

THE RELATIONSHIP BETWEEN LAST MILE DELIVERY IN E-COMMERCE AND  
CUSTOMER SATISFACTION

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CUSTOMER SATISFACTION

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## PLAGIARISM

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## ABSTRACT

Today, cargo delivery is in urgent need of innovation due to the imbalance between the two forces that can be observed in the market environment. First, package volume between businesses and consumers is growing rapidly, mainly through e-commerce. Second, consumer habits and lifestyles are changing in a way that requires more flexibility and comfort. Ultimately, the feasibility of the moment of delivery reaching consumers at home is diminishing. Therefore, this thesis deals with the relationship between the last mile delivery experience in e-commerce and customer satisfaction, which aims to improve customer experience and overcome the shortcomings of existing delivery models. Nowadays, consumers have started to turn to e-commerce sites for all their needs. 99 percent of e-commerce is logistics. If fast deliveries are not made in line with customer expectations, the chance of businesses to be successful decreases. Especially with COVID-19, the volume of E-Commerce in the world has grown by 70 percent. The purpose of this research is helped determination of the connection between last mile delivery and customer satisfaction. As a result of every shopping made, the customer expects the delivery to be carried out quickly and smoothly. Meeting this expectation has become a big priority for e-commerce companies and retailers. The journey is defined as the last mile delivery. At this stage, the package reaches its recipient. Therefore, the relationship between the customer's last mile delivery experience and customer satisfaction will be tried to be revealed in this study. Retailers who use the Internet efficiently can reach more customers and use their resources efficiently by optimizing them. In this study, the impact of customers on the last mile delivery and its importance in the last mile delivery experience are investigated. Including

the survey conducted and participants of a quantitative methodology was used to measure the latest e-retail practice in Turkey. Consequence show that last mile delivery experience affects the relationship between the customer's online shopping experience sensation and customer satisfaction. These results provide the basis for more extensive research on last mile delivery has important contributions to increase customer satisfaction.

Keywords: Electronic Commerce, Last Mile Delivery, Customer Satisfaction



## ÖZET

Günümüzde kargo teslimi, pazar ortamında gözlemlenebilen iki güç arasındaki dengesizlikten kaynaklanan inovasyona acil ihtiyaç duymaktadır. Birincisi, işletmeler ve tüketiciler arasındaki paket hacmi, esas olarak e-ticaret yoluyla hızla büyümektedir. İkincisi, tüketici alışkanlıkları ve yaşam tarzları, daha fazla esneklik ve rahatlık gerektiren bir şekilde değişmektedir. Nihayetinde, tüketicilere evde ulaşan teslimat anının fizibilitesi azalmaktadır. Bu nedenle, bu tez, müşteri deneyimini geliştirmeyi ve mevcut teslimat modellerinin yetersizliklerini gidermeyi amaçlayan ve e-ticaretteki son mil teslimat deneyimiyle müşteri memnuniyeti arasındaki ilişkiyi ele alınmaktadır. Günümüzde tüketiciler tüm ihtiyaçları için artık e-ticaret sitelerine yönelmeye başlamışlardır. E-ticaretin ise yüzde 99'u lojistikdir. Müşteri beklentilerine uygun bir şekilde hızlı teslimat yapılmazsa işletmelerin başarılı olma şansı azalmaktadır. Özellikle COVID-19 ile beraber Dünya'da E-Ticaret hacmi yüzde 70 oranında büyümüştür. Bu çalışmanın amacı son kilometre teslimatı deneyimiyle müşteri memnuniyeti arasındaki ilişkiyi belirlemektir. Yapılan her alışveriş sonucunda müşteri teslimatın hızlı ve sorunsuz bir şekilde gerçekleştirilmesini beklemektedir. Bu beklentiyi karşılamak e-ticaret firmaları ve perakendeciler açısından büyük bir öncelik haline gelmiştir. Bir ürünün depo rafından müşterinin kapısına kadar olan yolculuğu son kilometre teslimatı olarak tanımlanmaktadır. Bu aşamada paket alıcısına ulaşmış olur. Dolayısıyla müşterinin son kilometre teslimat deneyimi ile müşteri memnuniyeti arasındaki ilişki bu çalışmada ortaya konulmaya çalışılacaktır. İnternet tarafından etkinleştirilen perakendeciler daha fazla müşteriye ulaşabilir, dağıtım zincirinde çok daha fazla yayılabilir ve kaynaklarını optimize edebilir. Yeni pazar ortamında, müşteri deneyimi bir rekabet avantajı kaynağı

haline geldi. Bu çalışma, müşterinin e-perakende deneyiminde son kilometre teslimatının rolünü (etkisini) arařtırmaktadır. Türkiye’de yürütölen bir anketi içeren ve katılımcıların en son e-perakende deneyimini ölçen nicel bir methodoloji kullanıldı. Sonuçlar, son kilometre teslimat deneyiminin müşterinin çevrimiçi alışveriş deneyimi algısı ile müşteri memnuniyeti arasındaki ilişkiyi etkilediğini göstermektedir. Bu sonuçlar, e-perakende bağlamında son kilometre teslimatının rolüne ilişkin daha kapsamlı arařtırmalar için zemin sağlar ve e-perakendecileri müşterilerinin memnuniyetini artırmada destekler.

Anahtar Kelimeler: Elektronik Ticaret, Son Mil Teslimatı, Müşteri Memnuniyeti

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## **LIST OF ABBREVIATIONS**

E-Commerce: Electronic Commerce

COVID-19: Corona Virus

E-Retail: Electronic Retail

MIT: Massachusetts Institute of Technology

EFT: Electronic funds Transfer

EDI: Electronic data Interchange

IOS: Inter-organizational system

B2B: Business to Business

B2C: Business to Customer

C2B: Customer-to-Business

C2C: Customer to Customer

ICT: Information Communication Technology

IT: Information Technology

OECD: Organisation for Economic Cooperation and Development

3PL: Third-party Logistics

PUP: Pick Up Point

QFD: Quality Function Deployment

ESCI: The European Customer Satisfaction Index

UNESCO: United Nations Educational, Scientific and Cultural Organization

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## INTRODUCTION

### 1.1 Background

Nowadays there is a major rise in utilization of the e-commerce due to common usage of the internet. Purchase order, delivery, stock policy, package, client service and reverse logistics are presented services by e-commerce companies.

If we need to examine the history of the e-commerce is that e-commerce emblemizes a significant transformation of our era in terms of revolutions such as the contrivance of the printery and the industrial revolution, which contributes to developments in science and technology. In conclusion, in the development of science and technology is the spread of e-commerce. E-commerce arised with the improvement of information and transmission technologies. It is a significant media tool used for businesses and public corporations.

Another definition of e-commerce is that studying, giving a information, assumption, delivery of the product and services to the clients, cash before delivery, providing after sales repair and support services by the way of transaction, transferring and constitution of audio and video storage of digital data.

There is the final most important elements of the e-commerce is last mile delivery. The last mile delivery is the term which is an important logistics process that covers the entire delivery of the package or shipment from the warehouse to the customer's door (door to door).

The management of the last mile delivery process is able to be effortful and precious component of whole transportation stages. Customers' expectation of free delivery is increasing day by day due to the realization that total transportation costs may equal more than half of the delivery costs. As a result, some problems may occur during the last mile delivery process. The profitability and growth is the most essential to be comprehend how to be contributed to improve technological innovations on a last mile delivery process. The value of e-commerce is expected to be doubled in the next 10 years.

## **1.2 The Purpose of Thesis**

Many innovations have been made as a result of rapidly developing technology. Today, internet and e-commerce sites have formed the head of these innovations. Customers who turn to e-commerce sites expect deliveries to be carried out quickly and smoothly. Meeting this expectation has become a major priority for e-commerce companies and retailers. The journey from the warehouse shelf of a product to the customer's door is defined as the last mile delivery. At this stage, the package is considered to have reached its recipient. The purpose of this study is to determine the relationship between the customer's last mile delivery experience and customer satisfaction.

### 1.3 Research Questions

There are main research questions about last mile delivery to contribute to solve key challenges this issues and how to find alternative solutions. These questions refers to answer to be easy to find analysis.

Research Q1: Is there a relationship between last mile delivery and customer satisfaction in electronic commerce?

Research Q2: Is there a relationship between last mile experience and age?

Research Q3: Is there a relationship between last mile experience and gender?

Research Q4: Is there a relationship between last mile experience and education?

Research Q5: Is there a relationship between last mile experience and marital status?

Research Q6: Is there a relationship between last mile experience and professions?

Research Q7: Is there a relationship between customer satisfaction and gender?

Research Q8: Is there a relationship between customer satisfaction and education level?

Research Q9: Is there a relationship between customer satisfaction and marital status?

Research Q10: Is there a relationship between customer satisfaction and professions?

Research Q11: Does the last mile delivery experience affect customer satisfaction?

## 2.1 The Evolution of E-Commerce

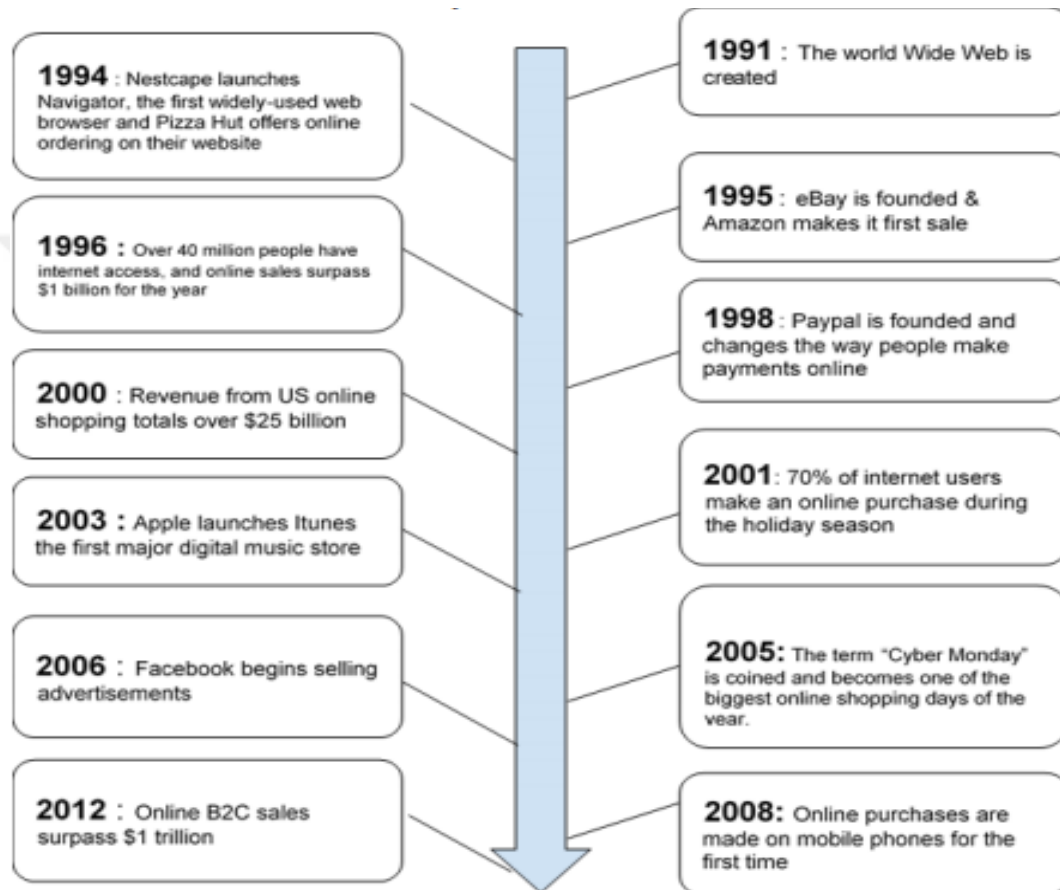
"Electronic commerce" or "e-commerce" is a term that refers to online business transactions. In simple terms; it is defined as “purchasing products or services over the internet”. Buying or selling anything using the Internet means getting involved in e-commerce. Today, most of the people who use the internet shop through e-commerce in some way. The development of the electronic commerce connected with a aggregation of the technological and improval novelty. The foundation of e-commerce is based on the 1960s (Nezu, 2000). The first e-commerce was made in the 1970s- transaction (Information Platform of E-Commerce (2020). *Introduction of E-Commerce*).

According to a report in The Guardian newspaper, students at Stanford University made sales to students studying at the Massachusetts Institute of Technology (MIT) using Arpanet calculations and the school's artificial intelligence laboratory. Technically, the first electronic shopping made using a network is seen as this sale. With the development of Internet web browsers in the 1990s, e-commerce started. Thus, the first e-commerce in today's sense was made by Pizza Hut in 1994. Thus, Pizza Hut became the "first company to do e-commerce" by selling pizza online (Information Platform of E-Commerce (2020). *Introduction of E-Commerce*).

EFT (electronic funds transfer) and EDI (electronic data interchange) are the main commercial and financial factors that have an impact on electronic commerce. EFT (electronic funds transfer) means that funds can be diverted from one organization to another structure to be transferred. With the EFT transfer method, businesses can try to

continue their transactions. Another definition is that electronic payment systems, electronic fund transfer (EFT), credit cards, smart cards, debit cards are technologies that automatically pay or record the value of goods and services (Özmen, 2012). With the EFT method, it has started to be used in the field of e-commerce. With e-commerce, this method, like other payment methods, has an important place in terms of payment for the consumer (Karakaya, 2013). There are three different definitions of EDI in literature. Electronic data transfer (EDI), organizations that allow structured business documents to be electronically transmitted between different departments or different companies within the company, reuse in machines, prevent re-entry of data, and allow data to be transferred from a business application. The inter system within a business application in another local area than the local area (Kuan, et al., 2001). Electronic data transfer (EDI) is the electronic transfer of standard business documents from computer to computer between organizations. EDI systems allow the documents sent to be used directly by the receiving organization. Depending on the level of development of the system, it is possible to use the data received in in-house applications without the need for any human intervention. EDI systems offer an easier exchange method instead of traditional document transfer methods such as telephone, fax, and mail (Lambert et al, 1998). It is the electronic transfer of business documents between companies in a structured way, that is, in a data format that can be processed on a computer. EDI involves the electronic exchange of routine business documents and transactions within a company. These transactions include documents such as purchase orders, payments, planning, information, price information, order information, schedules, test results, transportation and purchases, financial reports. With EDI, these high security documents are exchanged over special value-added networks in a compressed, machine-readable manner (Samtani, 2002). In

other words, EDI is the electronic transfer of standard business documents over a communication network that connects a company's computer system to its commercial partners (Down, 2002). EDI (electronic data exchange), one of the types of transaction processing, is used to transfer documents electronically. Inter-organizational system (IOS) is a system that helps to automate the flow of information between organizations in order to reach the supply chain management system and plays a role in the development of competitive organizations (Nogoev et al., 2011). E-commerce is the process of realizing the sales of information & products with the interaction of B2B and B2C in order for commerce to be carried out on the online platform and transferring the information of the products sold on the online platform. The delivery procedure of the service and products can be carried out offline or over the Internet. (Manzoor, 2010). E-commerce enables us to explore global markets and seize opportunities in these markets.

**Figure 1***Evolution of e-commerce*

According to Figure 1, it can be shown evolution of e-commerce. Will e-commerce adapt to economic powerhouses and what impact will it have? How is this affecting the traditional economic powerhouses and will they be able to adapt? The map of the world economy has been shaped thanks to information and communication technology and e-commerce. E-commerce has been placed among the class of economic models. Chaos and economic boom may be observed to continue. Chaos is one of the essentials for innovation. Important points is observed that it can mean that economic

models, business models and recent business processes are unpredictable. Along with this, new industries are occurring. How powerful does it make the countries and sectors that regulated the new economic revolution?

### **2.1.1 The Impact of Economic Revolution and ICT Technology on Countries**

What are the benefits of the new economic revolution to countries and the industry and the forces that regulate them? In order to benefit from new technologies, new products and processes must be realized and there must be interaction between countries. The Japanese industry rose rapidly in the 1960s and finally took the lead from the United States in automation, semiconductors, electronics, and computers in the 1980s (Risaburo Nezu, 2000). Japanese management techniques and systems called lean production system were used and management technical information of these systems was made by using technology and reducing costs. Most people basically agree that ICT technology is a new workforce and is central (Nezu, 2000).

According to US Federal Reserve Board economists, from 1996 to 1999, ICT's contribution to US growth was more than 20% (1.1 percentage points of the 4.9% growth rate). United Kingdom and Canada, the picture was shown similar. Despite all the mention that technology will make workers unemployed, these dynamic economies have been lowered their unemployment rates to the lowest in the OECD area.

In contrast, until recently, the three main economies of Japan and continental Europe - France, Germany and Italy - had seen fairly modest growth in new ICT investment and overall production. What is the important contribution of ICT technology

to the American economy? Thanks to ICT technology, very important developments and growths occur in terms of equipment and software. If we start to examine productivity figures in the long term, 1.4 percent growth was recorded between 1973 and 1995 (Nezu, 2000).

With the emergence of electronic commerce after 1995, the efficiency figures increased by more than 2 times and showed a serious growth of 2.9 percent (Nezu, 2000). In terms of business cycles, productivity has grown significantly, but as the recovery process begins to decline, productivity began to decline. With the growth of productivity, the expansion period takes a long time. Virtual trade up to the online bookstore is very much exaggerated stories being told about new types of electronic commerce, the so-called dot.com companies are only a part of the scene of the explosion story. In terms of national competitiveness, ICT's contribution to traditional industrial sectors is quite high.

If we observe in terms of company supplies, for example; suppliers are able to find such as raw materials, parts, fuel and components easily. Therefore, the best suppliers are found and the best business is done with them, and the necessary deals can be made without the need for expensive business trips thanks to the internet. As a result, Japan and Germany for a very long time for the success of long-term business relationships between the key companies now falling apart. It is the development of electronic commerce that makes this business model obsolete. With the widespread of electronic commerce, the need for manpower will decrease in terms of service and industry sectors, and as a result, there will be an increase in white-collar workers dismissal.

Rather than modernizing the last 20 years, great losses have occurred in terms of manual labor and blue-collar workers. They cannot see themselves as safe, including middle managers. In terms of white-collar employees, they need to discover and enhance themselves from the point of expertise and which skills they can adapt and realize in order to survive in the business world. They can achieve this by learning how to use external resources. One of the distinguishing features of the new economy is how outsourcing is used for large and small firms. Outsourcing used in the broadcasting and advertising sectors is spread in cash flow management systems and personnel management systems, which are one of the building blocks that form the central functions of companies. Outsourcing, which is one of the most important indicators of the landscape of the US economy, occurs in administrative tasks by large companies, small companies in the service sector, and companies specializing in business services (Nezu, 2000).

The information technology network of such companies interacts with companies that are their customers. However, interacting with the service provider systems of the companies they work with has the condition of working as if it were a department in the internal unit of that company. One of the things that outsourcing companies realize is the fact that they must be able to employ a team or person in order to manage outsourcing areas.

One of the surprising questions about traditional corporate boundaries is where does another company start and another company ends? One of the conditions associated with the most important peak of electronic commerce is deregulation in communication and financial services. If they can give the most concrete example to the users using the

new technology, it is the companies and banks that make financial investments. Thanks to the users, electronic commerce has gained a serious momentum to become the new technological trend that catches the growth fastest.

In the future, financial services and commerce will take place on online platforms. For one or more businesses, dot.com addresses are of great importance for trading on the online platform. With electronic commerce, there has been a serious demand for consultancy & equipment in the field of IT. It is understood that there is no need for physical branches with electronic commerce and they should be closed.

### **2.1.2 The Process of Slowly Forward**

The process of adapting to electronic commerce is slower in industrial sectors for a number of reasons. One of the reasons is their reluctance to abandon traditional business models and their serious resistance to this issue (Brodie,2000). For managers who are not open to new technologies and change and who resist to the end, the last means of resistance is the firing and firing of employees.

Managers and leaders in the business world find it difficult to believe that the new economic understanding is real. In terms of large companies, this situation is perceived as putting business relations at risk and it is seen as taking great measures.

These are one of the biggest parts of the problems. Contrary to these problems, the most important point in electronic commerce is speed in operations or speed in transactions (Brodie,2000). It is not clear that all countries in the world will spread and benefit from information technology at the same time. This is because every country has a

very different social, political and economic structure. Different approaches and responses to the challenging processes of ICT will occur and progress needs to be made.

According to research in OECD on internet usage, Japan lags behind. Industry and government collaborate to create a program to enable their countries to build a faster ground, even sparking a Japanese renaissance. Competition will occur. Asian countries can develop their markets if they can integrate new technology into business processes with an efficient and innovative approach.

Countries such as China and India have started to benefit from electronic commerce as a new economic model in order to gain a place in the world market. One thing is certain: the e-commerce epic drama has not ended the opening decade of the 21st century, while fighting for the lead industrial strength indeed promises to be packed with events.

New limits of economic powers will be seen. The foundation of the new economic models class will be e-commerce. Economic fluctuations, chaos and explosions can continue until e-commerce is integrated (Brodie, 2000). The inability to foresee the effects of chaos economic models, which require innovation to be integrated, means the uncertainty of business models. New trend and industries can take a role in the market.

### **2.1.3 The Aim of E-Commerce**

The purpose of e-commerce innovations is to reduce purchasing costs during (before and after) the transaction. If we examine every stage of e-commerce, it eliminates all kinds of manual filing and all data is documented electronically. Manual filing is

generally used in traditional business models. In electronic commerce, transactions can be automated thanks to EDI (electronic data exchange) and electronic websites.

In terms of the information revolution, which is one of the biggest waves of the industrial revolution after the first and second industrial revolution, Internet technology is one of the most prominent technologies. If we look at today's business world, the most important point that is a part of the business world is e-commerce.

The effects of e-commerce began to appear in all areas of business, from new products to customer service. E-commerce, in other words electronic commerce, is the entire process of purchasing or selling a product and service by users on the internet.

The purpose of e-commerce is to reduce the cost of goods and services, and to improve service timing and quality. In the new economy, The earliest stages of electronic commerce play an important role in business strategy. Companies of different sizes have determined or will begin to determine their electronic commerce plans. (Küpoğlu, 2008). When the major trading companies of the global world began to reduce their trading power in their country and began to search for new market areas, they spread to nearby countries. Not content with that, they aim to reach the farthest corners. The easiest and cheapest way of this is through e-commerce (Küpoğlu, 2008).

The purposes of electronic commerce are as follows (Doğan & Hamşioğlu, 2002):

- Making business activities easier locally and internationally to bring.
- To increase the effectiveness and sensitivity of the company.

- To provide compatible and high quality electronic interaction.
- Operation in all appropriate areas except hardware transportation
- It has aims such as making its activities electronic.

#### **2.1.4 The Positive Effects Of E-Commerce**

Canpolat (2001), the positive advantages of electronic commerce is caused its growing place in economic and social life are summarized below.

- E-commerce planning carried out over the open network developed electronic transmission. This provides managements, all consumers and other businesses with the opportunity to reach cheaper and more easily. In this way, many businesses can be market their goods without any physical investment, without constitution sales store or a physical marketing network.

- Conducting national and international commercial transactions electronically (within the scope of manufacturers, sellers, buyers, intermediaries, customs administrations, insurers, transporters, banks and other public institutions) ensures efficient use of time. Thus, the time elapsed between ordering and delivery of the products is minimized, and the costs arising from time and inventory costs are reduced.

- Documents needed in electronic commerce, electronically. This information and documents are made available to those concerned. Thus, transactions are completed in a

short time with minimum errors and without paying stationery costs. Internet-based e-commerce and electronic distribution systems accelerate international trade.

- E-commerce induce to convert the construction of the products, service trade, new products lead to new marketing and distribution styles, enables rapid product development, testing and identification of end user requirements, and responds rapidly to alteration in market request.

- E-commerce has made trading activities widespread, expanded the market area and led to economic concentration. Thus, it has become possible to get more shares from international trade.

- Due to the fact that production, marketing and distribution activities in electronic environment reduce expenditure, e-commerce provides competitive advantage to businesses at national and international level and develop competition.

- Transaction costs and transportation costs are reduced for consumers. Consumers can shop from virtual stores without leaving their homes without any problems and wasting time.

- Thanks to the internet, depletory can easily reach new output and product data can reach, have information and can easily purchase alternative goods by matching them.

## **2.2 The Key Elements of E-Commerce**

When we look at the global economy, electronic commerce plays a big role for companies to survive. E-commerce business model is the building block of innovation.

Since the Internet went public in 1994, analysts have stated that electronic commerce will be the most important economic sector in the future (Nagaty, 2010).

More secure online transactions and the widespread use of development security protocols in e-commerce is an important factor. At the beginning of the 21st century, in the 2000s, e-commerce sites were established, albeit basically. Basic sites related to dot.com were built in 2000 and 2001, but electronic commerce sites created in this style collapsed in the autumn. As a result, companies wishing to conduct electronic commerce have begun to take steps to improve their websites. E-commerce is divided into 4 main categories; B2B, B2C, C2B, and C2C (Nagaty, 2010).

**B2B (Business-to-Business):** B2B is the exchange and interaction of services, products and information between businesses. It does not occur between businesses and consumers (Nagaty, 2010).

Businesses, distributors, manufacturers who sell to wholesalers, who sell to retailers or other companies providing services to the customers, such as companies, rather than the product with other businesses located in the service and information exchange. Pricing is always negotiable so that lower prices appear with full transparency due to the integration that usually takes place on business systems. Minimum requirements for the installation of these systems (Nagaty, 2010).

One of the biggest factors in the development and growth of B2B is that each company purchases products and services from each other. In order to perform real-time transactions, businesses must follow policies to increase their productivity and efficiency.

According to analysts, there will be a significant increase in revenues from B2B compared to B2C (Nagaty, 2010).

If we explain the B2B electronic commerce model in a simple way that purchasing agents belonging to companies, which are one of the customers of the suppliers, can bid on the electronic platform for the price of the product that they can purchase from suppliers.

**B2C (Business-to-Customer):** B2C means a transaction between customers and businesses (Nagaty, 2010). In other words, the retail part of e-commerce offers products and services to customers online. B2C businesses play an important role in the development of e-commerce and providing discounts and free online services for customers to choose to shop online. Thanks to electronic commerce, businesses are able to meet customers' demands faster and their products are delivered to the market at low cost. According to observers, B2C was on the rise in its early days, but it is now less frequent and fails and the uptrend will not occur.

Conversely, some observers predict that B2C will re-evolve and rise again, but it can be predicted that it may not be as popular as it used to be (Nagaty, 2010).

**C2B (Customer-to-Business):** C2B's explanation in terminology is the process of the customer selling a service or product to the business (Nagaty, 2010).

It is customers, not businesses that price services and products. Businesses offer customers on request. Businesses observe the basic needs of the end user and analyze them based on these needs. The customer makes the choice of the company based on

these offers. Thanks to C2B, customers can pay their bills on the online platform without being physically located at a location.

**C2C (Customer-to-Customer):** It is a process that takes place from person to person (Nagaty, 2010). This process has been taking place since 1995 (Nagaty, 2010). All transactions between customers are realized through the intermediary. This e-commerce is a good example of the kind of consumers are auction websites like eBay can easily send and receive money online using online payment systems like PayPal (Nagaty , 2010).

### **2.3 The Success in E-Commerce Business**

One of the common terms used in organizations and the critical success underlying it has taken its place among the success factors in e-commerce. One of the points that success depends on is the future goals of businesses. It refers to the formation of certain procedures and activities in commercial life. For businesses to be successful depends on what they mission for. How they will achieve the goal is directly proportional to the goals they have set. In order to achieve this goal, the existing sales areas should be increased. One of the aim is to minimize the cost Companies need to produce successful applications in order to be successful and focus on the success target. Success elements is usually also be seen as "established examples that provide to be expand of the frontiers of

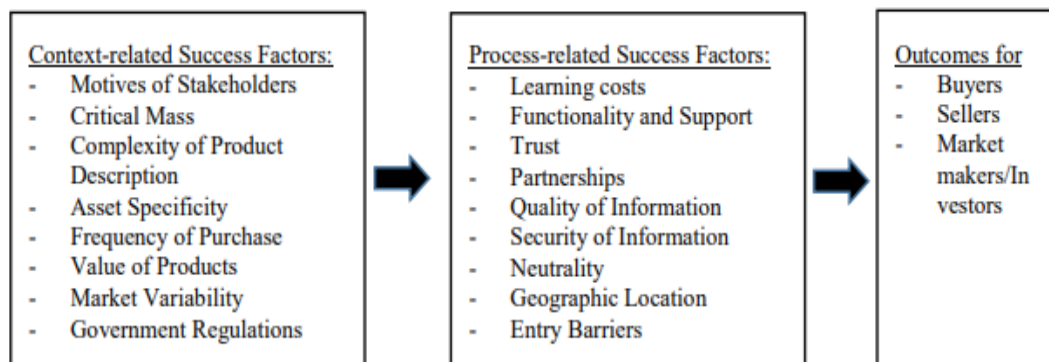
continuum development and whose impact is much wealthier when examined in terms of significance at all steps of practice stages".

According to Fairchild & Ribbers, (2004), success factors for e-commerce companies are listed as follow:

**Context and process-related success factors:** In the areas where e-commerce operates, the context factor comes into play. Factors in e-commerce can develop beyond the control of the manufacturer in the market. Conditions associated with the process also operates under the examination of the market makers. This accomplishment is understanding the factors, the application of e-commerce and permits the learning proseedures that contributes to prosperous business (Fairchild & Ribbers, 2004).

**Figure 2**

*Success factors and outcomes*



According to Figure 2, it can be explained success factors and outcomes in e-commerce business.

**Motives of stakeholders:** When companies decide to use electronic commerce in their own business processes, their business partners must focus intensively on their own goals in this process. And how these goals will have an advantage for the company should be well analyzed and evaluated (Fairchild & Ribbers, 2004).

**Context-related Success Factors:** - Motives of Stakeholders - Critical Mass - Complexity of Product Description - Asset Specificity - Frequency of Purchase - Value of Products - Market Variability - Government Regulations Outcomes for - Buyers - Sellers - Market makers/Investors (Fairchild & Ribbers, 2004).

**Process-related Success Factors:** - Learning costs - Functionality and Support - Trust - Partnerships - Quality of Information - Security of Information - Neutrality - Geographic Location - Entry Barriers (Fairchild & Ribbers, 2004).

**Critical mass:** It is argued that the importance of the advantages of single participants in a technological market system increases the participation of enterprises in the system. One of the biggest reasons of the sustainability of a market in an electronic portal is to understand the network externality. Thanks to the consumption of a product, the number of users using that product increases (Fairchild & Ribbers, 2004).

**Complexity of product description:** Complex situations occurring in products should be represented in the description of the product. Expensive products need more disclosure because their coordination costs are quite high. Owing to the sophistication

caused by this situation, the consumer prefers to buy products from a single supplier (Fairchild & Ribbers, 2004).

**Asset specificity:** In order to meet the needs of the buyer, the transactions of the products that are specific to their existence contain a certain number of adjustments according to the product. This process takes a long time to meet the needs of the buyer (Fairchild & Ribbers, 2004).

Customized (personalized) computer software is specific, although the service industry has low asset specificity. It is much easier to procure specific products at low prices in markets available on the electronic portal (Fairchild & Ribbers, 2004).

**Frequency of purchase:** Purchase frequency can affect the advantage achievement wherethrough re-use. In order to get the best price, it depends on the low frequency and there are related reasons (Fairchild & Ribbers, 2004).

**Value of products:** While the value of a product is high, it will support to little savings with all merchandise as it can contribute to a more balanced opportunity cost. Besides, electronic markets will likely be selected by the recipients of big-value goods. (Fairchild & Ribbers, 2004).

**Market variability:** If we consider it in terms of suppliers, search costs can be reduced in markets in the electronic portal. Thanks to E-Commerce, the cost of seeking commercial partners has decreased (Fairchild & Ribbers, 2004).

**Government Regulations:** It is very important that the government supports electronic commerce applications. Thanks to the support of the state, companies can feel safe. The market can be cleared of freeloader. This means that unknown outsiders who

could advantages for making any contribution from a company system (Fairchild & Ribbers, 2004).

**Learning costs:** Integrating IT (information technology) technologies for denouement purposes can facilitate successful solutions and the learning cost is very low. One of the biggest obstacles may be unwillingness to change (Fairchild & Ribbers, 2004).

**Functionality and support:** The last stage their application in electronic commerce is to provide alternative optimum solutions and options that support buyers (Fairchild & Ribbers, 2004).

**Trust:** Thanks to databases in electronic commerce, sellers and buyers interact through the online platform. The cornerstone of success in this field is trust. In order to achieve loyalty, it is necessary to consult again in order for developments to take place (Fairchild & Ribbers, 2004).

**Partnerships:** One of the biggest contributors to the success of e-commerce markets is the ability to interact with leaders and experts who are experts in their field. One of the most important contributions to the growth of the company is the establishment of successful business relationships with the right people and partners. Successful business relationships contribute to the development of the company. Thanks to business partnerships, it enables us to get information about a company's information source (Fairchild & Ribbers, 2004).

**Quality of information:** In order to be successful in electronic commerce, the quality of information must be good (Fairchild & Ribbers, 2004).

**Security of information:** Protection of financial and personal data helps to secure all information. In order to avoid any ethical problems, all stages should be checked and reviewed (Fairchild & Ribbers, 2004).

**Neutrality:** If we consider the electronic commerce sector in terms of the logistics sector, orders will be handled through the database. In order for an electronic market to be managed in terms of the logistics sector, it must be managed independently by an information technology company. In this way, the logistics sector will succeed in the electronic market (Fairchild & Ribbers, 2004).

"The possession and check of the computer market, is not shared between market attendants from several sectors in the industry, receiver and vendors are likely to overlook the system."

**Geographic location:** It is necessary to create an atmosphere of trust between buyers and suppliers in financial services, thereby developing the electronic commerce market (Fairchild & Ribbers, 2004).

**Entry barriers:** If you have special procedures or regulations of a company, participants will reduce unsafe to enter. It can act as an entry barrier for a firm.

According to Phan (2002) other significant achievement elements are; website of elevated quality confrontation or passing over user anticipations, decent ebusiness education and education to employees, management and clients and new rivals and marketshare tracked.

## 2.4 The Concept of Last Mile Delivery on E-Commerce

The term last mile delivery was not originally a term used in logistics and supply chain. It was a term used in telecommunications situations encountered in connecting to local networks occurring in homes (Gevears et al., 2009). Nowadays, the concept of last mile has gained great importance in logistics and supply chain, and its definition in these sectors is defined as the last leg of operations. It is the stage of the delivery the buyer's home. According to Gevears et al. (2009), last mile delivery covers the entire cost of delivery. However, it does not play an efficient role in the supply chain (Gevears et al. (2009).

Last mile delivery means the final stage of the distribution process in the online retail industry. The last mile delivery process covers the most comprehensive and challenging process of the logistics and supply chain. Last mile delivery means being in direct contact with customers. It is to deliver a product to the door of the consumer. According to Lim & Winkenbach, (2019), last mile delivery is defined as the last phase of B2C.

The last mile delivery process is the whole of the links of the chain that takes place from the entry area of an order to the destination declared by the buyer. The delivery of the last mile includes the operational activities that must be in the delivery phase from the distribution area of the product to the final buyer. The detail missing from these definitions is that there are no geographical and urban areas.

Final crossing points should be determined by the institutions. This zone must be an urban zone. Similarly, the customer can receive the product she ordered with her own

vehicle from the point she prefers. In this case, the distance between the point where the customer receives the package and the point where the product is located can have negative effects in terms of traffic density in urban areas.

Therefore, the definition should involve the entire urban area predefined by the organization, comprising upstream logistics, collection distance for the customer, and collection point to the transit point. Last mile delivery takes place at a predetermined delivery area. The last mile delivery process includes all processes from upstream logistics to the final destination of the product. One of the most important features that distinguish the last mile delivery from other transportation services is the delivery organization to the last point between the consumer and the retailer.

The delivery man who delivers the product is not only the representative of the delivery company he works for, but also all companies that have significant contributions in the supply chain. Time savings and economic benefits are an important criterion for the customer in electronic commerce.

The example we can give to these is that the sale and availability of non-salable goods can be made transparently to compare the prices of the products and so on. The buyer who buys products from online platforms requests that the product be delivered to her home address. The issue of how a product should be delivered to the buyer is one of the most difficult and thoughtful factors for businesses.

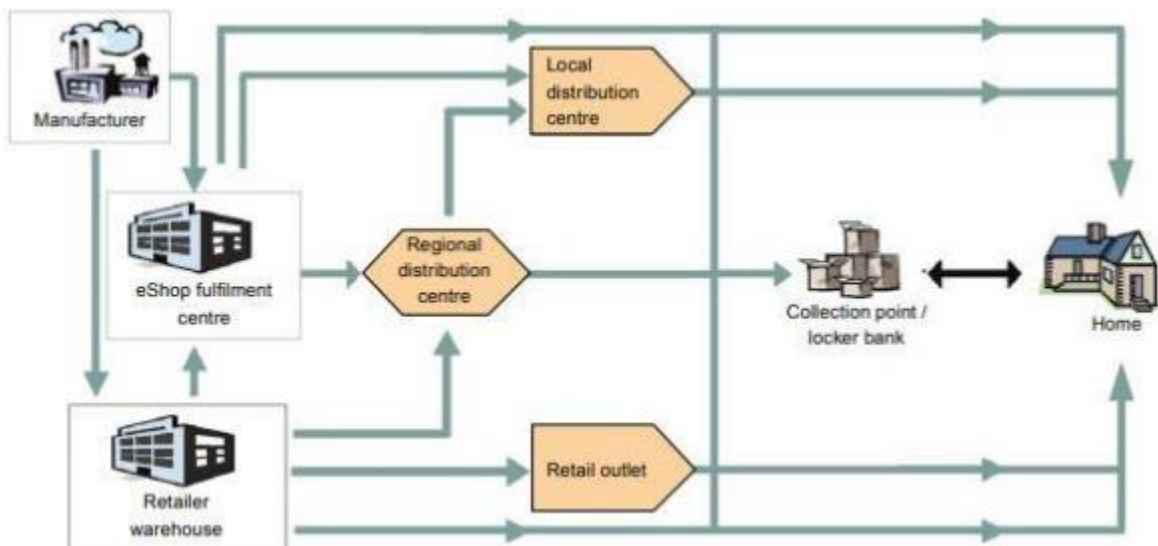
From businesses point of view, the last mile delivery process is a complex and challenging process, but complicate planning is required. It is perceived that last mile delivery can be possible with mix planning for businesses. They demand that these

processes are managed by a third forwarder (3PL), not themselves. The biggest problem in the last mile delivery is that the buyer is not at the address declared, except for legal and economic difficulties.

The results of unsuccessful delivery are as follows; It causes extra mileage, carbon emissions, extra costs. This is because in order for the package to be delivered to the buyer, it is necessary that the product can be delivered to the consumer until the buyer is at home and the last mile process can be successfully performed.

**Figure 3**

*Last mile delivery operation*



According to Figure 3, the warehouse of a retail company or the warehouses of companies performing electronic commerce are the starting place of the last mile delivery. There are a number of methods for products to reach the end user from these warehouses. The products will be delivered to the buyer either by their own vehicles or by an intermediary organization.

Before the products are delivered to the buyer, they are sent to a distribution warehouse close to the address of the recipient and delivered to the buyer from there. Deliveries can also be delivered through the supplier that sells the product or can be made directly to the customer from the store where the supplier sells. If the product is left at a delivery point close to the consumer's home, the buyer must go to that delivery point and receive the product.

#### **2.4.1 Last Mile Delivery**

There is a terminology in transportation that we have been talking about for a long time. This application, which we call "Last Miles", can also be translated into Turkish as "Son Mil Teslimatı". The last mile delivery is generally used as the distance that the transport vehicle must travel for the last piece of cargo to be delivered in partial transportation. On a vehicle that moves forward by distributing its load, a load is far below its carrying capacity for the final delivery and the expected income does not cover the cost required for the transportation of this load (Yıldıztekin, 2012).

With the development of logistics, inventory management has gained importance and complete shipments, which are rare in transportation, have been replaced by more

frequent partial shipments. Partial transportation increases its share not only within the country but also between countries, even by entering into intermodal transportation. With the supply chain management taking precedence over logistics management, the concept of the last mile delivery has gained more importance and not only the last delivery of the goods, but also the first transportation until it reaches the place of loading, that is, the first mile has started to gain importance. With the commissioning of the milk-run supply system, the first mile delivery performances of the collection vehicles have started to be discussed (Yıldıztekin, 2012).

The important thing in partial transportation is the management of transfer centers, namely hubs. Collecting and consolidating the materials to be collected in the most optimum collection center, and loading them into vehicles according to the locations of distribution centers. Three independent optimization studies are required, such as optimization of distribution centers according to delivery points. In addition to this work, which is the optimization of distance and tons, that is, ton-km, ton-m<sup>3</sup> optimization and vehicle selection will be activated according to the volume and weight of the loads to be transported (Yıldıztekin, 2012).

In a door-to-door transport, it is measured that the first transport and the last transport have a share of 28% in the total transport cost, in the position of transporting the transportation under the most ideal conditions, including the use of intermodal systems, namely railway, road, seaway and container, ro-ro (Yıldıztekin, 2012).

The reduction of these costs per unit load is achieved by bringing the partial loads delivered to the collection and distribution centers to diversity and scale sizes. While volume-weight optimization is achieved with different products, the efficiency of the first

collection and final distribution routes can be increased with growing scales. Larger scale aggregations lead to shortening of the first mile distance, increasing volumes and decreasing the cost of ton-km. In addition to this, the growth of the scales again allows for the shortening of the routes in the distribution step, namely the last mile delivery operation, the decrease of the last mile delivery distance and the reduction of unit costs (Yıldıztekin, 2012).

The first type is pushing center. It means that the goods which is sent by shipper or another person apart from receiver or consignee. The second diversity model is transaction based. It can be explained that the product is purchased by the customer from its source. The final model is hybrid which is based on products which is ordered by customer on website. There are three types of last mile delivery models. These models can be contributed last mile delivery research. It is most significant the last steps of the delivery process. Besides, it is the whole process that covers the entire process of delivering the product sent to the buyer by the customer or the sender to the consumer. This process is agnominated last mile delivery and it is one of the last stages of the B2C (Business To Customer) process. In this way, the shipment is delivered to the recipient, or delivered the delivery point which is identified by consignee. To explain, that last mile deliveries in e-commerce are realized to customer's preferred locations such as customer's home, workplace, mailboxes or reception boxes, specific delivery points (PUP's) etc.

Package sizes at the last mile deliveries (B2C deliveries) are usually small volume parcels. These parcels have a low volume and multiple parts and customer usually demands to be delivery this package quickly. For these reasons, if we evaluate the final delivery process of a product in terms of logistics, it is quite challenging, inefficient and

costly. During the delivery process, when the package or goods have been exited from the storage to distribute for consignee. As a result of these processes, the products which are bought by customers should be delivered to correct destination. Transportation process in the last mile delivery is valuable and complex in terms of customer's satisfaction.

One of the main reasons of the customer's expectation in free delivery is that last mile delivery costs are equal to more than half of the total shipping costs. As a result, the value of the e-commerce is estimated to increase the next decade based on customer's demand. Moreover, the impact of innovation on last mile delivery needs to be understood at this stages. This is necessary for profitability and expansion. With the rapid growth of the e-commerce industry package logistics service providers and online retail companies have serious difficulties in managing last mile delivery processes. *“This challenges are emphasized by the urbanization trends; indeed, in 1950, 30% of the world’s population was living in urban areas, in 2014 it was already 54%, and it will be over 65% by 2050 (World urbanization prospect, United Nations).”*

For this reason, last mile deliveries are an important and critical issue affecting the city, from emissions to congestion. It is part of the problems in city planning. Last and first mile deliveries are a costly component of the supply chain(), especially in areas that require transportation to city centers. Production and delivery times must be reduced so that the logistics personnel can determine the right spot and the goods can be supplied on time.

Logistics companies which care about distribution preferences "cleaner" decreased time and cost of commercial travel through the acceptance of urban distribution units (environmental and economic) for answering to the increasing demand. Successful

delivery process consist of the correct goods and delivery location, the correct time. Digital tools must be used to deliver a product at the right time to the right location.

The velocity with which customers receive their orders is one of the most important factors contributing to the success of e-commerce in terms of customer satisfaction. Trying to meet customers' orders within 24 hours, or in less than 24 hours or even the same day, is a very difficult and tiring process for retailers, but it reduces the delivery volumes of retailers and their partners, which leads to inefficiency. Therefore, factors of increasing supply chain and transportation costs are encountered. As high volume shipments are made to densely populated areas, air pollution, traffic density and noise pollution are observed in those regions.

In cities, up to 55% of vehicle emissions are caused by the distribution of goods (Faccio et al, 2015). Therefore, the same day delivery process in last mile logistics is economically and environmentally difficult and not sustainable. New solutions for the last mile in order to improve productivity in an ultra-speed delivery have been increased. The literature focuses on effective and innovative solutions in the area of city logistics and crowd-sourced transportation, vehicle route (Cleophas & Ehmke, 2014). These solutions about alternative delivery points such as; reception boxes, lockerbanks (Punakivi, et.al 2001). Some of the solutions focus on the comfort and convenience of the customer and customer involvement (Allen, et.al, 2007).

Customer engagement is an essential element of recent business models. Thanks to this model, competitive advantage can be achieved. A positive perception occurs on

customers regarding service performance, and customers' needs can be anticipated thanks to this perception. Six participation in the process of decreasing the cost of customer service advantage, there are psychological benefits in yieldance and stages (Cheung & To, 2011). Furthermore, the impact of customer self-service environment to increase production levels incorporated common input can also impress the overall contentedness (Jacob et. al, 2011). This is the final stage of the customer engagement process means that both the productivity and improve the satisfaction perceived in last mile delivery (Bouwman, 2017).

However, customers in order to develop these transactions is uncertain what roles may be included. Overall supply chain customer service while research on the roles of there is no research that connects the customer to the last mile delivery roles. Customer participation is seen as the new method to improve last mile impact (Bouwman, 2017). In order to realize delivery designs, customers must have participation. However, given how customers include organizations are related to be in the final stages and could be, and it is unclear what the as a result of customers. Various roles are identified in the literature in terms of service delivery, but are not cared in terms of last mile delivery. Therefore, control effects in terms of performance and last mile are blinded to be unfortunately.

Conducts interviews with a wide range of experts in the last mile, as many customers as possible participation and role of these roles have been shown to provide improved performance and control. When the last step becomes customer focused, customer efficiency, satisfaction and control over the process can be developed simultaneously.

### 2.4.2 The Challenges in Last Mile Delivery

If we consider it in terms of online customers, the demand in electronic commerce has started to increase considerably. Recent developments in e-commerce have also made city logistics more important. E-commerce offers faster, individual and direct trading opportunities in cases such as "business to business" (B2B) and "business to consumer" (B2C). As a result, suppliers need to transform their logistics systems into faster and more reliable logistics systems at lower costs in order to meet higher individual customer demand levels (Taniguchi et. al, 2001). The advance of online Internet selling and e-commerce (that is, the electronic channel) has given huge boost to retail companies' sales and has led to current and divergent business models (Gemini, 2013).

In this context, it is significant to execute that you have to be transported products to consumers' homes instead of retail sales will increase the number of freight movements. Also, since the size of deliveries will be small, the relative increase in the number of freight movements will be even greater. Thus, from a city logistics perspective, the increase in direct deliveries to the consumer becomes a disadvantage, not an advantage (Savelsbergh, et.al. ,2016). In addition to the excess load to be delivered, the speed factor related to the delivery process also plays an important role in city logistics. In recent years, some e-retailers have begun offering their clients the option of identical -day delivery (sometimes even 1 hour or 2 hours delivery), which has increased the appeal of purchasing any product on the internet.

From a city logistics perspective, the provision of these fast delivery options will further increase the number of freight deliveries and further complicate the coordination and consolidation of direct consumer deliveries (Savelsbergh, et.al. ,2016). The last mile

delivery is the first point of direct contact with logistics by the end customer, and for this reason, the problems experienced are perceived by the customers as the overall logistics performance (Gürel & Asan, 2018). The time factor should be considered during the last mile delivery process. Punctuality in delivery time, delivery of the product at the specified time, delivery speed are important. Attention should be paid to the time interval between the customer's order and the delivery of the product.

Consumers generally don't want to pay extra for last mile delivery. In terms of companies, the last mile delivery process is expensive and its efficiency is low due to the small volume of orders, the large number of packages, and too much destination distribution. As a result, suppliers must reduce costs in order to be successful in the electronic commerce market and to manage B2C processes. Online market, companies often service-level objectives, they need to see themselves as restrictions must meet in order to remain competitive. Considering the activities regarding delivery, it is aimed to find methods to minimize costs.

## **2.5 The Customer Satisfaction on E-Commerce**

Customer satisfaction can be defined as "*the customer's reaction to the evaluation of the differences between the expectations before the purchase action and the performance of the product after the purchase has taken place*" (Burucuoğlu, 2011). According to this definition, customer satisfaction, it is the expression of the difference between the expectations in perceptions and the experience gained by using the product or service. Customer satisfaction or dissatisfaction is not a part of the product or service, but a perception that the customer personally attributes to the product and service.

Therefore, when different customers encounter the same experience or service, their level of satisfaction may vary (Banar & Ekergil, 2010). These sense of clients towards goods or services forthrightly or indirectly impress their purchasing attitude and customer satisfaction. (Yılmaz & Karpat, Çatalbaş, 2007). In the respect, customer satisfaction can be expressed as a multi-factor, complex concept that includes customers' lifestyle, past experiences, expectations from the future, and individual and social values (Maviş, et.al., 2010). Customer services and online sales support services can also be provided to users in this portal. Electronic commerce is an electronic market where sellers (suppliers, companies and stores), service providers and buyers meet on a digital platform, where sellers can offer their products and services, and buyers can make their payments on an electronic platform.

Changes in all kinds of commercial transactions, goods and services can be followed through the electronic market. Payment can be made through electronic portals at any time. In electronic commerce, it is sufficient to have a residence address for the delivery of the ordered product, to use a credit card for online payment transactions and to have the internet.

Electronic commerce can offer many opportunities. It is important for the community of individuals and institutions to be able to easily access websites through secure electronic payment systems. Customer satisfaction is the biggest building block of electronic commerce.

The companies that can be channeled to customer satisfaction are the companies that can gain a place in the market that can gain the reliability of their business and the trust of the customers, and the businesses of the companies expand and grow thanks to

the gaining of the trust of the customers. As a result, the infrastructure of customer loyalty is formed.

When organizations try to measure customer satisfaction in electronic commerce, the definition of customer satisfaction can be discussed. With regard to goods and services, customer satisfaction is experienced in various conditions and may differ from supplier to supplier.

Their customers experience is different from individual to individual. Customer satisfaction is based on experience in communicating with the company and how it results individually.

Some researchers in the private sector, a satisfied customer is defined as a significant added value briefly describe the person that may be the case in public.

In electronic commerce, the service received on the electronic platform is of great importance. If we consider it in terms of customer relations and sales, we can observe a positive effect. We can list the services that customers value as follows: To be able to place the order quickly and easily through the website, to respond quickly by the e-retailer, to easy payment methods, transparent electronic transactions, to provide fast response support systems to the customer.

One of the factors affecting electronic commerce is the quality of information. The more plain and transparent the information on electronic websites is, the more preferred the site by the consumer. To explain the quality of information in detail, the point that the consumer pays attention to when shopping on online shopping platforms in

B2C wants to be able to see and access accurate and detailed information about the product they prefer to buy.

Another factor is that the information about the products on online shopping websites can be comprehended by the consumer. One of the factors affecting customer satisfaction is the customer's trust. In electronic commerce, customer trust is the time when the consumer transacts with a business on the online platform.

The difference between online and offline purchasing, the impact is explored. Some studies are carried out on how the online and offline purchasing method, which is the method of purchasing through the online website, makes a difference on customer loyalty. According to the studies conducted, it has been observed that there is no extreme difference between the effect of online and offline purchasing methods on customer satisfaction.

It has been found that when customers purchase a product online from an online platform, customer loyalty levels are higher than when purchasing online. There is a directly proportional relationship between customer satisfaction and loyalty. These two concepts affect each other positively and feed each other.

According to Zhang et al. (2019), one of the biggest factors affecting electronic commerce is that the online shopping website is simple and reliable in terms of security. Thanks to the simplicity of the website, they can discover their own experiences and skills.

According to Lim & Winkenbach, (2019), the quality and importance of the website in electronic commerce is emphasized in B2C. Regarding to, the quality of the

information provided on the websites of companies that carry out electronic commerce plays an important role in customer satisfaction.

As a result of the work done, the quality of the information on the websites makes the customer satisfied and the preference of such sites increases the loyalty and loyalty of the customer. It can persuade the consumer to buy products from that website again. Another important factor is the attitude of the company engaged in electronic commerce in terms of reliability, presence, and information security in the social media channel.

Considering the satisfaction and privacy of electronic commerce consumers, when a consumer wants to purchase a product or service through online shopping, the privacy of her information is extremely important. Consumers' confidentiality means that their personal information is safe and cannot be shared, viewed or used by any third party.

The ability to store, store and use personal information appropriately is one of the primary concerns of the customer when it comes to perceived privacy phenomena. If we are to evaluate customer satisfaction in terms of the electronic commerce sector, there are 5 factors that affect satisfaction.

The reliability of the website, the level of information and quality of the website, the service it provides to the consumer, is the design of the online platform. It has been observed that customer loyalty has a positive effect on customer satisfaction in B2C. Consumer trust does not seem to have much effect on customer loyalty.

As a result of researches in electronic commerce, sales made on the online platform at a global level and the quality of information on electronic commerce sites are factors affecting customer loyalty. In order to increase customer satisfaction in electronic

commerce, increasing profits, giving good comments by word of mouth, and desire to shop again from the e-shopping platform provides a significant benefit.

The customer satisfaction effect is considered in terms of the service provider that delivers the product. It is important to pay attention to how the infrastructure of the company is one of the most important factors when choosing the company that will deliver the product. Being able to satisfy customers also depends on the choice of the companies providing the distribution service chosen by e-retailers and the effect they have on the customers.

## **2.6 The Relationship Between Last Mile Delivery and Customer Satisfaction**

In the past, marketers thought their most important skill was to acquire new customers. They would spend all their efforts on acquiring new customers instead of developing their relationships with existing customers. Some new client acquired would be greeted with excellent happiness. Old customers were served with lowest enthusiasm. The current condition is the contrary of what happened in the history. The prime goal of recent's businesses is to keep existing customers connected to the business and to spread the capacity of business. Managements have lays a more money to obtain every single consumer they make; it is opponents are making an effort every day to steal these customers from him. Losing a customer means not only losing the next sale, but losing lifetime profits from that customer (Kotler, 2000). Because the cost of customer retention is lower than acquiring new customers, businesses can satisfy their existing customers and develop long-term relationships with them (Burucuoğlu, 2011). Businesses should not only

address customer satisfaction from a cost perspective. It should be able to show the customer the value and sensitivity given to the jewelery as precious as a jewel. Businesses must be able to create value for customers. While creating this value, they should be able to reflect on how a good service should be provided by putting themselves in the customer's shoes. To be successful in today's markets, customer requests must be better understood and satisfied.

There are many scientific studies, approaches and techniques on customer satisfaction and service quality in the literature. One of the techniques used in this direction is the Quality Function Deployment technique. Kano model is one of the approaches used in understanding customer requests in Quality Function Deployment applications (Delice, et.al., 2008). Today's customers are concerned with how much they are taken into account as individuals and how well their needs are met. To be successful in the market, customer requests must be well understood and satisfied. For this reason, a business that wants to be customer-oriented must first determine its target customers, recognize these customers and organize every activity in a way to satisfy them. One of the techniques used in this direction is the Quality Function Deployment (QFD) technique (Delice, et.al., 2008).

QFD will satisfy the customer and meet the customer's demands with design goals and quality assurance per use during production. It is a method that aims to improve the design quality in order to transform it into points. QFD improves design quality. It is a way to secure it while at the design stage (Akao, 1990). Since QFD is a customer-oriented approach; the most critical first step in the applications of this method is to understand the

voice of the customer. Understanding customer demands and needs and determining their differences are very important for the management of these needs (Delice, et.al., 2008).

A number of methods have been used to understand customer demands and needs. The most popular of these are the gemba and Kano models. Gemba is the actual environment where the product is used. With this method, the needs of the customers that they are not aware of, are tried to be revealed by observing the use of the product.

If the Kano is a model; it is a model used to categorize customer needs. In classical QFD, there is a simple logic that if customer requests are fulfilled, the customer will be satisfied, if these requests are not fulfilled, there will be dissatisfaction. However, with the Kano model, customer requests were graded and their satisfaction levels were determined (Delice, et.al., 2008).

Kano model; It is a model developed by N. Kano et al in 1984 to categorize customer needs (Delice, et.al., 2008). The Kano model emerges as an effective approach in classifying customer needs and understanding the nature of these needs. The inclusion of the Kano model in the KFG methodology on the basis of assigning different weights to customer needs in each category according to the effect it creates on customer satisfaction, enables high customer satisfaction to be achieved effectively (Sofyalıoğlu et al, 2012).

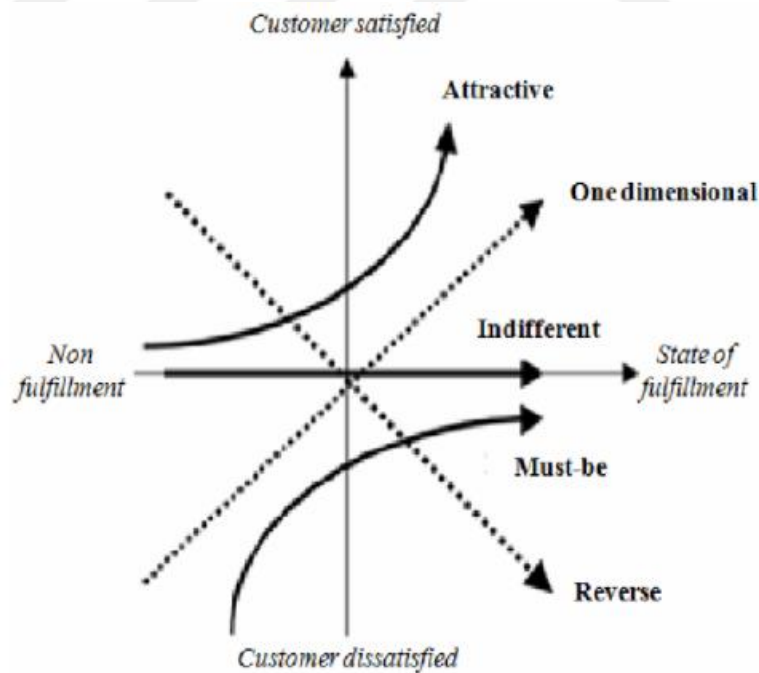
The Kano model shows the relationship between customer satisfaction and the performance level of the product or service. This relationship varies from exciting needs to basic needs. The Kano model is an effective approach that allows customer needs to be classified into different categories (Sofyalıoğlu et al, 2012). Noritaki Kano has developed

a methodology to determine which customer needs are basic, linear and exciting. The data needed in the classification of needs are obtained by the Kano questionnaire, which consists of a positive and a negative question pair (Sofyalıoğlu et al, 2012).

This model reveals the relationship between the extent to which businesses meet customer expectations and consumer satisfaction. This model is a model that explains why the level of customer satisfaction increases in an ordinary way, although there is a great improvement in other customer requirements, while customer satisfaction increases when a small improvement is achieved in some customer requirements (Tan et al, 2000).

**Figure 4**

*Kano models*



According to Figure 4; the features that the customer expects from the product are basically defined in three ways:

**Must-Be (M):** These features are the needs that must be present on the product and are presumed to be already on the product by customers (Özkan, 2002). Although having these specifications does not grow satisfaction. The lack of these peculiarities negatively influences satisfaction (Matzler et al., 1998).

**One-dimensional (O):** It is the answer when asked what a customer expects from that product. It is the basic performance that the customer expects from the product. When these requirements are fulfilled, it leads to customer satisfaction, if not, it leads to customer dissatisfaction (Tan et al, 2000). Customer satisfaction increases in direct proportion with the degree of success. In other words, the greater the level of completing of customer requests, the higher the level of satisfaction.

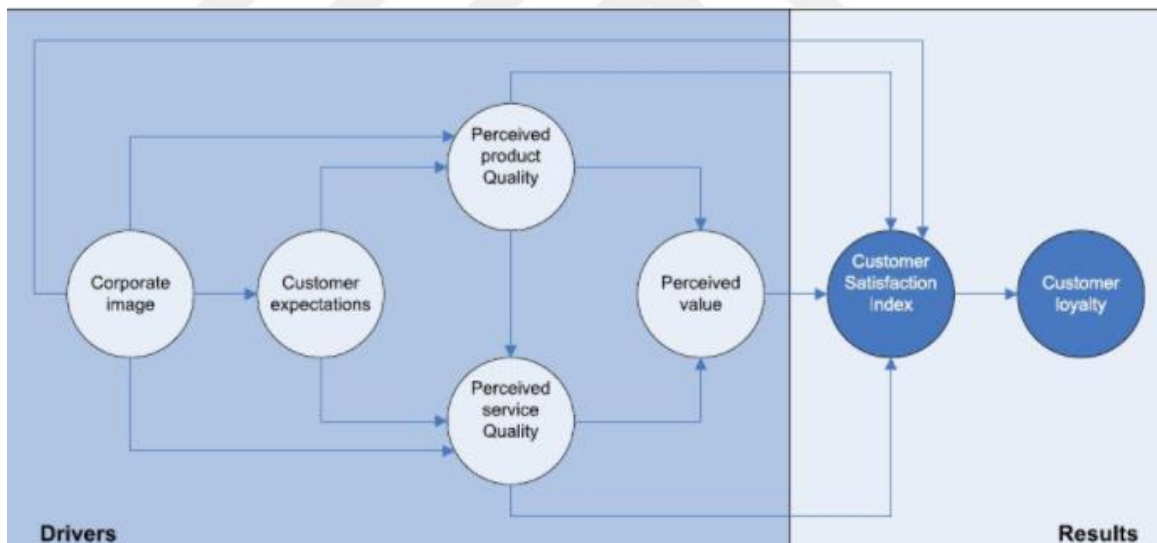
**Attractive (A):** Such requirements are the product features that satisfy the customer. The customer does not expect these features, but fulfillment of these requirements satisfies the customer. On the other hand, a output does not have these qualities does not cause disapprobation for the clients (Matzler et al., 1998).The relationship between customer satisfaction and the success of the product shows an increasingly parabolic behavior. While the success of the product increases to a certain value, customer satisfaction increases with a steeper acceleration. This means that the product provided customer satisfaction beyond expectations (Savaş et al, 2005). As a result, these features are what makes them stand out from competing products.

We examine customer satisfaction in terms of last mile delivery is that the most used customer satisfaction method in the last mile delivery process is the Kano model and ESCI (The European Customer Satisfaction Index). The Kano model was used on the last mile delivery to determine how easy home delivery is handled and how this relates to

customer satisfaction. This model helped to identify customer requirements easily (Matzler et al, 1998). The European Customer satisfaction index is an economic indicator that measures customer satisfaction (Mutua et al., 2012). European Customer Satisfaction Index Model determines customer satisfaction and customer satisfaction (perceived firm image, customer expectations, perceived quality and perceived value) and customer loyalty, which is the output of customer satisfaction (Martensen et al., 2000 ; Coelho et al, 2007).

**Figure 5**

*The European Customer satisfaction index methodology*



According to Figure 5, European Customer Satisfaction index methodology has been applied to Post Denmark. It is a model that emerged with the aim of making customer satisfaction geographically and industrially measurable and comparable (Kristensen et al., 2000). Businesses need to provide different services to customers in order to increase and improve customer satisfaction (Kearney, 1991). We should listen to customers' voices so that we can identify the factors most important to customers during

last mile delivery services Hsu et al. (2011). Due to the problems experienced in delivery models, businesses that organize the last mile delivery processes need to develop innovative and customer-oriented delivery models (Hepp, 2018).

The last mile delivery process is a step that also has a direct impact on customer satisfaction. It is one of the areas where consumers are most demanding. The delivery of the product in very short periods of time, at the time it wants and where it wants, are the factors that increase the satisfaction with the delivery. Especially in recent years, when online purchases have increased, last-step delivery has become more important (Nakıboğlu, 2020). In terms of information technologies, developments in information technology have been instrumental in serious developments, especially in improving the last mile delivery processes. It is online retailing, B2C distribution, that increases the last mile delivery process. B2C accounts for approximately 66 percent of the last mile delivery process. Based on this factor, customer satisfaction has an important role in last mile delivery. As a result, there is a relationship between last mile delivery and customer satisfaction directly.

### 3.1 Research Model and Methodology

**Figure 6**

*Research Model*



Research, critical examination of something or a subject. As a result, it is a set of searches and inquiries made in order to discover new realities and reach new relationships and results (Altunışık, et al. 2007). In other words, research means that it is the process of collecting data in a planned and systematic manner within the framework of scientific method in order to make improvements on a subject, to reveal the unknowns or to solve problems, to analyze and interpret the obtained data and to report the result (Durak, 2011).

Research, in its most general definition, is defined as a search for information to reveal certain facts or an examination that includes all kinds of systematic studies conducted for this purpose OECD. According to UNESCO's definition, research includes systematic creative actions undertaken to increase the accumulation of human, cultural and social knowledge and to use this knowledge for new applications (UNESCO Statistical Yearbook, 2001). In other words, Scientific research is the process of collecting, grouping, analyzing, synthesizing, explaining, interpreting and evaluating data in a purposeful, planned and systematic manner, making the findings a meaningful collection of information and finding reliable solutions to problems (Kaptan, 1973). It

cannot be defined research as just an information gathering process. It can be characterized it in relation to the creation of non-existents, answering unanswered questions. In other words, research is able to shown the stage of extention the limitation of the unawareness (Goddard, et al, 2001).

Scientific research can be defined as a search for reliable solutions to problems by solving a problem by using scientific method or collecting, analyzing, interpreting data according to a certain plan and system and reporting the result (Aziz, 2008). The research model is the arrangement of the necessary conditions for the collection and analysis of data in accordance with the research purpose and economically. The researcher uses one of two basic approaches, screening and testing, according to its purpose (Eroğlu, 2006).

One of the statistical methods is correlation analysis. It can be defined correlation analysis in many ways. There are various coefficients that provide information about the direction and degree of the relationship between two variables in statistics (Terzi, 2018). One of the statistical methods that measure the direction and degree of the relationship between two variables is correlation analysis. Correlation means that the degree and direction of the linear relationship between two variables (Şenyay, 2011). It is one of the statistical methods used to determine the degree and direction of the relationship between two variables. Of variables dependency or independence is not taken into account. The correlation coefficient takes values ranging from -1 to +1 ( $-1 \leq r \leq +1$ ). . The coefficient takes the value 0 if there is no relationship, 1 if there is a complete and strong relationship, and -1 if there is an opposite and complete relationship (Şahinler, 2010). About the degree of connection by looking at the degree of a relationship can be decided. If the square of the correlation coefficients between each independent variable and other

independent variables is close to 1, it is revealed that there is a highly multiple connection (İmir, 1986).

Another statistical method is regression analysis. Regression analysis is performed in order to determine the relationship between two or more variables with a cause-effect relationship and to make estimations or predictions about that subject by using this relationship. It is possible to encounter cause and effect relationships in many events in nature (Şahinler, 2010). In this analysis technique, a mathematical model is used to explain the relationship between two (simple regression) or more variables (multiple regression) and this model is called the regression model (Şahinler, 2010). Regression analysis is performed with the variable called dependent variable. It is a method used to fit a model or explain the relationship between variables. It is called simple regression when the number of independent variables is 1, and when there is more than one, it is called multiple regression. Thanks to regression analysis, future observations can be predicted. It is possible to evaluate the relationship or effect between the dependent variable and the independent variable and to make a general definition about the data structure (Yıldırım, 2010).

Quantitative and qualitative research methods were used in this study. The most widely used research methods traditionally in both science and social sciences have been "quantitative research methods". Experimental research, comparative research, quantitative research methods, which manifest themselves in various patterns such as survey research, have been deeply influenced by "realism" as a philosophical trend and "positivism" as its pattern in science (Yıldırım, 1999). In the quantitative research method, since the truth is outside of the researcher, only through some numerical

observations and analysis, the researcher can interpret the information he has collected and reach generalizations. It is important that the variables are defined in detail and that they are independent from each other; otherwise doubts may arise about the validity of quantitative analysis (Yıldırım, 1999).

A researcher using quantitative research methods determines the subject of the study, creates original research questions or hypotheses, it measures variables to make it easier to find answers, performs statistical analysis to provide information to answer research questions / hypotheses, and interprets the results obtained (Creswell, 2019). Qualitative research is based on interpretative approach. Using qualitative data collection techniques such as qualitative research, unstructured observation, unstructured interview and document review, facts and events are analyzed in a realistic and holistic manner within their natural environment. It is a research in which a qualitative process is followed to reveal it (Yıldırım ve Şimşek, 2005). Qualitative research method, on the other hand, is a concept that includes the attitudes and strategies followed in qualitative research that aims to understand how people understand, experience, interpret and produce the social world (Sandelowski, 2004).

A feature of qualitative research is that the researcher observes participants, asking open-ended questions directly through tools such as interviews and focus group protocols, or using questionnaires the collection. After collecting qualitative data, the researcher makes thematic analysis and presents the findings in literary texts such as stories and stories (Creswell, 2019). Quantitative and qualitative research components can be included in a mixed method research study. In this case, it is important to understand

that a mixed method researcher should have both quantitative and qualitative research skills (Creswell, 2019).

The study examined the effect of last mile delivery on customer satisfaction in electronic commerce. In the first part of study, the importance and history of electronic commerce are discussed and the concept of last mile delivery and customer expectation can be defined. In the second part of the study, there can be observed the evolution of the e-commerce, the key elements of e-commerce in terms of the success in business. At the end of the second part of the study, we examined last mile delivery definition and challenges. Finally, it can be observed the customer satisfaction in e-commerce. In the third part of the study, in order to test the hypotheses developed according to the research model, the quantitative research results were evaluated first. And then, so that the results of this study can be proven to be true. In order to measure the last mile delivery and customer satisfaction in electronic commerce, a survey was conducted with people who can shop online.

### **3.2 Research Hypotheses**

There are twelve hypothesis for last mile delivery.

H1: There is a relationship between last mile delivery experience and customer satisfaction.

H2: There is a relationship between last mile delivery experience and age.

H3: There is a relationship between last mile delivery experience and gender.

H4: There is a relationship between last mile delivery experience and education.

H5: There is a relationship between last mile delivery experience and marital status.

H6: There is a relationship between last mile delivery experience and professions.

H7: There is a relationship between customer satisfaction and age.

H8: There is a relationship between customer satisfaction and gender.

H9: There is a relationship between customer satisfaction and education.

H10: There is a relationship between customer satisfaction and marital status.

H11: There is a relationship between customer satisfaction and professions.

H12: Last mile delivery experience affects customer satisfaction.

### **3.3 Population and Sample**

In this study, the research population containing the necessary data to enable the hypotheses to be tested includes all consumers who shop from businesses on the internet. In addition, consumers who frequently purchase from businesses on the internet are considered to be a much more important data source in this study. The reason for this is to be able to evaluate it more clearly, based on the experiences it has gained. In this way, the research will be given the opportunity to examine more in-depth. A total of 134 people were reached in the study and 131 people were deemed appropriate to achieve the aim, considering the degree of compliance with the analysis. As a result, data obtained from 131 questionnaires were included in the analysis. In other words, it is a group of units that will be researched on the universe and that fit a certain definition, in other words, the researcher makes up her field of study and generalizes her results (Gay, 1987; Özmen,

2000). Population is a set of units with common features within the scope of the research in which the research results are generalized.

### **3.4 Data Collection Tool**

A questionnaire form was used to measure the research variables in the data collection tool. Participants were presented with a questionnaire prepared on Google Form. Participants fill out the questionnaire easily with internet provider tools, and their answers are automatically recorded in the Google Form and then transferred to the excel environment. The questions prepared for the survey form; Based on questionnaire questions administered by Yulia Vakulenko, et.al, (2019) & Kevin P. Gwinner, et.al, (2002). In order to prevent the phenomenon of not responding to any of the questions in the questionnaire, if there are unanswered answers to the questions created on the virtual platform, the questionnaire will not reach us and the participant will have to answer it in order to convey the results to the participant. Thus, no questionnaire was left unanswered. In the questionnaire questions, care was taken to create short, simple and understandable sentences in order to be easy, understandable and not to force the participants in terms of time. Demographic characteristics are included in the first part of the questionnaire. It was realized pilot survey in small group. The number of eight people contributed in the survey.

All questions except the demographic questions were prepared according to the 5-point Likert scale: (1 = Strongly Disagree, 2 = Disagree, 3 = What / What Disagree, 4 = Agree, 5 = Strongly Agree).

### 3.5 Statistical Analysis of Data

#### 3.5.1 Reliability Statistics

The concept of reliability is essential every indication, because it states consistency of the questions in a reliable test or questionnaire with each other and to what extent the scale used reflects the problem. Reliability provides a socle for interpretations on the measurements obtained and analysis that can be uncovered afterwards. An important aspect in survey studies is the reliability of the survey. Here, the answer is sought whether the questionnaire was filled in impartially by the participants or the results were intervened by the project owner. Reliability analysis is a type of analysis that can determine and reveal the subject or event under study. A reliable scale is the scale that makes accurate measurement. However, this is often not possible, so the error is minimized. Cronbach's Alpha is widely used to calculate reliability (Kalaycı, 2008).

If  $0.00 \leq \alpha < 0.40$ , the scale is not reliable.

If  $0.40 \leq \alpha < 0.60$ , the reliability of the scale is low.

If  $0.60 \leq \alpha < 0.80$ , the scale is highly reliable.

If  $0.80 \leq \alpha < 1.00$ , the scale is highly reliable

**Table 1***Reliability Test***Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,958	,958	16

According to Reliability Statistics test, evaluation the consistency of the questionnaire, a reliability value of  $\alpha = 0.958$  was acquired since the alpha value is close to 1, it is concluded that the research is highly reliable.

**3.5.2 Normality Test**

The degree of deterioration of symmetry in a normal distribution is called skewness. The distribution is called right (positive) skewed if it is long-tailed to the right, and left (negative) skewed if it is long-tailed to the left. The degree of sharpness or roundness of the normal distribution curve is called kurtosis (Yıldız et al., 1998). Huck (2008), according to Skewness, the range of +1 -1 is normal, and the range of +2 -2 in Kurtosis is normal distribution.

**Table 2***Normality Test*

Descriptives				
		Statistic	Std. Error	
LMD	Mean	4,0055	,05250	
	95% Confidence Interval for Mean	Lower Bound	3,9015	
		Upper Bound	4,1095	
	5% Trimmed Mean	4,0167		
	Median	4,0000		
	Variance	,317		
	Std. Deviation	,56302		
	Minimum	2,64		
	Maximum	5,00		
	Range	2,36		
	Interquartile Range	,64		
	Skewness	-,093	,226	
	Kurtosis	-,170	,447	
CS	Mean	3,8209	,06901	
	95% Confidence Interval for Mean	Lower Bound	3,6842	
		Upper Bound	3,9576	
	5% Trimmed Mean	3,8541		
	Median	4,0000		
	Variance	,548		
	Std. Deviation	,74002		
	Minimum	1,80		
	Maximum	5,00		
	Range	3,20		
	Interquartile Range	,60		
	Skewness	-,412	,226	
	Kurtosis	,263	,447	

This normality test analysis can be shown that the value of the Skewness and Kurtosis values for Last Mile Delivery is observed  $-.093$  and  $.226$   $-.170$  and  $.447$  respectively. This value shows that the data are normally distributed in terms of Last Mile Delivery. Skewness and Kurtosis values for Customer Satisfaction is observed  $-.412$  and  $.226$   $-.263$  and  $.447$  respectively. These value shows that the data are normally distributed in terms of Last Mile Delivery and Customer Satisfaction.

### 3.5.3 Descriptive Statistics on Demographic Characteristics

In this chapter, there have been represented statistical responses which demographic variables; age, gender, education level, marital status and professions. There were 115 participants in the study.

**Table 3**

*Frequency and Percent on Gender*

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Erkek	47	40,9	40,9	40,9
	Kadın	68	59,1	59,1	100,0
Total		115	100,0	100,0	

59,1 % (n=68) of the participants were female and 40,9 % (n=47) were male.

**Table 4**

Frequency and Percent on Age

		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20'nin altında	4	3,5	3,5	3,5
	20-29	61	53,0	53,0	56,5
	30-39	37	32,2	32,2	88,7
	40-49	8	7,0	7,0	95,7
	50-59	2	1,7	1,7	97,4
	60 +	3	2,6	2,6	100,0
	Total	115	100,0	100,0	

According to Table 4, the frequency and age of the participants, 3.5 % percent participants were below 20, 53% percent participants were between the ages of 20-29, 32,2% percent participants were the ages of 30-39, 7 % percent participants were between the ages of 40-49, 1,7 % percent participants were between the ages of 50-59, 60 and over is 2,6% percent.

**Table 5***Frequency and Percent on Education Level*

		EducationLevel			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lise	7	6,1	6,1	6,1
	Önlisans	7	6,1	6,1	12,2
	Lisans	81	70,4	70,4	82,6
	Yüksek lisans-Doktora	20	17,4	17,4	100,0
	Total	115	100,0	100,0	

About the frequency and Education Level of the participants, 6.1 % (n=7) percent of them graduated high school, 6.1 % (n=7), percent of them graduated associate degree, 70,4 % (n=81) percent of them graduated bachelor degree, 17.4 % (n=20) percent of them graduated Master-Doctorate.

**Table 6**

*Frequency and Percent on Occupation*

		<b>Occupation</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Öğrenci	40	34,8	34,8	34,8
	Çalışan	54	47,0	47,0	81,7
	İşsiz	16	13,9	13,9	95,7
	Emekli	5	4,3	4,3	100,0
	Total	115	100,0	100,0	

Regarding the occupation of the participants, 34.8 % (n=40) percent of them were student, 47 % (n=54) percent were employee, 13.9 % (n=16) percent of them were unemployee, 4,3% (n=5) percent of them were retired.

**Table 7**

*Frequency and Percent on Marital Status*

		<b>MaritalStatus</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Evli	31	27,0	27,0	27,0
	Bekar	84	73,0	73,0	100,0
	Total	115	100,0	100,0	

This Table 7 was shown the marital status of the participants, 27 % (n=31) percent of the participant was married, 73% (n=84) percent of the participant was single.

### 3.5.4 Correlation Analysis

Correlation shows the degree and direction of the linear relationship between two variables. It can be observed R value.

Degree of the R Relationship

0.00 - 0.25 very weak

0.26 - 0.49 Weak

0.50 - 0.69 Normal

0.70 - 0.89 Strong

0.90 - 1.00 very strong

According to Table 9 below, there is a positive relationship between variables; last mile delivery and customer satisfaction.

There is a strong linear relationship ( $r = .772$ ) between customer satisfaction and last mile delivery.

There is a negative relationship ( $r = -.203, -.206, -.211$ ) between last mile delivery and age, education level, occupation.

There is a normal relationship ( $r = .594$ ) between occupation and age.

There is a very weak relationship ( $r = .235$ ) between marital status and last mile delivery.

There is a negative relationship ( $r = -.440$ ) between marital status and age.

**Table 8**

*Correlation Analysis*

		<b>Correlations</b>						
		LMD	CS	Gender	Age	EducationLevel	Occupation	MaritalStatus
LMD	Pearson Correlation	1	,772**	-,012	-,203*	-,206*	-,211*	,235*
	Sig. (2-tailed)		,000	,900	,030	,027	,024	,012
	N	115	115	115	115	115	115	115
CS	Pearson Correlation	,772**	1	,100	-,091	-,181	-,116	,145
	Sig. (2-tailed)	,000		,286	,333	,053	,217	,122
	N	115	115	115	115	115	115	115
Gender	Pearson Correlation	-,012	,100	1	-,107	,015	,160	-,067
	Sig. (2-tailed)	,900	,286		,257	,873	,087	,480
	N	115	115	115	115	115	115	115
Age	Pearson Correlation	-,203*	-,091	-,107	1	-,127	,594**	-,440**
	Sig. (2-tailed)	,030	,333	,257		,176	,000	,000
	N	115	115	115	115	115	115	115
Education Level	Pearson Correlation	-,206*	-,181	,015	-,127	1	-,174	,021
	Sig. (2-tailed)	,027	,053	,873	,176		,063	,826
	N	115	115	115	115	115	115	115
Occupation	Pearson Correlation	-,211*	-,116	,160	,594**	-,174	1	-,360**
	Sig. (2-tailed)	,024	,217	,087	,000	,063		,000
	N	115	115	115	115	115	115	115
Marital Status	Pearson Correlation	,235*	,145	-,067	-,440**	,021	-,360**	1
	Sig. (2-tailed)	,012	,122	,480	,000	,826	,000	
	N	115	115	115	115	115	115	115

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

\* . Correlation is significant at the 0.05 level (2-tailed).

### 3.5.5 Principal Component Analysis

Factor analysis shows the quality and quality of measurement in social sciences. It is one of the most important analyzes to reveal its validity. There are two significant section here. The first one is which factor analysis will be used, and the second one is which statistical tools will be used for this factor analysis. The procedures to be applied will have an impact the results of the research and therefore the "structural validity" that is tried to be measured (Yaşlıoğlu, 2017).

As a result of the factor analysis performed over 16 questions, it was determined that the questionnaire was gathered under two sub-dimensions, the results of the factor analysis are below.

**Table 9**

*KMO and Bartlett's test*

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,927
Bartlett's Test of Sphericity	Approx. Chi-Square	2304,860
	df	120
	Sig.	,000

Table 9 shows KMO and Bartlett test results of the questionnaire. In the study, it is seen that the KMO sample competence measurement value is 0.927. It can be said that this value is a very pleasant worth for KMO and it is suitable to analyze the relevant data group (Akgül, 2005: 450).

**Table 10***Principal Component Analysis*

<b>Communalities</b>		
	Initial	Extraction
LastMile1	1,000	,710
LastMile2	1,000	,680
LastMile3	1,000	,425
LastMile4	1,000	,805
LastMile5	1,000	,649
LastMile6	1,000	,450
LastMile7	1,000	,627
LastMile8	1,000	,740
LastMile9	1,000	,821
LastMile10	1,000	,658
LastMile11	1,000	,800
Satisfaction1	1,000	,881
Satisfaction2	1,000	,887
Satisfaction3	1,000	,934
Satisfaction4	1,000	,898
Satisfaction5	1,000	,851

Extraction Method: Principal Component Analysis.

According to Table 10, when these values are examined, it was determined that the initial common values of the items were the lowest 0.425 and the highest 0.934. These values show the convenience of the data to factor analysis.

**Table 11***Principal Component Analysis***Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	9,967	62,296	62,296	9,967	62,296	62,296	6,323	39,520
2	1,848	11,549	73,845	1,848	11,549	73,845	5,492	34,326	73,845
3	,858	5,360	79,205						
4	,594	3,715	82,920						
5	,501	3,134	86,054						
6	,461	2,881	88,935						
7	,393	2,456	91,391						
8	,333	2,081	93,472						
9	,241	1,509	94,981						
10	,192	1,200	96,181						
11	,171	1,066	97,247						
12	,139	,871	98,119						
13	,110	,688	98,806						
14	,083	,520	99,327						
15	,059	,367	99,694						
16	,049	,306	100,000						

Extraction Method: Principal Component Analysis.

According to Table 11 these 2 factors explain 73,85 percent of the variance of the scale analysis. The higher the variance ratios obtained as a result, the stronger the factor structure of the scale. Variance rates varying between 40 percent and 60 percent in the analyzes made in social sciences are considered sufficient (Tavşancıl, 2010).

**Table 12***Principal Component Matrix***Component Matrix<sup>a</sup>**

	Component	
	1	2
LastMile1	,654	,531
LastMile2	,741	,361
LastMile3	,632	,159
LastMile4	,786	,432
LastMile5	,647	,480
LastMile6	,641	,199
LastMile7	,760	,222
LastMile8	,813	,283
LastMile9	,900	-,102
LastMile10	,740	-,333
LastMile11	,892	,060
Satisfaction1	,884	-,317
Satisfaction2	,863	-,377
Satisfaction3	,862	-,438
Satisfaction4	,860	-,398
Satisfaction5	,863	-,326

Extraction Method: Principal Component  
Analysis.

a. 2 components extracted.

**Table 13***Rotated Component Matrix*

**Rotated Component Matrix<sup>a</sup>**

	Component	
	1	2
LastMile1	,129	,832
LastMile2	,308	,765
LastMile3	,363	,541
LastMile4	,295	,847
LastMile5	,159	,790
LastMile6	,342	,577
LastMile7	,415	,674
LastMile8	,414	,754
LastMile9	,737	,527
LastMile10	,772	,248
LastMile11	,622	,642
Satisfaction1	,868	,357
Satisfaction2	,893	,298
Satisfaction3	,933	,252
Satisfaction4	,905	,280
Satisfaction5	,859	,336

Extraction Method: Principal

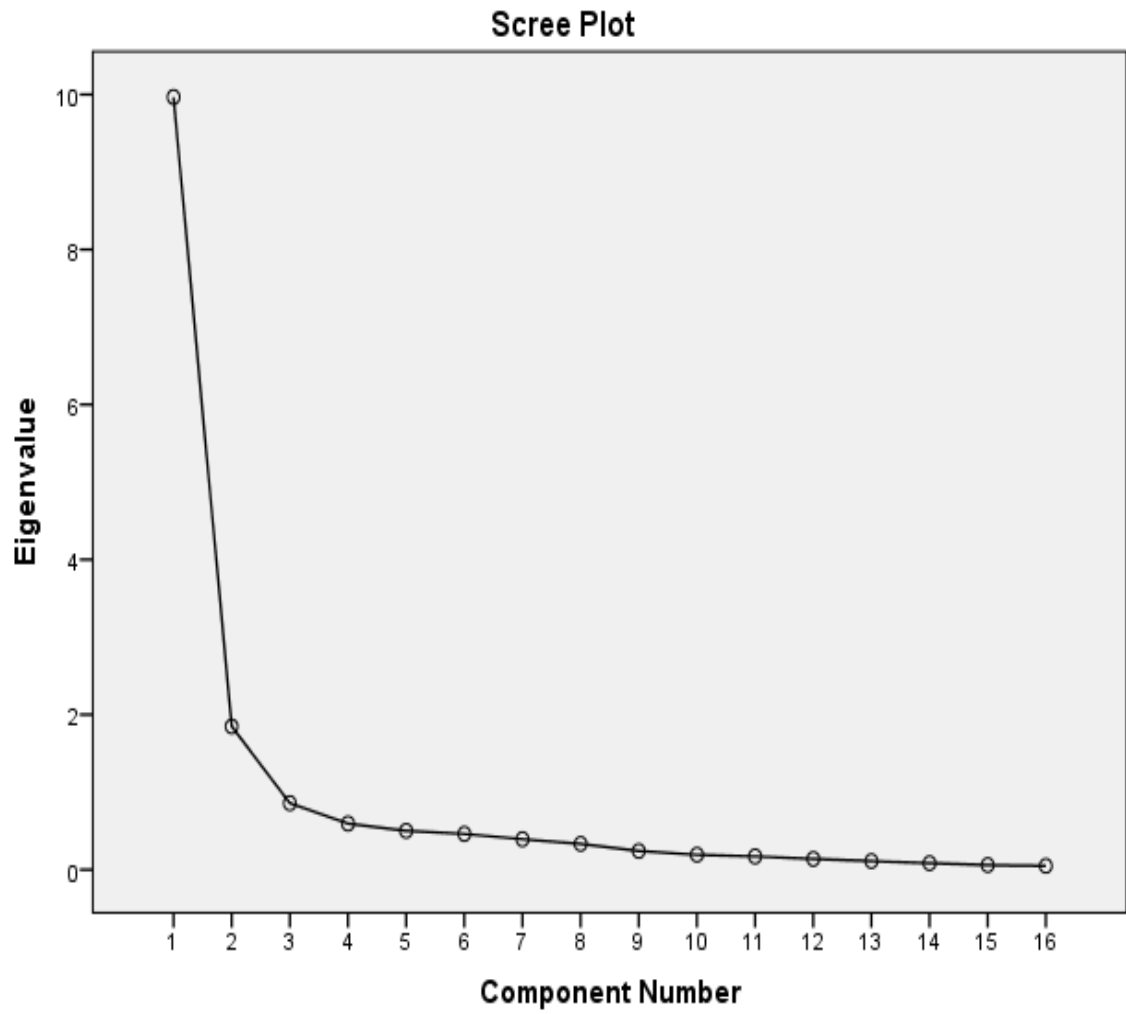
Component Analysis.

Rotation Method: Varimax with

Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 3 iterations.

According to Table 13, our analysis can be shown 2 components. The relationship between last mile delivery and customer satisfaction is explained by 2 factors.

**Figure 7***Scree Plot Analysis*

### 3.5.6 Linear Regression Analysis

Linear regression is an approach to modeling the relationship between a numerical dependent variable called  $y$  and one or more independent variables expressed as  $x$ . If the number of independent variables in the regression model is one, the model is defined as simple linear regression (Kılıç, 2013).

In this section, it is examined whether there is a relationship between last mile delivery experience and customer satisfaction. In this section, it is examined whether there is a relationship between last mile delivery experience and customer satisfaction. Regression analysis test results may be examined as follows.

#### H1

**Table 14**

#### *H1 Correlation Analysis*

		<b>Correlations</b>	
		LMD	CS
LMD	Pearson Correlation	1	,772**
	Sig. (2-tailed)		,000
	N	115	115
CS	Pearson Correlation	,772**	1
	Sig. (2-tailed)	,000	
	N	115	115

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

Correlation analysis was applied to test the H1 hypothesis. Correlation analysis shows that at least two variables are related to each other. It aims to define its direction

and strength. The most important assumption of the analysis is that the relationship between the variables is linear (Kurtuluş, 2010, p.181). According to the correlation analysis shows that there is statistically significant positive relationship with last mile delivery and customer satisfaction.

## H2

**Table 15**

*H2 Correlation Analysis*

Correlations			
		LMD	Age
LMD	Pearson Correlation	1	-,203*
	Sig. (2-tailed)		,030
	N	115	115
Age	Pearson Correlation	-,203*	1
	Sig. (2-tailed)	,030	
	N	115	115

\*. Correlation is significant at the 0.05 level (2-tailed).

The relationship between last mile delivery and age were tested with the help of correlation analysis and the analysis results are proffered in Table 15. It can be observed that there is statistically significant negative relationship with last mile delivery and age.

**H3****Table 16***H3 Correlation Analysis***Correlations**

		LMD	Gender
LMD	Pearson Correlation	1	-,012
	Sig. (2-tailed)		,900
	N	115	115
Gender	Pearson Correlation	-,012	1
	Sig. (2-tailed)	,900	
	N	115	115

The relationship of last mile delivery and gender were tested with the help of correlation analysis and the analysis results are presented in Table 16. It is able to survey that there is no statistically meaningful relationship between last mile delivery and gender.

**H4****Table 17***H4 Correlation Analysis*

		Correlations	
		LMD	EducationLevel
LMD	Pearson Correlation	1	-,206*
	Sig. (2-tailed)		,027
	N	115	115
Education Level	Pearson Correlation	-,206*	1
	Sig. (2-tailed)	,027	
	N	115	115

\*. Correlation is significant at the 0.05 level (2-tailed).

The relationship of last mile delivery and education level were tested with the help of correlation analysis and the analysis results are presented in Table 17. It can be observed that there is important negative relationship between last mile delivery and education level.

**H5****Table 18***H5 Correlation Analysis*

		Correlations	
		LMD	MaritalStatus
LMD	Pearson Correlation	1	,235*
	Sig. (2-tailed)		,012
	N	115	115
Marital Status	Pearson Correlation	,235*	1
	Sig. (2-tailed)	,012	
	N	115	115

\*. Correlation is significant at the 0.05 level (2-tailed).

The relationship of last mile delivery and marital status were tested with the help of correlation analysis and the analysis results are presented in Table 18. It can be observed that there is statistically positive and weak relationship between last mile delivery and marital status.

## H6

**Table 19**

*H6 Correlation Analysis*

		Correlations	
		LMD	Occupation
LMD	Pearson Correlation	1	-,211*
	Sig. (2-tailed)		,024
	N	115	115
Occupation	Pearson Correlation	-,211*	1
	Sig. (2-tailed)	,024	
	N	115	115

\*. Correlation is significant at the 0.05 level (2-tailed).

The relationship of last mile experience and occupation were tested with the help of correlation analysis and the analysis results are proffered in Table 19. It can be monitored that there is statistically negative relationship between last mile experience and occupation.

**H7****Table 20***H7 Correlation Analysis*

		Correlations	
		CS	Age
CS	Pearson Correlation	1	-,091
	Sig. (2-tailed)		,333
	N	115	115
Age	Pearson Correlation	-,091	1
	Sig. (2-tailed)	,333	
	N	115	115

The relationship of customer satisfaction and age were tested with the help of correlation analysis and the analysis results are presented in Table 20. It can be observed that there is no statistically significant relationship between customer satisfaction and age.

**H8****Table 21***H8 Correlation Analysis*

		Correlations	
		CS	Gender
CS	Pearson Correlation	1	,100
	Sig. (2-tailed)		,286
	N	115	115
Gender	Pearson Correlation	,100	1
	Sig. (2-tailed)	,286	
	N	115	115

The relationship of customer satisfaction and gender were tested with the help of correlation analysis and the analysis results are presented in Table 21. It can be observed that there is no statistically significant relationship between customer satisfaction and gender.

## H9

**Table 22**

*H9 Correlation Analysis*

		Correlations	
		CS	Education Level
CS	Pearson Correlation	1	-,181
	Sig. (2-tailed)		,053
	N	115	115
Education Level	Pearson Correlation	-,181	1
	Sig. (2-tailed)	,053	
	N	115	115

The relationship of customer satisfaction and education level were tested with the help of correlation analysis and the analysis results are presented in Table 22. It can be observed that there is no statistically significant relationship between customer satisfaction and education level.

**H10****Table 23***H10 Correlation Analysis*

		Correlations	
		CS	MaritalStatus
CS	Pearson Correlation	1	,145
	Sig. (2-tailed)		,122
	N	115	115
Marital Status	Pearson Correlation	,145	1
	Sig. (2-tailed)	,122	
	N	115	115

The relationship of customer satisfaction and marital status were tested with the help of correlation analysis and the analysis results are presented in Table 23. It can be observed that there is no statistically significant relationship between customer satisfaction and marital status.

**H11****Table 24***H11 Correlation Analysis*

		Correlations	
		CS	Occupation
CS	Pearson Correlation	1	-,116
	Sig. (2-tailed)		,217
	N	115	115
Occupation	Pearson Correlation	-,116	1
	Sig. (2-tailed)	,217	
	N	115	115

The relationship of customer satisfaction and professions were tested with the help of correlation analysis and the analysis results are presented in Table 24. It can be observed that there is no statistically significant relationship between customer satisfaction and occupation.

## H12

**Table 25**

### *H12 Regression Analysis*

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,772 <sup>a</sup>	,596	,593	,35931

a. Predictors: (Constant), CS

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,761	,177		9,950	,000
	CS	,588	,045	,772	12,919	,000

a. Dependent Variable: LMD

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21,548	1	21,548	166,904	,000 <sup>b</sup>
	Residual	14,589	113	,129		
	Total	36,137	114			

a. Dependent Variable: LMD

b. Predictors: (Constant), CS

It can be explained that the summary of the model showing the effect of the last mile experience concept on customer satisfaction is given Table 25. Accordingly ( $R^2 = 0.596$ ), the last mile delivery experience affects customer satisfaction by 59.6%.

The relationship of last mile delivery experience on customer satisfaction was tested with the help of regression analysis and the analysis results are presented in Table 25. It is understood from the value in the significance column of the table ( $p = 0.000$ ;  $p < 0.05$ ) that the relationship between the aforementioned variables is statistically significant. As a result, H12 hypothesis is accepted.  $H_0$  is rejected.

#### 4. CONCLUSIONS

E-commerce is the collection of business transactions between buyers, sellers, and suppliers around the world. Globally, trade is becoming competitive at an evolving pace, and customers have higher requirements for delivery time of goods and services needs. Under these circumstances, the demands and popularity of e-commerce are becoming more and more significant. When it comes to electronic commerce, it can be defined as the process of exchanging and exchanging products, services and information through computer networks, where the internet is an essential component. From the perspective of the field, e-commerce is used by the parties to carry out business transactions rather than any other form such as face-to-face exchange or direct interviews. It can be defined as their participation in electronic commerce. E-commerce has enabled companies to establish a presence in the market or develop an existing market position by providing a cheaper and more efficient distribution chain for products or services.

Package volume between businesses and consumers is growing rapidly, mainly through e-commerce. Second, consumer habits and lifestyles are changing in a way that requires more flexibility and comfort. Ultimately, the feasibility of the moment of delivery that reaches consumers at home is diminishing. Therefore, in this thesis, the relationship between customer satisfaction in the last mile delivery of cargoes, which aims to improve the customer experience and eliminate the inadequacies of current delivery models, is discussed. In order to understand the relationship between the last mill delivery and customer satisfaction in e-commerce, a questionnaire study was applied to consumers over the age of 18 who shop online. The first 11 questions in the survey are for measuring the last mile delivery experience. Customer satisfaction in the last 5

questions of the survey was measured. According to Vakulenko et.al. (2019), the reliability test result was obtained Cronbach's alpha value in terms of customer satisfaction, online experience and last mile delivery experience was 0.89, 0.88 and 0.85 respectively. In our survey results, examining the internal consistency of the questionnaire, a reliability value of  $\alpha = 0.958$  was obtained. In other words, the value of the Cronbach's alpha value is higher than Vakulenko research. In Vakulenko (2019)'s research, there have a important relationship between online retailer experience and customer satisfaction and also it can be found that there have a significant role of customer satisfaction and online retail experience in last mile delivery. In terms of it can be observed in our research that there have a big role of the terms of customer satisfaction in last mile delivery. Businesses should not only address customer satisfaction from a cost perspective. It should be able to show the customer the value and sensitivity given to the jewelry as precious as a jewel. Businesses must be able to create value for customers. While creating this value, they should be able to reflect on how a good service should be provided by putting themselves in the customer's shoes. To be successful in today's markets, customer requests must be better understood and satisfied.

According to Delice (2008), it is able to be successful in the market, customer requests must be well understood and satisfied. For this reason, a business that wants to be customer-oriented must first determine its target customers, recognize these customers and organize every activity in a way to satisfy them. The approach of the QFD is a customer-oriented approach; the most critical first step in the applications of this method is to understand the voice of the customer. Understanding customer demands and needs and determining their differences are very important for the management of these need.

## 4.1 Hypotheses Results

**Table 26**

*Hypotheses Results*

<b>H1:</b> There is a relationship between last mile delivery experience and customer satisfaction	<b>Accepted</b>
<b>H2:</b> There is a relationship between last mile delivery experience and age	<b>Accepted</b>
<b>H3:</b> There is a relationship between last mile delivery experience and gender	<b>Rejected</b>
<b>H4:</b> There is a relationship between last mile delivery experience and education	<b>Accepted</b>
<b>H5:</b> There is a relationship between last mile delivery experience and marital status	<b>Accepted</b>
<b>H6:</b> There is a relationship between last mile delivery experience and professions	<b>Accepted</b>
<b>H7:</b> There is a relationship between customer satisfaction and age	<b>Rejected</b>
<b>H8:</b> There is a relationship between customer satisfaction and gender	<b>Rejected</b>
<b>H9:</b> There is a relationship between customer satisfaction and education	<b>Rejected</b>
<b>H10:</b> There is a relationship between customer satisfaction and marital status	<b>Rejected</b>
<b>H11:</b> There is a relationship between customer satisfaction and professions	<b>Rejected</b>
<b>H12:</b> Last mile delivery experience affects customer satisfaction	<b>Accepted</b>

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## Appendix A

### Questionnaire Items in Turkish

Sizi Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü bünyesinde yürütülen “E-Ticarette Son Kilometre Teslimatı: Müşteri Memnuniyeti İlişkisi” başlıklı araştırmaya katılmaya davet ediyoruz. Soruları cevaplarken e-ticaret sitelerinden son yaptığımız alışverişinizdeki teslimat deneyiminizi göz önünde bulundurarak cevaplandırmanız istenmektedir. Anketi doldurmanız yaklaşık 5 dakikanızı alacaktır. Çalışmaya katılım tamamen gönüllülük esasına dayanmaktadır. Çalışmanın amacına ulaşması için bütün soruları eksiksiz ve içtenlikle yanıtlamanız önem arz etmektedir. Çalışmadan elde edilecek veriler sadece bilimsel amaçlı olarak kullanılacak olup kesinlikle üçüncü kişilerle paylaşılmayacaktır.

Katkılarınız için teşekkür ederiz.

#### Demografik Sorular:

1. Cinsiyetiniz \*

Kadın

Erkek

**2. Yaş aralığınız \***

- 20'nin altında
- 20-29
- 30-39
- 40-49
- 50-59
- 60 +

**3. Eğitim düzeyiniz \***

- ilköğretim
- Lise
- Önlisans
- Lisans
- Yüksek lisans-Doktora

**4. Mesleğiniz Nedir? \***

- Öğrenci
- Çalışan
- İşsiz
- Emekli

5. Medeni durumunuz \*

- Evli
- Bekar

6. Tam olarak sipariş ettiğim ürünümü aldım. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

7. Siparişim uygun zamanda ulaştı. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

8. Teslimatımla ilgili gerekli tüm bilgiler bana verildi. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

9. Uygun türde bir teslim alma hizmeti sağlandı. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

10. Ürünüm iyi durumda geldi. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

11. İade sürecim sorunsuz geçti. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

12. Siparişimin teslim noktasına ulaşmak kolaydı. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

13. Teslimat prosedürü konusunda kendimi güvende hissettim. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

14. Bu kargo firması güvenilirdir. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

15. Teslimatımı kontrol edebildim \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

16. Teslimat deneyiminden keyif aldım. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum



17. Kargo firmasıyla olan tüm deneyimlerime dayanarak kendimi çok memnun hissediyorum. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

18. Bu Kargo firmasını kullanma tercihim akıllıca bir seçimdi. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

19. Genel olarak, Kargo firmasını kullanma kararından memnunum. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

20. Satın alma işlemimi yapmak için bu kargo firmasını kullanmaya karar verdiğimde doğru olanı yaptığımı düşünüyorum. \*

- Kesinlikle katılmıyorum
- Katılmıyorum
- Kararsızım
- Katılıyorum
- Kesinlikle katılıyorum

