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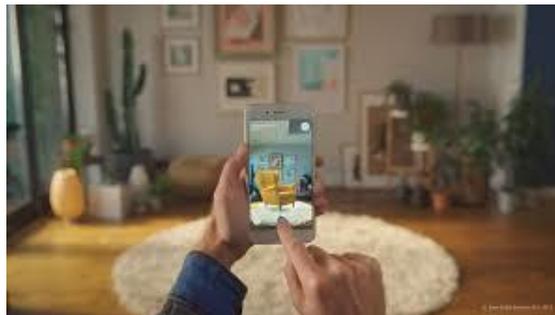
**ΟΙΚΟΝΟΜΙΚΟ
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ΑΘΗΝΩΝ**



ATHENS MBA

Investigate the challenges and risks between e-commerce and Inventory management.

How sales uncertainty influence stock levels. (IKEA case study)



This dissertation is submitted in fulfilment of the requirements of the degree in Master of Business Administration (MBA)

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ΔΗΛΩΣΗ ΕΚΠΟΝΗΣΗΣ ΜΕΤΑΠΤΥΧΙΑΚΗΣ ΕΡΓΑΣΙΑΣ

«Δηλώνω υπεύθυνα ότι η συγκεκριμένη μεταπτυχιακή εργασία για τη λήψη του Μεταπτυχιακού Διπλώματος Ειδίκευσης στη Διοίκηση Επιχειρήσεων, έχει συγγραφεί από εμένα προσωπικά και δεν έχει υποβληθεί ούτε έχει εγκριθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό.

Η εργασία αυτή έχοντας εκπονηθεί από εμένα, αντιπροσωπεύει τις προσωπικές μου απόψεις επί του θέματος. Οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης μεταπτυχιακής αναφέρονται στο σύνολό τους, δίνοντας πλήρεις αναφορές στους συγγραφείς, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο».

Όνοματεπώνυμο

Υπογραφή

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Abstract

This thesis is developed in the context of my Master "ATHENS MBA", organized by the Economic University and the National Technical University of Athens. The thesis has been conducted on behalf of and in collaboration with IKEA.

I am very grateful that I had the opportunity to work on this project and analyze a real business problem taking as a case study IKEA company, the leader of the home furniture industry.

Nowadays, E-commerce phenomenon increases rapidly, and many companies suffer from wrong decision making and ambiguous strategies. Demand uncertainty and sales volatility leads companies to keep high level of stock and consequently increase their inventory carrying costs. To summarize, the biggest problem that companies face is lack of knowledge, wrong management decisions and lack of technology development.

This Thesis aim is to provide with an overview of the current risks and challenges between e-commerce and inventory management. Due to the rising trend of e-commerce, companies face many challenges in order to balance customer satisfaction and appropriate inventory management. The stock levels must be in such levels so as just cover the company's needs. This balance is difficult as some companies suffer of overstock and high inventory costs and some others of stock outs and lost sales. As the research from Mustafa Caglayan, Sara Maioli , Simona Mateut (2011), there has been a clear relationship between high sales uncertainty that leads to largest stock of inventories. Based on these results I replicate the authors' research of the period 2016-2018 for IKEA e-commerce business in Great Britain. Through this empirical study we will try to understand if the demand uncertainty can influence the stock levels of IKEA online sales. Data sets from different locations have been analyzed and represented in a methodical way.

The first empirical analysis supports that many factors such as unemployment, percentage of migration and GDP can influence IKEA sales and inventory level in different European countries. In the second analysis, is proved that sales volatility leads to demand uncertainty and consequently in higher stock levels.

The results can be used as the basis for company-specific inventory optimization. A further analysis is needed by a company in order to identify the root-causes of high inventory levels and find solutions to improve it.

IKEA has started to change their way of working, as has realized the potential benefits of improving the inventory management and e-commerce. There is still not clear strategy of what is needed and how to work with the inventory and e-commerce. There is no clear visibility at the stock that is kept for online sales and coworkers are still confused of how to handle it. Each country works on different ways and this makes difficult to adapt only one way of working. However, IKEA works hard to improve this procedure and find the best and most cost-efficient solution for e-commerce. As the main goal is to secure availability to the final customer, sometimes this leads to wrong decisions with overstock at distribution centers and high operational costs. For this reason, there is a need to find a way to reduce the operational costs, decrease the unnecessary stock and minimize the lead times. An appropriate inventory system and strategy is needed in order to take the right decision and take advantage of the new trends of e-commerce. The stock must be enough to cover the need and not being kept at the distribution centers for a long time. The main problem which needs to be addressed is to find the right needs that would translate to maintaining proper inventory levels.

Key words: e-commerce, impact, risks, challenges, benefits, IKEA, inventory management, online Sales, Stock level, Regression analysis, sales volatility

Chapter 1 Literature review

1.1 E-commerce

1.1.1 Definition of e-commerce

There have been various definitions for the e-commerce developed over the years from the scientific research:

1. E-commerce is the activity of buying or selling of products on online services over the Internet. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. (Wikipedia)
2. E-commerce is any activity, including a one-time nature, aimed at making profit. It should be viewed as a form of business, realizing a large extent through the introduction into the business processes of information and telecommunication technologies and systems (The Evolution and Development of E-Commerce Market and E-Cash OCT2018).

In other words, electronic commerce as it is popular known as e-commerce is the purchasing of goods and services online. The 80% percent of the online users utilize internet daily either for shopping or other services like online bill payments. It is an easy and convenient way to buy and find every available retail product, at the cheapest price. It provides the customer with the opportunity to use it from any locations without worrying about having to visit the store. Nowadays it is important more than ever the save of time and money in the everyday peoples' life. Using online tools, we can complete any purchases quickly while travelling or working. There are many benefits for both customers and retailers, since not only they don't need a traditional outlet when they serve customers via e-commerce, but it also reduces their overheads and improves efficiency. Without doubt, e-commerce is one of the fastest growing industries in the world (McGraw-Hill/Irwin; 1 edition November 3, 2000).

E-commerce is often confused with e-business, although there are significant differences worth's mentioning. E-commerce refers only to the goods and services during transactions between a seller and a consumer, whereas e-business refers to the complete process necessary to manage an online business (Faramarz Damanpour, Jamshid Ali Damanpour, (2001).

Online Business or e-business is any kind of business or commercial transaction that includes sharing information across the internet. Commerce constitutes of the exchange of products and services among businesses, groups and individuals and can be regarded as one of the essential activities of any business. E-business are focused on business with the help of the internet. The term "e-business" was firstly introduced by IBM's marketing and Internet team in 1996.

1.1.2 E-commerce history

At present, living without ecommerce seems impossible, complicated and an inconvenient. It is only a few decades ago that the idea of e-commerce appeared. More and more companies have realized the significance of e-commerce and e-business. The history of e-commerce started about 50 years ago and for the time being is the key pillar of growth through innovation and new technologies. A great deal of businesses enters the online market every year regardless of their companies' size. The trends for e-commerce development show that the Internet is likely to mature into a more sophisticated form of communication during the next years. This is the age where internet can create a resurgence of economic growth and exert powerful effects on business, government, education and other social functions.

The history of e-commerce is closely interlinked with the history of the internet. However, the whole idea started in 1979 when Michael Aldrich, a UK entrepreneur had the idea to connect his computer to his phone line and activated a simple program he called "Teleshopping". The need behind this was to find a way in order to make life more convenient and purchase goods without having to leave the comfort of one's own home.

The first World Wide Web server and browser, created by Tim Berners-Lee in 1990, opened for commercial use in 1991 and this is the time when online shopping started. Amazon.com and eBay

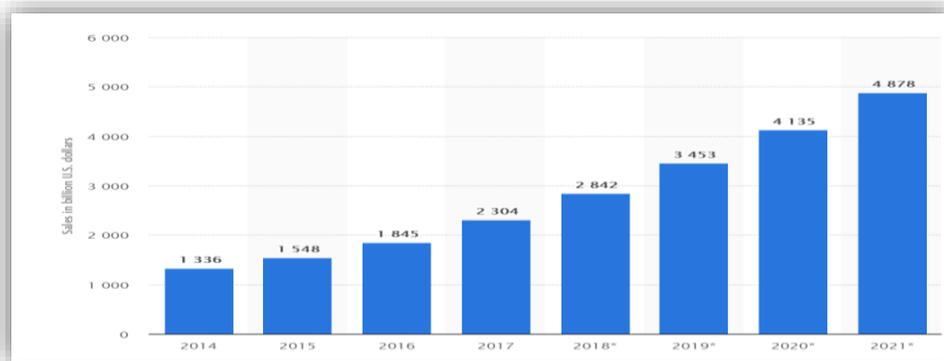
were the first e-Commerce sites in the US (in 1995) that started selling products online and numerous businesses have followed since. Alibaba's sites, Taobao and Tmall were launched in 2003 and 2008, respectively.

1.1.3 Figures and Trends

Companies must be ready for this new digital age if they would prefer to be competitive and take advantage of this new trend. Understanding customers' needs and evaluating all the potential challenges and opportunities, is the key for the future business success.

It is incredible how fast e-Commerce sales have increased during the last decades. Looking at the e-commerce sales global development (statista.com), there is a 360% growth expected to be reached by 2021 compared to 2014 sales levels.

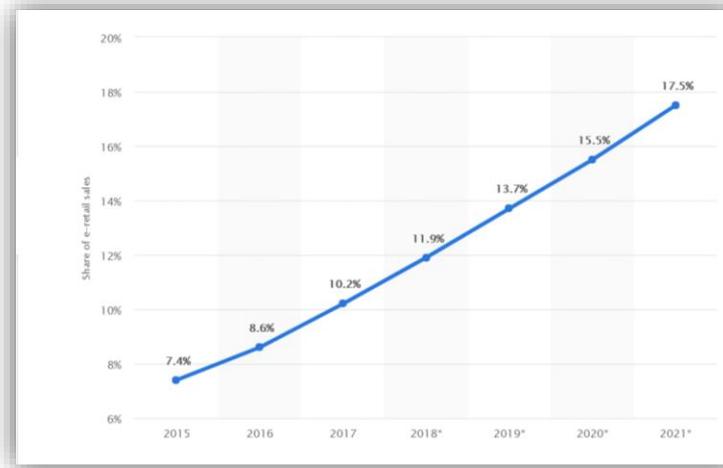
Graph 1: E-commerce sales worldwide from 2014 to 2021



Source: <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

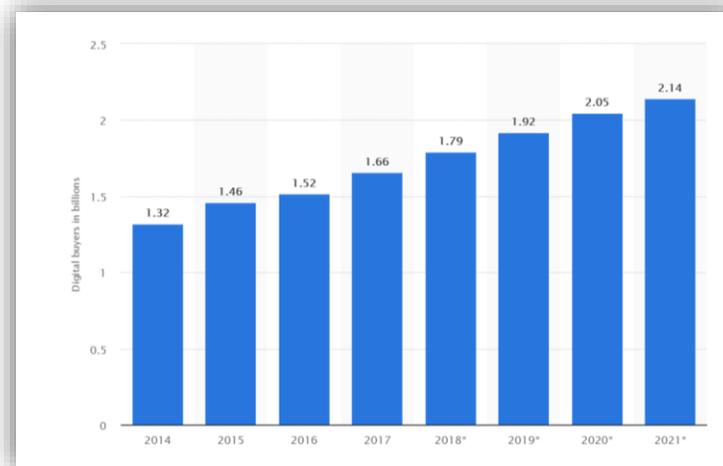
Additionally, Graph Nr.2 shows the tremendous growth of the e-commerce compared to the traditional retail sector. It is expected that in 2021 the share of the e-commerce will have reached 17%. It is interesting to note that as per Graph Nr. 3, the number of e-commerce buyers has is expected to reach 2.1 billion which is around 30% of world's total population.

Graph 2: E-commerce share of total global retail sales from 2015 to 2021



Source : <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

Graph 3: Number of digital buyers worldwide from 2014 to 2021



Source : <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

1.1.4 Future Trends

According to a research published by Kosta Popov 2018, product visualization is one of the most important factors for the future of e-commerce.

Online stores must be more visualized in order to give more accurate info to the customer. Due to lack of real touch with the products, most of the times customers are disappointed with the quality and return the product back to the company. The new trend for e-business is to use videos and high-quality images with 3D possibilities to present their products to consumers, to make an informed purchase decision without regretting it afterwards.

Another important factor is the Artificial Intelligence Solutions: The future is in IOT (internet of things) and artificial intelligence. Artificial intelligence analytics tools of 2019 will be able to track the way potential customers interact with products and present to them the most relevant topics on an interactive way. Via this way, companies can use the results and make recommendations according to customers' preferences. Intelligence solutions could also combine social media with historical data from customers in order to make a strong customer profile (knowledge of customers). Amazon is a successful example of artificial intelligence solution like Echo look which analyses the clothing style and makes fashionable recommendations through machine learning.

Renaissance of Physical Stores: Needless to say, physical stores remain the starting point of shopping and business. Nevertheless, as we are in the time of digital stores, this has to be review and follow the e-commerce structure. For example, Amazon and Alibaba now are experimenting now with the newly revived power of hands-on shopping.

In fact, Amazon opened a new retail store in New York that provides best sellers products which have a four-star rating in their customers' reviews. Following and copying the structure of the Amazon website, the store sells products organized under headings already known by online shoppers such as "Trends" "Frequently Bought Together" and "Amazon Exclusives."

1.1.5 Types of e-commerce

E-commerce can involve different types and various parties such as:

- B2B Business to Business: relationships between two businesses taking place during wholesale and trade between different companies and within one company between its

branches. B2B development requires increasing integration of business processes between entities (Anna Brzozowskaa Dagmara Bubelb 1 2015).

- B2C Business to Customers Transactions: relationships between a company and its consumers. Companies offer to individuals' online information, goods and services through online shopping centres. They may also include online banking services via which customers make bank wire transfers (Anna Brzozowskaa Dagmara Bubelb 1 2015). B2C e-commerce is the most popular type as it helps to reduce transactions costs by increasing consumer access to information and allowing consumers to find the most competitive price for a product or service. Websites are suitable tools for any company which performs direct sales via the Internet. For instance, one of the largest B2C websites for business is an American site www.amazon.com.
- C2C Customers to Customers: This type of sites is suitable for the companies which act as mediators between the clients and sellers. Trough websites users can provide private information's goods with an opportunity to sell or purchase directly. For example, among the most well-known C2C websites we can name an American site eBay.com
- C2B Customers to Business: This type of sites is the least popular among the types of sites for business under consideration. C2B websites allow the consumers themselves to set prices for the goods they desire to purchase themselves. The C2B website acts as a mediating broker which finds the seller who is eager to sell the goods for the price determined according to the consumers' propositions.

Most e-commerce transactions are B2B. In this type of transactions both sellers and buyers are business organisations. This type of websites for business is suitable for the companies which perform via the Internet.

1.1.6 Customer behavior and impact on e-commerce

There are several surveys which study customer behaviour in the online shopping. One of them evaluates and studies the factors which consumers find appropriate while shopping online

through the sites (According to International Conference on Computational Intelligence and Data Science ICCIDS 2018).

The findings of the survey show that:

- 38% percent of customers who prefer online shopping are between 18-30 years old, as they find it more convenient to use internet on any device. In the second place there are people from the 46-60 target group, whereas in the last place are people over 60 who have difficulty in using and trust of internet.
- The second finding which is remarkable is that women use more online shopping (55%) than men (45%).

But what factor is the most important for customers:

- variety of goods: 44.44% of the respondents highly agreed that they prefer online shopping as they get a wider variety of products online than the one offered in markets
- Product information and reviews: The research concluded that 11.10% also completely agreed to the fact that the information of the product available and their respective reviews help them know more about the product.
- Reasonable return and exchange policy: 66% completely agreed

After analysing the data of bad experiences, the majority of the customers answered that bad packaging and poor or below expectation quality of the product were the major reasons.

In addition, 58.3% of the users prefer Amazon for online shopping and most of the responders agreed that it would be better if the sites offered a faster delivery service while the majority replied that they would like to minimize the international shipping charges.

Thus, according to the above research, we can conclude that there is an increased trend buying via online channels. Customers trust companies with good reputation, but loyalty is the most important feature in order to keep satisfied customers.

The above and other related surveys conclude that the most significant factors which impact customer satisfaction is the accurate information and safe purchase of the product, easy returns

and convenient packaging and faster delivery and low costs. The biggest challenge for the online marketer is probably to manage to convert first-time visitors into actual buyers.

Website is of the highest importance in order to offer a good first experience to the customer. The research has identified some of the main antecedents of website satisfaction, such as ease of use, website content, and security (Bansal et al., forthcoming; Loiacono et al., 2002), as well as the consequences of website satisfaction, such as intention to return and willingness to recommend to friends (Forsythe and Shi, 2003; Yen and Gwinner, 2003).

Another important factor for e-commerce is to have good customer service. Due to lack of personal contact, consumers need to have the security that they can ask and solve any potential problem at any time. This is also confirmed by International Conference on Communication, Management and Information Technology ICCMIT 2015 published by Anna Brzozowskaa Dagmara Bubel.

In January 2015, a survey of implementation of other means of contact with surveyed enterprise employees was carried out on the basis of questionnaires and distributed among the customers. The results of the survey clearly show that those who use online business would like to have more opportunities to contact customer service.

1.1.7 Advantages and disadvantages of using e-commerce

Without doubt, the appearance of e-commerce has changed peoples' life. Undoubtedly it has enhanced the retail competition and of course this fact creates some difficulties for the companies. It is easier for consumers to compare prices because of several shopping search engines and websites, but sellers might find it too restrictive to their business revenues. This is only one example to describe that there are different benefits and challenges for customers and companies.

Advantages of e-commerce

Most researchers of this topic claim that time is the important factor in the changing buying behaviour from physical store to online shopping (Park & Kim 2010). There are many advantages in using online shopping and e-commerce such as:

- Customers
 - Provide variety of products at lower price (Yuji Nakayama 2007) due to lower transaction costs
 - Connectivity as customers have information visibility across the supply chain (SusanL.Golicic, DonnaF.Davis, TeresaM.McCarthy and JohnT.Mentze 2002).
 - Interactivity: in most of the cases when you buy online you can be interactive and either evaluate the product that you already bought or communicate with other users in order to receive recommendations for the product
 - Convenient way of shopping (Jiang et al. 2013): The tendency of busier life lead customers to look for convenient ways of shopping and ways to save time too.
 - Simplicity: Customers are able to order their product from everywhere thanks to the mobile Internet and variety of applications.
 - 24 hours 7 days (Close & Kukar -Kinnez 2010): E-shopping is the solution for people who work during the week. With online shops you can buy at any time without time limitations.
- Sellers
 - There is no doubt that the ability to sell online has increased the profit for many companies. However, is really important before doing your online business to evaluate the advantages and risks that you have to take. Below we can find some of the most important advantages for the companies:
 - Larger Market (Jessica Fender 2018): there are no borders and geographical limitations while shopping on line-you can shop even if you are an inhabitant of a different continent.
 - Third party logistics provider (AJEET KHURANA2018): As the business grows, we

have tougher logistics yet , however there is also a choice of third party logistics

- End to end system (AJEET KHURANA2018): interlinked with business to business e-commerce systems that give the opportunity to the customer to have accurate info and track logistic in an easy way. It is crucial to control and track logistics. Companies rely on 'system-to-system' connection with strategic suppliers and customers.
- Personalized Messaging and Data history Customer Insights Through Tracking and Analytics (Jessica Fender 2018): e-commerce platforms give the opportunity to recommend products and keep data history. In this way when customer just clicks in the web site for first time, the platform is able to keep the data and make recommendations according to each visitors' preferences.
- Demand information: using the percentage of likes and dislikes from social media exchanges as a measure of a customer's interest in a product, thus providing some potential insight into customer demand
- Increased sales and customers (Amir Abou Elnaga1 and Frahan Hassan Al Shammari 2016): e-commerce leads to increased sales, as it is easy to monitor and adjust the demand of the product or service.

Challenges of e-commerce

- Security (LECT.UNIV.DR. NICODIM LILIANA 2006): The most important reason for which some people hesitate to use internet for purchases is that they feel there is a lack of security and they are afraid to supply confidential information of their credit cards. Therefore, it is vital that companies should offer a safe way of payment to their customers.
- Absence of human contact (LECT.UNIV.DR. NICODIM LILIANA 2006): The absence of human presence sometimes creates doubts, as a customer hasn't got the opportunity to ask questions but only to search online. In this respect, some companies created programs that permit the vocal contact or the visual one

between a customer and a company's employee during the visit on the web site. In addition to this, a well-organized customer service is required.

- Web site is important for customer satisfaction as there is no human presence: The Website is responsible for the first online customer experience, which makes it more important if we consider the absence of the human presence. Websites must be user friendly, safe and provide the right information. Websites are the only mean available to the service provider to convince the most demanding consumers (Rush, 2004; Wolfinbarger and Gilly, 2003). Customization of websites could be a competitive advantage for companies. It is important to have a clear understanding of customer behaviour and characteristics. The combination of this knowledge with Innovative technology increasingly enables this customization.
- Accurate info and returns: There are specific tools that sellers can use in order to provide all the necessary info regarding the product (price, availability, lead time, returns policy, packaging, quality). For example, instead of pictures, a video could present the product or even a platform where customers could see how the products match and look in their house. Companies must keep in mind that the more accurate info they provide the less returns they will receive.
- Speed and forecast: Appropriate e-commerce tools are obligatory as it is very challenging nowadays to have an accurate forecast due to the high sales speed. The ideal method could be to implement JIT to minimize the stock at the distribution centres. It is also important that this stock will be complemented by a fast manufacturing process.
- Reverse logistics (AJEET KHURANA2018): Reverse logistics is an essential part of order fulfilment. Hence a strong reverse logistics setup can be a strategic advantage to an e-commerce business.
- Facilitating 'pull'-type supply chain management to enable reduced inventories and overheads – this is based on first collecting the customer order and then delivering through JIT (just-in-time) manufacturing.

- Returns and Complaints: Selling online means usually a higher return rate on products as either customers change their mind, or they are not satisfied with the product quality. In any case, e-commerce business must have a strong reverse logistic set up and good return policy, as this can give them a strategic advantage comparing it to the competition (AJEET KHURANA2018).

There are several advantages of adopting e-commerce such as cost savings, improved efficiency, customization and global market places explored (Amir Abou Elnaga¹ and Frahan Hassan Al Shammari² 2016). For the customer, is important to have goods on time at a lowest cost with accurate information on the web site and an easy returns policy.

Even if there is limitation in the availability or even stock out, is more important for the customer to know the next possible delivery. On the other hand, for big companies the main challenge is to maintain their customers satisfied with a cost- efficient and functional supply chain.

1.1.8 E-business and e-strategy

Consumers are fully aware of this new digital age that Dot com startups exist in our lives. Companies must find their own way to survive as online shopping has been increasing rapidly. There is no one way to perform successfully, each company must overcome its own challenges that have to be estimated and decide what is the best strategy for them. Even companies in the same industry of the same size, or with similar cultures, find out that one e-commerce strategy does not meet their requirements. Before starting the implementation of e-commerce, companies must evaluate the challenges that they will face. According to Bob Parker's research, 75% of the companies are starting e-business without evaluating the results they want to achieve. In his research, it is mentioned how important is for companies to set goals and take actions in order to succeed. Below we can find some of the most important factors/ KPIs that companies must evaluate before starting an e-commerce business:

- Improve inventory management
- Improve relationships with suppliers

- Improve supply chain management
- Improve time to market
- Improve relationships with partners
- Generate new sources of revenue
- Find new markets for products and services
- Reduce operational cost
- Improve customer satisfaction

E-commerce does not change the business nature, but it is a complementary tool that supplements the overall strategy and enhances the business performance. (Amir Abou Elnaga and Frahan Hassan Al Shammari 2016) According to this research, which is focused on the impact of e-commerce on business strategic plan, it is concluded that e-commerce improves organizations performance and adds value to customer satisfaction. Also, emphasis is given on the lack of knowledge of setting up a business plan as this is one of the main risks that could lead to a failure. Business Plan is part of a company's strategy/mission and provides an overview of its goals and actions. The main steps for building a business plan, are the following (SUSAN WARD 2018):

- The Industry overview and mission
- Market Analysis
- Competitive Analysis
- Marketing Plan
- Management Plan
- Operating Plan
- Financial Plan

Based on Vivian Michael (2018), the success factors of e-commerce business strategy can be summarized below:

- Initiating Business Strategy before Starting

- Check the competitors and create a competitive advantage
- Optimisation and customisation
- Focus on quality
- Customer Satisfaction should be a top priority
- Staying on top of the business

1.1.9 Competition of e-commerce and key players (Amazon example)

In the most of researches conducted in the previous years, Amazon is clearly the leader and pioneer of e-commerce world. Below are the 10 top e-Commerce companies in the world (according to MBA skool.com 2017)

1. Amazon
2. Alibaba
3. Walmart
4. Otto
5. JD
6. Priceline
7. eBay
8. Rakuten
9. Zalando
10. GroupOn

The Amazon example of success

“It remains Day 1.” That’s how Jeff Bezos, founder and CEO of Amazon, signed off in his 2018 letter to shareholders. He’s been propagating the “day 1” mantra for decades, and it’s meant as a reminder that Amazon should never stop acting like a startup - even though the company has million members of Amazon Prime, the company’s paid service for free shipping on select items. Amazon has and will remain one of the world’s fastest growing companies According to Richard Koch’s book “Simplify: How The Best Businesses In The World Succeed”. There are only two types

of businesses that win over time: Price simplifiers like Wal-Mart and proposition simplifiers as Apple. Amazon is the unique company that can combine them and does well simplifying both the price and proposition for its customers. There is no doubt that these two factors lead Amazon to success.

According to the article published by Charlie Liang 2018, there are 4 main points on which Amazon has been focusing during the years:

- Amazon's obsession with its customers. They are focused on customer behavior and their needs and they try to add unique value in their online experience. Amazon has also developed the customer service with helpful tools. In this way users can track packages and quickly return, or exchange ordered items, bringing simplicity and convenience to their online shopping experiences
- Innovation and technology: intelligent and innovative ideas like Echo voice and echo look where through a camera you can scan your outfit and make recommendations according to your style. Innovation is one of the factors that can enhance customer satisfaction and make the difference compare to other competitors (By Chris Welch 2018)
- The websites user experience. As we have already mentioned previously, a well-organized and user-friendly web site is a prerequisite for success. Customers can easily search for the product, add it to their cart and make a safe payment. Free shipping is an additional factor contributing to visiting and purchasing through Amazon.
- Optimization according to customer needs. Always focus on the customers and their needs. The company uses daily the technology to optimize the procedure and find new innovated and more convenient ways for their customers.

All four factors mentioned above, are around a customer-centric growth strategy where customer satisfaction trumps profit.

1.1.10 Tools and software tools used in E-commerce

There is a great number of e-business tools below the most important tools that companies used according to Anna Brzozowskaa Dagmara Bubel can be found (2015):

- **Websites:** It is mandatory for every company to have its own website. This is the best and fastest tool that can be used by a company in order to inform customers for its products and its included services. A proper website has many functions that companies can use in order to attract new customers. The most important function of a website includes promotion of a company, awareness and accurate information for each product, methods to stimulate customers to shop and build loyalty of the existing customers.
- **Blogs:** They are a mean of providing possibility of commenting on specific content and creating interaction between a company and its customers.
- **Search engines:** They are very important and inexpensive tools that can increase the customers demand. Users of internet who search for a product click the first few links displayed in the search engine. So, it is really important to be in a highest possible position in search engine results.
- **Social media:** Companies can use social media such as Facebook, Twitter, Google+ or YouTube and promote their products. This tool can be the key of success since more and more customers can share their online experience and recommend products to their friends.
- **E-mail marketing** is regarded as the cheapest and at the same time most effective e-marketing tool. The most important advantages are the constant communication with customers and measurability. Companies can measure how many e-mails have been sent and find the trends of the products. At the same time, they saved time and money as it less time consuming and costly to send e-mails than use the post.
- **Autoresponder:** It is a software that sends automatic e-mails to people who wrote an e-mail to a company and can support in an efficient manner the e-business in regard

to the communication with customers. It can be used to publish information or to advertise products and services as well.

- Viral marketing – finally viral marketing takes advantage of the social character of the increased Internet tendency. In this way, companies can promote a campaign or a product easily and make it viral as users just share what they find funny and different.

1.2 Inventory Management

1.2.1 Introduction of supply chain and e-commerce

The number of internet users is expected to increase during the next years due to the fact that internet and online services are becoming more and more safe and popular. Internet is the driving force for an inter-connected supply chain. According to Lankford, 2004, e-commerce is a complex process that involves the whole process and the smooth flow of products between suppliers and final consumers. In other words, a supply chain is designed to deliver products and services to customers in an efficient way (Leonard, 2003). Another significant factor for the supply chain is the use of flexible and high-level techniques systems. Only by using proper systems will companies achieve the full connectivity to the global supply chain.

1.2.2 Importance of inventory

It is vital for companies to understand the importance of proper inventory management. Nowadays a constantly increasing number of companies spend money on management tools and inventory systems. Inventory is one of the most important assets of a business as the management needs to be proactive, accurate and efficient. The company can take competitive advantage with proper track of Inventory management since it secures the smooth running of the production process, reduces the ordering cost of inventory and helps to avoid potential lost on sales. The idea is to utilize and optimize the plant capacity and reduce the unnecessary stock and the total price.

1.2.3 Definition

There are several different definitions for the inventory management according to the literature. It can be described as the total stock of any item or resources that are used in a company or organization (Chase et al. (2006). Other definitions depict inventories as the stock of items classified under 3 categories: 1) raw materials, 2) work in process and 3) finished goods (Ballou, 2004):

- Raw material: It refers to the unfinished items which go in the production process.
- Work in Progress: It refers to the semi-finished goods which are not totally completed but only a part of them.
- Finished goods: It refers to the ready for sales goods. The procedure has finished and there is no need for extra work.

In general, the inventory management controls the inventory levels and determines at what levels the inventory should be maintained, at what time it should be replenished, and how big is the quantity that would need to be ordered (Norazira Abd Karim, Anuar Nawawi, Ahmad Saiful Azlin Puteh Salin). In other words, an efficient inventory management secures the smooth flow of goods from manufacturers to final customer. The main goal is to keep a balance among stock, demand and real sales (West, 2009).

It can be clearly understood from Lankford, 2004 how difficult is for companies to acquire a competitive advantage at present. However, an efficient handling of Supply chain management is the key to success as it can account for 75% of total operating expenses.

Retailers must focus on managing inventory in order to reduce the costs and create higher inventory turnovers. Just in time delivery practices is one of the most essential processes for retailers. This technique has become popular as companies desire to reduce the waste and receive only the goods that according to real sales are of necessity. Thus, flexible systems that respond to customer demand and inventory uncertainties are of the utmost importance in e-commerce (Lankford, 2004)

According to Pandmanava Samanta 2017, holding excess inventory and overstock leads to the following:

- Unnecessary investment and reduction in profit.
- Increase in holding costs.
- Deterioration in inventory.
- Delivery problems

Of course, there is not only one rule for companies to follow concerning the inventory level. Each company must evaluate some significant factors so as to choose the best strategy and determine the proper stock level. Some of the factors that companies have to think first are given below (Odisha State Open University):

- Nature of business: The level of inventory depends on whether it is a retail business, manufacturing business or trading business.
- Inventory turnover: refers to the amount of inventory sold and the frequency of its sales.
- Nature of type of product: there are different sizes and the raw material of products.
- Inventory costs: the higher the inventory stock, the higher the operating costs of holding inventory will be.
- Period of operating cycle: The cycle life of the product is really important not only so as to understand how much stock is necessary to keep but also to have an idea where to display it and where it should be kept in a warehouse.
- Strategy of management: The strategy and philosophy of top management may support different tactics. Could be zero inventory concept like JIT or huge inventory level.

1.2.4 Costs

There are different types of costs that one company must estimate before starting the implementation of a business plan. It worth's taking into consideration that in some cases, the cost of purchasing and holding inventory can reach up to 60% - 80% of the total cost of a product

or service (Owoeye et al.2014). According to Gourdin (2005), three types of costs must be considered: holding, ordering, and stock out costs.

1. **Holding or carrying costs:** these are storing inventory costs before the product is sold. Holding costs include different factors like storage, insurance, taxes, inventory services and risks costs (Pandmanava Samanta 2017).
2. **Ordering costs:** Ordering costs are associated with the whole procedure of placing an order (Pandmanava Samanta 2017).
3. **Stock out costs:** Stock out costs are related to lost sales. This is the most important cost for a company as it is the biggest reason for customer dissatisfaction. When customers don't find the items they are looking for, they will turn into competitors' products which leads to loss of sales for a company. Therefore, companies need an efficient inventory management system, which can reduce the risk of customer dissatisfaction (Ali and Asif 2012).

1.2.5 Techniques for inventory management

Inventory management is a very significant part of logistics and supply chain management. Every organization holds inventory for different purposes. Appropriate quantities should be kept for a successful and efficient Inventory management. The goal for a company is to keep the inventory costs low while at the same time not having a negative impact from lost sales due to inventory shortages. Companies apply a variety of different methods and techniques in order to control the level of their inventories. These techniques can be divided in two main methods: a) The traditional and b) modern methods (Padmanava Samanta 2015). The main difference is that modern techniques have the vision of using scientifically evolved formulas for calculating optimal inventory levels. In this case, the business can make decisions on optimal ordering quantities and on frequency of the orders. More specific, these techniques include the calculation of order quantities, limitations of levels, average level and re-ordering levels. Most of the times, organizations use a combination of traditional and modern techniques to manage and control their inventory levels.

1.2.6 E-commerce and Inventory management

Challenges

The findings of many researches show that there are four main inventory management challenges for e-business:

1. Prompt delivery for goods and services: Services and fast deliveries are very important for online shopping. Delivery at home especially is really appreciated by customers though it creates a lot of complexities in the logistic chain (Visser, Nemoto & Browne 2014). However, the new trend shows that deliveries at different pick up points are most efficient and convenient for both sides. Customers take advantage of the fact that they can pick up at any time without having to wait for hours for the delivery as the estimated delivery time is 4 - 5 hours. In this way, companies can decrease transport costs and customers can pick up their order easily and quickly from the nearest pick up point.
2. Stock out: It is undoubtedly difficult for retailers and especially for online retailers to manage and balance both the inventory and the demand. They sometimes try to minimize the stock in order to reduce the carrying and inventory costs, yet this could create stock out and lost sales. Stock out should be the main reason for declining sales and reducing customer satisfaction. When customers face bad experience from an online purchase, there is a high likelihood that they will not buy again from the same company and most of the times switch to a competitor (Rell Snyder, 2009).
3. Demand fluctuations: Companies have to think and evaluate the seasonality as well as product preferences. The demand is different during the year and associated with high/low sales seasons where demand is shifted accordingly (Snyder, Rell & Hamdan, and Basel 2009).
4. Reverse logistics: It is a fact that a good return policy is crucial for customer satisfaction. On the other hand, retailers don't expect that this way of returns create a high return rate and a lot of waste. Without doubt, high returns rate causes a lot of problem in the logistic chain. A lot of time and money is wasted on handling returns, as many packages arrive

back, and the goods have to be checked so as to see if they are damaged or are suitable to be sold again. A great number of retailers manage to apply a kind of reverse logistics process thanks to a sophisticated way of classification of returned items which obviously have to be categorized distinctly so as to decide if they can be reused or disseminated into smaller pieces to see if their components can be reused in different products. (Rell Snyder, 2009).

1.2.7 Methods and strategies for inventory management at e-commerce

Internet retailers can organize and handle their inventory with 3 different ways (Snyder, Rell & Hamdan, Basel 2009): a) drop-shipping, b) inventory ownership (click and mortar), and c) a hybrid strategy that uses both drop-shipping and inventory ownership procedures. Overall, irrespectively of the tool & method that is being used, a successful inventory decision has been taken when the profit has been maximised (Hamdan, Basel Argosy University and Snyder, Rell National University 2016). More specifically:

- **Drop-shipping or risk pooling:** Many internet businesses try to take advantage of holding zero inventory by outsourcing their inventory management. This process is known as drop-shipping. In other words, supplier ships the product directly to the customer. The logic is to store inventory in one central location, by doing so wholesalers can serve multiple retailers easier.
- **Inventory ownership (click and mortar):** Is a traditional method, described by the fact that retailers store inventory in their own warehouse and sell directly to customers.
- **Hybrid strategy:** The hybrid strategy is the combination of traditional and drop shipping method, as both retailers and wholesalers keep stock inventory. In the hybrid strategy, customers are served from the retailers' own warehouses and drop shipping is used only in case the demand exceeds their stocks. The hybrid strategy is the best solution for retailers and customers as it reduces the risk of keeping unnecessary stock and provides flexibility for customers (Steinfeld, 2005).

Each company has to estimate the risks and the advantages of each method and choose the one that fits better in its needs. Some factors that can also affect their choice is the variety and size of goods, inventory costs, the lead time and the demand. The larger and heavier the products, the more inclined the retailers are to utilize the drop-shipping strategy (Steinfeld, 2005) (Randall, 2006).

1.2.8 Ways to improve inventory management

Companies can improve their inventory management with different ways. One of the most important is to utilize high technological systems in order to have accurate and fast information by using technology such as RFID (Fan et al., 2015; Talavera et al., 2015), centralization of stocking locations (Zinn et al., 1989; Evers and Beier, 1993; Tallon, 1993), appropriate adapted inventory control policy (Fu et al., 2015), and integrated warehousing with an inventory control system (Evers, 1999; Waller et al., 2006; Mason et al., 2003; Thomas and Tyworth, 2006).

Another significant fact is the safety stock that is kept. Companies must calculate the safety stock by using statistical formulas. Many different factors must be included in this formula in order to have an appropriate safety stock and avoid overstock or stockouts. The accuracy of sales forecast, required production lead times, manufacturing schedule and service-level data are some of the most important factors that must be included in the safety stock calculation. In addition, companies need to update these variables on a regular basis to ensure that all latest changes are included (Ronald Fink 2011)

Visibility into excess and obsolete stock also plays an important role. When such information is available, usually decisions are being take on how the obsolete stock would have to be managed, what kind of actions to be taken such as selling off the product or reducing the unnecessary inventory.

1.2.9 Trends and Future

The relationship that exists between logistics performance and e-commerce customer loyalty is much tighter in e-commerce business than in any other industries (Ramanathan 2010). The final customer always has high expectations on the logistics service level, therefore logistics are

crucial. Many studies conclude that customers regard the logistics performance as a vital factor of e-commerce, especially the last distribution (Esper, Jensen et al. 2003, Agatz, Fleischmann et al. 2008).

From a practical aspect of e-commerce logistics, the IT technology plays an active part in ameliorating the efficiency and effectiveness of supply chain management. Future technologies such as Internet of Things (IoT), Big Data Analytics, and Cloud Computing could be possibly adopted to ameliorate the e-commerce logistics as far as it concerns system level, operational level, and decision-making level that may have evolved into real time and intelligent ones in the next decade (YingYu, Xin Wang, Ray Y. Zhong, George Q. Huang 2016).

Status of fund, sales volume, management level, and informational capability are some of the factors that require consideration. Three future perspectives for the support of e-commerce are included in future technologies: Internet of Things (IoT), Big Data Analytics, and Cloud Computing. Such technologies are probably able to upgrade the e-commerce logistics, leading to a wider implementation appropriate not only for giant corporations, but even for small and medium-sized enterprises. IoT is a smart network of physical objects, devices, vehicles, architectures and is referring to any item with embedded sensors that aims exchanging data within an intelligent environment (Xu, Xu et al. 2014, Qiu, Luo et al. 2015, Zhong, Huang et al. 2015). After the use of a huge number of digital devices in e-commerce logistics, a great deal of data will be generated. The large amount of data from e-commerce logistics may provide profound knowledge helping to the support of advanced decision-makings for various businesses. Therefore, Big Data Analytics is another future perspective of e-commerce logistics. Big Data refers to the data sets having so huge volume or complexity that any typical data processing technologies or approaches are inefficient and ineffective to deal with them (Ciobanu, Cristea et al. 2014, Tan, Zhan et al. 2015, Zhong, Huang et al. 2015, Zhong, Xu et al. 2015). To process a great deal of data using reliable approaches, Cloud Computing maybe the appropriate one as it is a type of Internet-based computing in which resources, data, and information can be shared to computers and other devices on demand. Ubiquitous computing makes possible a convenient, flexible and on-demand network access to a shared pool providing a variety of resources of networks, services, servers and

so on (Morgan and O'Donnell 2015). Graham, Manikas et al. 2013, pointed out the e-logistics by using fully the Cloud Computing technology and infrastructures. In the e-commerce logistics, the SCM requires a high computation ability to come up with the optimal solutions or decisions, thus, the distributed computing resources might be used for figuring out what decisions to take both locally and globally. Another informative innovation, is highly customized software applications, enabling the link of the enterprise into its partners' system. Information regarding inventory levels and product types may be shared and presented together. It facilitates the company by using their supply chain business models to receive orders or manage deliveries better (Ying Yua, Xin Wang a Ray Y.Zhong b George Q.Huanga 2016).

1.2.10 Returns

The percentage of returns is one of the biggest problems in the inventory. Returns represent several challenges for the retails from an inventory management perspective. There's the obvious cost of handling returns as well as the time required for processing and refunding them. There are also other issues, such as stock returning at peak periods, which certainly places additional pressure on resources. The companies must be prepared to expect remarkable amount of returns through online sales due to the nature of the business. According to the research, there are different reasons that trigger the returns. The return policy must be easy and attractive for customers, as return policy is one of the most important factors for customer satisfaction. More than 8 out of 10 customers prefer brands with free returns. Following Amazon returns policies, there are the following steps in the process:

- Print label and Authorization
- Packaging preparation
- Attach return label
- Shipment

It is important to have a well organised package giving to the customer the opportunity to open and close it again without destroying it. This can reduce the waste and make the logistic process

easier. The feedback from customers is of course essential for what is needed and how to improve packaging.

Another good idea from Amazon is to make a C2C business with returns products. Customers can sell what they don't want to other customers. In that case the company will not lose time to check the product and won't make a refund. Returns are a given for online retailers and they should aim at minimising returns through clear product information, innovations and customer reviews.

Nevertheless, if a company desires not to make customers deterred from buying in the first place and wants to ensure that they will be content to purchase again even if they return products, it is of the highest importance to make the returns process as easy as possible. The only way to reduce returns is to find the root cause of them.

Below, there are some examples that would supporting to minimize the returns and improve customer satisfaction:

- Accurate information for the product: 3D pictures and video
- Innovation: platform where customers could display the product in a virtual reality
- Customer feedback and reviews: asking customers to provide feedback on products not only helps other shoppers make informed choices, but it also creates valuable data for retailers (Founder and CEO of Return Logic Peter Sobotta 2016).

Chapter 2 IKEA

2.1 History of IKEA

The founder of IKEA concept was a young (17 years old) Swedish entrepreneur Ingvar Kamprad. Ingvar was a young man with full of energy and passion. From the early age he began thinking about his own business and started cycling and selling things to the neighborhoods.

When Ingvar Kamprad founded IKEA in 1943, he didn't sell furniture but other things like pens, wallets, picture and many others all at low prices. IKEA is the acronym of the initials of his name, the Elmtaryd (his family farm that he was born) and Agunnaryd (his hometown in Småland, southern Sweden).

IKEA started with the vision of creating a better everyday life for the many people. After 75 years and 424 stores all over the world this mission continuous have the same values and vision. IKEA adapt the new reality and develop its products but at the same time keeps the same traditional mentality of creating a better everyday life with affordable products.

Core values and missions for IKEA can be summarized as per below:

IKEA's value chain is to provide the many people with home furnishing products, in the most sustainable and cost-efficient way (yearly summary report FY17)

IKEA's business idea: to offer a wide range of well-designed, functional home furnishing products at prices so low that as many people as possible will be able to afford them (yearly summary report FY17)

IKEA's vision: to create a better everyday life for the many people (yearly summary report FY17).

IKEA's Brand: our relationship to co-workers, suppliers and partners is also reflected in the image of our brand. (Yearly summary report FY17).

2.2 IKEA Supply chain

The initial idea for IKEA is to be affordable and low-price company. Today, the company counts 424 stores in 52 Countries. That means that IKEA tries to serve in the best way more than 600 million customers all over the world. It is important to understand the importance of an efficient purchasing and logistic system. Below we can find some of the most significant innovations which introduced over the years.

- One of the biggest success within Supply chain was the introduction of the flat pack and later the elimination of wooden pallets made further impact to the logistics. Flat pack was one of the greatest ideas as gives to the customer the opportunity to transfer their furniture by himself making them a part of the supply chain and of course reducing the total transport costs. There are different ways for the shipment from supplier to the store. The most cost-efficient way is from supplier to the store or to the final customer directly. More than 60% of IKEA shipment nowadays are directly from suppliers to stores. However, this kind of shipment is not always possible due to low volume orders or other factors (e.g.: unnecessary stock at Warehouses).
- IKEA supply chain is huge with around 1600 suppliers form different countries and a variety of products with each store holding more than 9500 items. IKEA always looks into the future and has been focusing on developing new materials, technologies, and sustainable products
More than 60% of the products are being sourced from suppliers located in the below countries:
 - China (28%)
 - Poland (18%)
 - Italy (7%)
 - Lithuania (5%)
 - Sweden (4%)

2.3 Replenishment setups

There are different types of replenishment solutions used in IKEA depending on the demand and the volume. The main separation becomes due to different ordered volume. For example, if the ordered volume is large enough, the goods are shipped from supplier to the store directly (is named DD set up and is the most cost-efficient solution). In addition, under this replenishment solution goods can be transported through Transit, which means supplier send the goods to an IKEA distribution center. Within 24 hours, the goods are loaded and consolidated with other goods into new trucks before being transported to the store. This is known as a cross docking method as the goods are not stored for more than 24 hours in the warehouse.

For smaller ordered volumes, the goods are transported from supplier to a warehouse (DT) and stored according to the demand (DT set up). It is important to notice that stock is calculated differently for each item and each distribution center. There are many factors that impact the ordering and the volumes. For example, orders are placed in the system according to safety stock, lead time and customers need.

Finally, the replenishment setups can also be combined supply, that means that there is a percentage of DD set up and DT set up. For example, a 20/80 split, means that 20% is the minimum quantity taken from DT and 80% from supplier directly (Strategic Framework for Inventory Management 2015).

Furthermore, IKEA in order to have smooth deliveries, has separated the goods in two different flows. High and low flow which means that there are also two different types of Distribution centers:

- High-flow DT Warehouses located close to the markets supplying one or multiple countries. Used for higher selling goods requested on pallets.
- Low-flow DT Warehouses located centrally supplying entire regions. Used for lower selling goods requested in pieces or multi-packs.

Regarding online sales, IKEA try to imply the same logic of deliveries. Has separated the goods in two different flows. Items which are delivered by truck and small items which are delivered by parcel. That means that there are also two different types of customer Distributions centers one for trucks and one for parcel items

CDC: Customer distribution center which serve customer orders that are ordered from the stores or through IKEA website. Overall 80% of the keep stock is going to online sales and 20% to stores. The percentages are not stable and can vary by each country.

CPU: Central parcel unit will fulfil customer orders in their entirety when include only parcel products. Otherwise when orders contain different articles, the parcel unit may fulfil part of an order, with the rest coming from another fulfilment unit

Today IKEA has 37 CDC and parcel units all over the world from which 24 are located in Europe. Each Country has different way of fulfilling online orders and this makes difficult to adapt one aligned way of working. However, during the fiscal year 2019 the new IKEA e-commerce structure will apply to all the Countries.

2.4 Inventory planning

IKEA employees work with high priority to secure availability to the final customer in the lowest possible cost. The goal is to keep enough stock in order to cover their customers' needs avoiding at the same time an overstock situation. Therefore, a good and accurate inventory planning is necessary. Following IKEA concept, the products must be available to the customers immediately. Finished goods stock is kept at each point in the supply chain: at suppliers, DTs, CDC and stores (Strategic Framework for Inventory Management 2015).

Stock is kept for several and different reasons for example the proposed dimensions of finished goods consist of Cycle stock, Safety stock and Excess stock. (Strategic Framework for Inventory Management 2015)

- Cycle stock is similar to turnover stock, in other words represents the estimated stock to meet customer demand.
- Safety stock is kept preventing stock outs due to the uncertainties.
- Excess stock in turn consists of Hedge stock. Uncertainty and sales volatility, transport restrictions, and production capacities can lead to excess stock.

2.5 IKEA Case study

2.5.1 Background

IKEA is the leader in the home furniture business since 1943. During the last years, IKEA has realized the significance of succeed strategy in Supply chain and inventory management. Therefore, IKEA spends time and money to develop their systems, improve the procedures and educate the employees.

One of the biggest challenges for big companies such as IKEA is to create a proper inventory management and take the right decisions in order to avoid high extra costs. With specific procedures and tools try to track the inventory and work proactively with main goal to secure availability to the final customers. Sometimes this strategy leads to wrong decisions as high level of stock are stored and company suffer of overstock.

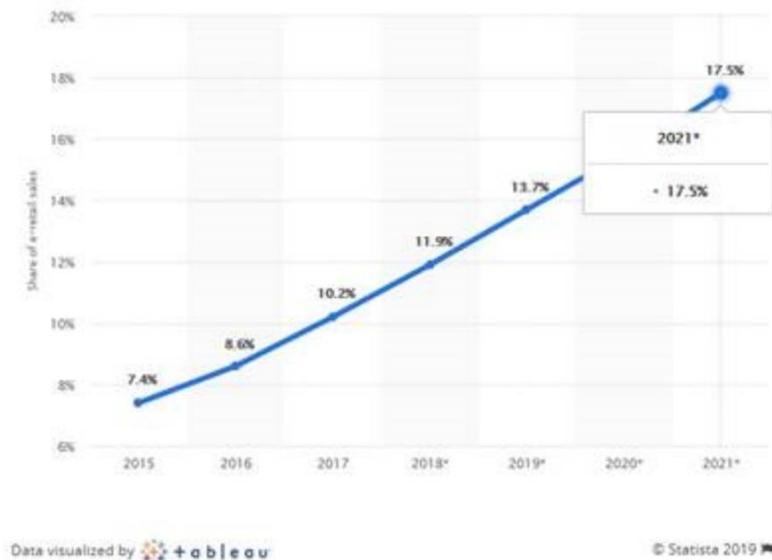
The world changes rapidly and companies need to act fast and follow the new trends.

Busy people, lack of time and technology evolution lead to incredible fast increasing of online shopping. Companies must adapt this new reality smoothly, the only way to do it correct is to investigate and calculate the risks and evaluate the barriers before acting.

Even though IKEA operates online shopping for many years, many processes and strategies must be developed in a more efficient way. IKEA for many years were focused to self service processes and tried to attract customers inside the stores.

Today IKEA e-commerce contribute to 7% of the global IKEA sales, and grew more than 50% during the last three years (from 4.5% to 6.8%). which is a remarkable percentage, but still far away of the industry (2019: 13.7% below graph 4).

Graph 4: E-commerce share of global retail (2015-2021)



Source: Statistica.com

2.5.2 Customer satisfaction

As it has been already mentioned before customer satisfaction is the most significant factor for succeed companies. There are many researches regarding customer satisfaction, what is remarkable in below research is that according to Harish Patila ; Brig. Rajiv Divekarb *2014 most of the customers would not buy again on the same website after a bad experience of product delivery. This is an indicator of the importance of on time delivery and accurate information. The findings of the research show that exists a relationship between customer satisfaction and inventory management. More specific the regression statistics indicates that there is a positive correlation between complaints from customers when products were not delivered on time. As a consequence, customers will not shop again on the same website after a bad experience of delivery.

So real time, accurate information and delivery on time are the main factors of online business. It is needed to maintain good levels of stock and avoid stock outs and deliver them on time. On the other hand, is really important to balance yours levels and don't keep unnecessary stock. From customer perspective transparency and track methods are necessary in order to succeed customer satisfaction. Regarding IKEA e-commerce is still at the first steps, they have many projects that are running right now and are focusing in customer satisfaction. However, there are potential of improvements, such as a more customer-oriented Web site, more cost-conscious packaging and efficient reverse logistic.

2.5.3 IKEA Trends

IKEA is working hard to improve and develop their business, so as integrate in the new reality and adapt the new trends. By 2020, the goal for IKEA is to reach 10% of total sales and provide full range availability through E-commerce. IKEA is also looking to develop their services and increase customer satisfaction. The main goal is to meet the customer`s need in a better way.

This is why, it started offering services for online shoppers that allow customers to pick up goods in more convenient places. More specific customer chooses to click and collect option and can choose their pick-up point:

- Click & Collect in store: customer orders article and pays online, then collects their purchase in a store.
- Click & Collect at Pick-up Point: Similar to the above, except that the customer collects their order at the closest pick-up point.
- Click & Collect with home delivery: Order is delivered from the store to the customer's home

The next step for IKEA is the store`s format. The concept change, and new formats will be created with smaller stores inside the city. The idea is to meet customers in the City and not in the Country side with huge stores. IKEA is in a pilot stage in order to secure that can have small stores with 100% of the range displayed. (IKEA HOME meet the customers projects 2018).

Customers meeting points

IKEA is always close to customer and wants to secure a smooth distribution network and optimize IT solutions. As the needs change and the expectations increase IKEA offer a mix of IKEA customer meeting points that secures a full IKEA Brand and customer experience. The customer meeting points split in two parts: the core and add-on IKEA customer meeting points.

Core IKEA customer meeting points include below three points:

- IKEA store
- IKEA small store
- IKEA website (with or without ecommerce, IKEA website lets customers explore the full range and offer all relevant information)

Core Ikea meeting points are complemented by:

- IKEA customer support centre
- IKEA social media
- IKEA mobile apps (IKEA mobile apps let customers reach and interact with many more of the people. Mobile apps can make IKEA more accessible and help customers to create flexibility and personalized experiences. This generates data and knowledge that IKEA can use to better understanding of customer behaviours)
- IKEA catalogue

Small stores

Are part of the core IKEA customer meeting points and are approximately 10,000m² to 15,000m². The new concept that IKEA adapt in order to meet the customer is new small urban stores. The next two years IKEA will open 30 new small stores in the city centre. The small store creates new possibilities for younger and busy people. They get easy, close and convenient access to IKEA, they experience a full range and they can easily return the product back in case of a change of mind or a problem.

Add-on IKEA customer meeting points

Add-on IKEA customer meeting points created in order to add value to IKEA customers and increase customer satisfaction. Below points summarise the add-on customer meeting points which strength the core of IKEA

Add-on IKEA customer meeting points are:

- IKEA pick-up points
- IKEA pop-up
- IKEA shops
- IKEA plan & order points
- IKEA Locker Solutions

IKEA pop-up (IKEA concept work in progress 2018)

IKEA pop up Is included in the add on-customer meeting points, it is a temporary physical store which is located for 6 months more or less and focuses in specific themes .Depending on the Country and the customer needs can have different events and spread he IKEA brand to different groups.

IKEA shops (IKEA concept work in progress 2018)

This concept will support existing IKEA store(s) and ecommerce web on the market and will focus on a specific department of the range according to local preferences and needs. Customers get a personalized experience and advice by meeting highly skilled IKEA co-workers that support individual needs and connect them to the total IKEA product offer through the IKEA store or ecommerce/web.

IKEA Plan and Order Point (IKEA concept work in progress 2018)

IKEA plan and order is also part of the add-value meeting points, the difference here is that is focusing on complex products and solutions like kitchen, bedroom and bathroom. Customers will

also get support from full experienced IKEA co-workers which are focused on customer satisfaction. They will also have the opportunity to combine the benefits of physical store and online shopping. In the meaning that they will have access to physical presentation of relevant parts of the IKEA range to touch and try, in addition customers are able to choose when and how to get purchases

IKEA Locker Solutions (IKEA concept work in progress 2018)

Another innovative idea from IKEA that is also part of IKEA concept work in progress 2018 is the IKEA locker solution. In reality that means that there will be different places with IKEA lockers where customers can come and pick up their orders. This solution offers a 24/7 service for customers in their chosen location. The lockers are more cost-efficient and sustainable solution compare to home delivery.

IKEA's expansion plans and strategies are endless, they find an enormous potential for expanding and more accessible IKEA in Asia, North and South America and Africa, with rapid population growth and increasing Home Furnishing markets.

Chapter 3 Aims

In this chapter, I will describe the main aims of this thesis. I will present the key focus areas of this study as well as their connection with IKEA business strategy. The empirical study is split into three main sub-chapters.

3.1 Aim 1: IKEA positioning on e-commerce

As part of IKEA business strategy is to boost its e-commerce sales and potentially add furniture showrooms in city centres to stay abreast of shifting consumer behaviour. While late to the online shopping scene, up until 2016, the company was officially present in 28 countries and offered e-commerce in 14 of them. Additionally, the retailer also targets to strengthen its online delivery muscle by installing a new IT platform that would drive efficiencies across in supply chain.

Taking into consideration these facts, aim 1 will be covering IKEA e-commerce area by measuring its sales performance over the last years and comparing it with its traditional retail store channels. Furthermore, it will explore the key countries that contributed most to the online sales growth for IKEA. I end with an exploratory analysis by category and country level providing a better understanding about IKEA performance on the e-commerce business.

3.2 Aim 2: IKEA sales and inventory growth for the period 2016-2018

Moving into aim 2, our aim would be to shed more light on the top performing countries in Europe, as Europe describe the 68% of the total sales and analyse the trend of IKEA e-commerce sales in comparison with its inventory development. As mentioned above, one of IKEA fundamental pillars is its high-quality customer satisfaction that is being achieved through continuous product availability at its retail stores. For this reason, it would be of great interest to understand the development of IKEA inventory levels for its online business in conjunction with its online sales performance.

Additionally, the aim of this section is also to capture the growth of IKEA e-commerce by introducing in parallel some other variables which might impact the company's specific country performance. For example, variables such as the gross domestic product (GDP) of a country, the unemployment and net migration are expected to have a direct effect on a firm and hence on IKEA sales performance. Finally, the aim of this chapter will explore if IKEA traditional sales channels such as stores, will have an adverse impact on the company's e-commerce growth.

3.3 Aim 3: The impact of demand uncertainty on IKEA inventory levels

Aim 3 will be focusing on the effect of the inventory on IKEA sales performance for the e-commerce business. As mentioned above, IKEA's core strategy is to maintain a high-quality service level and product availability across its online and retails business and as a result, it is expected to maintain sufficient inventory for this purpose. At the same time, digitalisation and the fast-growing trend for online shopping with an increased number of customers, creates vast opportunities for the companies to grow in areas which were unexplored a few years ago. On the other hand, it is getting more challenging to maintain an accurate sales forecast for a company so that it would enable it to optimize its inventory levels and minimise its working capital and operating costs. As a result, the aim of this thesis is to understand the relationship between demand and hence sales uncertainty for IKEA e-commerce and its impact on the firm's inventory levels.

Chapter 4 Methodology & Data

In this section I will describe the research questions that I am intending to investigate, and the relevant hypotheses based on the Aims that are stated in previous chapter. More specifically, the main objective of this study is threefold : 1) to explore IKEA growth on the e-commerce area and its importance compared to the traditional retail channel, 2) to provide a more detailed analysis on IKEA online sales development during the last 3 years for Europe counties as well as to understand the impact on the sales driven by country-specific and macroeconomic factors and 3) to understand if the demand uncertainty on the e-commerce impacts IKEA inventory levels.

The rest of the Section include a thorough description of the databases and the process that was followed for the data collection. This Section will continue by describing the key variables & control variables that will be used in the econometric models. At the final part of this Section, the models that have been developed, will be described.

4.1 Research questions and Hypothesis

IKEA positioning on e-commerce

As described before, the first aim of this thesis is focusing on IKEA e-commerce area. E-commerce has not exactly been a priority for IKEA. Its online store is basic and not comparable to the retail stores where a massive variety of products is available to the customer. IKEA managed to enter the online market only during the last years in Europe. For this reason, someone would expect a significant growth for IKEA e-commerce part as more and more products being introduced, and the online store is constantly being upgraded to meet specific customers' expectations. Following the above rationale, Hypothesis 1 would be framed as:

H1: *During the last three years, the share of IKEA e-commerce sales vs. the company's retail sales, would experience a significant increase*

IKEA sales and inventory growth for the period 2016-2018

The second Aim of this thesis is focusing on IKEA e-commerce sales and inventory. There have been various timeseries models developed that explore the growth of these two variables (sales and inventory) for IKEA for the period of 2016-2018. Additionally, the graphs presented below, provide a holistic view on a country level as well as on each product category area.

In this Section, there are number of macroeconomic country-specific variables have been tested to support the evidence on their impact on a firm's sales performance. More specifically, the **gross domestic product (GDP)** of a country, which is one of the main indicators to measure the performance of a country's economy, is expected to impact positively a firm's performance. As GDP increases, the consumers have higher income available for spending on goods and services within this country. On the other hand, the **unemployment rates** of a country, might adversely impact a firm's sales performance. As people have less money for spending while they are out of work, this tends to weaken their purchasing power, which leads to softer sales for a firm which operates within this country. Furthermore, the migration impact is also expected to influence a firm's sales performance. More specifically, we expect that countries with high **migration influx**, would have an adverse impact on GDP per capita which by itself would lead to weaker sales for the companies in this country. Finally, we have introduced IKEA **number of stores** as a variable which would also drive an adverse impact on its online sales. The main rationale behind this assumption, is that the higher the number of stores in each country, the higher the chances that consumers would prefer to visit a store which is close in proximity and accessible to them. This is a key factor to determine if a consumer would rather visit a physical store or purchase online the products.

As a result, Hypothesis 2 would be framed as following:

H2: *IKEA online sales per population is positive impacted by the country's Gross Domestic Product per capita (GDP), while the unemployment rates, net migration and IKEA number of stores are leading to lower sales per population for IKEA e-commerce*

The impact of demand uncertainty on IKEA inventory levels

The third Aim of this study examines the linkages between sales uncertainty and IKEA's inventory investment behaviour. Following the study from Mustafa Caglayan, Sara Maioli, Simona Mateut (2012), they provide evidence that demand uncertainty as measured by the sales volatility, has a positive impact on inventory accumulation. In other words, companies tend to build inventories to avoid stock-out as they are subjected to high demand uncertainty. As a result, taking into consideration that IKEA focuses on increased customer satisfaction by maintaining high service levels and product availability, we would expect that the above conclusion to be persistent accordingly.

H3: The higher the sales uncertainty, the higher the inventory *IKEA inventory levels for the e-commerce business in Great Britain and Ireland.*

4.2 Data, Methodology & Analysis

Data availability & main variables

The data were gathered from various sources, under the IKEAs approval. The scope of the analysis is based on the last two fiscal years starting from week 36 2016 until week 35 2018. For the accuracy of this exercise, all information has been gathered at an item level, which is the lowest level of details that could be retrieved. Each year week observation contains information about the article number, the category that the product belongs to (HFB) and the week number.

Below there is an overview of the main variables that were extracted for this study:

- **Article number:** this is referring to the unique 8-digit number that defines a product code sold by IKEA. These codes are shared by various countries which means that the performance of each item could be measured consistently across Europe.
- **Inventory:** it is defined as the number of pieces (or the value in Euros) stored at IKEA's regional warehouses (CDC) which are being sold through e-commerce.

Weekly observations have been collected per article number at a given point of time for these two year (104-year weeks).

- **Sales:** is the number of pieces (or the value in Euros) sold through IKEA e-commerce channel.
- **CDC:** is a regional warehouse which store products mainly for online sales (in general >80% and especially in Great Britain >95%)
- **Country of Sale:** This is the country which the products were sold through IKEA e-commerce channel

There have been two different datasets developed as those have been extracted from IKEA internal systems. The first dataset includes the stock level information (in pieces and in Euros) per article number, per year week (104-year weeks in total) and per regional warehouse CDC. The second dataset includes the sales information (in pieces and Euros) per article number, per year week and per country of sale (22 countries in total).

Additionally, the World Data Bank has been used as an independent source to extract the macroeconomic indicators for the countries which are in scope. The data were available only for each calendar year and not per year week. For this reason, we assumed that these variables are unchanged during each year.:

- **GDP per capita (GDP):** Is the gross domestic product converted to international dollars using purchasing power parity rates. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars based on the 2011 ICP round.
- **Unemployment rate:** Unemployment refers to the share of the labour force that is without work but available for and seeking employment. Definitions of labour force and unemployment differ by country.

- **Net Migration:** Net migration is the net total of migrants during the period, that is, the total number of immigrants less the annual number of emigrants, including both citizens and noncitizens.
- **Population:** is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates.

As a next step, these three datasets have been merged by using as unique identifiers the year weeks and the article number for each observation. It worth mentioning that there has been a mapping developed to connect the countries of sale to the regional warehouses where the inventory is being kept at and is being supplied to. This is the third unique identifier that enabled the merging of these two datasets.

Observations with zero sales or zero inventory levels were included in the dataset to capture for any potential overstock or out of stock situation during the examined period. Taking into consideration the massive amount of observations (7.2 million observations from the sales dataset and 32.0 million observations from the inventory dataset), the various articles have been aggregated on product category HFB level (19 HFB in total) per year week observation. Another reason for aggregating the data on product category level, is the fact that there has been an increasing number of articles introduced during the period 2016-2018. More specifically, the number of article codes that were sold through IKEA e-commerce has increased from 20,200 unique articles in 2016 to 39,800 unique code in 2018.

The above dataset has been used for the timeseries analysis for the main European countries as well as for testing Hypothesis 2, which measures the impact of the above-mentioned macroeconomic variables on IKEA sales per population performance.

An additional sub-dataset has been created for the regression model to explore Hypothesis 3, which measure the sales volatility of IKEA on the inventory investment. As the scope of this analysis is based on Great Britain and Ireland, only part of the original dataset was used (1976-year week observations). The descriptive statistics will be presented in Section 5.

4.3 Model

For examining **Hypothesis 2** as outlined in Section 4.1 and to understand if different macroeconomic indicators are impacting IKEA sales performance, the following Poisson generalized linear model has been developed (model 1):

$$\log\left(\frac{Sales_{it}}{population_{it}}\right) = \alpha + \beta_1 GDP_{it} + \beta_2 MIG_{it} + \beta_3 UNEMP_{it} + \beta_4 STORES_{it} + f(\text{weeks})$$

Where $Sales_{it}$ per population is the dependent variable and is measured as the number of pieces sold via IKEA online stores per country i and per year week t . The covariates used are the GDP_{it} which is the Gross Domestic product per capita, MIG is the net migration, $UNEMP$ is the unemployment rate, $STORES_{it}$ is the number IKEA retail stores. The intercept of the regression is symbol α , the regression coefficients are $\beta_1, \beta_2, \beta_3, \beta_4$. The variables $GDP, MIG, UNEMP, STORES$ were scaled because they were of different magnitude. To capture the temporal trend, we used penalized splines.

For examining **Hypothesis 3** and to examine the demand uncertainty impact on the inventory levels, the model from Mustafa Caglayan, Sara Maioli, Simona Mateut (2012) has been used. Denoting I as the logarithm of inventory value and S as the logarithm of sales, we model the growth in inventories as follows (model 2):

$$\Delta I_{it} = \alpha_i + \beta_0 \Delta I_{it-1} + \beta_1 \Delta S_{it} + \beta_2 \Delta S_{it-1} + \beta_3 (I_{it-1} - S_{it-1}) + \gamma_1 \sigma_{it} + \epsilon_{it}$$

,where i defines the product category (HFB) and t is the year week. ΔI_{it} is the dependent variable and is defined as the change in the logarithm of Inventory I of the current week minus the one from the week before. In a similar way, the first difference of lag of Inventory I has been included in the regression to capture any short-term effect on the inventory movements. ΔS_{it} is the first difference on the logarithm of Sales vs. prior week. The term $I_{it-1} - S_{it-1}$ is the error correction term which would capture any movements in Inventory towards the long run target. Last, the impact of the sales uncertainty is defined as the sales volatility σ_{it} (standard deviation of returns).

Compared to the model from Mustafa Caglayan, Sara Maioli, Simona Mateut (2012), in our study, we do not include the impact of a firm's financial strength on inventory changes. The reason for that, is that our focus is only on one specific company (IKEA), while the authors are using multiple firms in their study. Another difference is the number of years which are limited to a 3-year period in our sample compared to the 7 years in the authors' study. This impacts the way the sales volatility has been calculated as 6 months moving standard deviation of the unpredictable part of sales has been used to construct the uncertainty measure (compared to the 3-year).

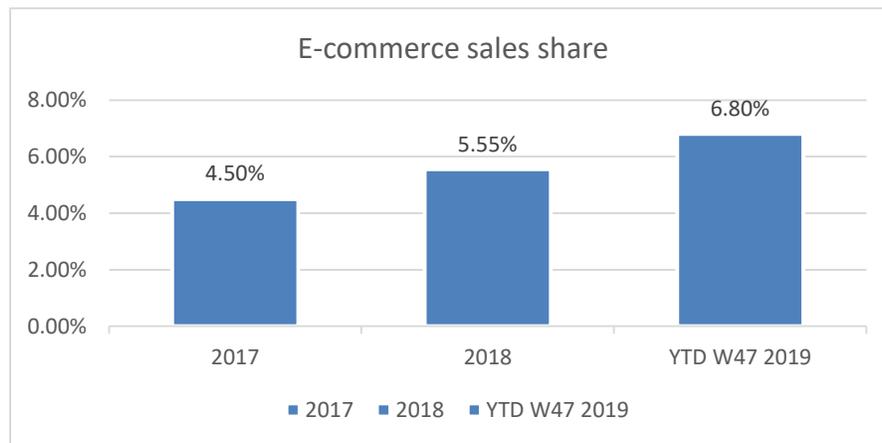
Chapter 5 Results

5.1 Aim 1: IKEA positioning on E-commerce

As described in Section 4, the sample has been downloaded from IKEA sources for all countries on a Global level. However, the results and graphs will be focusing on the European Countries. All reported numbers will be in Euro as IKEA's reported currency of the annual reports.

As e-commerce is a high growth area for most of the multinationals, in a similar way, IKEA has managed to grow its online sales over the last years. In the below graph, there is a representative view of the share of online sales vs. traditional channels (such as the stores). More specifically, the latest e-commerce sales from 2018, have contributed to almost 7% of IKEA total sales and they grew more than 50% during the last three years (from 4.5% to 6.8%). The aforementioned results confirm **Hypothesis 1** that IKEA e-commerce part has grown remarkably, which is in line with the assumption that firms experience an important growth during the first years since they have entered a new market (e-commerce).

Graph 5: E-commerce sales vs. traditional sales channels

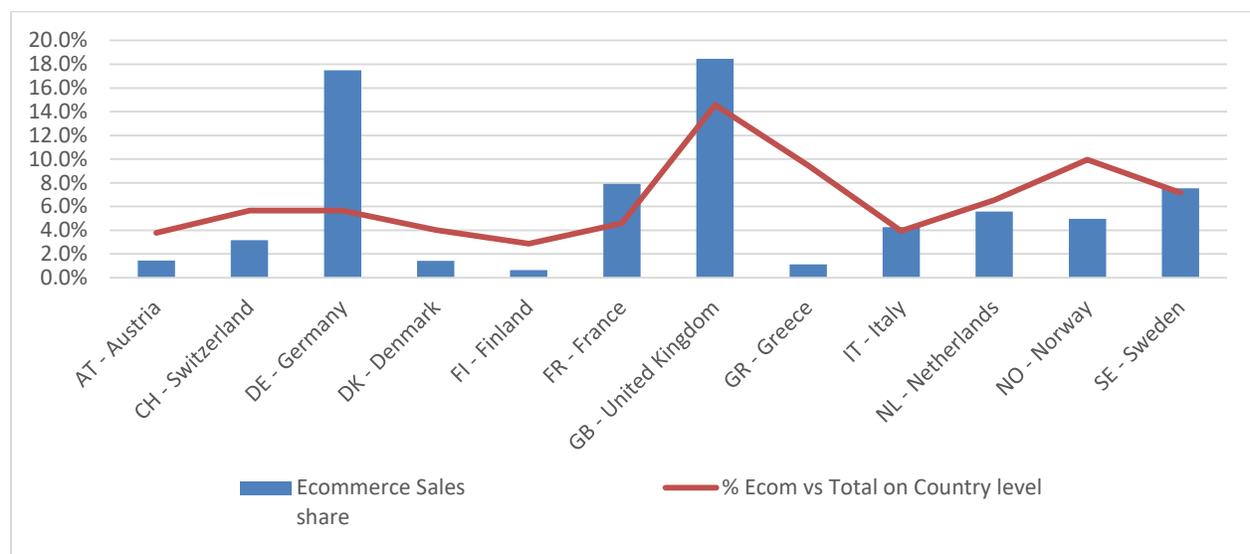


On the other hand, the ratio of online shares vs. traditional sales seems to be much lower compared to the 15.6% of the industry standards as measured by the Business wire Global Online Furniture Market for the period of 2018-2022. As a result, the above figures, highlight the

importance and the focus of IKEA on the online market and the high growth opportunities that could be unlocked in the future.

Moving further into IKEA e-commerce performance on country level, Graph 6 provides an overview of the key countries which contribute to the firm's online sales for 2017. More specifically, Germany and Great Britain are by far the countries with the highest Net Revenue and contribute more than 30% of IKEA online sales in Europe. Additionally, Great Britain has the highest percentage of online sales contribution vs. traditional retail sales on country level (15%). On the other hand, Germany online sales contribute only 5% to IKEA total sales for this country. As a result, we can conclude that the expansion of IKEA e-commerce can vary on a country level.

Graph 6: E-commerce sales on Country level FY17



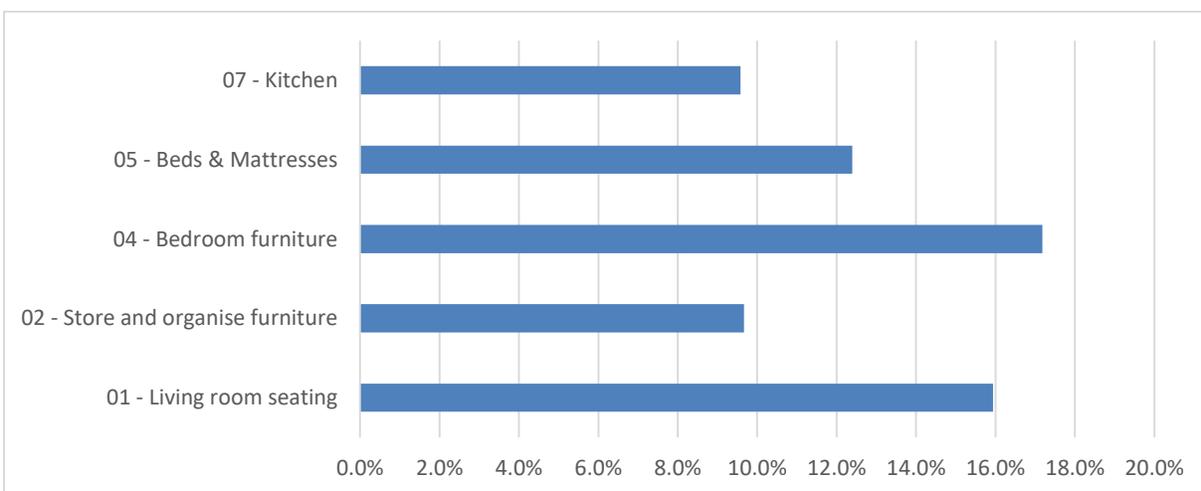
The same analysis has been performed for 2018 fiscal year for the same countries. Based on Graph 7, Great Britain online sales share has grown from 15% to 16% in 2018 compared to the growth of the traditional sales. On the other hand, Germany online sales share has remained flat at 6%. This might relate to the fact the traditional retail sales are growing at the same pace with the online sales. It worth mentioning that most of the countries (Sweden, Greece and France) have continued to grow their online sales share vs. the traditional retail sales, which is in line with IKEA business strategy to heavily invest in this area.

Graph 7: E-commerce sales on Country level FY18



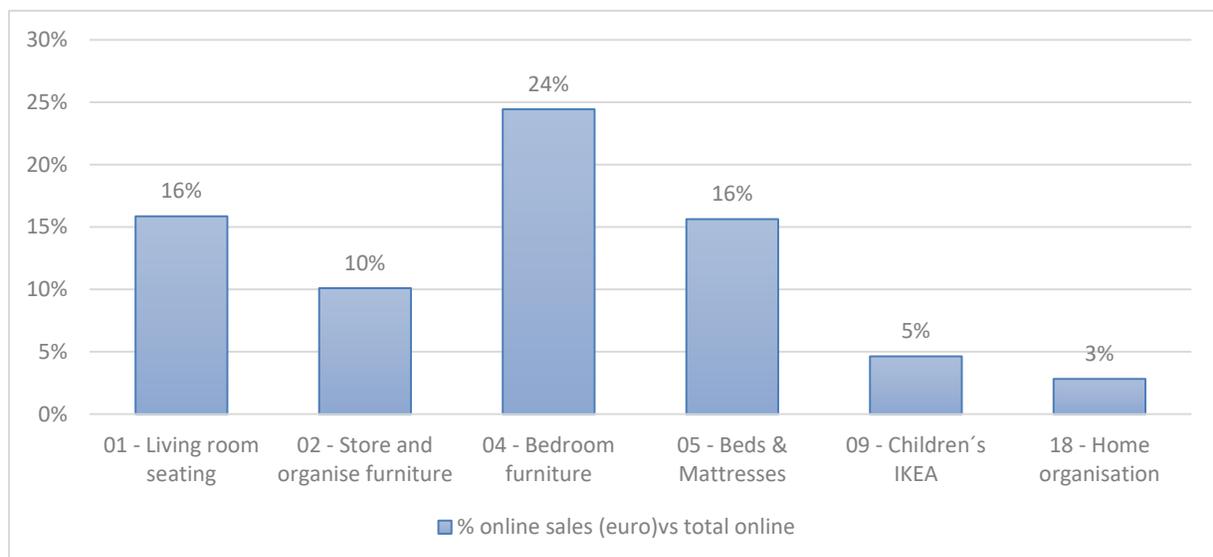
Looking into the various IKEA product categories (HFB) on Graph 8, Bedroom furniture and Living room seating constitute more than 30% of IKEA online sales for FY18. Other top performing categories are Beds & Mattresses as well as Kitchen and Store & Organize furniture. Overall, from 19 different HFBs, the top 5 categories make approximately 65% of total sales for IKEA e-commerce business.

Graph 8: E-commerce sales on product category (HFB) FY18



As mentioned above, Great Britain is the lead market when it comes to IKEA e-commerce share. For this reason, it would be interesting to understand which product categories in this market are the top performers. Graph 9 shows a split of GB e-commerce sales by product category (HFB). As expected, the top 3 categories in Great Britain are consistent with those from Graph 8 in Europe. More specifically, Bedroom furniture, Bed & Mattresses as well as Living room seating contribute around 56% on total e-commerce sales. This number is again in line when compared to Graph 8 which indicates that these product categories are the strongest performers in most of the countries.

Graph 9: Great Britain e-commerce sales share on product category (HFB) FY18



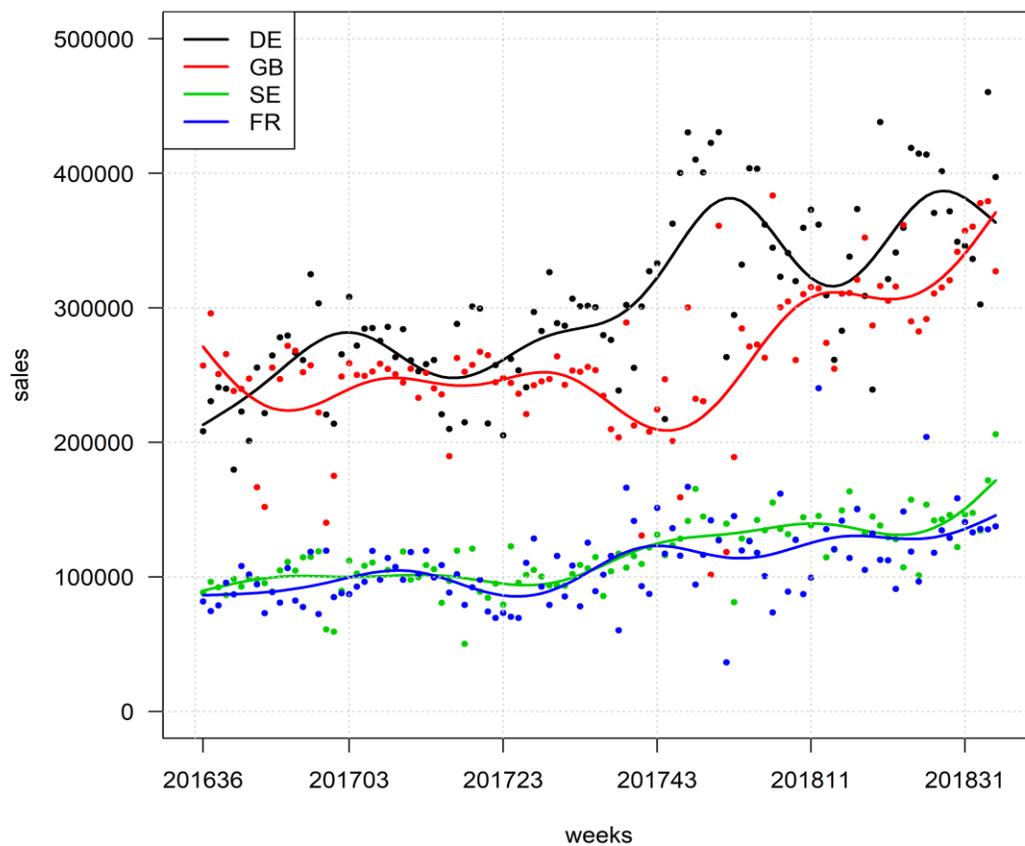
5.2 Aim 2: IKEA sales and inventory growth for the period 2016-2018

Plot 1: Top 4 countries (sales in pieces)

In this Section, we developed various time series models from the dataset to present the growth of IKEA online sales during the last years together with the inventory growth. The time series graphs are presented in pieces (quantities) for 104-weeks in total (2016-2018). The second part of this Section will explore the impact of the macroeconomic indicators (GDP, unemployment rate, net migration) as well as the impact of the number of stores to IKEA online sales performance.

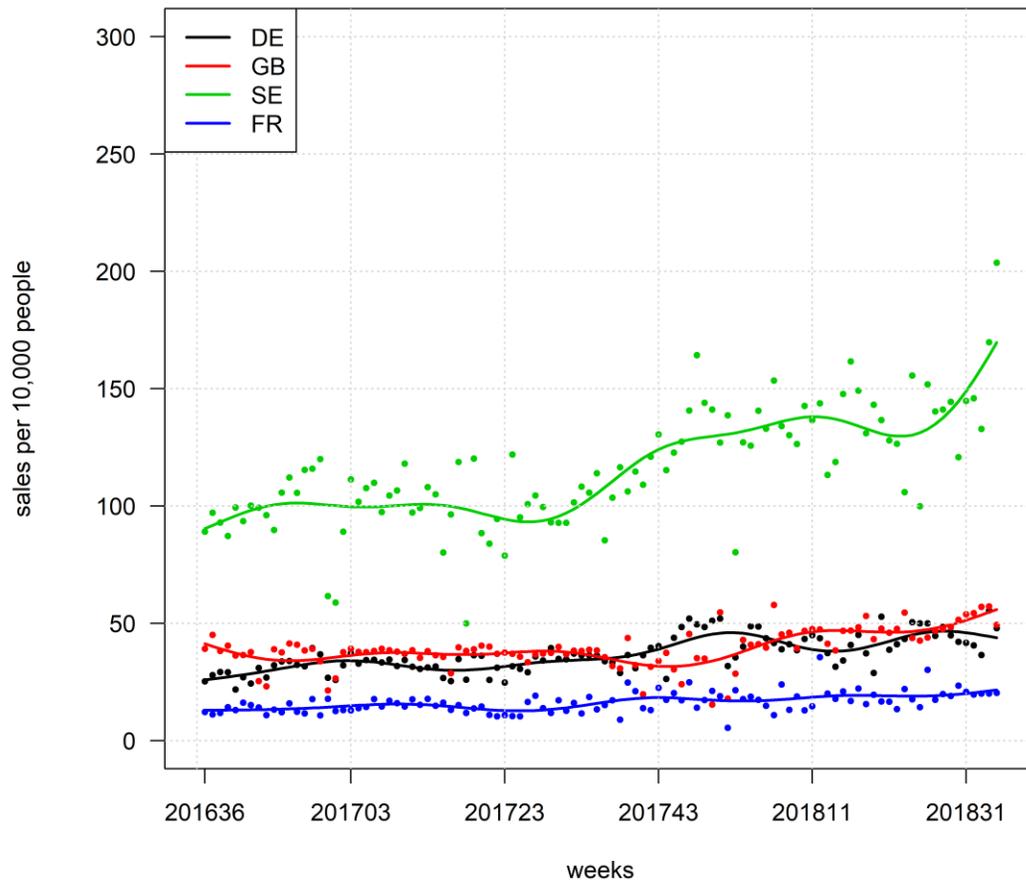
Graph 10 shows the sales quantities per year week observation of IKEA e-commerce for the top 4 countries as identified in Section 5.1 which contribute more than 50% of the total IKEA online sales. Due to the significant variation of the weekly sales, a smoothing line has been used to capture the weekly trend during the period of examination. Overall, there is an increasing trend for the top 4 (Germany, Great Britain, Sweden, France) which indicates that IKEA e-commerce is a growth market in Europe.

Graph 10: E-commerce Sales quantities for top 4 Countries



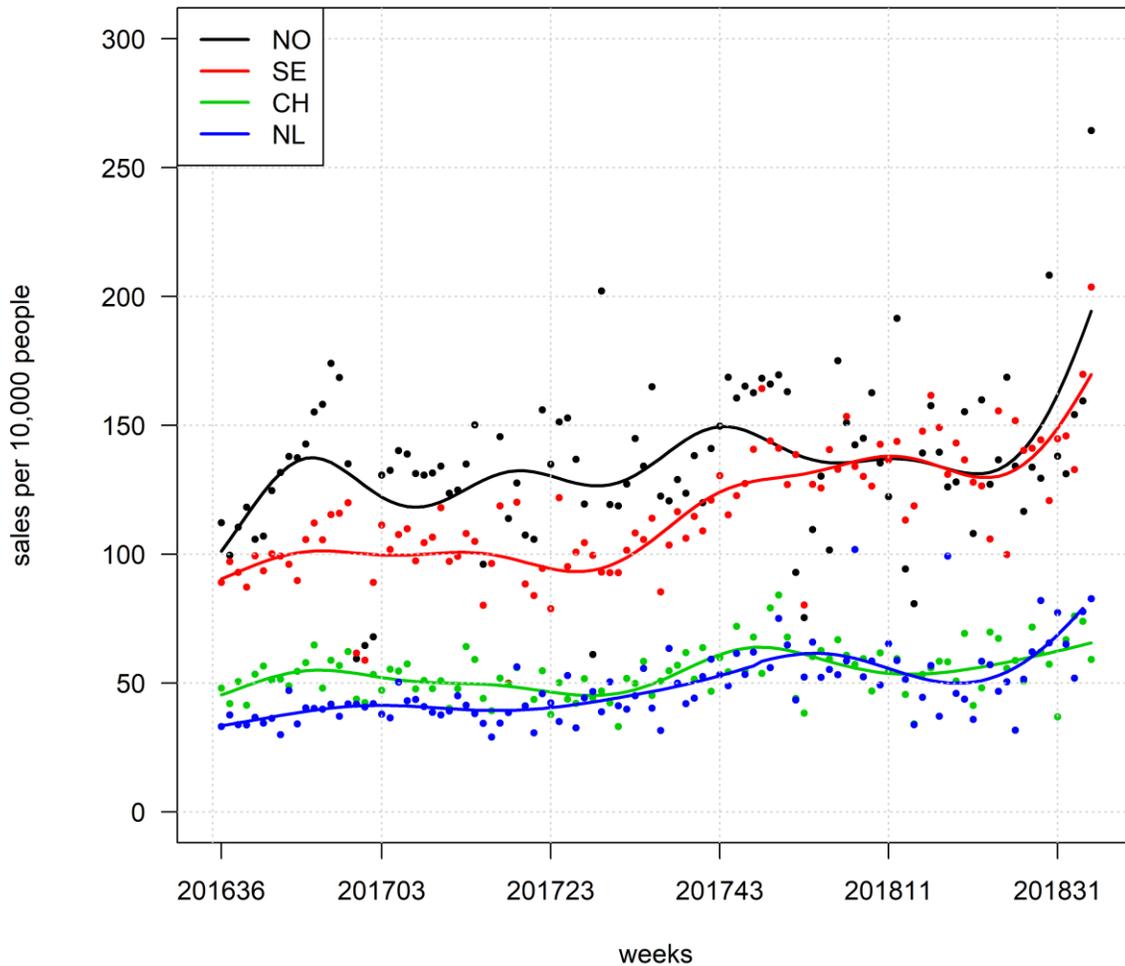
Graph 10 is focused only to the sales quantities per country and it does not take into consideration the size of the country. Thus, we have introduced the country population as the denominator. The results are shown in Graph 11 and indicate that Germany is not anymore, the leading market, while Sweden has the highest number of sales quantities (100-150) per 10,000 of population.

Graph 11 : E-commerce Sales quantities per population for DE, GB, SE, FR



If we were to expand the same analysis across the rest of the European countries for which IKEA has introduced its e-commerce platform (Graph 12), Germany, France and Great Britain are not anymore, the top countries. On the other hand, Norway and Sweden have the highest number of sales quantities per 10,000 of population. The rationale behind this is mainly driven by the fact that Germany population (82 million) is x15 higher than Norway (5.3 million). The same logic applies for Switzerland, Sweden and the Netherlands. However, as the analysis has been performed based on number of quantities instead of Euro sales, we cannot conclude in an accurate way that these countries are more profitable compared to Germany and Great Britain.

Graph 12: E-commerce Sales quantities per population for top 4 counties



The impact of macro-economic variables to IKEA sales performance

This Section examines **Hypothesis 2**, which tests whether the macro-economic indicators are impacting IKEA online sales performance on a country level. More specifically, we explore the impact of GDP, unemployment rate, net migration and number of stores on the Sales quantities per population for the top 14 countries in Europe.

Table 1 indicates the results of Ordinary Least Squared regression on the effect of those variables on the sales per population. The p-value is given in the second column which is calculated as the

test statistic for the hypothesis that tests that the true corresponding regression coefficient β is 0.

From the table below, all the covariates are statistically significant at 99% level as the P value is <0.001 . The coefficient of GDP has positive sign which indicates a positive relationship between the GDP and the sales quantities per population. On the other hand, the unemployment rates, the net migration as well as the number of stores are negative, which in a similar way indicate a negative impact on the IKEA online sales.

Table 1: This table shows the results of the regression, based on log model 1

	exp(beta)	p-value <0.001	Standard error
GDP	1.38	0.000	0.027
Migration	0.98	0.000	0.007
Unemployment	0.78	0.000	0.006
Number of stores	0.92	0.000	0.011
			$R^2=0.82$

Overall, the results, which are in line with Hypothesis 2, are explained as below:

- For every 1% increase of the GDP per country, the online IKEA sales per population increased by 0.38%
- For every 1% increase of migrated people, the online IKEA sales per population decreased by 0.02%
- For every 1% increase of unemployment, the online IKEA sales per population decreased by 0.22%
- For every 1% increase of physical number of stores, the online IKEA sales per population decreased by 0.08%

In other words, the above results, provide support on a 99% confidence level that a country's GDP is impacting positively IKEA sales performance. On the other hand, the net migration, the unemployment rate and the number of stores have a negative impact on the online sales per

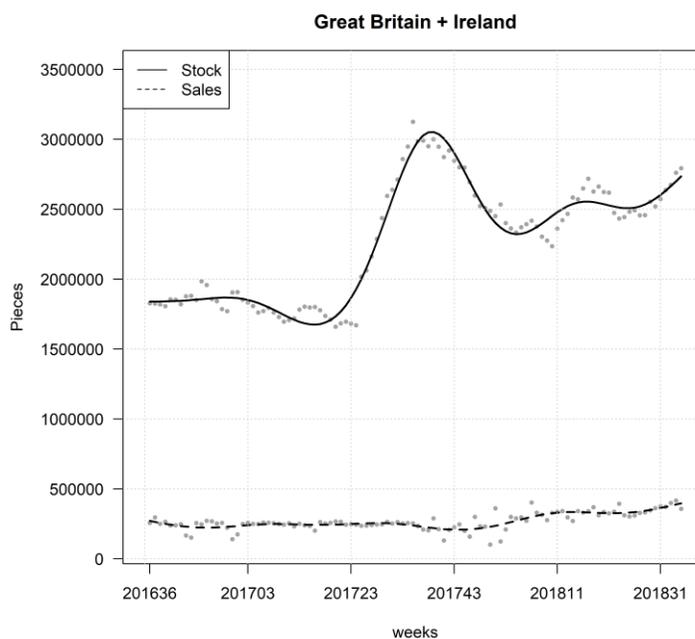
population. However, as our covariates are on country level, we can't talk about true effects, since these covariates could be confounded by anything that also varies on the country level, such as different country policies, or advertisements, or other cultural behaviours.

5.3 Aim 3: The impact of demand uncertainty on IKEA inventory levels

1. Stock levels time series

In this part the scope is to examine the relationship between inventory and sales. The results are quite impressive as a big deviation is noticed between stock and sales. Graphs 13 below show the results and prove that Great Britain keep on average 10 quantities for one piece of sale. There are various reasons that those results could be interpreted. For example, poor inventory management policies, demand uncertainty and increased sales volatility as well as excess safety stocks. However further investigation is needed in order to find out the root cause of this analysis. A good indicator for measuring a firm's inventory management efficiency is captured by the inventory turnover ratio which is defined as cost of goods sold divided by average inventory. Due to limitations on data, we couldn't calculate the turnover ratio for online sales, however IKEA can calculate it and compare it with the average industry for online sales which is about 4 to 6.

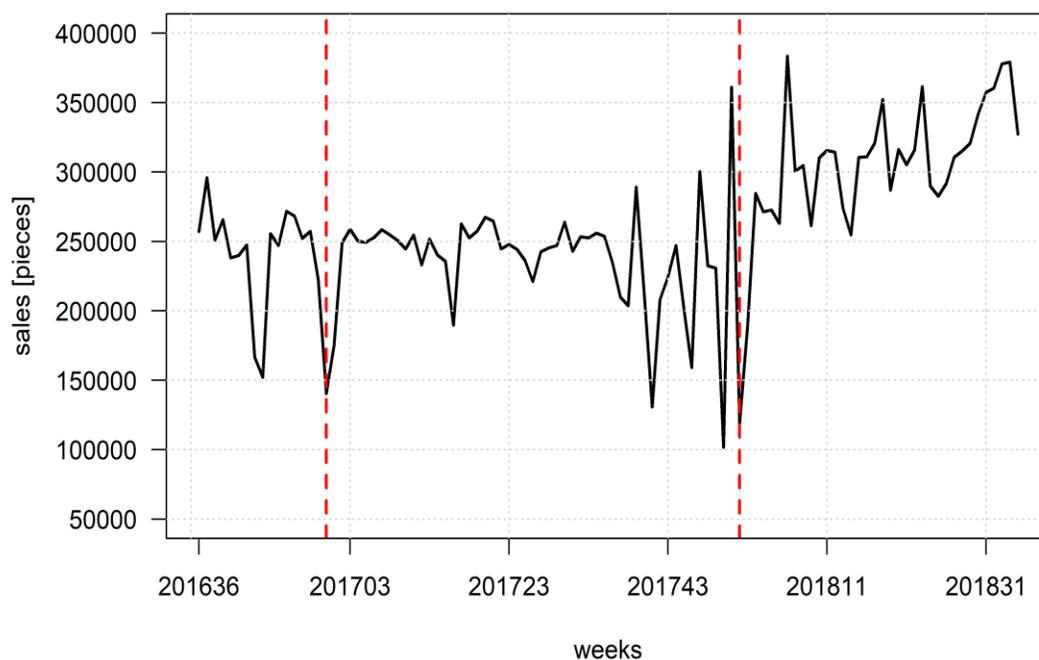
Graph 13: E-commerce Sales quantities compare to stock level



2. Check seasonality

The sales and inventory data for IKEA Great Britain e-commerce have been tested against seasonality assumptions. It is expected that online sales would peak during high demand periods, such as Christmas, sales periods, start of physical year. For this reason, we took as an example the Christmas period to explore any seasonality trends over the last two fiscal years. On the below graph, the red line indicates the cut off points for Christmas. The big drop after Christmas date could be explained by postponed deliveries due to public holidays of that week. However, despite the increase of the online sales during the years there is not any intense seasonality effect. The reason could be the limitation of data as have been selected only for the last two years and that IKEA want to keep customers in physical stores.

Graph 14: E-commerce Sales quantities for Great Britain-check seasonality



3. How sales uncertainty influence inventory:

In this Section, the results of Hypothesis 3 will be presented based on the model that was firstly introduced by Mustafa Caglayan, Sara Maioli, Simona Mateut (2012) and adjusted according to the requirements of this study.

Descriptive statistics

Descriptive statistics for the variables used in the analysis are presented in Table 2. We observe from the table that the average logarithmic change in inventories is positive for the total sample of 1976 observations. On the other hand, the average logarithmic change in Sales is negative while the weekly lagged average change in Sales (ΔS_{t-1}) is also positive. The same results are also observed for the top 4 product categories accordingly.

Table 2: Summary of statistics

Variable		Total Sample	01 - Living room seating	02 - Store and organise furniture	04 - Bedroom furniture	05 - Beds & Mattresses
Δ_{it}	Mean (St.dev)	0.006 (0.058)	0.006 (0.057)	0.004 (0.053)	0.003 (0.053)	0.008 (0.083)
Δ_{it-1}	Mean (St. dev)	0.006 (0.057)	0.006 (0.056)	0.004 (0.052)	0.002 (0.052)	0.008 (0.083)
ΔS_{it}	Mean (St. dev)	-0.003 (0.304)	-0.000 (0.224)	-0.003 (0.206)	-0.000 (0.194)	0.000 (0.202)
ΔS_{it-1}	Mean (St. dev)	0.015 (0.276)	0.019 (0.176)	0.009 (0.184)	0.009 (0.176)	0.014 (0.175)
$I_{t-1}-S_{t-1}$	Mean (St. dev)	1.656 (0.679)	1.638 (0.396)	1.240 (0.332)	1.415 (0.364)	0.945 (0.386)
σ_{it}	Mean (St. dev)	0.481 (0.485)	0.219 (0.044)	0.223 (0.044)	0.214 (0.047)	0.214 (0.059)
Observations		1,976	104	104	104	104

Note: The table reported sample means, Standard deviation are presented in parenthesis. The subscript i indexes different categories, and the subscript t, time in weeks where t=201636–201835. I: logarithm of inventories; S: logarithm of sales, ($I_{it-1} - S_{it-1}$), is the error correction term which reflects the movement in inventories.

In my research I used a generalized linear mixed model previously proposed by Mustafa Caglayan, Sara Maioli, Simona Mateut 2011 has been fitted as a more simplified version of the model. This model check sales uncertainty and test the impact of demand uncertainty on firm inventory stock level. In our study a real case will be utilized, and data will be selected by internal resources of IKEA Company. To study the impacts of demand uncertainty and firm inventory accumulation,

we focused on Great Britain and Ireland and selected 1976 observations that cover each category of the period of 2017-2018.

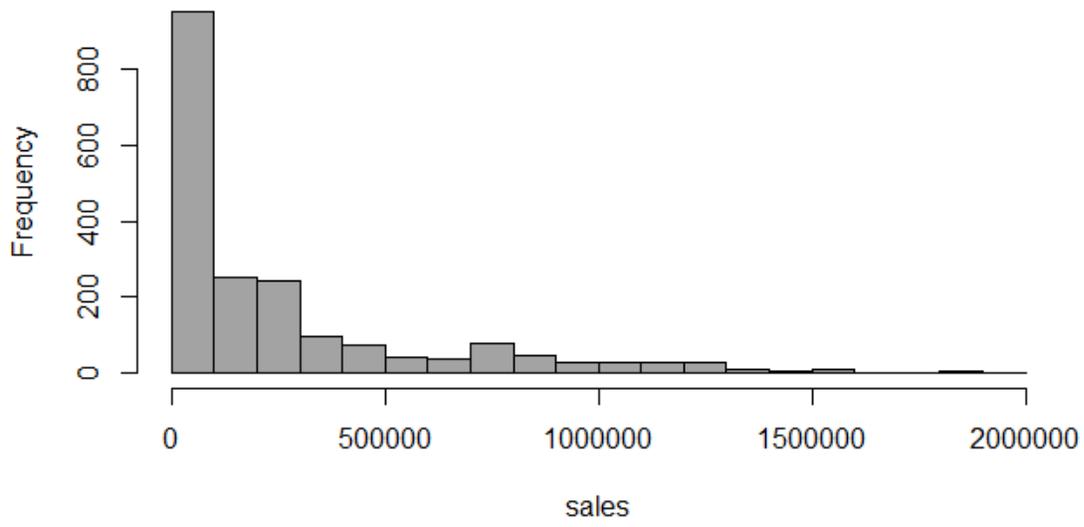
H3: The higher the sales uncertainty, the higher the inventory *IKEA inventory levels for the e-commerce business in Great Britain and Ireland*

Since the outcomes is continuous, we used the Gaussian family of distribution with the identity link. The Gaussian distribution (normal distribution) is having the parameter μ (the mean) and σ (the standard deviation). The mixed term was on the HFB level being a realisation of normal distribution, to adjust for the clustering on HFB level.

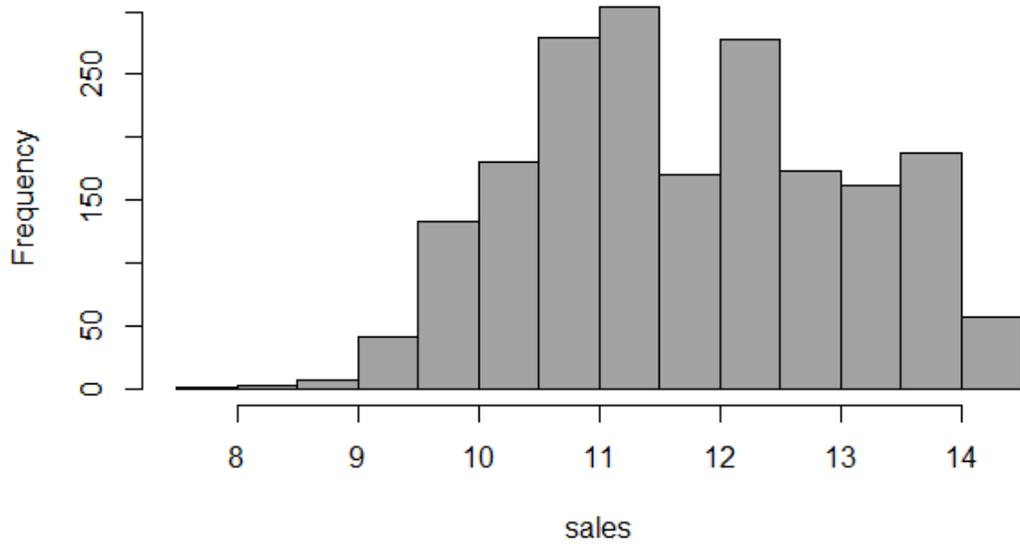
All the covariates were used as linear terms as discussed before (Lowell). At the beginning the initial observations were selected per article number level. That means that 903.000 observations for sales and 877.530 observations for stock were gathered. Then the sample was aggregated on HFB level and took one week as the time lag. The one-week lag is adequate as the average lead time from supplier to warehouse is approximately 9 days. In addition, the formula used the log transformation of the Inventory and Sales in order to make them normally distributed, in agreement with the Gaussian distribution used to fit the model.

The plots bellow shows the need of such transformation. The top panel shows the sales, which are highly right skewed, whereas the panel bellows shows the log transformation, which is fairly normal.

sales



log sales



We begin our investigation, as defined, by implementing a dynamic model for each category of IKEA online sales to explore the effects of current and lagged change in sales, the error correction term, and sales uncertainty on IKEA' inventory investment behaviour. Table 3 shows the results for the model.

Overall, we observed that all the covariates excluding the difference of the log of sales are statistically significant associated with the log of the inventory changes. More precisely, the DI_lag1 have a positive impact on the log of the inventory changes (0.264;0.22-0.31, $p < 0.001$). That means that for every unit increase on the difference of the log of inventory between the current and previous week, the log of inventory change increases by 0,264.

Table 3: This table shows the results of the regression, based on model 2

	coefficient	95% CI	p-value
ΔI_{t-1}	0.264	(0.22, 0.31)	0.000
ΔS_{it}	-0.003	(-0.012, 0.007)	0.51
ΔS_{it-1}	0.011	(0.001, 0.02)	0.019
$I_{it-1} - S_{it-1}$	-0.006	(-0.01, -0.001)	0.037
volatility	0.008	(0.003, 0.014)	0.005
			$R^2 = 0.08$

The ΔS_{it-1} has a positive impact on the log of inventory changes ΔI_t (0.011,0.001- 0.02, $p < 0.05$). That means that for every unit increase on the difference of the log of sales between the current and previous week, the log of inventory change increases by 0.011.

The error correction term $I_{t-1} - S_{t-1}$ has a negative impact on the log of inventory changes (-0.006, -0.01, -0.001, $p < 0.05$). That means that for every unit increase on the error correction the log of inventory decreases by 0.006

The volatility has a positive impact on the log of inventory changes (0.008, 0.003-0.014, $p < 0.05$).

That means that for every unit increase on the sales volatility, the log of inventory change increases by 0.008.

The R^2 is rather low, namely 0.08. However, the main objective of the model was to assess specific associations with the outcome, rather having a large R^2 that will allow us to make more accurate predictions.

In order to double check the results we did the same analysis for every covariate separately. Now the results summarised as below:

Table 4: This table shows the results of the regression

	coefficient	95% CI	p-value	R^2
ΔI_{t-1}	0.261	(0.218, 0.304)	0.000	0.068
ΔS_{it}	-0.008	(-0.017, 0.000)	0.053	0.001
ΔS_{it-1}	0.013	(0.005, 0.022)	0.002	0.004
$I_{it-1} - S_{it-1}$	-0.004	(-0.008, 0.001)	0.100	0.001
volatility	0.010	(0.004, 0.015)	0.000	0.005

When we run the regression one by one covariates, we observe that the change of the error term correction $I_{it-1} - S_{it-1}$ doesn't seem to impact the change of current week's inventory. This might be interpreted due to the fact that sales long run relation between inventories and sales is already taken on board by the lagged changes which affect statistically significant firm behaviour. It seems that these two covariates are auto correlated, as in the first regression the lagged changes and error correction were both significant. This different result prove that we cannot interpret any accurate results from the above two covariates.

All the other covariates are consistent with the previous regression and our results are aligned with the literature. In addition, we observe that the R^2 is rather low like previous multivariate

regression. This means that we cannot make accurate predictions, but we can study and discuss the correlation between the different covariates on our model.

Chapter 6 Conclusion -Discussion

6.1 Discussion and Conclusion

This finding from Table 3 and 4 suggests that there is persistence in firms' inventory investment, that means past inventory adjustments do significantly affect current adjustments in inventories. In contrast to the literature (paper), we find that the effect of the changes in sales doesn't affect current week's inventory levels. On the other hand, lagged changes in sales has significant effect in the inventory changes. This could be interpreted as companies are building additional stock for higher sales from previous weeks.

When we turn to understand the impact of sales uncertainty on inventories, we find that it is positive and statistically significant. However the impact on inventory is not as big as, one standard change in sales uncertainty leads to 0.08% percent on the log of inventory. Overall, our findings provide evidence that firms increase their stocks as they experience high demand uncertainty to avoid running out of stocks.

However, it worth's noting that the reported association in the literature was based on year-lags, whereas in our case we used weekly lags for the examined period. This discrepancy on the definition of the lags might explain the observed differences.

E-commerce and inventory management is one of the most common topics of discussions. Customer satisfaction and efficient inventory is the main topic for the last decades. Nearly all the literature on optimal inventory management uses criteria of cost minimization or profit maximization. An inventory managers' goal should be to achieve customer satisfaction with balanced stock. That means minimizing cost or maximizing profit while satisfying customers' demands. There are also several empirical evidences in the inventory management-performance relationship. Specifically, Alan R.Cannon 2008, indicates that improved firm performance can be achieved through reduced inventories. However, there are only few papers which check how sales uncertainty affect stock level during the last 25 years. More specific Lee and Koray (1994), show that there is not any connection between sales uncertainty and inventory behaviour. On

the other hand, Bo (2001), show that demand uncertainty (measured by the volatility of sales) has a positive and significant impact on inventory investment. Finally, according to Mustafa Caglayan, Sara Maioli, and Simona Mateut (2011) uncertainty has a positive impact on inventory accumulation as firms build up their inventories to avoid stock-out. As mentioned before, there are not many studies about sales uncertainty and inventory changes and for this reason we know little about how inventories are affected as a firm experiences periods of uncertainty. Even more, there is not any paper to my best of my knowledge to focus specifically on the e-commerce uncertainty and its connection to the inventory.

This research is based on Mustafa Caglayan, Sara Maioli, Simona Mateut (2011) who examine the relationship between inventory investment, sales uncertainty, and firms' financial strength. We simplified the model and we didn't examine the firms' financial strength, as we execute it only for one company. The findings of Mustafa's research summarized as below:

- sales uncertainty has a positive impact on inventories indicating that when firms facing high demand uncertainty build up inventories to avoid stock-out.
- Negative sign of the error correction and lagged inventory and positive sign in the coefficients associated with sales and lagged sales. As a firm adjust its inventories when it experiences increased or decreased sales.

The main differences compared to the study from Mustafa (2011) are summarized as below:

- We examined the relationship between online sales and inventory in one of the most traditional retail companies
- The research is limited in Great Britain and Ireland
- The lagged series was used on weekly level instead of yearly.

In general, our results can be interpreted as below:

We observe that the dependent variable of inventory is positive affected by lagged variable of inventory, lagged variable of sales and volatility. This finding suggests that there is persistence in IKEA's inventory investment, for example the last week's inventory and sales adjustments affect

current adjustments in inventories. In associated with the literature, we find that the effect of the change in last week sales has a positive effect on current inventory as companies do not want to be out of stocks. The error correction term in Table 3 has a negative sign as the theory implies, that means if the stock of inventories moves away from its desired level, future inventory investment should be adjusted accordingly. However, we cannot consider this covariate as the results are different in Table 4. [

6.2 Constraints

In our research there were some limitations and constraints. While I was working on my thesis, I realised that there are many constraints on selecting and using data. The main reason is that there are various sources of information for the sales and inventory levels. That means that a lot of manual work was needed to consolidate the data and it increased the possibility of human error. In addition, in order to utilise the above research, we did some assumptions, such as that all stored items in regional warehouses (CDC) are supplying only the online sales part of IKEA. However, we know that small percentage of this stock is being used for the retail stores. The above research was executed only for 2 fiscal years, which is considered to be quite small period compared to other studies. The regression from model 1 was built on sales quantities and not on Euro numbers. As result, this might have changed the results if the same method was using Euro sales numbers instead of quantities. Furthermore, all IKEA items have been included in this study, such promotional items, permanent items and newly introduced items during this period. For this reason, it might have impacted the picture of total IKEA sales & inventory during some year weeks.

6.3 Future Research

It seems to be challenging for the future how firms are going to improve the inventory management and use highly developed systems. However, as the trends change rapidly, companies must be flexible and agile on such changes. The efficiency of supply chain and proper inventory management is based on the connection and interaction between IOT technology and blockchain, which can support in a better more transparent and reliable information flow among

the chain. Blockchain is the new trend for the companies. More specifically, it is the technology that promises to change how data is stored and businesses operate. It is a new way of smooth distribution network that connects all parts of supply chain and ensure that data is properly stored and securely kept.

In addition, as e-commerce and e-business is the new trend, further investigation is needed. As I have already mentioned before, the above research was executed only for 2 fiscal years, which is quite small period compared to other studies. So, a new research would be executed for more years and more countries. Then IKEA could use the results analyse them and compare it to other similar companies.

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ΣΥΝΟΨΗ

Αυτή η εργασία αναπτύσσεται στο πλαίσιο του μεταπτυχιακού μου προγράμματος "ATHENS MBA", το οποίο διοργανώνεται από το Οικονομικό Πανεπιστήμιο και το Εθνικό Μετσόβιο Πολυτεχνείο. Η διατριβή διεξήχθη σε συνεργασία με το IKEA.

Είμαι πολύ ευγνώμων που είχα την ευκαιρία να εργαστώ σε αυτό το έργο και να αναλύσω ένα πραγματικό επιχειρησιακό πρόβλημα λαμβάνοντας ως μελέτη περίπτωσης την εταιρεία IKEA, τον ηγέτη της βιομηχανίας επίπλων οικιακής χρήσης.

Σήμερα, το φαινόμενο του ηλεκτρονικού εμπορίου αυξάνεται με ταχείς ρυθμούς και πολλές εταιρείες υποφέρουν από λάθος λήψη αποφάσεων και διφορούμενες στρατηγικές. Η αβεβαιότητα ζήτησης και η αστάθεια των πωλήσεων οδηγεί τις εταιρείες να διατηρούν υψηλό επίπεδο αποθεμάτων και κατά συνέπεια να αυξάνουν το κόστος αποθεμάτων τους. Συνοψίζοντας, το μεγαλύτερο πρόβλημα που αντιμετωπίζουν οι εταιρείες είναι η έλλειψη γνώσης, οι λανθασμένες αποφάσεις διαχείρισης και η έλλειψη τεχνολογικής ανάπτυξης.

Σκοπός της παρούσας εργασίας είναι να δώσει μια γενική εικόνα των υφιστάμενων κινδύνων και προκλήσεων μεταξύ του ηλεκτρονικού εμπορίου και της διαχείρισης αποθεμάτων. Λόγω της αυξανόμενης τάσης του ηλεκτρονικού εμπορίου, οι εταιρείες αντιμετωπίζουν πολλές προκλήσεις προκειμένου να εξισορροπήσουν την ικανοποίηση των πελατών και την κατάλληλη διαχείριση αποθεμάτων. Τα επίπεδα των αποθεμάτων πρέπει να είναι τέτοια ώστε να καλύπτουν μόνο τις ανάγκες της εταιρείας.

Αυτή η ισορροπία είναι δύσκολη καθώς μερικές εταιρείες υποφέρουν από υπερπληρωμές και υψηλό κόστος αποθεμάτων, ενώ κάποιες άλλες απο έλλειψη αποθεμάτων και απώλειες πωλήσεων. Όπως κατέδειξε η έρευνα από τους Mustafa Caglayan, Sara Maioli, Simona Mateut (2011), υπήρξε σαφής σχέση μεταξύ της υψηλής αβεβαιότητας των πωλήσεων που οδηγεί σε μεγαλύτερο απόθεμα αποθεμάτων. Με βάση αυτά τα αποτελέσματα επαναλαμβάνω την έρευνα των συγγραφέων της περιόδου 2016-2018 για την επιχείρηση ηλεκτρονικού εμπορίου της IKEA στη Μεγάλη Βρετανία.

Μέσω αυτής της εμπειρικής μελέτης θα προσπαθήσουμε να καταλάβουμε εάν η αβεβαιότητα της ζήτησης μπορεί να επηρεάσει τα επίπεδα αποθεμάτων των online πωλήσεων της IKEA. Τα σύνολα δεδομένων από διαφορετικές τοποθεσίες έχουν αναλυθεί και παρουσιαστεί με μεθοδικό τρόπο.

Η πρώτη εμπειρική ανάλυση υποστηρίζει ότι πολλοί παράγοντες όπως η ανεργία, το ποσοστό μετανάστευσης και το ΑΕΠ μπορούν να επηρεάσουν το επίπεδο πωλήσεων και αποθεμάτων του IKEA σε διάφορες ευρωπαϊκές χώρες.

Στη δεύτερη ανάλυση, αποδεικνύεται ότι η μεταβλητότητα των πωλήσεων οδηγεί σε αβεβαιότητα της ζήτησης και συνεπώς σε υψηλότερα επίπεδα αποθεμάτων.

Τα αποτελέσματα μπορούν να χρησιμοποιηθούν ως βάση για την βελτιστοποίηση του αποθέματος ανάλογα με την εταιρεία. Απαιτείται περαιτέρω ανάλυση από μια εταιρεία, προκειμένου να εντοπιστούν οι ρίζες των υψηλών αποθεμάτων και να εξευρεθούν λύσεις για τη βελτίωση της.

Το IKEA έχει αρχίσει να αλλάζει τον τρόπο λειτουργίας, καθώς έχει συνειδητοποιήσει τα πιθανά οφέλη από τη βελτίωση της διαχείρισης αποθεμάτων και του ηλεκτρονικού εμπορίου. Δεν υπάρχει ακόμη σαφής στρατηγική για το τι χρειάζεται και πώς να χειριστεί την ραγδαία αύξηση του ηλεκτρονικού εμπορίου. Δεν υπάρχει σαφής ορατότητα στο απόθεμα που διατηρείται για ηλεκτρονικές πωλήσεις και οι συνεργάτες εξακολουθούν να είναι συγκεχυμένοι για το πώς να το χειριστούν. Κάθε χώρα λειτουργεί με διαφορετικούς τρόπους και αυτό δυσχεραίνει την προσαρμογή μόνο ενός τρόπου εργασίας.

Ωστόσο, το IKEA εργάζεται σκληρά για να βελτιώσει αυτή τη διαδικασία και να βρει την καλύτερη και οικονομικά αποδοτικότερη λύση για το ηλεκτρονικό εμπόριο. Δεδομένου ότι ο κύριος στόχος είναι η διασφάλιση της διαθεσιμότητας στον τελικό πελάτη, μερικές φορές αυτό οδηγεί σε λανθασμένες αποφάσεις με υπερκατανάλωση στα κέντρα διανομής και υψηλό λειτουργικό κόστος. Για το λόγο αυτό, υπάρχει ανάγκη να βρεθεί ένας τρόπος μείωσης του λειτουργικού κόστους, μείωσης του περιττού αποθέματος και ελαχιστοποίησης των χρόνων παράδοσης. Απαιτείται ένα κατάλληλο σύστημα απογραφής και στρατηγική προκειμένου να ληφθεί η σωστή απόφαση και να αξιοποιηθούν οι νέες τάσεις του ηλεκτρονικού εμπορίου. Το

απόθεμα πρέπει να είναι αρκετό για να καλύψει την ανάγκη και να μην κρατηθεί για μεγάλο χρονικό διάστημα στα κέντρα διανομής. Το κύριο πρόβλημα που πρέπει να αντιμετωπιστεί είναι να βρεθούν οι σωστές ανάγκες που θα μεταφραστούν στη διατήρηση των κατάλληλων επιπέδων απογραφής.

ΒΙΒΛΙΟΓΡΑΦΙΚΗ ΕΡΕΥΝΑ

1. ΗΛΕΚΤΡΟΝΙΚΟ ΕΜΠΟΡΙΟ

Έχουν υπάρξει διάφοροι ορισμοί για το ηλεκτρονικό εμπόριο που αναπτύχθηκε με την πάροδο των ετών από την επιστημονική έρευνα:

1. Το ηλεκτρονικό εμπόριο είναι η δραστηριότητα αγοράς ή πώλησης προϊόντων σε απευθείας σύνδεση υπηρεσίες μέσω Διαδικτύου. Το ηλεκτρονικό εμπόριο βασίζεται σε τεχνολογίες όπως το κινητό, η ηλεκτρονική μεταφορά κεφαλαίων, η διαχείριση της αλυσίδας εφοδιασμού, το μάρκετινγκ στο Διαδίκτυο, η ηλεκτρονική επεξεργασία συναλλαγών, η ηλεκτρονική ανταλλαγή δεδομένων, τα συστήματα διαχείρισης αποθεμάτων και τα αυτοματοποιημένα συστήματα συλλογής δεδομένων. (Wikipedia)

2. Το ηλεκτρονικό εμπόριο είναι οποιαδήποτε δραστηριότητα, που αποσκοπεί στην πραγματοποίηση κερδών. Θα πρέπει να θεωρείται ως μια μορφή επιχειρηματικής δραστηριότητας, πραγματοποιώντας σε μεγάλο βαθμό την εισαγωγή στις επιχειρηματικές διαδικασίες τεχνολογιών και συστημάτων πληροφορικής και τηλεπικοινωνιών (Η Εξέλιξη και Ανάπτυξη της Αγοράς Ηλεκτρονικού Εμπορίου και E-Cash OCT2018).

Με άλλα λόγια, το ηλεκτρονικό εμπόριο, όπως είναι δημοφιλές ως ηλεκτρονικό εμπόριο, είναι η αγορά ηλεκτρονικών αγαθών και υπηρεσιών. Το 80% των ηλεκτρονικών χρηστών χρησιμοποιούν το Διαδίκτυο καθημερινά είτε για αγορές είτε για άλλες υπηρεσίες όπως πληρωμές λογαριασμών στο διαδίκτυο. Είναι ένας εύκολος και βολικός τρόπος να αγοράσει ο καταναλωτής και να βρεί κάθε διαθέσιμο προϊόν λιανικής πώλησης, στη φθηνότερη τιμή. Παρέχει στον πελάτη την ευκαιρία να το χρησιμοποιήσει από οποιαδήποτε τοποθεσία χωρίς να ανησυχεί για την ανάγκη να επισκεφθεί το κατάστημα. Σήμερα είναι σημαντικό περισσότερο

από ποτέ να σώζουμε χρόνο και χρήμα στη καθημερινότητα των ανθρώπων. Χρησιμοποιώντας ηλεκτρονικά εργαλεία, μπορούμε να ολοκληρώσουμε τις αγορές γρήγορα, ενώ ταξιδεύουμε ή εργαζόμαστε. Υπάρχουν πολλά οφέλη τόσο για τους πελάτες όσο και για τους εμπόρους λιανικής πώλησης, δεδομένου ότι δεν χρειάζονται μόνο ένα παραδοσιακό κατάστημα όταν εξυπηρετούν πελάτες μέσω του ηλεκτρονικού εμπορίου, αλλά μειώνονται επίσης τα γενικά έξοδά τους και βελτιώνεται την αποτελεσματικότητα. Χωρίς αμφιβολία, το ηλεκτρονικό εμπόριο είναι μία από τις ταχύτερα αναπτυσσόμενες βιομηχανίες στον κόσμο (McGraw-Hill / Irwin, 1 έκδοση 3 Νοεμβρίου 2000).

Το ηλεκτρονικό εμπόριο συχνά συγχέεται με το ηλεκτρονικό επιχειρείν, αν και υπάρχουν σημαντικές διαφορές που αξίζει να αναφερθούν. Το ηλεκτρονικό εμπόριο αναφέρεται μόνο στα αγαθά και τις υπηρεσίες κατά τη διάρκεια συναλλαγών μεταξύ πωλητή και καταναλωτή, ενώ το ηλεκτρονικό επιχειρείν αναφέρεται στην πλήρη διαδικασία που απαιτείται για τη διαχείριση μιας ηλεκτρονικής επιχείρησης (Faramarz Damanpour, Jamshid Ali Damanpour, (2001)).

Η ηλεκτρονική επιχείρηση ή το ηλεκτρονικό επιχειρείν είναι κάθε είδους επιχειρηματική ή εμπορική συναλλαγή που περιλαμβάνει την ανταλλαγή πληροφοριών μέσω του Διαδικτύου. Το εμπόριο συνίσταται στην ανταλλαγή προϊόντων και υπηρεσιών μεταξύ επιχειρήσεων, ομάδων και ατόμων και μπορεί να θεωρηθεί ως μία από τις βασικές δραστηριότητες οποιασδήποτε επιχείρησης. Το ηλεκτρονικό επιχειρείν επικεντρώνεται στις επιχειρήσεις με τη βοήθεια του διαδικτύου. Ο όρος "ηλεκτρονικό επιχειρείν" εισήχθη για πρώτη φορά από την ομάδα μάρκετινγκ και του Διαδικτύου της IBM το 1996.

ΙΣΤΟΡΙΑ ΗΛΕΚΤΡΟΝΙΚΟΥ ΕΜΠΟΡΙΟΥ

Στις μέρες μας, η καθημερινότητα χωρίς ηλεκτρονικό εμπόριο φαίνεται αδύνατη, περίπλοκη και ενοχλητική. Μόλις μερικές δεκαετίες πριν εμφανίστηκε η ιδέα του ηλεκτρονικού εμπορίου. Όλο και περισσότερες εταιρείες έχουν συνειδητοποιήσει τη σημασία του ηλεκτρονικού εμπορίου και του ηλεκτρονικού επιχειρείν.

Η ιστορία του ηλεκτρονικού εμπορίου ξεκίνησε πριν από περίπου 50 χρόνια και προς το παρόν αποτελεί τον βασικό πυλώνα της ανάπτυξης μέσω της καινοτομίας και των νέων τεχνολογιών. Πολλές επιχειρήσεις εισέρχονται στην ηλεκτρονική αγορά κάθε χρόνο ανεξάρτητα από το μέγεθος των εταιρειών τους. Οι τάσεις για την ανάπτυξη του ηλεκτρονικού εμπορίου δείχνουν ότι το Διαδίκτυο ενδέχεται να ωριμάσει σε μια πιο εξελιγμένη μορφή επικοινωνίας κατά τα επόμενα χρόνια. Αυτή είναι η εποχή όπου το Διαδίκτυο μπορεί να δημιουργήσει μια αναζωπύρωση της οικονομικής ανάπτυξης και να ασκήσει ισχυρές επιπτώσεις στις επιχειρήσεις, την κυβέρνηση, την εκπαίδευση και άλλες κοινωνικές λειτουργίες.

Η ιστορία του ηλεκτρονικού εμπορίου συνδέεται στενά με την ιστορία του Διαδικτύου. Ωστόσο, όλη η ιδέα ξεκίνησε το 1979, όταν ο Michael Aldrich, επιχειρηματίας του Ηνωμένου Βασιλείου, είχε την ιδέα να συνδέσει τον υπολογιστή του με την τηλεφωνική του γραμμή και ενεργοποίησε ένα απλό πρόγραμμα που ονομάζεται "Teleshopping". Η ανάγκη πίσω από αυτό ήταν να βρούμε έναν τρόπο προκειμένου να κάνουμε τη ζωή πιο βολική και να αγοράζουμε αγαθά χωρίς να χρειάζεται να αφήνουμε την άνεση του σπιτιού μας.

Ο πρώτος διακομιστής και πρόγραμμα περιήγησης World Wide Web, που δημιουργήθηκε από τον Tim Berners-Lee το 1990, άνοιξε για εμπορική χρήση το 1991 και αυτή είναι η εποχή που

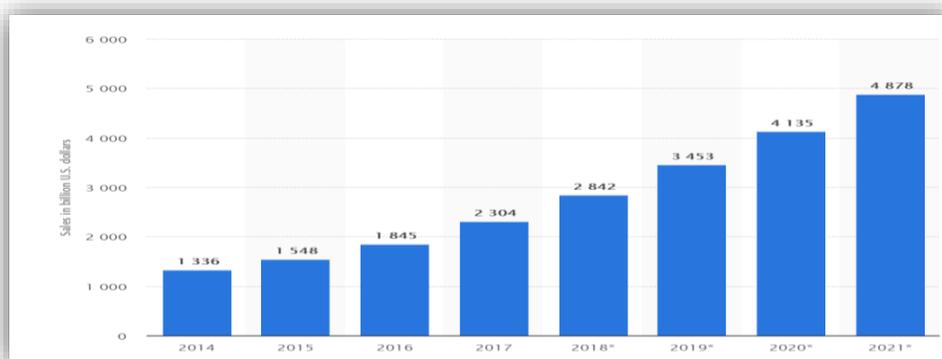
άρχισαν οι ηλεκτρονικές αγορές. Το Amazon.com και το eBay ήταν οι πρώτοι δικτυακοί τόποι ηλεκτρονικού εμπορίου στις ΗΠΑ (το 1995) που άρχισαν να πωλούν προϊόντα online και πολλές επιχειρήσεις ακολούθησαν από τότε. Οι τοποθεσίες Alibaba, Taobao και Tmall ξεκίνησαν το 2003 και το 2008, αντίστοιχα.

ΤΑΣΕΙΣ

Οι εταιρείες πρέπει να είναι έτοιμες για αυτή τη νέα ψηφιακή εποχή αν προτιμούν να είναι ανταγωνιστικές και να επωφεληθούν από αυτή τη νέα τάση. Η κατανόηση των αναγκών των πελατών και η αξιολόγηση όλων των πιθανών προκλήσεων και ευκαιριών είναι το κλειδί για τη μελλοντική επιχειρηματική επιτυχία.

Είναι απίστευτο πόσο γρήγορα οι πωλήσεις του ηλεκτρονικού εμπορίου έχουν αυξηθεί τις τελευταίες δεκαετίες. Εξετάζοντας την παγκόσμια ανάπτυξη των πωλήσεων ηλεκτρονικού εμπορίου (statista.com), αναμένεται αύξηση 360% μέχρι το 2021 σε σύγκριση με τα επίπεδα πωλήσεων του 2014.

Graph 1: E-commerce sales worldwide from 2014 to 2021

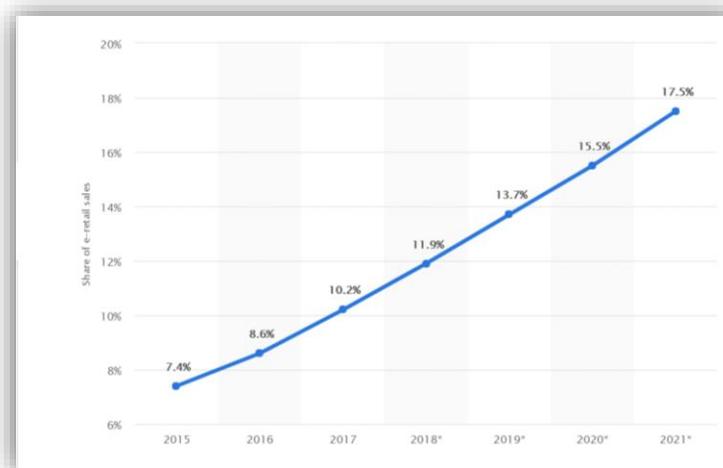


Source: <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

Επιπλέον, το γράφημα 2 δείχνει την τεράστια ανάπτυξη του ηλεκτρονικού εμπορίου σε σύγκριση με τον παραδοσιακό τομέα λιανικής. Αναμένεται ότι το 2021 το μερίδιο του ηλεκτρονικού εμπορίου θα φτάσει το 17%. Είναι ενδιαφέρον να σημειωθεί ότι σύμφωνα με τη γραφική παράσταση 3, ο αριθμός των αγοραστών ηλεκτρονικού εμπορίου αναμένεται να

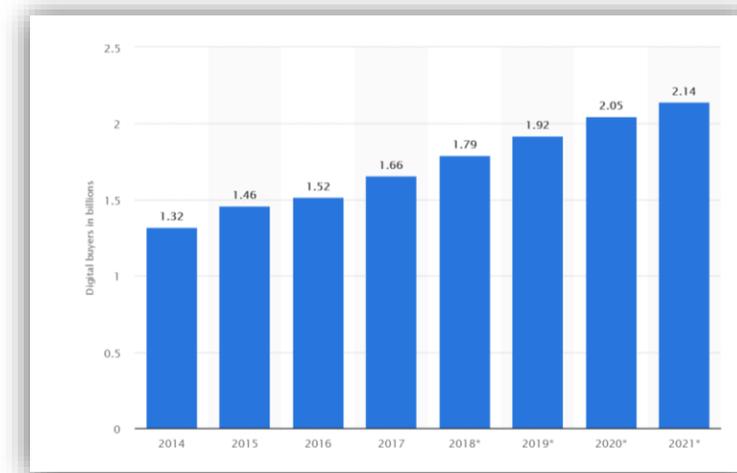
φθάσει τα 2,1 δισεκατομμύρια που είναι περίπου το 30% του συνολικού πληθυσμού του κόσμου.

Graph 2: E-commerce share of total global retail sales from 2015 to 2021



Source : <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

Graph 3: Number of digital buyers worldwide from 2014 to 2021



Source : <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>

ΜΕΛΛΟΝΤΙΚΕΣ ΤΑΣΕΙΣ

Σύμφωνα με έρευνα που δημοσίευσε ο Kosta Poron 2018, η οπτικοποίηση προϊόντων είναι ένας από τους σημαντικότερους παράγοντες για το μέλλον του ηλεκτρονικού εμπορίου.

Τα ηλεκτρονικά καταστήματα πρέπει να είναι πιο “visualized” ώστε να δίνουν ακριβέστερες πληροφορίες στον πελάτη. Λόγω έλλειψης πραγματικής επαφής με τα προϊόντα, οι περισσότεροι φορές οι πελάτες απογοητεύονται από την ποιότητα και επιστρέφουν το προϊόν πίσω στην εταιρεία.

Η νέα τάση για το ηλεκτρονικό επιχειρείν είναι η χρήση βίντεο και εικόνων υψηλής ποιότητας με 3D δυνατότητες για να παρουσιάσουν τα προϊόντα τους στους καταναλωτές, να λάβουν μια ενημερωμένη απόφαση αγοράς χωρίς να το μετανιώσουν αργότερα.

Ένας άλλος σημαντικός παράγοντας είναι οι λύσεις τεχνητής νοημοσύνης: Το μέλλον είναι στο IOT (διαδίκτυο των πραγμάτων) και η τεχνητή νοημοσύνη. Τα εργαλεία ανάλυσης τεχνητής νοημοσύνης του 2019 θα είναι σε θέση να παρακολουθήσουν τον τρόπο με τον οποίο οι δυνητικοί πελάτες αλληλεπιδρούν με τα προϊόντα και να τους παρουσιάσουν τα πιο συναφή θέματα με διαδραστικό τρόπο. Με αυτόν τον τρόπο, οι εταιρείες μπορούν να χρησιμοποιήσουν τα αποτελέσματα και να κάνουν συστάσεις σύμφωνα με τις προτιμήσεις των πελατών. Οι λύσεις Intelligence θα μπορούσαν επίσης να συνδυάσουν τα κοινωνικά μέσα δικτύωσης με ιστορικά δεδομένα από τους πελάτες προκειμένου να δημιουργήσουν ένα ισχυρό προφίλ πελατών (γνώση των πελατών).

Το Amazon είναι ένα επιτυχημένο παράδειγμα λύσης τεχνητής νοημοσύνης, όπως το Echo look, το οποίο αναλύει το ύφος της ένδυσης και κάνει τις συνηθισμένες συστάσεις μέσω της μηχανικής μάθησης.

Αναγέννηση των φυσικών καταστημάτων: Περιττό να πούμε ότι τα φυσικά καταστήματα παραμένουν το σημείο εκκίνησης των αγορών και των επιχειρήσεων. Παρ' όλα αυτά, όπως είμαστε στην εποχή των ψηφιακών καταστημάτων, αυτό πρέπει να επανεξετάσουμε και να ακολουθήσουμε τη δομή του ηλεκτρονικού εμπορίου. Για παράδειγμα, οι Amazon και Alibaba τώρα πειραματίζονται τώρα με την νέα αναζωογονημένη δύναμη των πρακτικών αγορών.

Στην πραγματικότητα, η Amazon άνοιξε ένα νέο κατάστημα λιανικής πώλησης στη Νέα Υόρκη, το οποίο παρέχει σε πωλητές προϊόντα που έχουν βαθμολογία τεσσάρων αστερίων στα σχόλια των πελατών τους. Ακολουθώντας και αντιγράφοντας τη δομή της ιστοσελίδας, το κατάστημα πωλεί προϊόντα που οργανώνονται με τίτλους ήδη γνωστούς από τους αγοραστές του διαδικτύου.

ΜΕΘΟΔΟΛΟΓΙΑ ΚΑΙ ΔΕΔΟΜΕΝΑ

Σε αυτή την ενότητα θα περιγράψω τα ερευνητικά ερωτήματα που σκοπεύω να διερευνήσω, καθώς και τις σχετικές υποθέσεις που βασίζονται στους στόχους που αναφέρονται στο προηγούμενο κεφάλαιο. Πιο συγκεκριμένα, ο κύριος στόχος αυτής της μελέτης είναι τριπλος: 1)η ανάπτυξη ΙΚΕΑ στην περιοχή του ηλεκτρονικού εμπορίου και τη σημασία της σε σύγκριση με το παραδοσιακό κανάλι λιανικής πώλησης, 2) να παρέχει μια πιο λεπτομερή ανάλυση σχετικά με την ανάπτυξη διαδικτυακών πωλήσεων ΙΚΕΑ κατά τη διάρκεια των τελευταίων 3 χρόνων για τις χώρες της Ευρώπης, καθώς και για να κατανοήσουν τον αντίκτυπο στις πωλήσεις που οδηγούνται από συγκεκριμένους και μακροοικονομικούς παράγοντες και 3) να κατανοήσουν αν η αβεβαιότητα της ζήτησης στο ηλεκτρονικό εμπόριο επηρεάζει τα επίπεδα αποθέματος ΙΚΕΑ.

Η υπόλοιπη ενότητα περιλαμβάνει μια λεπτομερή περιγραφή των βάσεων δεδομένων και τη διαδικασία που ακολουθήθηκε για τη συλλογή δεδομένων.ο πρώτος στόχος αυτής της διατριβής επικεντρώνεται στην περιοχή ηλεκτρονικού εμπορίου (ΙΚΕΑ). Το ηλεκτρονικό εμπόριο δεν ήταν ακριβώς προτεραιότητα για την ΙΚΕΑ. Το ηλεκτρονικό κατάστημά του είναι βασικό και δεν συγκρίνεται με τα καταστήματα λιανικής πώλησης όπου μια τεράστια ποικιλία προϊόντων είναι διαθέσιμα στον πελάτη. ΙΚΕΑ κατάφερε να εισέλθει στην διαδικτυακή αγορά μόνο τα τελευταία χρόνια στην Ευρώπη. Για το λόγο αυτό, κάποιος θα ανέμενε μια σημαντική ανάπτυξη για ΙΚΕΑ e-commerce μέρος καθώς όλο και περισσότερα προϊόντα εισάγονται, και το ηλεκτρονικό κατάστημα αναβαθμίζεται συνεχώς για να ανταποκριθεί στις προσδοκίες των συγκεκριμένων πελατών. Ακολουθώντας το παραπάνω σκεπτικό, η υπόθεση 1 θα πλαισιώνεται ως:

H1: κατά τη διάρκεια των τελευταίων τριών ετών, το μερίδιο των πωλήσεων ΙΚΕΑ e-commerce έναντι των λιανικών πωλήσεων της εταιρείας, θα βιώσει μια σημαντική αύξηση

Ο δεύτερος στόχος αυτής της διατριβής επικεντρώνεται στο ΙΚΕΑ e-commerce πωλήσεις και απογραφή. Έχουν υπάρξει διάφορα για την ανάπτυξη αυτών των δύο μεταβλητών (πωλήσεις και απογραφή) για ΙΚΕΑ για την περίοδο 2016-2018. Επιπλέον, τα γραφήματα που παρουσιάζονται παρακάτω, παρέχουν μια ολιστική προβολή σε επίπεδο χώρας, καθώς και σε κάθε περιοχή κατηγορίας προϊόντων.

Σε αυτή την ενότητα, υπάρχουν ορισμένες μακροοικονομικές μεταβλητές ανά χώρα που έχουν δοκιμαστεί για την υποστήριξη των αποδεικτικών στοιχείων σχετικά με τον αντίκτυπό τους στις επιδόσεις των πωλήσεων μιας επιχείρησης. Ειδικότερα, το ακαθάριστο εγχώριο προϊόν (GDP) μιας χώρας, το οποίο αποτελεί έναν από τους κύριους δείκτες για τη μέτρηση της απόδοσης της οικονομίας μιας χώρας, αναμένεται να επηρεάσει θετικά τις επιδόσεις της επιχείρησης. Καθώς αυξάνεται το GDP, οι καταναλωτές έχουν υψηλότερα εισοδήματα για τις δαπάνες για αγαθά και υπηρεσίες σε αυτήν τη χώρα. Από την άλλη πλευρά, τα ποσοστά ανεργίας μιας χώρας, ενδέχεται να επηρεάσουν αρνητικά τις επιδόσεις των πωλήσεων μιας επιχείρησης. Καθώς οι άνθρωποι έχουν λιγότερα χρήματα για να ξοδεύουν ενώ είναι εκτός εργασίας, αυτό τείνει να αποδυναμώσει την αγοραστική τους δύναμη, γεγονός που οδηγεί σε ηπιότερες πωλήσεις για μια επιχείρηση που λειτουργεί σε αυτή τη χώρα. Επιπλέον, ο αντίκτυπος της μετανάστευσης αναμένεται επίσης να επηρεάσει τις επιδόσεις των πωλήσεων μιας επιχείρησης. Πιο συγκεκριμένα, αναμένουμε ότι οι χώρες με υψηλή εισροή μεταναστών θα έχουν αρνητικό αντίκτυπο στο κατά κεφαλήν, το οποίο από μόνο του θα οδηγούσε σε ασθενέστερες πωλήσεις για τις εταιρείες σε αυτή τη χώρα. Τέλος, έχουμε εισαγάγει τον αριθμό των καταστημάτων IKEA ως μεταβλητή που θα οδηγήσει επίσης σε δυσμενείς επιπτώσεις στις διαδικτυακές πωλήσεις του. Το κύριο σκεπτικό πίσω από αυτή την υπόθεση, είναι ότι όσο υψηλότερος είναι ο αριθμός των καταστημάτων σε κάθε χώρα, τόσο υψηλότερες είναι οι πιθανότητες οι καταναλωτές να προτιμούν να επισκέπτονται ένα κατάστημα που είναι πλησίον και προσβάσιμα σε αυτά. Αυτός είναι ένας βασικός παράγοντας για να προσδιοριστεί εάν ένας καταναλωτής θα προτιμούσε να επισκεφθεί ένα φυσικό κατάστημα ή να αγοράσει ηλεκτρονικά τα προϊόντα.

Ως αποτέλεσμα, η υπόθεση 2 θα πλαισιώνεται ως εξής:

H2: IKEA ηλεκτρονικές πωλήσεις ανά πληθυσμό είναι θετική επηρεάζεται από το ακαθάριστο εγχώριο προϊόν κατά κεφαλήν (GDP) της χώρας, ενώ τα ποσοστά ανεργίας, καθαρή μετανάστευση και IKEA αριθμό των καταστημάτων οδηγούν σε χαμηλότερες πωλήσεις ανά πληθυσμό για IKEA e-commerce

Ο τρίτος στόχος αυτής της μελέτης εξετάζει τις συνδέσεις μεταξύ της αβεβαιότητας των πωλήσεων και της επενδυτικής συμπεριφοράς του ΙΚΕΑ. Μετά τη μελέτη από τον Μουσταφά Κανιλάταν, τη Σάρα Μαϊόλι, τη Σιμόνα Mateut (2012), παρέχουν αποδεικτικά στοιχεία ότι η απαίτηση αβεβαιότητας, όπως μετράται από την αστάθεια των πωλήσεων, έχει θετικό αντίκτυπο στη συσσώρευση αποθέματος. Με άλλα λόγια, οι εταιρείες τείνουν να οικοδομουν αποθέματα για να αποφύγουν την απογραφή, καθώς υπόκεινται σε μεγάλη αβεβαιότητα της ζήτησης. Ως αποτέλεσμα, λαμβάνοντας υπόψη ότι η ΙΚΕΑ επικεντρώνεται στην αύξηση της ικανοποίησης των πελατών, διατηρώντας υψηλά επίπεδα υπηρεσιών και τη διαθεσιμότητα των προϊόντων, θα περιμέναμε ότι το παραπάνω συμπέρασμα θα είναι ανάλογο.

H3: όσο υψηλότερη είναι η αβεβαιότητα των πωλήσεων, τόσο υψηλότερα τα επίπεδα απογραφής του αποθέματος ΙΚΕΑ για την επιχείρηση ηλεκτρονικού εμπορίου στη Μεγάλη Βρετανία και την Ιρλανδία.