Neutral	Satisfied	Totally Satisfied
Simple procedures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abilities to return after receiving and inspecting products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Returns with full refunds or comparable alternatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What are the feasible solutions for improving customer experiences in standard delivery services in e-commerce?

- More rapid and accurate deliveries
- Shippers are more friendly and professional
- Green solutions for packages
- More state-of-the-art payment methods
- More convenient pick-up points
- Greater traceability
- Ability to return products with full refunds or new better alternatives
- No high fees
- Mục khác: _____