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Impact of Covid-19 on E-commerce Last Mile
Logistics

*Impacto del Covid-19 en la logística de la última milla
del comercio electrónico*

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INFORMATION

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ABSTRACT

The trend of the unstoppable rise of e-commerce in the last years is clear, but in 2020 there was a factor that impacted significantly on this trend, the Covid-19. The coronavirus pandemic has provided a major boost to a business model that was already rising. The objective of this project is to evaluate how the Covid-19 has influenced the behavior of people in online consumption and to study the impact of this change on last mile logistics of companies with online sales. To achieve this, an analysis of the last mile logistic situation before Covid-19 has been carried out, evaluating the problems that already existed and the solutions that were being proposed. Additionally, the impact of Covid-19 on this last phase of logistics has also been evaluated by carrying out a survey. With this research technique the behavior of e-commerce consumers has been studied to see the changes of their consumption and how Covid-19 has affected their online purchases. The results show that coronavirus has been a disruptive element for e-commerce affecting the last mile logistics, and that there are still many problems that need to be solved so that customers have a satisfactory online shopping experience.

Key words: *behavior - consumption - Covid-19 - e-commerce - impact - last mile logistics*

RESUMEN

La tendencia del imparable aumento del comercio electrónico en los últimos años es clara, pero en 2020 hubo un factor que influyó significativamente en esta tendencia, el Covid-19. La pandemia de coronavirus ha dado un gran impulso a un modelo de negocio que ya estaba en alza. El objetivo de este proyecto es evaluar cómo el Covid-19 ha influido en el comportamiento de las personas en el consumo en línea y estudiar el impacto de este cambio en la logística de última milla de las empresas con ventas en Internet. Para ello, se ha realizado un análisis de la situación de la logística de la última milla antes del Covid-19, evaluando los problemas que ya existían y las soluciones que se proponían. Además, también se ha evaluado el impacto de Covid-19 en esta última fase de la logística mediante la realización de una encuesta. Con esta técnica de investigación se ha estudiado el comportamiento de los consumidores de comercio electrónico para ver los cambios de su consumo y cómo el Covid-19 ha afectado a sus compras online. Los resultados muestran que el coronavirus ha sido un elemento perturbador para el comercio electrónico afectando la logística de la última milla, y que todavía hay muchos problemas que deben ser resueltos para que los clientes tengan una experiencia satisfactoria de compra por Internet.

Palabras clave: *comercio electrónico - comportamiento - consumo - Covid-19 - impacto - logística de última milla*

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1. INTRODUCTION

In a globalized and digitized world, the evolution in trade must not be left behind. The digital revolution continues to transform the way people shop and the buyers themselves. With today's world so advanced in digitalization, e-commerce has opened possibilities for businesses to overcome barriers.

Today the idea of living without e-commerce seems impossible, complicated, and inconvenient for many people. It was not until just a few decades ago that the idea of e-commerce had even appeared. E-commerce started 40 years ago, and, to this day, it continues to grow with new technologies, innovations and thousands of companies entering the online marketplace every year. This increase of e-commerce has turned the last mile logistics into a key sector; its management will influence the valuations that customers make on the products purchased and on the company.

In 2020, the coronavirus crisis has impacted people's habits, including the shopping habits, which was reflected in the increasing exponentially sales in the e-commerce channel. In this context, the last mile logistics is experiencing a great impact due to these trend increases.

In this changing environment, the objective of this work is to evaluate how the Covid-19 has influenced the behavior of people in online consumption and to study the impact of this change on last mile logistics of companies with online sales.

To achieve this general objective, three intermediate objectives are established in the work: (1) know the global situation of e-commerce and last mile logistics before Covid-19, (2) know this situation mentioned before but focused in Spain, and (3) study how the coronavirus has affected online consumer behavior in Spain and how these changes can affect companies and their last mile logistics.

Considering these aspects, the rest of the work has been structured around five chapters.

- Chapter 2: THEORETICAL FRAMEWORK. This section presents the main trends that existed globally in e-commerce in the recent years prior to Covid-19, gives a brief introduction to last mile logistics and presents the main challenges and solutions that were already underway.

- Chapter 3: COVID-19 AND LAST MILE LOGISTICS. In this section, the disruptive element, coronavirus, is presented, stating the reasons why it has been able to influence last mile logistics and discussing the impact it has had on this phase of logistics.
- Chapter 4: EMPIRICAL ANALYSIS. In this section, we first present the starting point of the last mile logistics situation in Spain before Covid-19, to later carry out a survey, which is the selected research technique. All the results obtained are also presented, providing the necessary graphs for a better understanding.
- Chapter 5: MAIN PROBLEMS DETECTED AND SOME GUIDELINES FOR ENTERPRISES. In this section, the main problems analyzed in the survey, about delivery times, website failures, availability of online stores and new delivery methods, from the consumer's point of view focused on last mile logistics, are discussed. In addition, a series of recommendations for companies are introduced according to these aspects analyzed.
- Chapter 6: CONCLUSIONS. This section recalls the steps that have been followed to achieve the proposed objective. After this, some conclusions are established based on the results obtained.

2. THEORETICAL FRAMEWORK

2.1. RECENT YEARS IN E-COMMERCE TRENDS

In the last decades, globalization has had a very important impact all over the world, affecting not only politically and economically but also the cultural level. Demographic and socio-economic factors and the increase in consumer awareness have led to a structural change in the economy, based on e-commerce as a dynamic factor. E-commerce, also known as electronic commerce or internet commerce, can be defined, according to the World Trade Organization (WTO) as: “the production, distribution, marketing, sale or delivery of goods and services by electronic means”.

Since 2010, the impact e-commerce has had on the Gross Domestic Product (GDP) has been rising, amounted to 30% of total GDP (2018), 8% more than in 2017, according to a report published by the UN Conference on Trade and Development (UNCTAD, 2020). The United States was again the country with more internet sales, 7,9 billion euros, followed by Japan with 3,02 billion euros and China with 2,1 billion euros. Spain climbed up the ranks to tenth place in the world, with a total sale of 307.000 million of euros, only exceeded by the three mentioned

countries and South Korea, United Kingdom, France, Germany, Italy, and Australia (Forbes, 2020).

According to a report by Deloitte, these trends which are changing in our shopping behavior will result in permanent changes. Some companies have experienced short-term peaks in demand, but other businesses will move to online for good and these are the reasons (Deloitte, 2020):

- ❖ Convenience beats prices: People are getting used to the convenience of the Internet, and these habits will last. In 2019, convenience topped the list of reasons to buy online.
- ❖ Social Distancing Remains at Risk of Pandemic Rollback: There is concern in society about a medium-term reversal of the pandemic, and the greater focus on personal hygiene and social distancing will lead to continued online shopping, enhancing long-term behavior change.
- ❖ Intensified online competition: Online retailers who have experienced an increase in volume want to retain these new consumers through subscription models, offers, increased product range and loyalty programs.
- ❖ New distribution and logistics capacity: Distribution companies are registering an overloaded demand for last-mile and non-contact parcel delivery, which has made it possible for them to create new capacity. In addition, the new peer-to-peer parcel delivery structures are being accelerated.
- ❖ Elderly consumers go online: Since this situation is of particular concern to the older population, who are expected to be locked up at home, by their own will, for longer than the rest of society, their online consumption is expected to increase.

Therefore, e-commerce has become a priority for many companies, as it is considered a way to overcome many obstacles in traditional distribution channels, by innovating key processes in their supply chain related to the last mile. E-commerce has forced industries to focus more their attention in accomplishing what is promised to customers, especially in the products delivery. Nowadays, companies are facing much more technological and empowered clients, which makes firms need to improve their distribution chain to satisfy their desires.

This boom in e-commerce in recent years makes logistics more complicated and there has been a rise of the importance of last mile logistics. *Last mile (or last mile logistics)* is the step in the distribution chain, from the time the package leaves the last distribution point (warehouse,

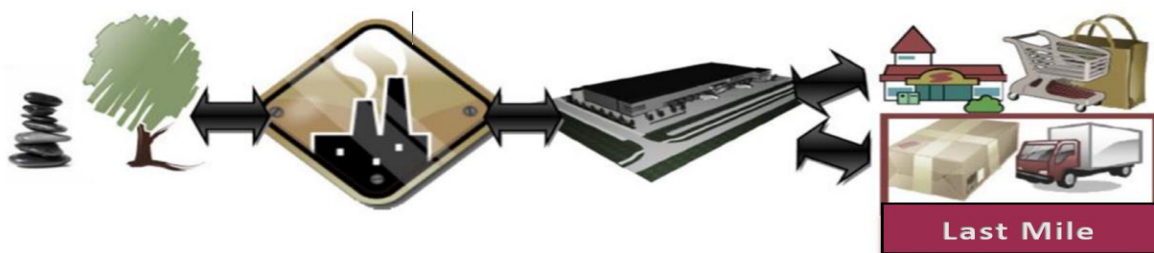
shop, distribution center...) until it reaches its delivery destination (Garrell & Guilera, 2019). In this process the shipment is delivered to the receiver, either the final consumer or the retailer who will sell it, from the distribution centers.

2.2. LAST MILE LOGISTICS

Recently, there has been a transformation in e-commerce logistic strategies, where the function of last mile logistics is no longer limited only to transport products from the warehouse to the clients. Nowadays, the key to the success of e-commerce is to do that process in the shortest time possible and under the best conditions. Last mile logistics is a term which covers all the processes related to the quality of the final delivery of an online order to the customer.

This phase consists of only a few kilometers but it is where many problems arise, and efficiency and customer satisfaction come together at a critical point. The last mile is an important part of the total cost of the whole supply chain between 13% and 75% of the total logistic cost (depending on the city the delivery is made) being this the most expensive section of the distribution of goods (Gevaers, 2011; Guisti, 2019). These costs are so high due to the inefficiencies in the distribution and to the mismanagement. Figure 1 shows a schematic representation of the supply chain and the position of the last mile within it.

Figure 1. Basic structure of the supply chain



Source: Gevaers et al., 2011

In this process, there are complex relationships between many agents involved which must face different challenges that require effective responses and good coordination and communication to maintain a good position in the market.

Below, several agents that intervene in the last logistic mile are going to be listed (Deloitte, 2020):

- ❖ Producers, who oversee the production of the goods. They can be divided in Business to Business or Business to Consumer.

- ❖ Shippers or distributors, who are sometimes also the producers, oversee preparing and organizing the shipment of the goods. They are responsible for contracting the transport services, managing it in such a way as to minimize their logistics costs.
- ❖ Receptors of the delivery, that can be the final client or another intermediary of the supply chain.
- ❖ Freight forwarders, who work as intermediaries between shippers and receivers managing transportation services by consolidating shipments or other systems.
- ❖ Distribution centers, which are the places where the cargo consolidation and deconsolidation processes take place, and which sometimes also provide added services (packaging of the goods, etc.).
- ❖ Intermodal terminals, where various modes of transport arrive so that goods can easily change from one mode of transport to another (ports, airports, terminals with road and rail access, etc.).
- ❖ Carriers are the companies in charge of the physical transport of the goods, this can be made by any transport mode such as trucks, trains, ships, or planes. There are different types of carriers:
 - Public carriers who sell their service in a free competition market.
 - Private carriers who belong to different companies not specialized in transport (furniture stores, appliance stores, supermarkets, etc.) but they perform these tasks as an added service for the customer or for their own supply.
 - Contract carriers, which are public carriers that have signed an exclusive contract with a certain company and often operate as private carriers.
 - Exempt carriers, which are responsible for transporting special, unregulated goods (often outside of public travel).

2.2.1. Last Mile Logistics Main Challenges

As mentioned above, the last mile logistics is a complicated and critical phase where many challenges arise and where numerous agents are involved. The following is a list of the different factors and challenges that make last mile logistics a complicated process (Deloitte, 2020; Garrell & Guilera, 2019):

1. Last mile is normally **carried out in urban areas**, with the consequent mobility problems, such as: traffic, traffic jams, scarcity or absence of unloading sites, pedestrian streets, historical centers of difficult access. The 20% of the traffic in the cities is due to the transport of goods. Many cities do not have adequate unloading sites, either by the size, quantity, location, or times when they can be used. Also, they are many times occupied by non-authorized vehicles (parked cars) which reduce the effectiveness and make it difficult for transporters to use.
2. Another problem is that the deliveries are normally of a **small number of parcels** as clients expect to have their order as soon as possible in certain time windows. Making each delivery very personalized, and not creating an optimal route to follow with many products. Transport units have a maximum load that is usually not used efficiently, with an average vehicle occupancy ranging from 30% to 40%. This makes that sometimes a delivery vehicle must travel long distances inside a city to deliver a single package. This shipment is not only ineffective and inefficient, but it also makes the cost increase.
3. There are big **contamination problems**, which affect the company's corporate social responsibility. These problems are not only the atmosphere contamination but also the noise, traffic accidents, visual intrusion, which can disturb the citizens. Obviously the most important problem is the atmospheric contamination, which can be estimated that the transport of goods is responsible for approximately 25% of CO₂ emissions in the EU (2019).
4. The main incidence occurs in the direct delivery with the final consumers, as it is very common that the parcel cannot be delivered due to the absence of the receptor. Normally **no specific delivery schedule** has been established and therefore delivery failure rates due to the customer not being at home are considerably high. Many times, the delivery man goes several times to the address before the delivery is carried out successfully. The cost overrun for failed deliveries is estimated at 30%. In case a receptor is not at home, it is not recommendable to leave the packages in front of the clients door, because it forces to face the losses by robberies and by destruction by rain in the houses with garden

These problems are not expected to decrease, on the contrary they are increasing in the different cities. The volume of goods the cities receive keep rising and are mainly distributed by delivery vehicles. Also, the production technologies keep improving making the production cycles

quicker, leading with this to an increase in the online sales. The *just-in-time* deliveries increase the frequencies of small shipments.

To improve the last mile logistics there are three main challenges which must be overcome. Firstly, reduce the number of failed deliveries due to the absence of the receptor. Also, reduce the costs due to the repetition of journeys and finally, reduce environmental pollution from emissions of combustion engine vehicles.

2.2.2. Last Mile Logistics Solutions

Despite that in the last mile there are unpredictable obstacles, so there will always be situations out of our control. However, there are others which could be solved with a good planification. In order to have an efficient delivery of the packages and in this way be able to improve the last mile logistics, there are some solutions which must be considered to overcome the problems mentioned before (Deloitte, 2020; Garrell & Guilera, 2019).

1. **Planning the optimization of delivery routes** whenever it is possible. To do so, it is important to know which would be the most efficient route in order to avoid the critical points, where there is going to be a lot of traffic, close streets, works, and at the same time cover the largest number of delivery points in the shortest time. It is necessary to synchronize all the elements of the capillary distribution. For this planification it is also important to achieve total communication with the client with positioning methods so that they can always visualize their package, thus improving the efficiency of the service.
2. To solve the loading and unloading areas problem Public Administrations are investing in **digital platforms** to improve these infrastructures, by collecting the parking reservation of this type of zone by means of an electronic ticket that allows to know the time of use of the assigned places, improving this way its management.
3. Start using **more agile and light commercial vehicles** to move in urban areas. Hybrid or electric vehicles are much more efficient and prepared for delivery. It is worth mentioning the option of electric scooters that some logistics providers are already using. Electric scooters prioritize fast and non-polluting mobility to points where larger vehicles cannot access. The e-commerce sector is the most capable of implementing this trend, reducing emissions caused by last mile deliveries by up to 70%. These types of vehicles are gaining importance as congestion increases and access restrictions arise in cities.

4. Another solution for when the customer is not at home, and therefore the delivery man does not have to return a second time to the home, and so increase costs is to have **smart lockers** for parcel deliveries. They are delivery and collection mailboxes accessible at all times, located at strategic points in cities such as the most densely populated districts or shopping centers, subway stations, large offices, etc. Users can pick up their packages in the mailbox they have chosen by means of a personal access code that they previously received in their cell phones.

This is an emerging infrastructure in Spain, as there are currently only about 10,000 lockers (2020), while France, for example, has more than 60,000. However, investment in this type of infrastructure has been growing to a great extent in recent years. An example of this is the case of Citibox, which plans to have more than 300,000 mailboxes in private buildings in Madrid, for which it will invest 26 million euros.

The intelligent lockers save parcel companies 0.8 euros per package, due to the standardization of shipping routes and the elimination of failed deliveries. However, only 4% of Spaniards use this service.

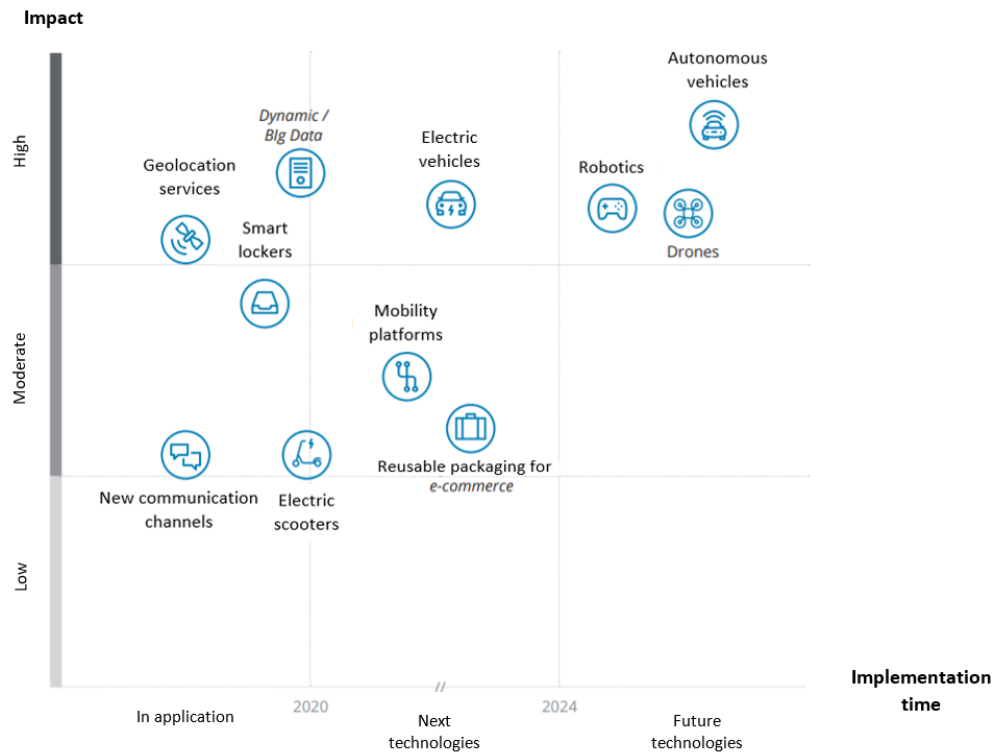
Finally, there are **new technologies** that can be a way to improve the last mile logistics, but which are still being developed and improved. These are future technologies which still need to be regulated, but that are expected to improve the last mile logistics in the following years (Deloitte, 2020):

- ❖ Drones: They allow you to carry out quicker deliveries with a big cost reduction. They are limited to support 2 to 5 kilogram parcels, allowing up to 60% of all package deliveries to be made by drones. This would reduce notably the quantity of vehicles in the cities.
- ❖ Autonomous vehicles: Having a vehicle that can make trips without a driver and take the packages to the final destination can save personnel costs, make the shipment at the time that best suits the consumer and avoid errors in the planned route.
- ❖ Robotics: Using robotic warehouses can save on personnel costs as well as space. It would eliminate the corridors necessary for the passage of workers and increase the space available for storage.

Graph 1 summarizes the expected impact of the different solutions that are being implemented and that will be implemented in the logistics of the last mile in the next ten years. Although all

these solutions are important, they will not all have the same impact or be at the same level of development.

Graph 1. Impact of technological trends



Source: Deloitte analysis

As it can be seen, some of the actions that are being carried out nowadays do not have a great impact on the development of the last mile logistics, such as new communication channels or electric scooters. On the contrary, smart lockers and geolocation services are having a great effect on the last mile. But we can see that all the future measures are expected to have a great impact, and instead they are the ones that are not yet developed. This graph can help companies see where they need to focus their attention today and in the near future to improve their last mile logistics.

3. COVID-19 AND LAST MILE LOGISTICS

3.1. COVID-19: GLOBAL PANDEMIC

The e-commerce logistics was already, in previous years, a challenge in itself but at the beginning of the year 2020 a disruptive element, Covid-19, appeared that made all these problems mentioned before to be pronounced and that the growth of e-commerce accelerated more than expected.

Covid-19, also known as coronavirus, is an infectious disease which transmission occurs through small droplets that are emitted by speaking, sneezing, or coughing (OMS, 2020).

The first outbreak was in December 2019 in the city of Wuhan, China. It was a rapidly spreading disease, and on January 30, 2020 the World Health Organization (WHO) declared it a health emergency of international concern. Later, on March 11, the disease had already reached more than 100 countries and was recognized as a pandemic by the WHO.

To reduce the spread, quarantines were declared in different countries, including Spain, which restricted human movement. This lockdown forced people to stay at home, without going to work, school or public areas, maintaining safety distances with other people, and it also forced the suspension of all economic activity in those professions that were not considered essential.

Although at the beginning of the year it was clear that it was happening in China, the other countries did not know how to foresee what was going to happen so no country had a prevention method. No country or company was prepared for what was to come, leading this to a socioeconomic crisis.

All the measures carried out to stop the spread of Covid-19 had an impact on the purchasing habits of consumers as there were movement restrictions and fear of contagion. It also generated psychological effects such as the feeling that people would be restricted in what could be bought.

3.2. IMPACT OF COVID-19 ON LAST MILE LOGISTICS

In this crisis there are certain characteristics that have led to a change in trends in online shopping. It has been a health crisis, where a state of alarm was declared preventing citizens from going out to the streets and which forced the closure of those stores whose activity was not strictly necessary. This, along with society's fear of getting infected in closed places, such

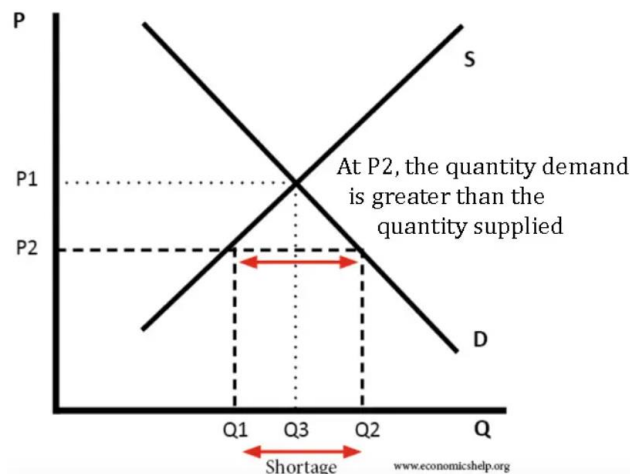
as physical stores, has led to a boom in online shopping. According to a study by the consulting firm Nielsen: “online shopping grows by 75% thanks to lockdown” (Nielsen, 2020).

The fear of the coronavirus and a possible isolation as it had already happened in Italy, made individuals go to the supermarkets to collect food and toilet paper, leaving a situation not much seen before in the different establishments of the cities. This fear caused an impulse buying reaction which led to seeing empty shelves in the supermarkets.

Faced with this situation, where the supermarkets were affected, Juan Roig, executive president and main shareholder of Mercadona, sent a message of calm to society: “Situations similar to this crisis have already been experienced in the past, and there has always been enough products to supply all customers. Mercadona is very efficient and so is the sector. The supply of products is guaranteed. I believe that after a period of uncertainty we human beings will react and return to normality” (Juan Roig, 2020).

Although many shelves were empty, there were no shortages. *Shortage*, as seen in Figure 2 is “a situation in which demand for a product or service exceeds the available supply” (Investopedia, 2019). There was no shortage because it would only happen if some kind of product was not available anymore. What was happening at that moment of the crisis were punctual stockouts, which were resolved when a truck with merchandise from its centers and logistics platforms arrived at the stores. A *stockout* is “a situation in which a company sells its entire inventory and the demand or requirement for an item cannot be fulfilled from the current inventory” (Farlex Financial Dictionary, 2012).

Figure 2. Diagram to show a shortage



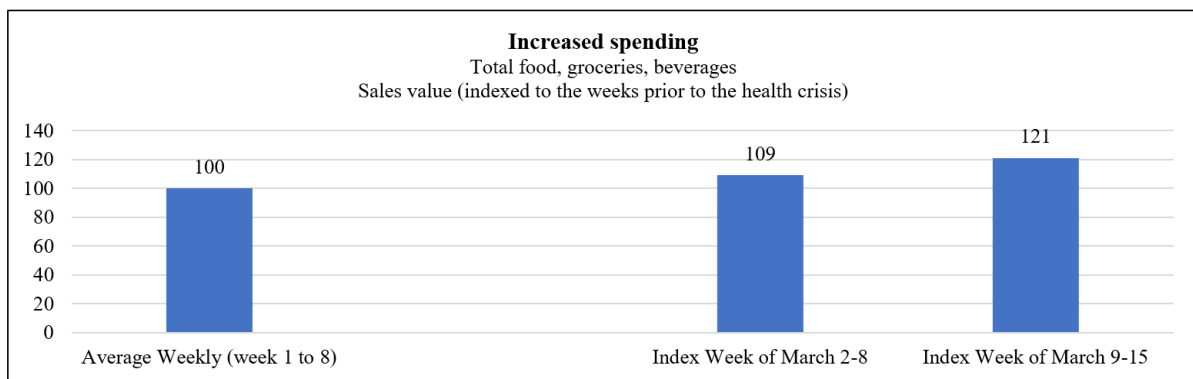
Source: *Economicshelp.org*

The “shortage gaming” effect is a classic cause of this bullwhip effect that needs to be managed. This effect gives an explanation to how the downstream gamers inflate on purpose their supply needs to demand a larger quantity of a resource when they anticipate a supply shortage. This leads to more unpredictable demand patterns during this crisis (Seifert, 2020).

The increase of the sales produced a peak in the demand, due to the fear to find empty shelves in the supermarkets or out of stock products making people over-provisioning. To respond to this situation, the supermarkets generated higher purchase volumes to secure their inventories.

Specifically, there was a 21% increase in weekly spending for the week of March 9-15. This increase was driven by larger shopping baskets, with customers spending on average 25% more than in the weeks prior to the coronavirus crisis (KANTAR, 2020).

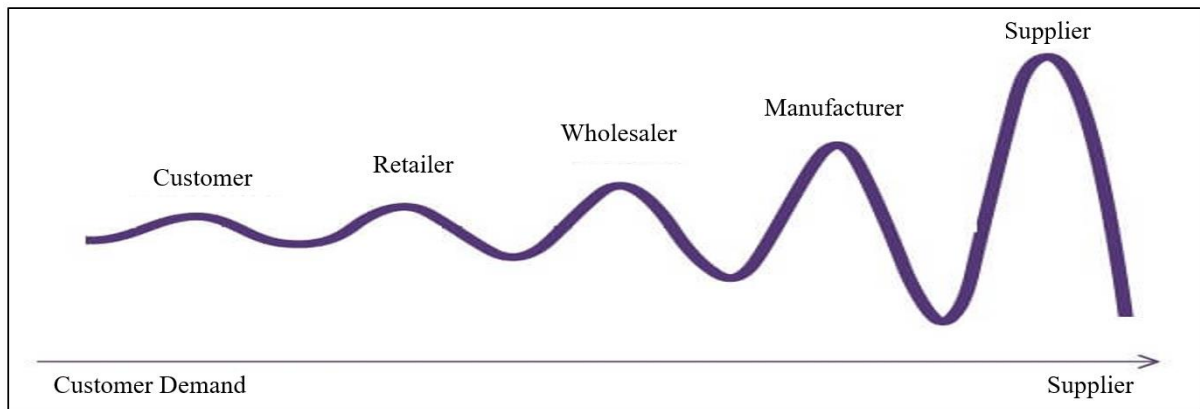
Graph 2. Increased spending of food, groceries, and beverages



Source: KANTAR, consumer panel

Due to the uncertainty caused by the pandemic, the consumer, fearful of running out of supplies, made large purchases, leaving stock breaks. This specific disruption increased the demand for some products, creating an enormous and costly challenge of dealing with the “bullwhip effect”.

Bullwhip effect (BWE) is “a phenomenon describing how small fluctuations in demand at the retail level can cause progressively larger fluctuations in demand at the wholesale, distributor, manufacturer and raw material supplier levels”. Bullwhip effect is the uncertainty in the supply chain caused by an increase in demand variability and lead time (Jaipuria & Mahapatra, 2016).

Figure 3. The bullwhip effect

Source: Clay Norris

According to the report “Radiografía de las cadenas de suministro españolas: Afectación del Covid-19, retos y perspectivas para la reconstrucción”, carried out by BDO, established that these pronounced changes in demand behavior have affected the pre-established inventory levels prior to Covid-19, and around 76% of the companies surveyed have suffered a ‘bullwhip effect’ (BDO, 2020).

Companies often, to counteract forecasting errors, carry an inventory buffer called “safety stock”, which is extra stock to allow for uneven demand. This disruption generates a supply above the real perceived need, an increase that will be perceived and increased even more in each of the links of the supply chain, amplifying the reaction to the previous intermediary, generating an amplified wave evolution.

The distributor makes a forecast of the consumer demand and orders a larger quantity for the safety stock. The wholesaler orders more units than requested to get discounts and keep enough. And finally, the manufacturer orders material to make more units than required to lower manufacturing costs and make a timely delivery. As a result, many more units are manufactured than the consumer has requested.

The problem is that the manufacturer, to meet the peaks in demand, must increase its working capacity, raising the cost of the product it supplies to the chain and reducing the value it generates.

The volume of orders also causes delivery times to be longer, and as a result, retailers and distributors increase orders. This generates periods in which orders increase dramatically, charging the entire supply chain with stock and therefore the costs of keeping so much

merchandise in stock. The oversupply due to the health crisis of the Covid-19 causes an overdimensioning of the products demanded from the stock of manufacturers, distributors, etc.

4. EMPIRICAL ANALYSIS

4.1. STARTING POINT OF LAST MILE LOGISTICS IN SPAIN BEFORE COVID-19

According to the VI Annual Study of e-commerce in Spain 2019, presented by Digital Commerce Marketing Elogia, in Spain, 71% of Spanish Internet users between 16 and 65 years old purchase products online, this amounts to 20.3 million people, representing an increase of 4.6% over the previous year.

As for the profile of the offer, the pure digital players are the sites where most people buy online. 88% of online consumers buy in stores that only sell on the Internet, while 70% of online purchases have been made in omnichannel stores, i.e., that sell on the Internet and in physical stores. Entertainment (71%), travel (66%) and technology (62%) are the three product categories that Spanish consumers have bought most online during 2019. Behind them, there are fashion (60%), food (55%) and household products (51%) (Rafael Sotelo, 2019).

During 2019 only e-commerce generated 38,000 million euros. These figures are good news for e-commerce and e-commerce logistics in Spain and looking ahead, the forecasts are just as hopeful. This increase that is taking place in the tendencies of online sales also brings with it a series of logistical problems that must be dealt with for it to be a profitable process.

Logistics is a very important aspect of every company with online sales. One of the biggest challenges that Spanish e-commerce faces is: to have a distribution system as organized, fast, efficient, rational, and optimized as possible, all in tune with the times. The online consumer expects newer and more sophisticated options for product delivery, reliable and modern monitoring, and information solutions. The e-commerce logistics changes at the same time as the consumption habits of the users, so nowadays what is most considered is (Fernandez, 2020):

- ❖ The availability of products in the online store.
- ❖ The delivery. The preferred delivery methods are home delivery or pickup at a service point.
- ❖ The delivery times. Customers seek to define the date and time of their delivery, as well as the immediacy.

- ❖ Shipping costs. Spanish people do not like to pay shipping costs. Customers are very demanding and do not want to pay shipping or return costs.
- ❖ The resolution of incidents. The client wants immediate solutions for possible problems that may occur.
- ❖ Tracking of shipments. Customers want detailed and personalized information on the status of the package, so that they are informed in advance if there are any delays.
- ❖ Easy returns. Customers review return policies prior to purchase. This influences their decision to purchase.

In this study it is wanted to analyze and measure how Covid-19 has impacted on these aspects mentioned.

4.2. METHODOLOGY

This section will explain the method used for the resolution of the objectives of the study. This study has been carried out using a research technique which has structured this report, providing a great deal of information which allows to obtain relevant data to work with: an online survey.

It was decided to carry out this research technique in order to know first-hand the changes in the behavior of online consumers due to the coronavirus, since I have not found current surveys as it is a very recent topic.

The survey allows us to collect quantitative information and data on the individuals in the sample and extract conclusions about the change in consumer behavior in online shopping due to coronavirus. A self-administered questionnaire was carried out, specifically, a website one (CAWI). The main reasons to choose this research tool were the reduced costs, the high response rate, the freedom to answer without pressure or influence from the interviewer, the speed to obtain the responses, people had enough time to think properly about the answers, the possibility to use complex questions and the ease to extract graphs and visual support.

The questionnaire was done in Google Forms due to all the possibilities it offers. Some types of questions included were the following: multiple choice, checkboxes, linear scale, multiple choice grid and short answers. It was spread out through WhatsApp and respondents were asked to answer it honestly. Once all the data had been obtained, the appropriate graphics would be made.

The selection of the sample has been self-delimited as it was a survey sent by WhatsApp. The population chosen for this study has been the Spanish population, regardless of their age, with access to the Internet, who may or may not have made previous purchases, as it was wanted to see if the Covid-19 had changed this trend.

The main reason for not using only a population interval, is due to the intention to collect the opinion of the entire population that may have had a change in the behavior of online shopping due to coronavirus and to see how companies have reacted to these changes from the point of view of consumers. Even though a specific age range has not been chosen, there has been a control of the age and gender of the respondents, to analyze which are the age ranges that make more purchases online and which ones less. A future study could be conducted focusing only on a certain age range, to obtain more specific information.

The method chosen for this study was a non-probability snowball or chain sampling. In this type of sampling, the researchers establish contact with specific subjects and then they obtain new participants for the sample until it is complete. After the survey, the participants were asked for access to other contacts.

It was an exponential sampling which consisted in that everyone could invite one or more individuals to participate. This way, the more people participated in the study, the more people were added to it.

Finally, with the information obtained, a statistical analysis has been done to discover patterns and implicit tendencies. The data collected was organized, tabulated, and made a descriptive analysis to describe the tendencies found.

Table 1. Technical sheet

Universe	Spanish population with access to online shopping
Sample size	332 total surveys
Geographical scope	National
Field research date	From September 8 to September 14, 2020 (6 days)
Gathering technique	Online survey distributed through social networks
Distribution method	WhatsApp

Source: Own elaboration

4.3. SURVEY

4.3.1. Survey Description

It was decided to divide the survey into six different blocks, to filter questions and carry out the survey in a more organized way, to make it easier for them to answer it (See Appendix I). Next, a description of the structure of the survey, divided in the different blocks, will be made.

1. Who has Made Online Purchases Before Covid-19?

The first block included the classification data and a general question, which was the first filter question “*Have you ever made purchases on the Internet before confinement?*”, with a dichotomous answer (“*yes*” or “*no*”) to be able to filter and focus on the sample that purchased online before the lockdown. Those who answered ‘*yes*’ to this question went on to the next block, while those who answered ‘*no*’ were redirected to another part of the survey (fifth block), concerning the reasons why they did not make online purchases.

2. Online Consumer Behavior Before Covid-19

The second block is the referred to online consumer behavior prior to the pandemic situation; looking for the online consumption trends that existed in previous years and then compare them with the trends obtained during the coronavirus.

3. Who has Made Online Purchases During Covid-19?

The third block is a general one, in which we find the second filter question: “*Did you make any online purchases during the confinement?*”, which is another dichotomous question to answer (“*yes*” or “*no*”) and be able to filter out those who made online purchases during the lockdown. Those who answered ‘yes’ continued to the next block and those who answered ‘no’ were directed to the sixth block.

4. Online Consumer Behavior During Covid-19

The fourth block is composed of questions related to consumers' experience on those online purchases during the quarantine and their future online shopping forecast. The objective of this part is to extract results of the behaviors in the online purchase acquired during the quarantine and their intentions of future online purchase, as well as to obtain results of how companies faced this important change according to the consumers.

5. Reasons for Not Shopping Online Before Covid-19

The fifth block is where those who answered ‘no’ in the first block were redirected. In this one there is a question about the reasons for not making any online purchase before the confinement and another filter question. This filter question is the same as in the third block: “*Did you make any online purchases during the lockdown?*”, to find out if, even if they had not made any online purchases prior to their confinement, they had purchased because of the coronavirus. So, if people answered ‘yes’ they were redirected to the fourth block, regarding purchases made during Covid-19, and if they answered ‘no’ they continued to the next block.

6. Reasons for Not Shopping Online During Covid-19

The last and sixth block, focused on the reasons why people did not shop online during Covid-19. People who answered ‘no’ to the filter questions in the third and fifth blocks were redirected to this section.

4.3.2. Profile of Respondents

The total of this study is based on 332 people who belong to various age ranges, of which it is worth noting that 25.7% are between 18 and 24 years old and 24.5% are between 45 and 54 years old. It can be seen from Table 2 that most respondents have been women (64.4%).

Table 2. Age and Gender of the respondents

AGE						
< 18	18 - 24	25 - 34	35 - 44	45- 54	55 - 64	> 64
2,4%	25,7 %	8,2%	13,3%	24,5%	17,8%	8,2%

GENDER	
Female	64,4%
Male	35,6%

Source: Own elaboration

4.4. SURVEY RESULTS

In this section the results of the survey will be presented, grouped by blocks, and tabulated to facilitate their analysis, which will be carried out in the following section.

4.4.1. Results of the Block: Who has Made Online Purchases Before Covid-19?

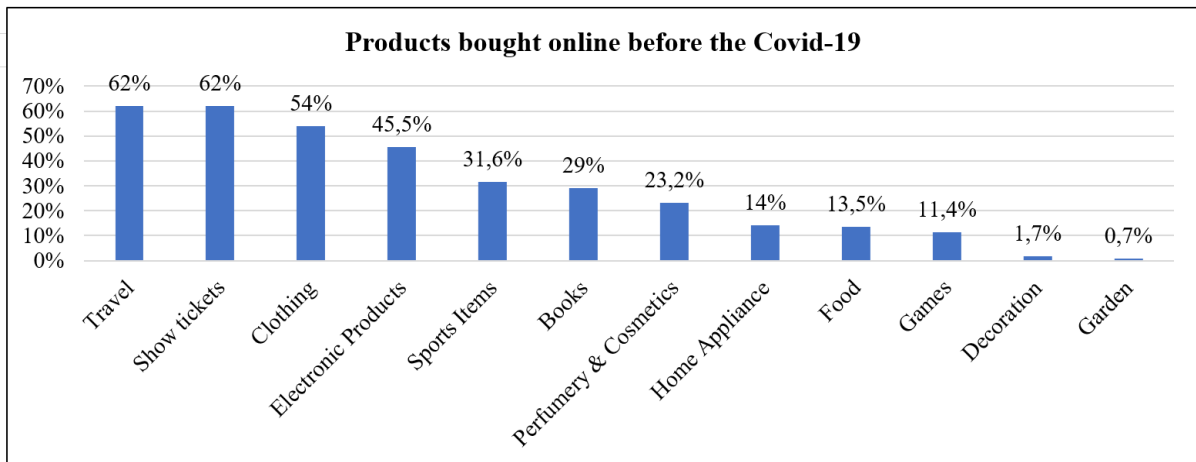
The first filter question was regarding **if people had purchased online before the lockdown**, the result is that 89.5% of the sample answered ‘yes’. So, most of the sample had previously made an online purchase before the coronavirus.

4.4.2. Results of the Block: Online Consumer Behavior Before Covid-19

❖ Types of products purchased

Information about the **type of products consumed before Covid-19 on the internet** was wanted to be obtained. According to a study conducted by Deloitte where it was established which were the most popular products on the Internet, the products have been divided into the different categories that can be seen in Graph 3. We found out that the products the sample claims to have purchased were those related to travel (62%) and show tickets (62%), followed by clothing (54%) and electronic products (45.5%).

Graph 3. Products bought online before Covid-19

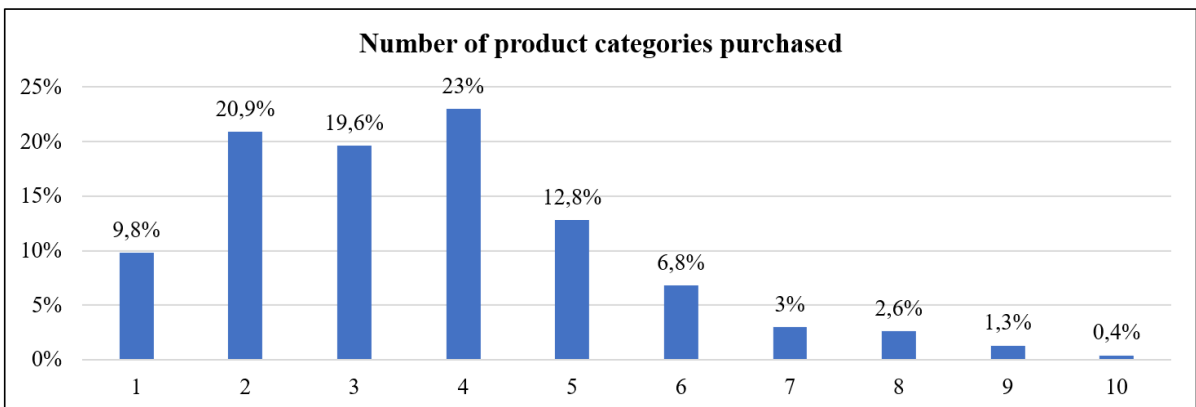


Source: Own elaboration

❖ Scope of purchases

Graph 4 allows us to see **how many product categories each person has bought**. In assessing the purchasing scope of the respondents, we found that although 89.5% of respondents had made purchases online before the Covid-19, most had purchased 4 or less different product types (73.3%). This is a significant figure, because although the vast majority of people bought online, they do not buy many different products, nor are they large online consumers.

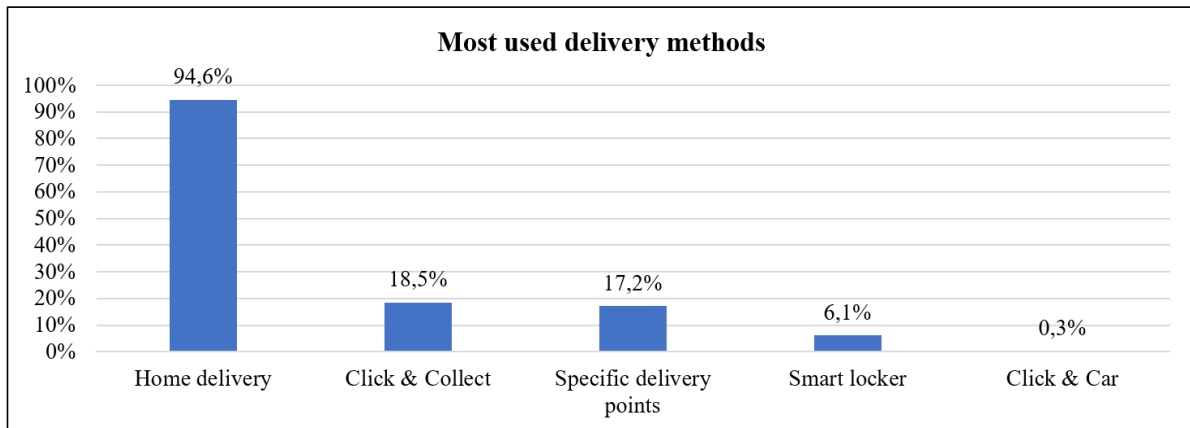
Graph 4. Number of product categories purchased



Source: Own elaboration

❖ Delivery methods used

As for the **most used delivery methods**, it can be seen in Graph 5 that a great majority, 94.6%, use home delivery as the most frequent method. Despite this, there are people who also make use of other methods such as click & collect (18.5%) and pick up orders at specific delivery points (17.2%).

Graph 5. Most used delivery methods before Covid-19

Source: Own elaboration

To go deeper into the different types of delivery that exist, two specific questions were asked about **smart lockers and click & collect usage and awareness**.

With these questions it has been extracted that 15.2% have at some point used the smart lockers, 38.7% have never used them but know them and 46.1% do not know this method of delivery. Smart lockers are quite well known but rarely used. (See Appendix II, Graph 12).

Furthermore, as for the click & collect, a higher percentage has made use of this method sometime (40.7%) and 43.5% has not made use of this method but knows it. On the other hand, 15.8% does not know about this delivery method (See Appendix II, Graph 13). Click & collect is a well-known and used method, although used not very often. With this we can see that more people know the click & collect method and have made greater use of it, compared to the smart lockers.

❖ Customer Service

The next two questions were about **delivery costs and delays**. We could see that most of the products had delivery costs depending on the amount spent (49.1%), and that 40.1% used to have free delivery costs (See Appendix II, Graph 14). Regarding delays, more than half of the respondents tended to receive their orders on time (55.6%), and 35.4% had occasional delays (See Appendix II, Graph 15). It should be noted that 10.8% usually have delivery costs and 9.1% have delays in their delivery orders on a regular basis.

4.4.3. Results of the Block: Who has Made Online Purchases During Covid-19?

The second filter question was to get to know **whether these people who had made online purchases before the Covid-19, had also done so during it**. 79.8% responded that they had made purchases online, but 20.2% had not made any during lockdown.

It was also noted that 14.3% of people **who had not made online purchases prior to Covid-19 had done so during the pandemic**. Thanks to the coronavirus, people who had never entered the e-commerce world have now done so.

4.4.4. Results of the Block: Online Consumer Behavior During Covid-19

In this section we want to make a study on different aspects that can be important during the shopping experience of customers during the Covid-19. It includes both the people who made purchases before and during the Covid-19 and those who were introduced to e-commerce for the first time because of the Covid-19.

❖ Scope of purchases

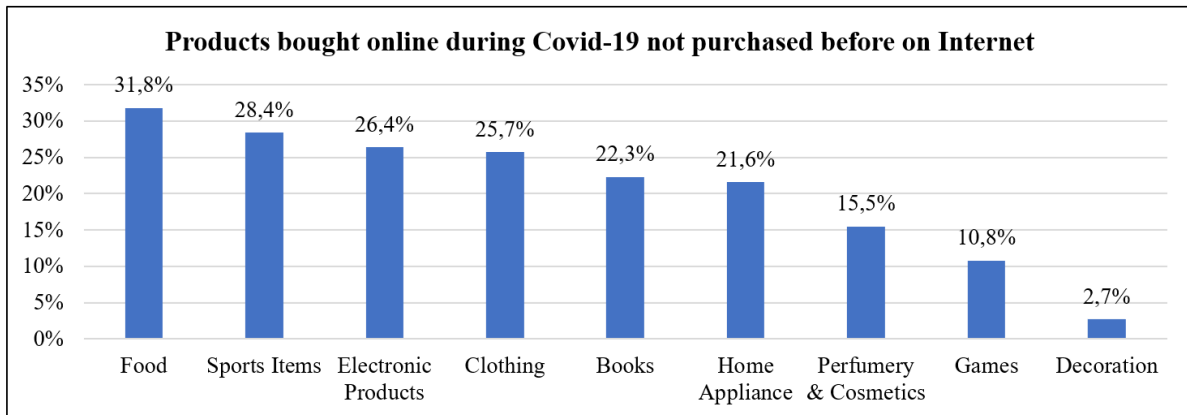
In analyzing the results, it has been observed that **people have increased their purchases of new products compared to those they bought before the pandemic**, since 59.5% of the sample stated that they had indeed bought new products. It has been observed that online consumption has changed because of the coronavirus, the first observation being an increase in the type of products purchased.

Of these people who acquired new products, it was possible to see a relationship with those who, before the lockdown, bought 2 to 4 categories of products. It is reasonable to think that they already had established online shopping habits and it has not been a great effort to introduce more to the e-commerce. On the other hand, those people who only bought 0 or 1 types of products, have not been introduced as much in the purchase of other products as the above mentioned, since they are not so familiar with online shopping. Furthermore, those who already made numerous purchases of different product families (6 to 10 product categories), have not seen a big increase in the number of categories purchased because by already making so many purchases online, it is more difficult to find some needed product that they have not bought before.

❖ Types of products purchased

Of the people who did buy different products during and possibly due to Covid-19, as seen in Graph 6, the **most purchased products that people did not use to buy before** were food (31.8%), sports items (28.4%), electronic products (26.4%), clothing (25.7%), books (22.3%) and home appliance (21.6%).

Graph 6. Products bought online during Covid-19 not purchased before on Internet



Source: Own elaboration

It was also asked if there was any **intention to continue buying** in the future these products acquired online during the coronavirus. The sample stated that 25.2% will prefer to buy the products in a physical store in the future, but the majority (66.1%) will continue to buy products online in the future (See Appendix II, Graph 16).

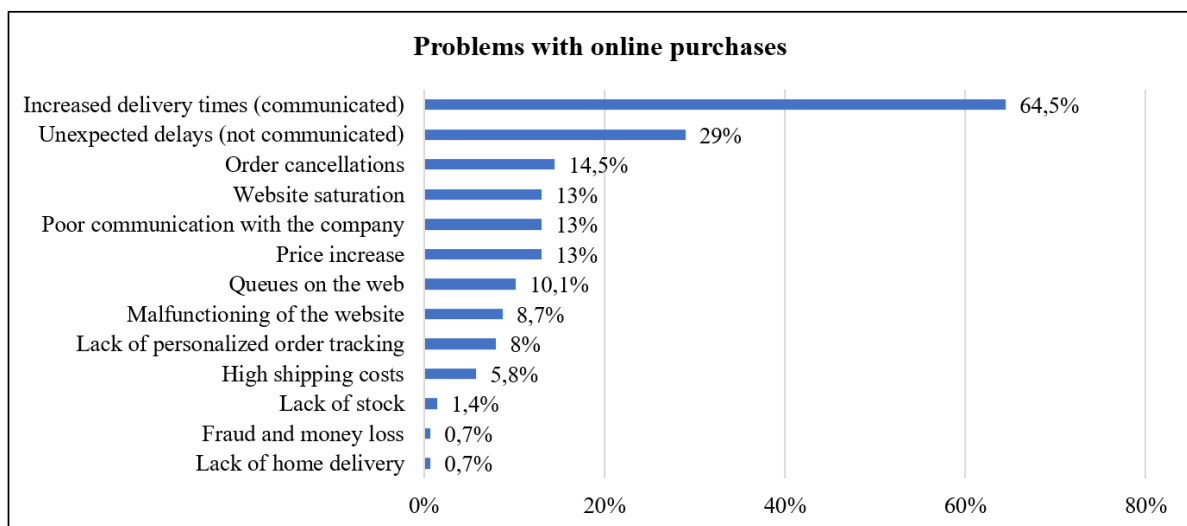
❖ Delivery methods used

Research was also done on delivery methods. It must be considered that due to the situation that was being lived, and the lockdown, where people could not leave their homes, the method most used was home delivery. But it was asked if **during Covid-19 they had discovered or used any other method** that they had not before, answers show that only 5.8% had used a new method (See Appendix II, Graph 17). The methods that people have used for the first time during Covid-19 have been: 35.7% leaving the package at the door, 35.7% home delivery, 14.3% click & collect, 14.3% smart lockers and 7.1% collection at specific points (See Appendix II, Graph 18). Especially those methods that did not involve physical contact due to the high risk of infection.

❖ Customer Service

A question was asked about the problems the sample had during their online orders, to analyze the **service of the companies during Covid-19** and see how enterprises reacted to the pandemic. More than half (57.02%) of the people who placed an order online during the coronavirus had problems with their purchase. As we can see in Graph 7, the main problems were related to the delivery time of the parcels, in fact 64.5% were due to an increase in delivery times communicated by the company and 29% were unexpected delays not communicated by the company.

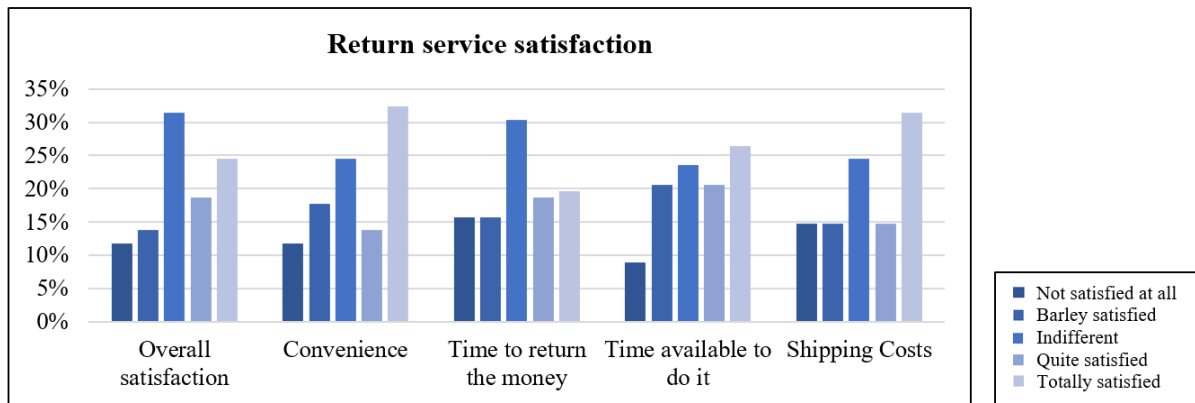
Graph 7. Problems with online purchases



Source: Own elaboration

As for the **return service**, the sample valued by means of a Likert scale of 5 positions from 1 (not satisfied at all) to 5 (totally satisfied) the different characteristics of the return service. In Graph 8 we can see the percentage of people who voted for the different important aspects in the return service. To analyze it we have considered *'not satisfied'* and *'barely satisfied'* as the service was not adequate for the customers, and on the other hand, *'quite satisfied'* and *'completely satisfied'* have been interpreted as the customer was satisfied with the service.

Graph 8. Return service satisfaction



Source: Own elaboration

People were asked about the **general satisfaction of the return service**, where 43.14% have been satisfied with the service offered but 25.49% were not satisfied and think that the service should improve. The service of returns has been satisfactory for a high percentage of people, but it should improve in some aspects to reduce the percentage of people not satisfied with the service.

Regarding the specific aspects studied, 46.08% were **satisfied with the convenience** of the service. We also studied how **satisfied they were with the time available for the return and the delivery costs**, which were 47% and 46% respectively. On the other hand, 31.37% were not satisfied with the **return time**.

❖ Further Information:

Apart from all the previously mentioned results directly related to those of the pre Covid-19, more questions were asked about the shopping experience during coronavirus. Therefore, it has been possible to obtain more results, which are very important for the subsequent analysis of the survey.

➤ Future purchases

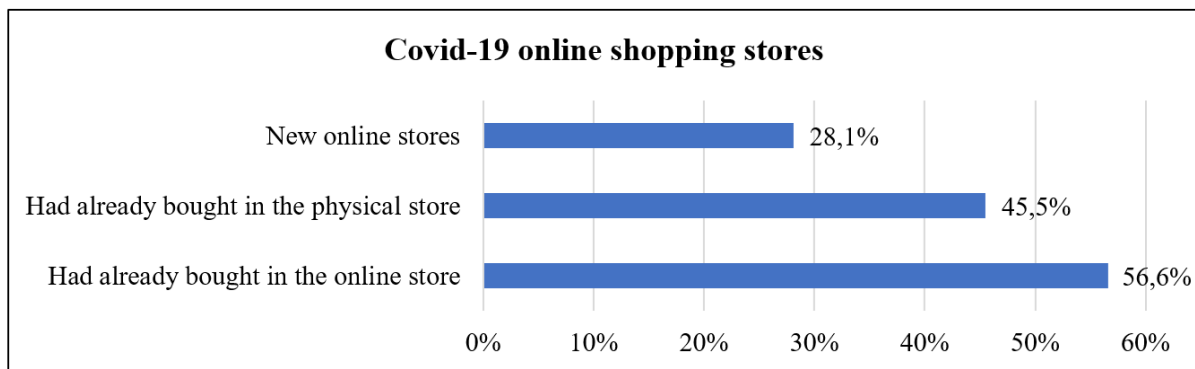
It was wanted to investigate whether people, because of the shopping experience during Covid-19, thought that their **online purchases would increase in the future**. 40.1% of people thought so, so it can be said that coronavirus had influenced their online consumption, 27.3% thought it might increase and 32.6% thought their online consumption would not change (See Appendix II, Graph 19).

In this section it is also important to note that, of the total number of people who made purchases online during Covid-19, a small percentage (2.09%) had been introduced to e-commerce for the first-time during coronavirus. Of these people, 80% answered that perhaps their online consumption will increase in the future.

➤ Customer loyalty

They were asked **where they made their online purchases during Covid-19**, as seen in Graph 9, 56.6% bought from stores where they had already made online purchases, 45.5% bought from stores where they had previously bought from physical stores, and 28.1% bought from online stores where they had never bought before. It can be observed that people tend to buy in stores where they already know the service and the product, thereby affirming that there is a great customer loyalty.

Graph 9. Covid-19 online shopping stores



Source: Own elaboration

➤ Reasons to buy online

It was analyzed if **people had bought for fear of scarcity**, 12.8% said 'yes' and 7% said 'yes but not Internet purchases'. But the majority (80.2%) denied having bought products for fear of shortage (See Appendix II, Graph 20). The products most bought by fear were non-perishable food, milk, flour, cleaning products, masks, gloves, and hygiene items such as toilet paper, hand soap or disinfectant gels, which were previously not used to buy online.

➤ Absence of online stores

It was asked if they had **missed any online stores** during the lockdown, 78.1% of the sample did not miss any online store, but 15.7% did (See Appendix II, Graph 21). The stores that were most missed were firstly, 26.3% supermarkets, highlighting Mercadona, Supermercados El

Corte Inglés, Carrefour or Lidl, secondly, 18.4% Primark, and 10.53% also missed local stores. Other businesses mentioned were greengrocers and fruit stores, lighting stores, copy shops, hardware stores and haberdashery.

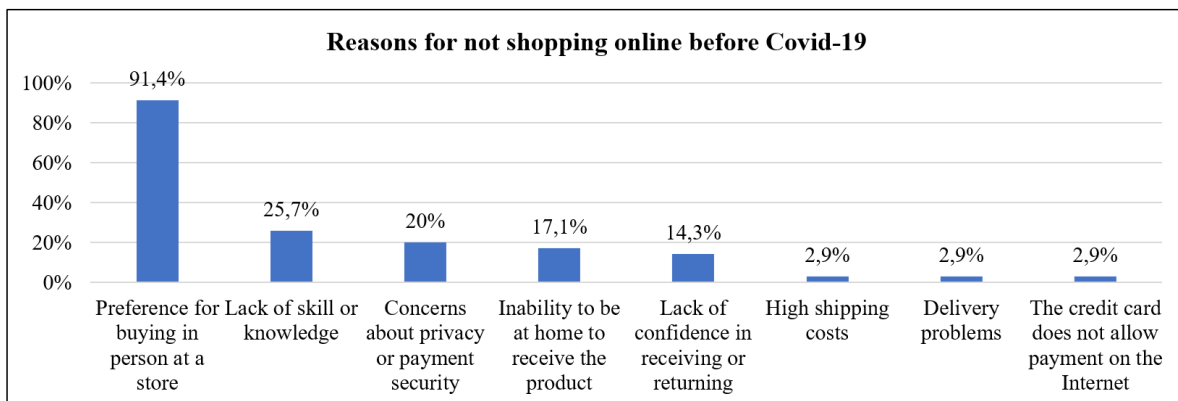
➤ New online stores

The last question in this block was whether they knew of **any store that had begun e-commerce** during or because Covid-19. The respondents have realized that some of the local stores in Zaragoza already have online sales, such as, Digicopy, María Palmero, Heladería Los Italianos or Mercado Central.

4.4.5. Results of the Block: Reasons for Not Shopping Online Before Covid-19

In this block, the aim was to investigate the reasons why 10.5% of the sample had not made any online purchases prior to the coronavirus. There were several reasons for not buying online, but it stood out that almost all (91.4%) preferred buying personally in a physical store. Other reasons mentioned were lack of skills or knowledge (25.5%), concerns about privacy or payment security (20%) and inability to be at home to receive the products (17.1%). These reasons will be analyzed later in *Section 5.4.* and it will be seen on which one's companies can carry out actions to solve them.

Graph 10. Reasons for not shopping online before Covid-19



Source: Own elaboration

In Table 3, we can see the **percentage within each age range and gender that did not purchase online**. It can be established that there is a direct relationship between not buying online and age, the older the age, the more people did not buy online before Covid-19. Of the people over 64 years old surveyed, 25.9% had not made any purchases online before. It can

also be seen that 12.7% of the women interviewed had never bought online before Covid-19, a higher percentage than men.

Table 3. Age and Gender of people who did not purchase before Covid-19

AGE				
18 - 24	35 - 44	45 - 54	55 - 64	> 64
1,2%	6,8%	17,28%	16,9%	25,9%

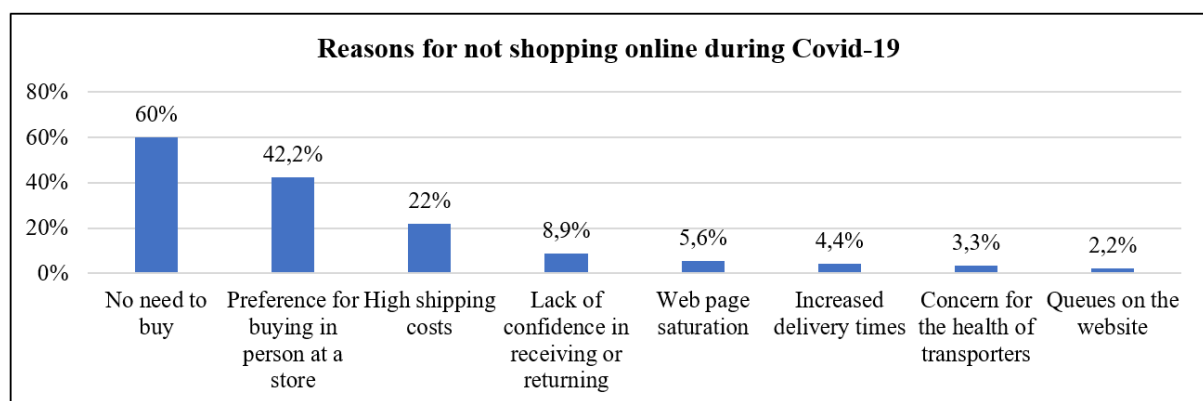
GENDER	
Female	12,7%
Male	6,8%

Source: Own elaboration

4.4.6. Results of the Block: Reasons for Not Shopping Online During Covid-19

In this block it was asked the reasons for not buying online during the Covid-19. In Graph 11 we can see that 60% stated that they had no need to buy. But of the people who did have need, 42.2% preferred buying the products in the physical store and 22% did not buy due to high shipping costs.

Graph 11. Reasons for not shopping online during Covid-19



Source: Own elaboration

5. MAIN PROBLEMS DETECTED AND SOME GUIDELINES FOR ENTERPRISES

In this section, from all the results that we have been able to obtain in the survey and that have been exposed in the previous section, a deeper analysis is going to be made of the problems people had with their online purchases and finally we will finish with some proposals to the companies according to what has been analyzed.

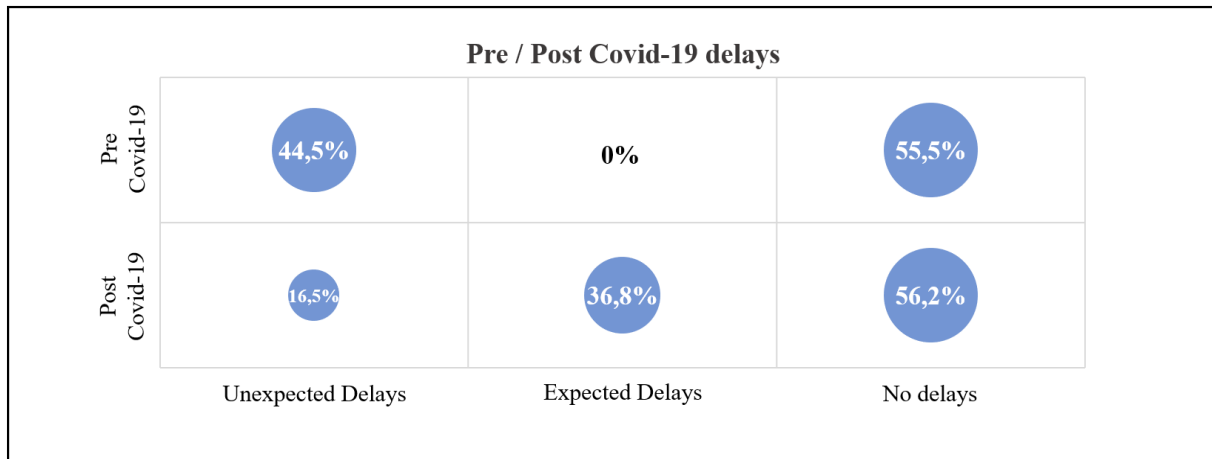
First, it should be noted that more than half of the sample (57.02%) has suffered problems during their online order and that 15.7% missed some online commerce. As we have seen in the results mentioned above, the most frequent problems were related to order delays and poor communication with the company. It is also worth noting that there were problems related to the companies' websites.

These problems can result in the loss of customers for various stores. To see if this is the case, different problems were compared with the impact this has on the future online shopping. We must consider that the fact that a person decides not to increase their future online consumption, has not only to do with these analyzed problems but also perhaps with other unstudied reasons. For future research it would be interesting to analyze what are the key factors when customers decide that their online consumption will not increase in the future.

5.1. Delivery Times

From the responses obtained, it has become apparent that most of the people who made post Covid-19 purchases had problems of some kind with the delivery time of their parcels (43.8%). This problem is also important because as we have seen in section 4.4.6., where the reasons why people did not purchase online during the pandemic were analyzed, 4.4% of the people who did not shop online were due to increases in delivery times. Therefore, an increase in the lead time has meant the loss of some customers' purchases. In this section, this will be studied in more depth, comparing the number of delays before Covid-19 and after it, in Chart 1.

Chart 1. Pre / Post Covid-19 delays



Source: Own elaboration

It can be seen the number of people who had unexpected delays before Covid-19. These people represent the total number of people who suffered delays since it was not common for a company to warn that delivery times were going to increase before making the purchase. We can also observe people who suffered unexpected and expected delays (warned by the company) among the total number of people who bought online during the coronavirus. It is important to mention that some people answered both possibilities (unexpected and expected delays).

Of the people who made online purchases before Covid-19, 44.5% had some unexpected delay. A priori, if we compare it with the people who suffered unexpected delays when they bought online post Covid-19 (16.5%) we can think that the problem was solved, but we have to take into account two factors when analyzing it.

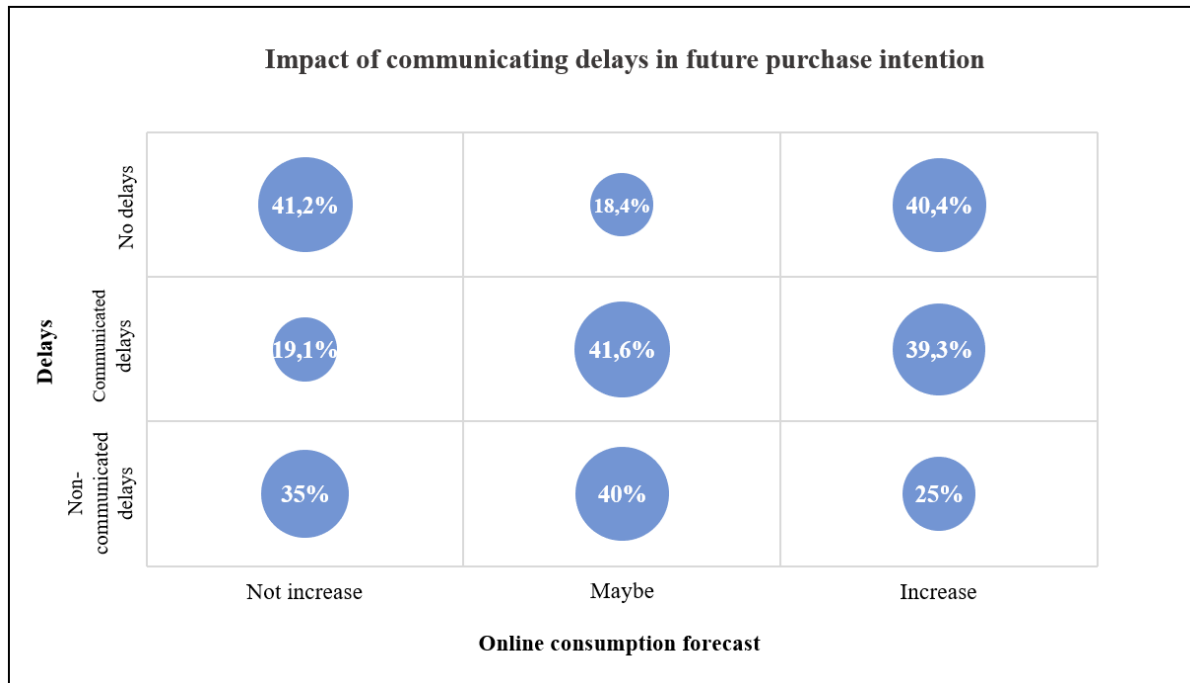
Firstly, the time, we are comparing a pre Covid-19 situation where a person has been able to have, for example, ten years of online shopping experience with a post Covid-19 situation that only refers to four months.

Secondly, during the Covid-19 another way of communicating the increase in delivery times appeared, where the company already warned, before making the purchase, that the order would take longer than usual. This method of communication has been positive for the companies since it established contact with the client, warning them, but as there were problems with delays that have not been solved ,it has been negative for the logistic process.

To further explore this problem, it was thought to study whether delays or bad shopping experiences could influence people's willingness to increase their post-Covid-19 purchases.

The hypothesis was that when there were no delays or when they had been reported, people would be more likely to increase their future online consumption intention than when people had had delays and the company had not reported them.

Chart 2. Impact of communicating delays in future purchase intention



Source: Own elaboration

As can be seen in the Chart 2, this hypothesis is true for when the delays have been communicated and for when they have not, since we see that more people intend to increase their online consumption in the future when there is communication by the company (39.3%) than when there is not (25%). Surprisingly, on the other hand, when there has been no delay (a good shopping experience) the hypothesis is not fulfilled, since 41.2% do not intend to increase their online consumption, a higher percentage than when people have had a bad shopping experience. So, we can see that there is not a direct relationship between the people who had delays and the intention to not increase their future online consumption. Therefore, we cannot directly link this intention to the fact that there have been reported delays.

5.2. Website Failures

The website is the customer's first contact with an e-commerce site, like the storefront of a physical store. If that website is not easy to use or has problems, the customers will probably decide not to finish their purchase. Although it is a very important aspect, it was one of the most reported problems by consumers. The main problems related with website failures were

breakdowns of the web, virtual queues, and general malfunctioning of the website, as mentioned in the results

We have been able to observe that 7.8% of the people who did not make purchases during the lockdown were due to problems with the web pages, 5.6% because of web page saturation and 22% because of queues on the website. Thanks to these answers, we can see that the functioning of the web page has an impact on the consumers' purchase decision. So, it is important that companies are prepared for sudden increases in demand by improving their online platform, to ensure a good consumer experience.

This problem was not mentioned in the reasons why people had not made purchases online before Covid-19. Due to the situation experienced and the boom in e-commerce, websites began to have more problems and not meet the needs of consumers.

Companies were not prepared for this sudden increase in demand, so their sites did not support such figures. Some companies made use of virtual queues to guarantee that the customer could make their purchase without having a collapse of the web. Alcampo and Carrefour opted for this system. Trying to give a solution to a problem, they created another one. In both companies, the average waiting time was over an hour. In the case of Alcampo, the people who precede you in the virtual queue were warned, and sometimes it exceeded the 41,000 users (Prieto, 2020).

5.3. On-line Store Availability

Covid-19 crisis has made many companies realize how little their businesses are digitized. When they had to close their physical economic activities, many companies had no way to continue with their business. This meant that many of the products that people could buy or consume in a physical establishment were still not available on the Internet.

We can see that the world is already quite digitized when the majority (84.3%) did not miss any shop to buy online. On the other hand, 15.7% did have the need to buy something they could not do because the store did not have e-commerce.

According to the answers obtained about the businesses that were missing during the lockdown, a distinction could be made between the reasons why there were lack of online stores. On the one hand, large chains which had an online page but were overwhelmed by the increase in demand so they could not offer an adequate service and decided to close online sales, such as supermarkets. On the other hand, some companies that did not have an online service either

because of the strategy they follow, like Primark, or because of the type of company, such as local commerce, as for example, fruit stores, greengrocers, lighting stores, copy shops and haberdashery.

In the case of SMEs, most closed their doors when the alarm was declared and could not continue with their economic activity due to the lack of e-commerce. There have been some who have seen this problem and have begun to provide solutions by entering the online world, such as Digicopy, María Palmero, Heladería Los Italianos and Mercado Central, according to respondents. They have been few, so if there were any situation similar to the lockdown, many companies would still be unable to sell as they would have no way to do so and may be still missed by the clients. Moreover, no direct relationship was observed in the survey between the store's consumers missed during lockdown and the new ones they mentioned, since only 2 people noticed the incorporation to e-commerce of a company that they missed.

Nevertheless, web applications, e-commerce development, website creation and digital marketing are some of the services most demanded by companies to try to compensate for the losses caused by the Covid-19 (Ibecomía, 2020). The priority right now may be to move from an offline to an online activity. It is possible that companies are indeed developing these services, but as it is a development process, it may still be unfinished. The problem is not only in having an online page, but in developing the logistics for distribution, which can be complicated for companies with low-cost products in which the price of transport exceeds by far that of the product. Therefore, introducing new delivery methods can also help this problem.

5.4. New Last Mile Delivery Channels

When analyzing the main reasons why people had not made purchases online before the Covid-19, obtained in *Section 4.4.5.*, we can see that the inability to be at home to receive the parcel was the fourth most prominent option (17.1%). Instead, it is the first problem on which companies can deal with proposing a solution and working on it. Since the other three most mentioned (preference for buying in person at a store, concerns about privacy or payment security and lack of skills or knowledge) are out of the reach of companies.

This problem can be solved by introducing new delivery methods such as smart lockers or click and collect, which do not depend on a set schedule, therefore people do not have to be aware of their packages and can go to pick them up when it is convenient for them. As previously studied, the new method of delivery, smart lockers, has been seen to be an ongoing technology

that has a high impact on the development of last mile logistics. On the other hand, thanks to the survey we have been able to observe that it is not a widely used method since only 15.2% of the people have ever used it, even though a high percentage (46.1%) knows the method.

All the reasons why people did not make purchases before or during Covid-19 have been studied to see which are linked to delivery methods. It has been possible to extract that by introducing new delivery methods other than home delivery, not only solves this problem mentioned about the impossibility of being at home when picking up the product, but those related with the high costs of shipping. 22% of people who did not buy online during the Covid-19 were because of this reason. In the mentioned new delivery methods, the shipping costs are practically null, so those people who did not buy due to this problem could be reached.

Prior to the pandemic, there was already a growing use of delivery methods other than home delivery. Thanks to the results obtained we can see that the coronavirus has helped some people make use of new methods, especially those that do not involve physical contact. 7.43% of people who made an online purchase during confinement responded that they had discovered new delivery methods different from those they had previously used. Among these people, the new most used delivery methods are the intelligent lockers or amazon lockers and the click & collect, being able to pick up the product in the store. It is true that most people were at home during the confinement so they could receive the packages at home.

6. CONCLUSIONS

The main objective of this study was to analyze the impact and repercussion that Covid-19 has had on online consumption and how this has affected companies and their logistics, more specifically last mile logistics. To do this, a series of steps have been followed. (1) Firstly, a search was made for information about e-commerce in the years prior to Covid-19. In this point, the last mile logistics on a global level, its major challenges, and a series of solutions to those challenges were discussed. (2) Secondly, research has been done on the disruptive element that has occurred, the coronavirus, to see how it has been able to influence companies and the way people consume online. It has also been studied the impact it has had on last mile logistics, as for the bullwhip effect and the fear of shortage. (3) Thirdly, a more specific analysis of how the last mile logistics was in Spain prior to Covid-19 was made, to establish a starting point for analyzing the change that has taken place due to this pandemic. (4) Fourthly, a research technique, a survey, has been carried out to collect first-hand information on changes

in the online consumer habits of Spanish people. The survey has been divided into several blocks with the intention of collecting information on online consumption habits both before and after coronavirus to be able to see the changes caused. (5) Fifthly, all the results obtained have been observed and the appropriate graphs have been made to facilitate subsequent analysis. (6) In sixth and last place, all the results obtained have been analyzed together and the main problems obtained have been presented recommending a series of actions that companies should consider. In this point we have focused on the most important problems according to customers related with the last mile logistics, such as delivery times, web pages, availability of online stores and delivery methods.

Thanks to the information obtained and the study carried out, some conclusions can be drawn that should be a warning signal for companies.

Before the pandemic, e-commerce habits were already established, although they represented a small percentage of sales. These online purchases already posed some problems for last mile logistics, the most consumer-oriented part. Therefore, solutions were already being sought to improve the efficiency of the process and thus, customer satisfaction. But Covid-19 has broken through and accelerated this e-commerce process, making people go even further into online purchases and this is not something that looks like it will disappear, on the contrary, the increase in the online channel will remain greater than the situation before the pandemic. In the wake of this extraordinary situation, Spaniards have been very predisposed to buy during the lockdown, some people have even entered the e-commerce world for the first time, others have shopped more frequently and many have started to diversify their purchases.

As for the companies, there are already many that market online, and others that due to the coronavirus have started selling on the Internet, but consumers still miss some online stores. Due to this reason and given that the e-commerce trend is going to increase, it is important that they are prepared, having access to the digital world. It should be noted that when entering the digital world, the online shopping experience must be made user friendly, simple, easy, and safe for everyone. It is also essential that companies work on those aspects that make the consumer not get full satisfaction in their online shopping, especially those that have to do with the last mile logistics.

In short, we have seen that due to the Covid-19 there has been an increase in the trend of online consumption, and companies are adapting to this process, but there is still much work to be done.

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APPENDIX I. Survey

Block: Who has Made Online Purchases Before Covid-19

Cambios en el comportamiento de los consumidores en compra online debido al coronavirus

Soy una estudiante de Administración y Dirección de Empresas de la Universidad de Zaragoza. Con motivo de mi TFG, estoy realizando un estudio con el objetivo de recopilar información acerca de los cambios que ha originado el COVID-19 en los comportamientos de los consumidores en la compra online.

Para ello, me gustaría que colaborara respondiendo con la mayor sinceridad posible el siguiente cuestionario. Los datos que facilite serán tratados de forma anónima.

Agradezco de antemano su colaboración.

***Obligatorio**

¿Cuál es su edad? *

Menor de 18

18 años a 24 años

25 años a 34 años

35 años a 44 años

45 años a 54 años

55 años a 64 años

Más de 64

¿Cuál es su género? *

Femenino

Masculino

Preferiría no contestar

Otro: _____

¿Alguna vez realizó compras por Internet ANTES del confinamiento? *

Sí

No

Block: Online Consumer Behavior Before Covid-19

Compras por Internet realizadas ANTES del confinamiento

En esta sección, las preguntas se refieren a las compras realizadas online antes del confinamiento.

¿Qué productos solía comprar por Internet antes del confinamiento? *
Puede seleccionar más de una opción.

- Viajes
- Entradas a espectáculos
- Electrodomésticos
- Alimentación
- Prendas de vestir
- Perfumería y cosmética
- Productos electrónicos
- Juguetes
- Artículos de deporte
- Discos, libros, periódicos y demás artículos de papelería
- Otro: _____

¿Cómo suele recibir sus pedidos normalmente? *
Puede seleccionar más de una opción.

- Entrega a domicilio
- Recogida en puntos de entrega específicos
- Recogida en tienda
- Taquillas inteligentes
- Recogida en tienda pero sin la necesidad de entrar en ésta, ya que la introducen directamente en el maletero de su coche
- Otro: _____

¿Alguna vez ha hecho uso de las taquillas inteligentes? *

- Sí
- No, pero sí que las conozco
- No, no las conozco

¿Alguna vez ha hecho uso del 'click&collect' que consiste en realizar el pedido online e ir a la tienda física a retirar su pedido cuando mejor le venga? *

- Sí
- No, pero sí que lo conocía
- No, no lo conocía

¿Sus compras solían tener costes de entrega? *

Sí

No, eran gratuitos

Dependiendo del importe gastado

Otro: _____

¿Solían tener retrasos en la entrega de los pedidos? *

Sí

No

A veces

Block: Who has Made Online Purchases During Covid-19

Compras por Internet realizadas DURANTE el confinamiento

En esta sección, las preguntas se refieren a las compras realizadas online durante el confinamiento.

¿Realizó alguna compra online DURANTE el confinamiento? *

Sí

No

Block: Online Consumer Behavior During Covid-19

Compras por Internet realizadas DURANTE el confinamiento

En esta sección, las preguntas se refieren a las compras realizadas online durante el confinamiento.

¿Cree que después del confinamiento su compra online va a aumentar? *

Sí

No

Tal vez

Durante el confinamiento, ¿compró algún producto online que no solía antes del COVID-19? *

Sí

No

Otro: _____

En caso de que sí, ¿cuáles?
Puede seleccionar más de una opción.

Electrodomésticos

Alimentación

Prendas de vestir

Perfumería y cosmética

Productos electrónicos

Juguetes

Artículos de deporte

Discos, libros, periódicos y demás artículos de papelería

Otro: _____

¿Tiene intención de seguir comprando, tras el confinamiento, algunos de los productos que compró durante él? *

Sí, online

Sí, pero los compro en tienda física

No

No realicé compra online durante el confinamiento

Otro: _____

¿La compra online era a tiendas que previamente ya había comprado en ellas o era su primera vez? *

Puede seleccionar más de una opción.

- Tiendas en las que ya había comprado en su tienda física
- Tiendas en las que ya había comprado online
- Nuevas tiendas online

¿Compró algún producto pensando que habría escasez? *

- Sí
- Sí, pero no online
- No
- Otro: _____

En caso de que sí, ¿cuáles?. En caso contrario, responda: NO *

Tu respuesta _____

¿Tuvo problemas con sus compras online durante el confinamiento? *

Puede seleccionar más de una opción.

- No tuve ningún problema
- Mal funcionamiento de la web
- Colas de espera en la web
- Saturación de la página web
- Gastos de envío elevados
- Incremento de los precios
- Aumento de los tiempos de entrega (comunicados por la empresa)
- Retrasos inesperados en los tiempos de entrega (no comunicados por la empresa)
- Cancelación de pedidos
- Mala comunicación con la empresa
- No había un seguimiento personalizado del pedido
- Otro: _____

Gracias al confinamiento ¿ha descubierto o empleado algún método de entrega que no conocía anteriormente? *

- Sí
- No
- Otro: _____

En caso de que sí, ¿cuál?

Tu respuesta _____

En caso de que haya usado algún método de entrega diferente, pero no lo vaya a seguir usando en el futuro, ¿qué método y cuáles son los motivos?

Tu respuesta _____

Si ha realizado alguna devolución durante el confinamiento, puntúe el servicio de éste. *

Marque 0 en todas las columnas si no realizó ninguna devolución. Siendo: 1=Nada satisfecho y 5=Muy satisfecho

	0	1	2	3	4	5
Satisfacción general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comodidad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tiempo de devolución del dinero	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tiempo disponible para realizarla	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Costos de envío	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

¿Echó en falta la venta online de alguna tienda física? *

Sí

No

Tal vez

En caso de que sí, ¿cuáles?. En caso contrario, responda: NO *

Tu respuesta _____

Si conoce alguna tienda que haya lanzado su página web durante esta crisis o como consecuencia de ella, por favor indique cuál.

Tu respuesta _____

Block: Reasons for Not Shopping Online Before Covid-19

No ha realizado compras online durante el confinamiento

Motivos por los que no realizaron compras online durante el confinamiento *
Puede seleccionar más de una opción.

- Preferencia por comprar personalmente en una tienda
- No tuve necesidad de compra
- Saturación de páginas web
- Colas de espera en la página web
- Costes de envío elevados
- Malas experiencias
- Las tiendas a las que suelo ir no tienen página web
- Falta de confianza en la recepción o devolución
- Problemática en la entrega
- Aumento de los tiempos de entrega
- Cancelación de pedidos
- Otro: _____

Block: Reasons for Not Shopping Online During Covid-19

No ha realizado compras online antes del confinamiento

Motivos por los que no realizaron compras online antes del confinamiento *
Puede seleccionar más de una opción.

- Preferencia por comprar personalmente en una tienda
- Preocupación por la privacidad o la seguridad en el pago
- Falta de habilidad o conocimientos
- Costes de envío elevados
- Imposibilidad de estar en casa para recibir el producto
- Malas experiencias
- Las tiendas a las que suelo ir no tienen página web
- Falta de confianza en la recepción o devolución
- Problemática en la entrega
- Vendedores extranjeros no atienden pedidos en España
- No dispone de una tarjeta que permita pagar por internet
- Otro: _____

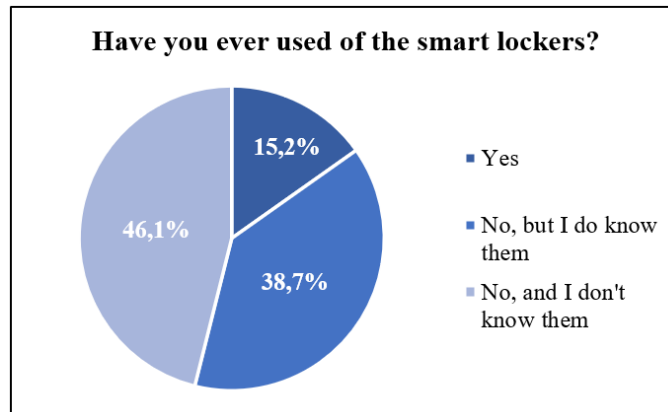
¿Realizó alguna compra online durante el confinamiento? *

Sí

No

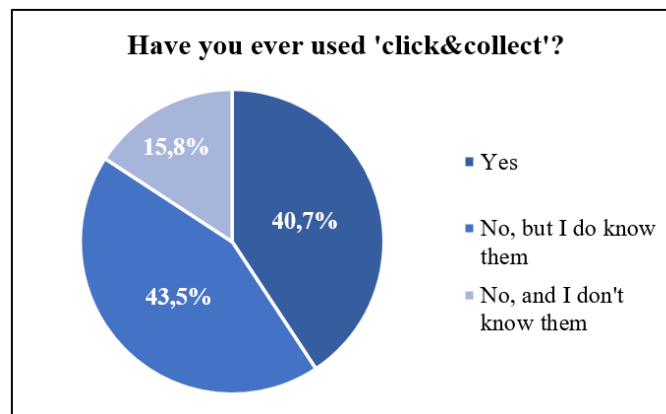
APPENDIX II. Results of the survey

Graph 12. Have you ever used smart lockers?



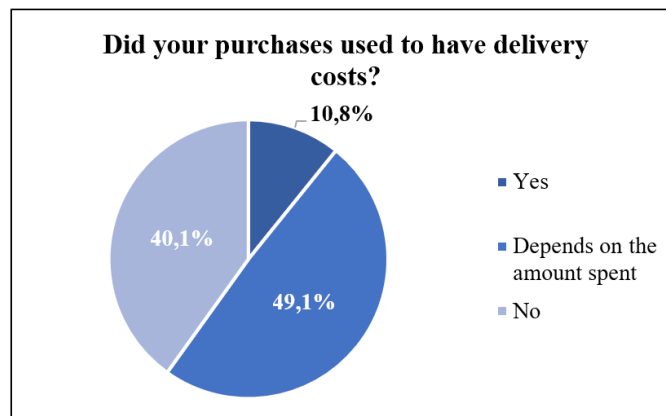
Source: Own elaboration

Graph 13. Have you ever used 'click and collect'?



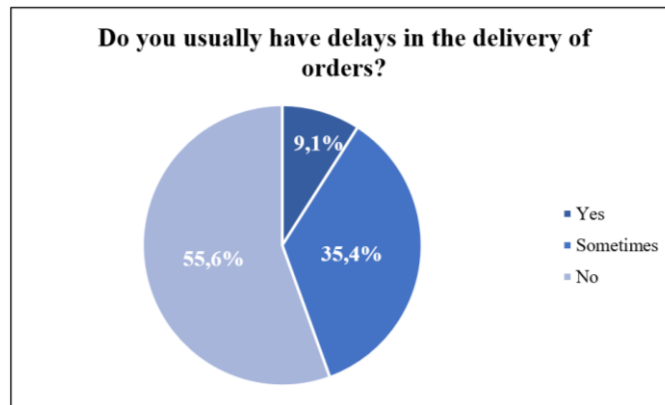
Source: Own elaboration

Graph 14. Did your purchases used to have delivery costs?



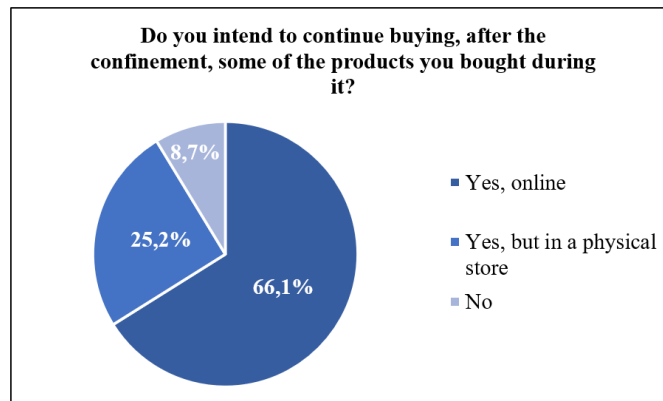
Source: Own elaboration

Graph 15. Do you usually have delays in the delivery of orders?



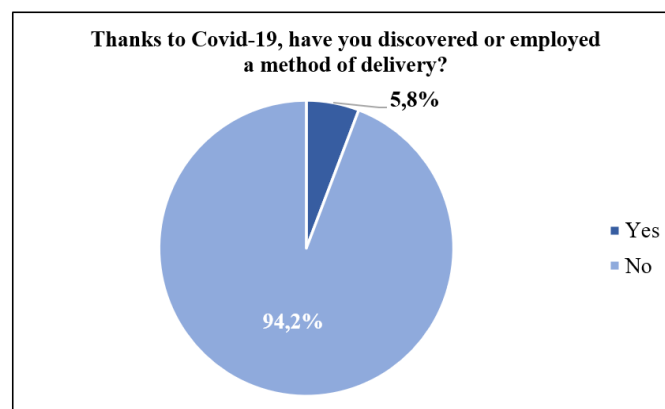
Source: Own elaboration

Graph 16. Intention to continue buying the products



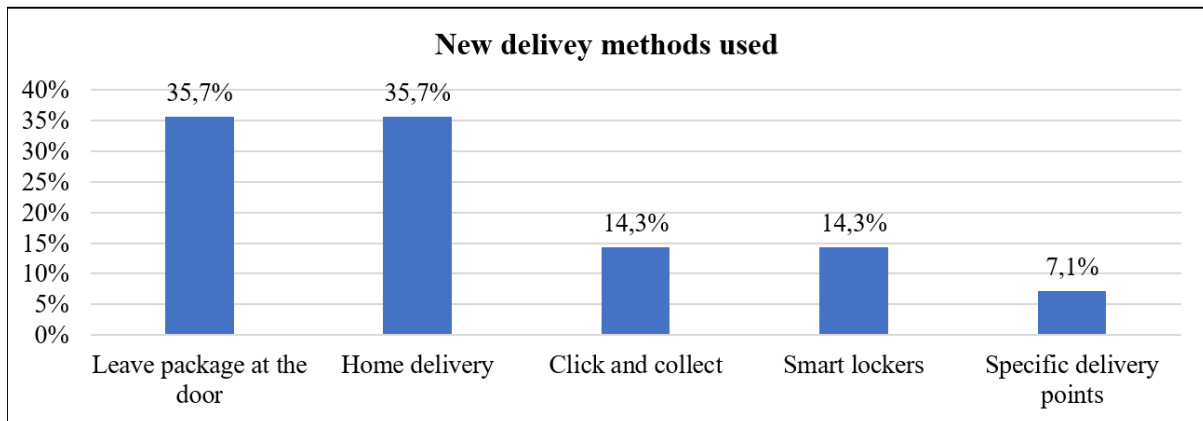
Source: Own elaboration

Graph 17. Thanks to Covid-19 have you discovered or employed a method of delivery?



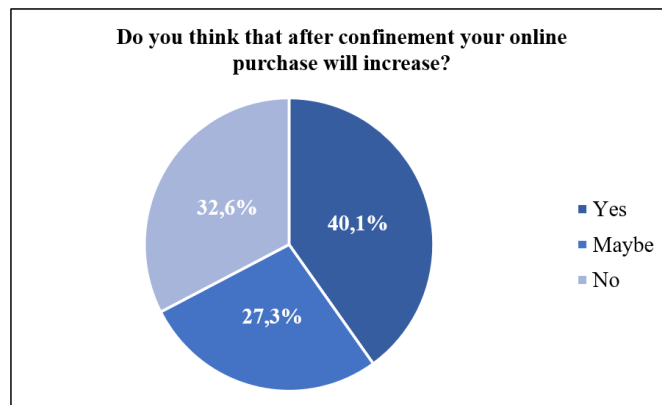
Source: Own elaboration

Graph 18. New delivery methods used



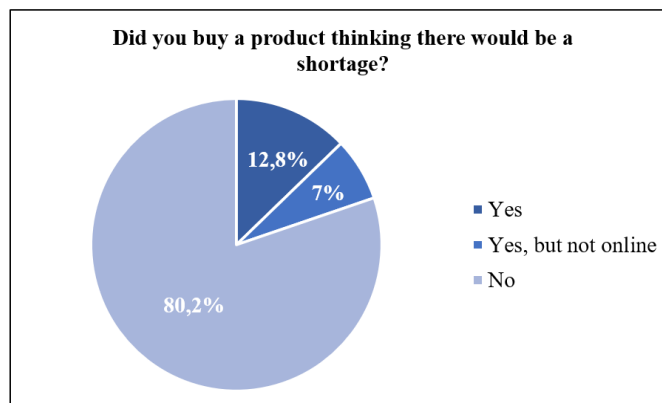
Source: Own elaboration

Graph 19. Do you think that after confinement your online purchase will increase?



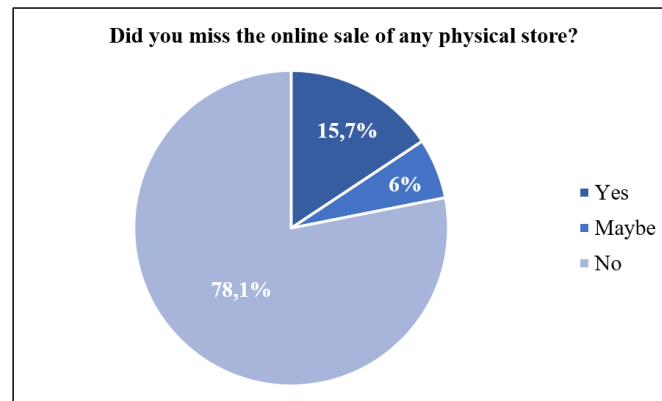
Source: Own elaboration

Graph 20. Did you buy products for fear of scarcity?



Source: Own elaboration

Graph 21. Did you miss any online store during lockdown?



Source: Own elaboration