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**Profitability differences between online and offline retailers  
- An empirical study on European SMEs**

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## TIIVISTELMÄ

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Tämän pro gradu tutkielman tarkoituksena oli selvittää jos ja miten kannattavuus eroaa verkko- ja kivijalkakauppojen välillä. Lisäksi pyrittiin selvittämään onko näiden erojen syitä mahdollista selvittää yritysten taloudellisten tunnuslukujen avulla.

Tutkielma koostuu kirjallisuuskatsauksesta ja kvantitatiivisesta tutkimuksesta. Kirjallisuuskatsaus antaa yleiskuvan siitä miten verkkokaupan toiminta eroaa kivijalkaliikkeen toiminnasta ja mitkä ovat näistä eroista koituvat hyödyt ja yleisimmät sudenkuopat. Kvantitatiivisessa tutkimuksessa käytetään Amadeus tietokannasta kerättyjä taloudellisia tietoja Eurooppalaisista verkko- ja kivijalkakaupoista.

Tutkimuksessa löydettiin tilastollisesti merkitseviä eroja verkko- ja kivijalkakauppojen kannattavuudessa. Verkkokauppojen todettiin olevan kivijalkakauppoja kannattavampia, mutta taloudellisten tunnuslukujen tilastollisella analysoinnilla ei kyetty löytämään yksittäisiä selittäviä tekijöitä näille eroille.

## **ABSTRACT**

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The purpose of this thesis is to examine if and how the profitability between online retailers differs from that of offline retailers and if it is possible to use the financial data from online and offline retailers to determine whether these are differences that are inherent to the different business models.

The thesis consists of a literature review and a quantitative study. The literature review gives an overview of how online retailing differs from offline retailing and what are the benefits and pitfalls of these differences. The quantitative study uses data gathered from the Amadeus database and includes financial information from both online and offline retailers in Europe.

The results show that there are statistically significant differences between the profitability of online and offline retailers. Internet retailers managed higher profitability, but based on the analysis of the financial data it was not possible to determine the root cause of these differences. Based on the analysis it is not possible to say that online retailing is inherently more profitable, but it has the potential for higher profitability if well implemented.

## **FOREWORD**

This study has been long in the making and would never have been completed without the help of my thesis instructor Professor Satu Pätäri, who has offered valuable advice and helped steer this project in the right direction. A sincere thanks is also owed to all of my friends and other members of the LUT community who have offered criticism and advice during this project.

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Jämsä, 11.02.2015

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# 1 Introduction

This thesis attempts to find out how the profitability of online retailers, also called e-tailers, differs from the profitability of traditional brick and mortar retailers or if there are no differences. The study will be conducted as a quantitative analysis of financial information from various European internet retail companies and brick and mortar retailers.

## 1.1 Background

Few technologies have had as large an impact on society as quickly as the Internet. Other popular 20th century technologies such as radio and television took decades to become popular. It took only five years for the Internet to reach 50 million users. Between the years 1995 and 2000 the proportion of U.S. population who were online, went from 9 percent to 44 percent. Views on the importance this technology is going to have on the retail industry range from total devastation of existing physical retailing to limited if any impact upon real retailing. Whatever the long term impact of Internet on retailing will turn out to be, it is quite right to say that no other innovation in the history of retailing has received as much attention from retailers, manufacturers, consumers and the general public. This is not quite so surprising considering that before the Internet and digital transfer of information, the most advanced technical innovation the customers were in touch with in the retail environment, was the shopping cart. (Burt et al. 2003; Grewal et al. 2004; Lumpkin et al. 2002)

While the dot.com bubble bursting in 2000 to 2001 reduced the attractiveness of e-commerce as a source of revenue, online retailing has seen significant growth over the last decade and has expanded to many new areas. This development has somewhat polarized the retail sector between those companies willing to embrace e-commerce as a long term solution and those who do not see it as an attractive growth route, but the opportunities created by the Internet cannot be ignored. Being able to order goods online and have them delivered in a matter of days means that almost anyone around the world can enjoy the benefits of lower prices and extensive product selection. (Hart et al. 2000; Lee et al. 2003; Reynolds 2002)



When retailers have posted their product selections and prices online, consumers can make comparisons very conveniently. There are even websites specifically designed for the sole purpose of finding the best deals. This brings the search costs down for the consumer and as microeconomic theory teaches us, better knowledge of the prices on the customers part brings prices down. While online retailers offer better deals than brick and mortar retailers, the prices still vary between different e-tailers. Consumers' incomplete price awareness is not the only factor contributing to differing prices. Big and well known e-tailers can charge somewhat higher prices, because consumers are willing to pay extra for the safety that comes from dealing with an established operator. (Hart et al. 2000; Lee et al. 2003)

Internet retailing may not have matched the, in retrospect ludicrous, expectations of the late 90s information technology boom, but it has achieved success in terms of sales volumes and customer base. Instead of seeing e-commerce as a threat, many of the world's largest retailers and manufacturers have planned and implemented the integration of online retailing into their existing operations. It is therefore safe to say that e-tailing is here to stay. However the fact that online retailing is often integrated into a multi-channel approach indicates that what started out as a separate format of retailing, may now be becoming simply a part of a larger multi-channel retailing concept. Instead of being a disruptive technology capable of rewriting the rules of retailing, e-commerce has transformed the retail environment in a more evolutionary manner. (Grewal et al. 2004; Wrigley & Currah 2006)

The integration of online retailing as a part of the wider multi-channel approach has in some ways led to a self perpetuating cycle of retailers adding more e-commerce functionality to their retail chain, consumers demanding more e-commerce functionality and retailers responding to this demand. This combined with the opportunities opened up by modern digital media has led to some retailers attempting to combine the physical and online retail outlets to create more inspiring omni-channel retail experiences. These omni-channel experiences can address shortcomings of pure-play e-tailers such as lack of interpersonal trust and

instant gratification while still providing the benefits such as personalization and access to information. (Grewal et al. 2004; Manasseh et al. 2012)

Some product categories, such as computer products, books and music and video recordings are better suited to internet retailing due to their standardized formats. This has made them easier for consumers to purchase without being able to physically touch the product. Other products that lack the high degree of standardization and require more physical evaluation before purchase, such as clothing, have traditionally been more difficult to sell online. Despite this, and the initial negative response of luxury retailers to e-tailing, even luxury apparel brands have now integrated online retailing into their operations. As an example the Ralph Lauren brand Rugby integrates online retailing via a smart phone application that allows customers to design personalized rugby jerseys, create a picture of themselves in the jersey and upload it to facebook for feedback from their friends.(Grewal et al. 2004; Manasseh et al. 2012)

When even luxury brands have integrated online retailing into their operations and products requiring a great deal of pre purchase evaluation such as clothing can be purchased online without a problem, e-tailing is once again starting to look like a very strong challenger to traditional retail channels. Possibly the most prominent retail category still lacking a strong e-tailing break through is that of groceries. For some reason one of the most routine purchasing experiences in our daily lives remains one of the least automated ones. That is not to say that buying groceries online is not already possible and technical advances keep making internet retailing a more and more appealing strategy. (Wrigley & Currah 2006)

Bernstein et. all (2008) found that instead of a profitable decision, going online might be a strategic necessity for traditional retailers and the largest benefit from the changing market conditions could actually go to the consumer. This is supported by Lumpkin & Dess (2004) who emphasize the importance of speed of searching for and access to more information as some of the most important advances of the Internet. As well as Reynolds (2002) who suggests the informational leverage provided by the Internet results in more informed consumers. Considering this, it is interesting to find out if and how the profitability

of e-tailers differs from traditional retailers, most of whom have adopted the click-and-mortar model, where online retailing co-exists with traditional retail channels.

## **1.2 E-tailer profitability in previous literature**

Much has been written about the exiting possibilities and many pitfalls of online retailing as a business model. Most of the literature on the subject of e-tailing concentrates on studying this particular business model almost in a vacuum. Bernstein et al. (2008) studied the differences between brick-and-mortar and click-and-mortar business models. Cai et al. (2009) used a game theoretical approach to study the impact of adding e-tailing as a new channel to support an existing relationship with offline retailers to form a dual-channel retail environment. Many other studies referenced later on in this study, concentrate solely on internet retailing or study the possibilities of different dual-, multi- and omni-channel approaches to retailing.

Direct comparisons between pure-play internet retailers and traditional brick-and-mortar retailers are few and far between, especially regarding profitability. Enders & Jelassi (2000) compare the pure-play e-tailing business model to traditional retail models, but concentrate more on the pitfalls of internet retailing than straight up profitability comparisons. Other comparisons between the business models, such as Ashworth (2012) largely concentrate on how the development cycle of online businesses differs from that of their offline counterparts or how much of the marketing and layout research of offline retailers is applicable to online retailers as studied by Vrechopoulos et al. (2004)

There is much previous literature on the subjects of successful e-tailing strategies, growth models explaining the success and failure of different internet companies and the benefits and pitfalls of established brick-and-mortar retailers establishing an online presence. Where there is a gap in our knowledge, is on the differences in profitability between online and offline retailing. This study is aimed at that particular gap in our knowledge. If successful, this study will offer some explanation as to how the profitability differs between pure-play internet retailers

and traditional brick-and-mortar retailers and what the underlying causes for these differences are.

### **1.3 Research goals and scope**

This study attempts to determine, if the lower prices of internet retailers, established by Lee et al. (2003), are due to lower profit margins and tighter competition or are e-tailers capable of sustaining comparable or even higher profit margins than their brick and mortar counterparts due to a systematic advantage provided by their differing business model. The study aims to achieve this by seeking the answer to the primary research question and two secondary research questions.

Primary research question: How does the profitability of online retailing operations differ from that of brick-and-mortar retailers?

This serves as the primary research question because it is the starting point for the rest of the study. We must first find out if and how the profitability between online and offline retailers differs before we can dive deeper into analyzing the numbers in an attempt to find the causes for these differences.

Secondary research question 1: Are the differences in profitability of these operations statistically significant?

After answering our primary research question we must find out if the possible differences in profitability are in fact statistically significant. While answering this question may seem tangential to the rest of the study, it is very important because there is little point in trying to explain differences that are not statistically significant.

Secondary research question 2: Do these differences point to online retailing being inherently more or less profitable than brick-and-mortar retailing?

After answering the first two research questions we can move on to what is possibly the most interesting of our research questions. If we find that there are statistically significant differences in profitability between online and offline

retailers, it is interesting to examine what are the causes for these differences and if these causes point to the differences in profitability being inherent to these different business models.

Due to the nature of this study, there are some limitations to the methods that can be used and the amount of detail that can be extracted from the data. To answer our primary research question and the first of our secondary research questions, it is necessary to conduct our research as a quantitative analysis of a dataset that is as large as possible. Analyzing a larger set of data increases the robustness of the statistical analyses performed during the study. However, a quantitative analysis of a larger set of data, poses limitations when we are trying to answer the last of our research questions.

In attempting to find out the causes for the differences in profitability between brick-and-mortar retailers and e-tailers, it would be beneficial to start with a qualitative research over a few companies. This would allow for a more detailed approach to building a theory to explain the differences and this theory could then be tested in a future quantitative study. This would be the optimal approach but would require two or three separate studies.

In the scope of this study it is possible to build on previous literature and test those ideas using the gathered data. This allows us to find the causes for differences that can be found in the financial information of a company. However, it is possible that there are causes for the differences in profitability that are not visible in the financial information of a company. The key limitations of this study are the lack of operational details and use of financial information. The study will likely yield interesting results, but in interpreting these results it should be remembered that companies are more than just their financial information.

## **1.4 Methodology and data**

This following section introduces the methodology and data used in this study. In addition to introducing the data, we will introduce the limitations used in choosing the data and expand on the reasons for these choices.

### **1.4.1 Methodology**

The theoretical section of this study is based on previous literature on the subject. The purpose of the theoretical section is to establish a framework for choosing the best variables to use in the empirical section and interpreting the results of these empirical tests. Because the purpose of this thesis is to establish how the profitability of online and offline retailers differs if at all, the focus of the theoretical section will be the strategic advantages and disadvantages of online retailing compared to offline retailing. Of special importance are those strategic advantages and disadvantages with a significant connection to revenue streams or balance sheet items.

The empirical section of the study will be conducted as a quantitative analysis of the data described in the following section. After filtering and sorting the data, a series of quantitative tests will be used to determine if it is possible to make statistically significant statements about the differences in profitability between online and offline retailers based on the data set used in this study. After a detailed description of the data, analysis of variance will be used to determine whether the differences are statistically significant. After analysis of variance tests, a series of correlation analyses will be performed in order to determine the causes for these differences. Finally, before concluding the empirical section of the paper in a discussion of the analysis results, a regression model will be built in an attempt to predict values of profitability based on balance sheet items.

### **1.4.2 Data**

This study uses financial data over five years from 2008 to 2012 collected from the Amadeus database. The companies are chosen based on their branch of business, defined by their NACE code. The business branches chosen for this

study were retail sale of textiles and sporting equipment, retail sale of books, newspapers and stationary and retail sale via mail order houses or via the Internet.

Europe was chosen as the scope of the study for several reasons. A truly global scope would not be possible to achieve with the databases currently in use and within the limitations of a master's thesis. From a retailing perspective Europe is an interesting area, because European Union regulation and numerous treaties have lowered the bar of international commerce within Europe. At the same time Europe remains a culturally heterogeneous area which sets it apart from for example the United States. This puts European companies in a somewhat unique position where international trade should be very easy. As globalization and increased revenue from abroad is cited as one of the main benefits of online retailing, European SMEs are a very interesting group to study in the context of e-tailing.

Bookstores and clothing and sporting goods retailers were chosen to represent the brick-and-mortar retailers, because they serve markets where delivery times are not a critical factor in consumers' purchasing decisions and e-tailing has served these markets long enough for consumers to be used to e-tailing as a valid option. E-tailers have served the book market since the 1990s and while internet retail of clothing and textiles has gained popularity only more recently, it is an established branch of the internet retailing portfolio. This study focuses on SMEs of these sectors, because much of the previous literature focuses on the giants of the industry such as Amazon and eBay. For internet retailing to be a true rival for conventional retailers, it must prove itself as a profitable and viable strategy for the SME sector.

The data will be sorted to three different categories rather than just e-tailers and brick-and-mortar retailers to allow us to divide the offline retailers in two subsets and make comparisons between not only online and offline retailing but also between offline retailers serving two different markets and online retailing and different sectors of offline retailing. Comparisons between the two different offline markets are important because they allow us to better understand if the benefits of online and offline retailing have different effects based on the goods that are sold. The final data set consists of 145 companies. 35 of these companies are internet

retailers and 67 are bookstores, which leaves 43 clothing and textile retailers. Table 1.1 illustrates how the companies are divided into different sectors.

**Table 1.1** Division of data.

<b>Brick-and-mortar</b>	<b>Bookstores</b>	<b>67</b>
	<b>Textile retailers</b>	<b>43</b>
<b>E-tailers</b>	<b>Internet retailers</b>	<b>35</b>
		<b>145</b>

Ideally we would have wanted to divide the internet retailers into two different categories just like the brick-and-mortar retailers resulting in four subsets of data that could be compared more closely with each other. However, this was not possible due to the relatively small number of internet retailers in the data and the lack of detail in the NACE codes. These codes do not differentiate between online retailers offering different goods. Despite this it was decided that dividing the brick-and-mortar retailers in two sets based on the goods sold could still offer insight into the differences between online and offline retailing when these companies were compared to Internet retailers independently. This is why we decided to use the seemingly lopsided division where brick-and-mortar retailers are divided in two groups and e-tailers are all in the same group.

## **1.5 Research structure**

The research is structured as follows. After the introduction we will start building the theoretical foundation necessary to answering the research questions. This theoretical foundation will be based on previous literature relating to the profitability of online retailing. The theoretical portion of the research will be further divided into categories discussing the strategic benefits of operating online, the process of gaining an online presence, the challenges of going online and information security and usage restrictions. The theoretical foundation will enable us to make better use of the data during the statistical analysis and allow us to



better understand the role of strategic decision making and operational practices in determining the profitability of an online operation.

Following the theoretical portion of the study will be the statistical analysis part. In this section we will first introduce the data that will be used to conduct the research and follow that with a series of analyses that will help us in finding answers to the research questions. The statistical part of the study is further divided into several subsections. At first we will introduce the financial indicators used in the analyses. This will be followed by an explanation of the methods that were used to collect and filter the data. After this we will describe the key financial information before beginning the analysis of variance. The analysis of variance is followed by first a correlation analysis on the determinants of profitability before the section on correlation analysis on other financials and a summary of the correlation analyses. The last two sections of the statistical portion of the study will be an attempt at creating a regression model to explain profitability based on balance sheet items and finally a discussion of the results of the performed statistical analyses.

After the research questions have been answered in the theoretical and statistical portions of the study, all the information gathered during this process will be summed up in the conclusions.

## 2 Theoretical foundation

Globalization and the high rate of internet adoption bring about exciting new possibilities to both consumers and businesses alike. Fast information flow and highly developed global logistics make it possible for both consumers to find new service providers and businesses to expand their market and attract new customers. Enterprises have taken advantage of these possibilities and the Internet has been a key ingredient in many of the successful new companies that have managed to build up a remarkable brand in the past two decades. Commercialization of the Internet has happened at a very rapid pace. In 1993 only two percent of all Web sites were commercial. By 2010 70 percent of all Web sites were categorized as commercial dot.com sites and global e-tailing sales were estimated to be in excess of 680 billion dollars. The move to international e-commerce is driven, depending on the business, by market demands or institutional changes. However, internet adoption also poses security threats and requires new skills and capabilities. Some of the technical skills required can be outsourced, but even in e-commerce cultural and language skills are required when entering new markets and these skills are harder to outsource. In-house expertise often defines the level of sophistication present in the early adoption of internet services. Mehrtens et al. (2001) found that in companies with in-house expertise, financial resources were not a concern during internet adoption. This seems to suggest that in early stages of their development internet services are often seen as something done as a side job. Or as Ashworth (2012) found in studying SMEs in the fashion retail industry. Developing the necessary IT skills was done gradually as business evolved and was seen as a pleasant learning experience rather than a problem. (Tiessen et al. 2001; Warf 2003 p.94)

E-commerce is a varied field, which encompasses many different operations. North-America and Europe have seen e-commerce conquer the largest share of the market. Canada, UK and Germany lead the list with e-commerce accounting for 11, 12 and 9 percent of the countries entire GDP respectively. While USA and the rest of Europe trail behind in GDP shares, as table 1.2 shows, they occupy top positions on E-government rankings with the two entries from Asia, South-Korea and Singapore, also being the leaders in e-tailing in the region. While the GDP

shares of e-tailing are at best barely in double digits, the Internet has a much greater impact on the economy. The most basic and wide spread uses of the Internet in retailing is as a tool for communicating information about the retail organization and their products to consumers or providing a convenient communication channel between the company and its customers. The effects of this use of Internet aren't reflected in the sales figures. (Warf 2013. p.96-98; Hart et. al. 2000)

**Table 1.2** U.N. E-Government development index ranking, 2012.

Rank	Country	Index
1	Republic of Korea	0.9283
2	Netherlands	0.9125
3	United Kingdom	0.8960
4	Denmark	0.8889
5	United States	0.8687
6	France	0.8635
7	Sweden	0.8599
8	Norway	0.8593
9	Finland	0.8505
10	Singapore	0.8474

Businesses in developing countries are faced with a number of challenges when it comes to adapting and exploiting e-commerce. Usually models that describe the adoption of electronic commerce in developing countries place a large emphasis on the relevance of technological, financial, and legal infrastructure constraints. While most of the countries in the developing world still need to address these problems, improvements in the infrastructure over the last years have made consideration of contextual constraints as sole determinants of e-commerce adoption untenable. (Molla & Licker 2005)

Underhill (2000) states that the notion of the Web replacing brick-and-mortar stores is nothing but fantasy, but recognizes the new ways it allows companies to integrate distribution and marketing. The effects the Internet has over retail operations, that are not directly reflected in the sales numbers are described by Reynolds (2002) as informational leverage. The internet has enhanced the speed of information gathering while lowering the cost of the process and broadening the scope of information that can be accessed. The informational leverage resulting from this has led to more informed consumers. (Lumpkin & Dess 2004)

While one of the concerns traditional brick-and-mortar retailers had about internet retailers was that customers would come to physical stores for the service and then go make their purchases online, the numbers suggest that the opposite is true. 34 percent of store shoppers looked for or purchased something in-store after having seen it on the retailers Website. The number of online shoppers purchasing something they had seen in a store online was actually smaller at 27 percent. Combining these numbers with the knowledge that even experienced users spend only 5 percent of their time online engaged in shopping activities and the same experienced users also spend 13 percent of their time online just browsing, a number that is second only to the 23 percent of time spent sending and reading received e-mail, the emphasis of the Internet as a source of information becomes more and more clear. There is a role for the electronic marketplace in the consumer buying process, but the deck of retailing may not be stacked quite as much in favor of the online retailers as is often feared by traditional retailers. (Reynolds 2002; Keen et al. 2004)

The fear of losing business to online competitors has driven many traditional brick-and-mortar retailers to build up their Internet presence at great expense, but these expenses can go completely to waste if the importance of information is neglected. The challenges of integrating online presence in multi-channel retailing can be solved in more than one way. Uploading product information online allows consumers to research product specifications, establish product availability and make rudimentary price comparisons. A quarter of U.S. consumers engage in this kind of pre-purchase activity often and 42 percent do it sometimes. In addition to providing information and enabling transactions, Websites can be used to enhance

the shopping experience by finding new touch points that add distinctive value. These touch points can be more convenient forms of online purchasing or adding to the traditional retail experience by utilizing the Internet. Smart phones have become extremely popular and utilizing them in enhancing the retail experience opens new possibilities for integrating internet services such as social media to the trip to store. Continued development in the fields of augmented reality and virtual reality have the potential to completely change how we think about a trip to the store. (Manasseh et al.; Keen et al. 2004; Reynolds 2002)

## **2.1 Strategic benefits of going online**

E-commerce offers many exciting opportunities, but to successfully exploit these opportunities, adopting internet and e-commerce, even incrementally, must be a part of a strategic plan involving top level management. High expectations and poor management led to many failed e-commerce projects and subsequently a drop in investment towards e-commerce in companies. For larger established companies, going online may be a strategic necessity for the simple purpose of acquiring a presence online. However the rate of internet adoption by retailers may affect the rate of adoption by consumers, thus established businesses that rely heavily or almost exclusively on offline retailing, may be reluctant to expand into non-store electronic retailing, due to fears of such expansion resulting in diminishing offline returns. . (Tiessen et. all. 2001; Mehrtens et. all. 2001 ; Hart et. all. 2000; Ashworth et. all. 2006)

New entrants face fewer barriers and are more likely to embrace the concept of online retailing. Strategically some of the biggest beneficiaries of e-tailing should be smaller companies who serve niche markets. Small companies that can't benefit from economies of scale in manufacturing, purchasing or logistics can find competitive advantage in forming a portfolio of several Web sites all catering to niche markets and sharing the same basic e-tailing infrastructure. After setting up one Web site, the cost of adding new ones to the portfolio is much smaller. However SMEs don't always seem interested in expanding to the Internet and the CEO's attitude towards and aptitude in information technology has been found to

have a significant effect on the Internet adoption rate. (Tiessen et. all. 2001; Mehrtens et. all. 2001 ; Hart et. all. 2000; Ashworth et. all. 2006)

After only a few years of widespread commercial usage, the Internet had fundamentally changed the way we see the world of retailing. In theory the Internet enables e-tailers to operate without the expensive brick-and-mortar infrastructure of their physical counterparts. This is possible because interaction with the customers, such as product searching, browsing, selecting and payment, takes place solely through the website. Physical activities such as warehousing, shipping, and delivering goods can be outsourced to subcontractors. (Enders & Jelassi 2000)

Grewal et al. (2004) challenge the prevailing understanding of lower operating costs for e-tailers, citing escalating shipping and handling costs and the cost of developing and maintaining the required software. Well designed and maintained website and back-end systems can have very large annual costs. They also note that concentrating on website and front-end systems, as e-tailers often do, may result in reduced attention to the critical back-end systems.

The benefits of lower costs in internet retailing may be in dispute to some degree, but the inherent scalability of internet retailing as a model is not in question. Using subcontractors to take care of physical activities can result in savings, but more than that the lack of any physical infrastructure makes scaling the operation to serve hundreds of thousands or even millions of customers much less expensive and resource intensive than in the brick-and-mortar model where the same added customer capacity would require substantial investments in physical infrastructure. (Enders & Jelassi 2000)

According to Quelch & Klein (1996) the Internet was promoted as a revolutionary vehicle that would change the dynamics of international business and allow small companies to compete in the global marketplace. As has already been mentioned, Grewal et al. (2004) challenge this view. Contrary to this Ashworth (2012) argues that the technological sophistication and complexity usually associated with successfully operating a sustainable online business may not apply to SMEs. This reduced need for technological intensity is justified by consumer research, which

does not support consumer need for complexity in e-shopping sites. Consumers prefer simplicity and functionality rather than laborious and slow-to-load websites. Thus criticizing SMEs for their lack of necessary IT skill-base to engage with the digital economy may not be justified.

In addition to being a more cost effective way of serving the retail market for traditional retailers, e-tailing has also opened up a channel for manufacturing companies to sell their products online as well as through retail companies. Initially large retailers were opposed to the idea of straight channel internet retailing by manufacturers and especially in the case of smaller manufacturers used their bargaining power to shut down these operations. Nowadays the coexistence of manufacturer retailing channels and traditional retailing channels is not seen as that much of a problem. Two basic pricing strategies exist in this kind of situation. Consistent pricing refers to the model where the pricing is consistent through both the direct channel and the retail channel. This approach can protect the retailer from losing profit when the supplier enters the market. The other strategy is inconsistent pricing, which covers all the other cases. The best strategy to use must be decided on a case by case basis, because a different combinations of consistent or inconsistent pricing and simple price discounts can either improve the performance of both or one at the expense of the other. (Cai et al. 2009)

The Internet and e-commerce have made it possible for small suppliers, that were previously hard to find, to be noticed by consumers. These small suppliers can be manufacturers attempting to gain more volume or profit by establishing a straight retail channel or they can be small retailers looking for chances to expand their operation. Whatever the case may be, there are two primary ways of increasing the traffic on the website. Companies can gain an online presence by increasing their online brand. There are several ways to do this, some of which will be discussed further in the next chapter. The other way to gain traffic is through search engines. Jansen & Molina (2006) found that specified search engines returned more relevant results regarding e-commerce. They also found that there was no statistically significant difference in average relevance among average ranks for any of the search engines. This highlights the importance of optimizing the website for search engines in an attempt to be higher up on the list of search

results. Given that sponsored links were found to be less relevant than organic links, it appears that buying sponsored links can be a double edged sword. Buying sponsored links can get the site more visibility, but reduced relevance to queries can lead to consumers skipping over these links. Given the increased use of mobile devices, with smaller screens and higher contextual awareness, the importance of being positioned in the sweet spot of search results is only going to increase. (Cai et al. 2009; Goldfarb 2013; Lumpkin & Dess 2004)

In addition to the ubiquitous nature of the Internet in the modern world, what with smart devices with fast internet connections being available virtually everywhere, another driver pushing consumers towards the internet is the combination of time pressure and heavy workloads. The old adage "time is money" is more true than ever in the online world. Consumers perceive their time to be very valuable and efficient use of time is considered crucial for sound customer service. Customers will only respect a business that recognizes the value of their time. The perceived scarcity of time may not be quite so real, when we consider that consumers have a tendency to linger on their favorite websites and according to Reynolds (2002) even experienced consumers spend 13 percent of their time on the Internet just browsing. Whatever the reality of time constraints on the consumers part is, what matters to retailers is the perceived lack of time. Koivumäki et al. (2002) found that time savings made shopping online lead to increased purchases at Web stores. This paradox of attempting to create a streamlined Web experience for the customer while at the same time attempting to capture their attention and make them linger on the Website is something that needs to be taken into account right from the beginning of planning. Compelling consumers to pay attention to the content of the Website is a prerequisite to selling online, but at the same time the Website needs to be easy to navigate and responsive. Speed and ease of use are essential, because the typical consumer reaction to delays is frustration and abandoning the site. (Koiso-Kanttila 2005; Manasseh et al. 2012)

Responding to customer expectations of speed is a continuous project, because technological development allows both increased speed and more sophisticated and capturing content. At its best an Internet retail medium can provide round the clock service, displaying an exhaustive product selection and reach a worldwide



audience. Fast connections and digital multimedia formats enable e-tailers to provide consumers with an immersive and comprehensive digital shopping experience. The companies that can leverage the evolving technology to inspire customers with a seamlessly integrated channel experience, will be the ones to reap the benefits. While all these possibilities are extremely exciting, the process of integrating new technology must be part of a strategic process and managers should not be blinded by shiny new technology. If new technology is added for the sake of adding new technology, the company is at a great risk of facing the spiraling costs and overt attention to front end processes at the cost of the vital back end processes that Grewal et al. (2004) warn e-tailers about. (Enders & Jelassi 2000; Manasseh et al. 2012)

Another factor that needs to be considered when it comes to new technology and speed is that the faster things are done in the present, the faster they are expected to be done in the future. Long gone are the times of early Internet, when consumers needed to use programs like Wget to download software over flaky connections and downloading even small packages could take several hours. Nowadays even mobile devices are capable of transfer speeds that enable streaming high definition video content while on the move and according to Molla & Licker (2005) even the developing nations have largely addressed the problems of lackluster Internet infrastructure. The trend of increased speed does not concern only the Internet side of the operations. With fast connections and streaming media, instantaneous access to digital content is already a reality. The more challenging part is delivering on the consumer expectation of faster and faster delivery of physical goods. This is when location begins to once again matter for e-tailers. Being well placed in the logistical chain can be a source of significant competitive advantage. Given the advantages in speed offered by e-commerce, it is interesting that Lewis & Cockrill (2002) found that SMEs are often dismissive of the benefits e-commerce could provide them. (Koiso-Kanttila 2005; Kotha 1998)

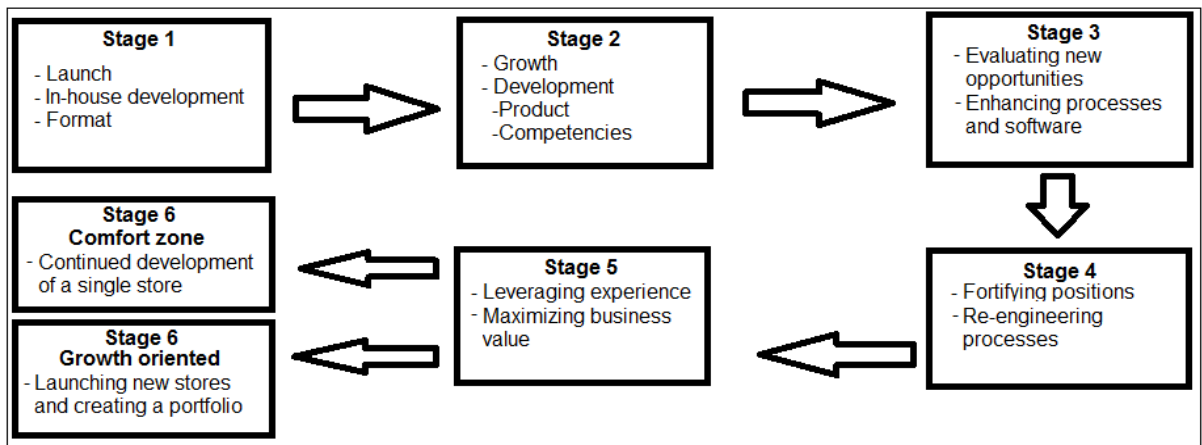
## 2.2 Gaining online presence

For SMEs the process of gaining an online presence is often an uncoordinated ad hoc process. In addition to evolving consumer needs and habits, demographic shifts are changing the age and overall profile of consumers. This brings radical change to the world's retail industry. Elliot & Fowell (2000) suggested that the typical Internet shopper was a 30 to 35 years old single with a college degree. But the changing overall demographic of consumers is likely to alter that profile. Understanding the consumer and their needs is critical for success in the retail sector and addressing emerging but poorly met consumer needs can open up tremendous growth opportunities. The presence of a unique or innovative product or service that fits with the media of the Internet is critical for success in e-tailing. The importance of strategic thinking with regard to e-tailing cannot be overstated, because being the first to implement a new and innovative idea can lead to reputation effects derived from first mover advantage and these effects can significantly diminish the effectiveness of copying. (Kotha 1998; Lewis & Cockrill 2000; Manasseh et al. 2012)

Ashworth (2012), exploring the process of launching an online pure-play business and the development of the organizations, identified two types of operators, growth-oriented businesses and comfort-zone businesses. The online portfolio approach expands on the model introduced by Ashworth et al. (2006) and is in line with the findings of Carrier et al. (2004). Similarities can be drawn between offline-portfolios and online-portfolios as means to achieve sustainability by SMEs. Acquiring a portfolio of online businesses can be an effective way of diversifying and creating sustainability while creating benefits of scale at the same time. Companies doing business on the Internet have been faced with environmental turbulence from early growth and success to decline as businesses failed. Ashworth (2012) identified a six stage model, pictured in Figure 1, for the launch, growth and sustainable operation of a successful online store. (Javalgi et al. 2004)

The first stage of gaining a presence online is launching the website. During this stage the retailer decides how the site will be positioned and marketed. This stage can be very similar to new pure-players entering the world of retailing and

established offline retailers who are looking to expand their operations online, because brand names established over other media do not necessarily transfer to the internet. Deciding the format of the website plays a fairly large part in how it is positioned. (Ashworth 2012; Kotha 1998)



**Figure 1** Six stage model by Ashworth

Store image is a crucial factor that affects consumer behavior and the design of the layout is one of the key determinants of this image. Selling floor layouts influence the in-store traffic patterns, shopping atmosphere, consumers' shopping behavior and operational efficiency. The problem is that predictions generated from the literature of conventional retailing about the differences in the outcome of different layouts generally do not hold true in a virtual environment. In addition to this, customer expectations regarding innovative retail concepts vary considerably and consumers in different markets value different things. (Manasseh et al. 2012; Vrechopoulos et al. 2004)

There are three major layout types in conventional retailing grid, freeform and racetrack. The grid layout is a rectangular arrangement of parallel aisles and facilitates routine and planned shopping behavior. In a grid layout it is easy for consumers to identify pre-selected products that appear on their shopping list. A freeform layout is a free-flowing asymmetric arrangement that employs a variety of different sizes, shapes and styles of display. Freeform layouts are mainly used by department stores, because they facilitate easy movement and browsing and increases the time customers are willing to spend in the store. In a racetrack layout the store is organized into individual semi-separate areas, each built around

a particular theme. A racetrack layout leads customers along specific paths to visit the store sections and departments. This leads to an unusual, interesting and entertaining shopping experience. Virtual store layouts are usually some sort of hybrid combinations of these traditional models. For example a combination of grid and freeform layouts or a grid layout with limited search mechanisms. Virtual shoppers tend to prefer hierarchical structures and find the grid layout the easiest to use. Freeform and racetrack layouts do engage customers longer even in virtual shops, but this might not be as desirable in e-tailing as it is in conventional brick-and-mortar retailing. Customers are often driven to online shopping by perceived time constraints and value simplicity and ease of use over anything else. Conventional wisdom tells us that customers spending more time in the store leads to increased purchases, but in the case of internet retailing time saved while shopping may lead to increased purchases online. (Koiso-Kanttila 2005; Koivumäki et al. 2002; Vrechopoulos et al. 2004)

In this first stage of launching the online operation, most companies develop competencies in-house in an attempt to maximize operational flexibility while minimizing costs. Capital plays two important roles in this phase. Human capital allows development of mechanisms and software that can become a source of competitive advantage. The other way to acquire these assets is by purchasing them from other parties. This is where the other role of capital comes in. Even if most companies attempt to develop competencies in-house, capital is still very much necessary in order to gain recognition. (Ashworth 2012; Kotha 1998)

E-tailers often launch with only a few product lines and these lines are expanded to meet customer demands as opportunities rise. A successful launch is important for the company, because it may lead to all the benefits of achieving first mover status and even if the first mover advantage does not materialize, the initial public relations efforts are crucial because the initial PR contacts used as a foundation for developing long-term media relationships. The ability to find and exploit a consumer need that is poorly catered to is even more important to pure-play SMEs because marketing budgets are often very limited and the companies do not have high street or local presence to fall back on. Not that high street presence is a

guarantee of the brand transferring to the Internet, but it does help with some initial brand recognition. (Ashworth 2012; Masseh et al. 2012; Kotha 1998)

In the second stage of developing online presence the companies develop greater e-tailing competencies as sales and confidence in the medium grow and new opportunities present themselves. Most retailers develop their competencies in-house and launch new and improved versions of the initial offerings. Developing competencies within the company facilitate greater control and flexibility than outsourcing them. Often the process does not only improve flexibility but also becomes an enjoyable learning experience. The new offering in this stage also usually necessitate enhancements to the functionality of the site. Historically the decision to develop competencies in-house rather than outsource them has been the right decision since the companies that have succeeded in the sometimes turbulent environment of the internet have derived their strength from their ability to manipulate the technology involved in establishing their presence. The positive attitude towards e-commerce solutions in a company is often a result of management interest and a belief that e-commerce adds strategic value to the company. (Ashworth 2012; Grandon & Pearson 2004; Javalgi et al. 2004)

The third stage is one of market development and value integration. In this stage the company concentrates on evaluating opportunities for differentiation and integrating creative adaptations based on customer feedback. Responding to customer feedback is critical because poor customer experience is a significant disincentive to shopping online. The enhancements made to front- and back-end processes and software enhance the stickiness of the website and represent a more incisive use of strategic marketing in an attempt to add value to both the consumer and the enterprise. The extension of product ranges involves relationship marketing strategies to build closer ties to existing suppliers and seek new associations. The third stage also sees an increase in promotional and e-marketing activities as opportunities and sales, possibly international, grow. (Ashworth 2012; Liao & Cheung 2001)

During stage four, the companies enter a period of fortifying their positions. This requires reviewing evidence from the previous process stages in order to develop

plans to enhance internal operations and back-end systems. External customer and supplier relationships are developed and market space is surveyed to ensure that customers needs are satisfied and new opportunities spotted and exploited. This requires management commitment to developing resource infrastructures including human resources and strategic planning activities. Both business processes and consumer-facing systems need to be re-engineered to improve flexibility, develop efficiency and boost market presence. At this point increased attention should be paid to issues such as safe money transactions. Safety of money transactions is one of the primary concerns for customers shopping online, but consideration should also be given to enabling reputation systems such as public product and company reviews. While these reputation systems can be cheated, in a retailing environment where customers are already sharing personal information with the company to facilitate delivery, raising the cost of entry by limiting the use of these systems to registered users should be an effective way of keeping the systems reliable. The difference between this re-engineering and the previous incremental changes is that re-engineering takes a strategic and planned rather than an opportunistic approach. (Ashworth 2012; Liao & Cheung 2001; You et al. 2011)

In stage five the companies leverage their experience to maximize business value. The cumulative experience of the previous stages is utilized to enhance service-delivery and added value to increase customer loyalty. This involves a strategic focus on more formally planning for sustainability of the operation. The strategy usually takes the form of a two-prong approach of planned extension with incremental adaptations to existing product offerings and giving a formal status to the investigation of emerging opportunities. Implementation of sustainability strategies to new products and range extensions coupled with controlled experimentation ensures that customer attention is retained while driving a constant stream of traffic. This model of operating has the benefits in stability and security of a formal, planned approach and at the same time allows the exploration and exploitation of emerging opportunities. This stage also sees the separation in marketing decisions between the more growth-oriented companies from the so called comfort-zone companies. While the comfort-zone companies may be less

interested in expansion, the investigation of emerging opportunities is still a necessity for them, because the structure of consumer decision is not static and as the retail landscape changes over time, the structure of consumer decisions changes too. (Ashworth 2012; Keen et al. 2004)

Stage six is one of strategic development and sustainability. At this point the companies have either consolidated their position extending their product ranges as a part of retaining a single Internet store or have pursued additional organizational development by engaging in extension strategies within, across or beyond the original sector. In online retailing stage six does not represent maturity and decline. Instead companies perceive organizational development as a process of constantly seeking to refresh their activities in pursuit of sustainability. This is a necessity for the operations to keep pace with technological developments online and to inspire consumers to return to the store time and time again. (Ashworth 2012; Manasseh et al. 2012)

After stage six the companies can either keep developing their existing operations and maintain a single internet store or they can leverage the compounded knowledge gathered through stages one to six in launching new internet stores to serve different consumers. The advantage of this portfolio approach is that the knowledge and technology gained from launching the first store can be directly transferred to launching an additional store and thus the costs are reduced and development through stages one to five is accelerated. Other benefits of the portfolio approach include the ability to cross market the stores and maintaining tighter focus on individual stores. However, not all SMEs are willing to immediately embrace the technology or engage in the same rapid rate of development. The rationale behind maintaining a single online store is that with a single store it is easier to keep the size of the business manageable. (Ashworth 2012; Ashworth et al. 2006; Carrier et al. 2004; Lewis & Cockrill 2002)

### **2.3 Challenges of going online**

While going online definitely opens new and exciting opportunities for businesses, being a part of the world wide web does not come without risks. There are

problems and threats online businesses have to deal with that offline businesses don't have to take into consideration.

The Internet has been around and a part of our daily lives for over two decades now. During those two decades the Internet itself has evolved enormously from the first time you dialed up with your modem, listening to that nostalgic dial up sound, connecting to largely text based Web sites, to the constantly present all encompassing network we are all connected to now. While the development rate of the Internet itself is baffling, it is dwarfed by the change it has brought to the world we live in. However, while the rate of progress on transfer speeds, coding languages and search engines has left us all marveling at the development of the information society, some problems with the internet have remained largely the same. Concerns over security, payment methods and access restrictions have limited the Internet's succession over traditional marketing tools. A large portion of consumers are not comfortable with sharing their personal information with Internet services. The threats of identity theft and viruses are as old as the Internet itself. These traditional consumers' fears are now joined with more concern over surveillance of Internet behavior by corporations and governments. (Hart 2000; Lumpkin et al. 2002; Villeneuve 2006)

Security concerns, especially when it comes to personal information have become even harder to address as consumers are increasingly concerned over surveillance and profiling by corporations and governments as well as malicious attacks by hackers. In e-tailing transactions are carried over public domain and issues of encryption, network security, and transactional privacy and security become a paramount concern.. New technologies such as biometric recognition like fingerprint and iris scanners have been developed to increase the security of payments over the internet, but have been met with concerns over the security of this biometric information. Companies doing business online are forced to put more effort into showing that their services are both convenient to use and secure. The need for this is emphasized by the fact that the online experience lacks the interpersonal trust inherent in traditional retail environment where transactions are conducted between people rather than with an invisible electronic entity. (Grewal et al. 2004)



E-commerce has a turbulent past with extreme highs and lows in terms of what the general public has expected of it. In the run up to the dot.com bubble bursting, people expected information technology to increase productivity to impossible levels and internet retailing to devastate the traditional brick-and-mortar retailers. This led to some ludicrous valuations of IT stocks and subsequent crashes during this time. According to Watson (2001) In the year 2000 over 130 Internet companies declared bankruptcy or closed their doors. Probably the best example of the dot.com hysteria was the initial public offering of VA Linux Systems in late 1999. VA Linux Systems was a company that married Linux based software with Intel hardware and was looking to challenge the likes of Dell. The initial public offering set a record first day gain at 697 percent only for the company to declare bankruptcy in 2001. The story of VA Linux system is a good example of how things can go wrong for companies doing business on or around the Internet. The idea driving the company development was actually very good. Since the 1990s Intel has dominated the hardware market and the Apache Web server made Linux the most popular operating system for servers. The failure of VA Linux Systems can be attributed to unrealistic expectations and lack of managerial direction. A contemporary example of a company that had a highly successful IPO but managed to navigate through the dot.com bubble bursting would be redhat. Redhat did suffer from the bubble bursting and the stock price dropped from 105,63\$ at year end 1999 to 3,50\$ at year end 2001. However, as a result of competent management decisions, the company is still alive and healthy today. (Reynolds 2002; redhat 2014; SunSentinel 1999)

This rollercoaster ride that is the world of e-commerce might go some way to explaining why, while studying 25 small and micro retail companies throughout Wales, Lewis & Cockrill (2002) found that the use of e-commerce was in an embryonic stage. Majority of the retailers were not participating in the sophisticated e-commerce solutions larger companies were focusing on.

The rapid rate of progress of the Internet itself and the devices used to access it also pose threats to companies operating on the Internet. While most of us enjoy rapid technological progress, new technologies change the way we use the Internet and businesses ignore this change at their peril. As has been noted

before, changes in the retail landscape lead to changes in the structure of consumer decisions. While the Internet coming to homes significantly reduced the importance of location and distance to customers, the popularity of mobile devices has again increased the significance of these factors. The way we use mobile devices is significantly different from the way we use personal computers. (Goldfarb 2013; Keen et al. 2004)

Larger screen sizes and physical keyboards make searching content and filtering the search results relatively easy. The Internet is most often used by consumers to research products and retailers in the early part of a buying decision. When done on a PC, it is much more convenient to do thorough research and possibly even order the product from an online retailer. On a mobile device, the small display sizes and slower to operate input methods mean that consumers are less likely to do extensive searching and much more likely to tap on the first visible links. As search engines often factor in the location and prioritize the search results nearby, location becomes important once again for companies to be visible to mobile device users. In addition Jansen & Molina (2006) found that the sponsored links that are displayed at the very top of the search results are less relevant to the user than the organic links below them. On a mobile device this means that there is very little space for relevant organic links on the first page of the search results. This means that to gain visibility in mobile search results, a company must either constantly develop the Website to match the search engines' algorithms or invest in sponsored links. It is also more likely that a consumer who is quickly searching for a product on the go will stop by at a physical retailer nearby, and enjoy the instant gratification of receiving the product immediately, rather than order the item online and wait for it to be delivered. (Goldfarb 2013; Hart 2000; Keen et al. 2004)

How the changing form factor of smart phones to include larger screens and on the other hand the increasing use of tablet computers instead of PC's for home computing affect consumer behavior remains to be seen. On one hand mobile devices are able to display more information at once, but on the other hand tablet computers bring the mobile usage patterns to home computing. It is also possible that the differences of mobile and home usage of internet are more rooted in the

difference in the location rather than the devices. When we add the possibility of augmented reality gaining more popularity in the not so distant future and the new emphasis on location this would bring with it, businesses have to pay attention to how the Internet and the devices used to access it keep changing.

This rapid rate of progress and other environmental turbulence make it easy to draw parallels between the Internet business environment and a newly formed ecosystem. Both are populated at a relatively fast rate by a variety of individuals and those individuals that survive in this environment do so because they are able to adapt to the changes in the environment. In some ways then the growth and decline of Internet businesses is part of a natural selection process. The usual reasons behind companies becoming 'evolutionary dead-ends' and fading away from the Internet have been poor business models, lack of strategy, security issues and lack of infrastructure. Combining these with unrealistic expectations and lack of management expertise has led to some fairly spectacular failures. (Javalgi et al. 2004; Wrigley & Currah 2006)

While the Internet clearly has changed the way many companies do business, many still see it as nothing more than enabling technology. To these companies the Internet is not a new market place, just a new way of distributing knowledge and information. Physical goods and raw materials still need to be distributed via physical outlets and this is why retail stores may still have an advantage over stores on the Internet. Because of this reasoning it should not be a complete surprise that Zheng et al. (2004) found widening gaps between large and small companies in terms of investment and strategy towards exploitation of e-commerce. There was no explicit resistance towards using e-technology in the businesses, but the nature of the business and importance placed on interpersonal relationships, in addition to non-existent external pressure, kept the adoption rate slow and strategy as an ad hoc process. These findings are in line with those of Lewis & Cockrill (2002). (Keen et al. 2004; Lumpkin et al. 2002)

The use of an uncoordinated ad hoc approach by many small companies entering the world of e-retailing is not encouraging. Historically many fledgling companies attempting to do business on the Internet were doomed to failure because they

were only attempting to take advantage of the short-term business opportunity and did not have a long term business plan. To succeed in e-tailing a company must have a unique or innovative product that fits the media of the Internet and a long term strategic plan to leverage the innovation and gain a recognized presence online. The Internet opens up new possibilities, but also introduces threats in the form of new competitors into what used to be a more closed up domestic market. This is why SMEs that choose to utilize e-retailing solutions cannot be afraid of the technology and must have a long term strategic plan to compete in the marketplace. This is especially important since instead of being rendered obsolete by e-tailers, traditional retailers have integrated Internet into their business plans and following the dot.com bubble some of the large transnational retail corporations rose up the rankings of the world's largest industrial corporations. When moving into the internet, large corporations rely on their established brand names and quality reputation to carry over into the Internet and lead them to success. Brand names established elsewhere do not automatically transfer over to the Internet, but they are a starting point and some might argue that recent attempts of e-tailers to branch out into offline markets, such as Amazons Fire phone, indicate that offline brand names transfer better to online usage than the other way round. (Javalgi et al. 2004; Kotha 1998; Lewis & Cockrill 2002; Wrigley & Currah 2006; Zheng et al. 2004)

So far only certain pure-play e-tailers have truly flourished and the threats they pose to the large transnational corporations dominating the offline retail market have been limited to particular sectors of general merchandise. These are usually sectors consisting of merchandise of standardized format. So, despite some relative success, especially in terms of sales volumes and customer base growth, the rate of growth in e-tailing has slowed. The challenges that e-tailers are facing in categories of non-standardized merchandise are a result of the very nature of the e-shopping experience compared to the traditional shopping experience of visiting a physical outlet. (Grewal et al. 2004; Wrigley & Currah 2006)

While online shopping fulfills the consumer needs of speed, convenience and access to information, when it comes to purchasing non-standardized products the importance of consumer needs that the online shopping experience lacks, are

elevated considerably. E-tailing lacks the pre-trial experience and evaluation that is often crucial when purchasing goods of non-standardized formats. This lack of pre-trial experience cannot be solved until significant development has happened on the field of virtual reality devices offering tactile feedback. Another aspect of the offline shopping experience that cannot be matched by online retailers is that of interpersonal trust. When consumers are purchasing products the value of which they cannot accurately measure themselves, they tend to rely on competent sales personnel to assist them in making the purchasing decision. The Internet offers a wealth of objective information on most subjects, but there is no decision-making assistance from competent sales personnel. (Grewal et al. 2004; Keen et al. 2004)

The key factors that are often cited as reasons for success in online retailing are speed and convenience. These are things that e-tailers do very well when it comes to selling products, but the experience can be markedly worse when it comes to handling returns and refunds. The lack of interpersonal communication can make the experience of returning a purchase or dealing with warranty issues feel very laborious and inconvenient. When shopping online, consumers expect convenience and having to fill out several forms on the internet, package the product and arrange for shipping instead of just walking to the physical retail outlet to deal with returns and warranty issues does not leave the consumer with a feeling of convenience. The issue of shipping costs also plays a role in this experience, especially when business is done on an international scale. Requiring the customer to pay for shipping in these situations can turn them away from making future purchases, but paying for all shipping costs, especially in the case of returns, can cause the shipping and handling costs to escalate very quickly. This issue of after sales care is very important in gaining loyal customers because poor vendor quality is a significant disincentive to shopping online (Elliot & Fowell 2000; Grewal et al. 2004; Koiso-Kanttila 2005; Liao & Cheung 2001)

Traditional retailers took their time before even considering the Internet as a viable medium for commerce and many thought e-tailing would be nothing but a passing fad. As e-tailers established themselves as serious competitors to the traditional transnational retail giants, both fields of retailing have tried to meet emerging challenges by expanding their business models. E-tailers have been able to

challenge and even surpass traditional retailers in some areas, but the brick-and-mortar retailers still hold advantages in many critical areas. New e-tailers entering the market must challenge established conventional retailers who have the benefits of owning an established brand name and already having a large customer base. Brick-and-mortar retailers also have a tried and tested distribution infrastructure at their disposal and many e-commerce solutions have already been integrated in the distribution channel to increase speed and productivity. (Enders & Jelassi 2000; Lumpkin & Dess 2004; Wrigley & Currah 2006)

Challenging the established distribution channels of brick-and-mortar retailers is one of the key factors in successfully operating an e-tailing business. In theory e-tailers are capable of operating on leaner infrastructure than physical retailers, but in reality poor logistics and badly designed back-end functions have often resulted in shipping and handling costs spiraling up. In addition to problems with poorly designed logistical infrastructure, e-tailers have also had problems with converting site visits to actual purchases and convincing customers to return to the e-tailer after their initial purchase. This indicates that the lowered switching costs resulting from increasing internet usage, can actually work against e-tailers by making it more difficult to turn one time purchasers into loyal customers. It appears that while the Internet has provided businesses with new and improved tools for managing costs, at the same time it has eroded opportunities for sustainable advantages. Due to these issues, e-tailers have often chosen to evaluate their performance with traffic based measures such as number of unique customers, average spending per customer and average order size instead of traditional profitability measures. (Enders & Jelassi 2000; Grewal et al. 2004; Lumpkin & Dess 2004; Lumpkin et al. 2002; Wrigley & Currah 2006)

## **2.4 Information security and usage restriction**

From a corporations' perspective it is imperative to ensure that confidential information or trade secrets do not end up in the hands of their competition. Industrial espionage has been around as long as businesses have competed with each other over customers. However, information technology has made industrial espionage much more convenient than what it used to be. In the modern era

almost all critical information on a company's processes, innovations and customers is stored on a server somewhere.

It is in every organizations best interest to ensure no unauthorized parties can gain access to their confidential information. In the unfortunate event of a security breach, almost all critical information can be transferred to a something as small as a USB drive or with modern connection speeds downloaded in minutes to a remote location. If confidential information leaves a company's secure servers, it can be sent anywhere around the world and end up in the hands of the competition or malicious hackers. Given that issues of privacy and security are a paramount concern in the e-tailing environment and transactions take place over public domain, such threats mean that companies have to build a robust security network both in their information technology network and the physical location of their servers. (Grewal et al. 2004; Javalgi et al. 2004; Villeneuve 2006)

Internet censorship is a threat companies need to take into account when planning their online strategy. The fast access to abundant information has resulted in more informed consumers and diminishing switching costs while at the same time streamlining all the processes throughout the entire retail chain. While the promise of abundant, unfiltered information and removal of conventional boundaries for distribution of information and digital media is most often greeted with joy and enthusiasm by individuals, governments are not always that keen on unrestricted information flow. Corporate interests on limiting information flow are usually limited in scope and motivated by security concerns. Information flow limitations by governments on the other hand can have effects with a much more wide reach. (Lumpkin & Dess 2004; Lumpkin et al. 2002; Reynolds 2002; Villeneuve 2006)

Nation states are adopting practices that aim to control and regulate the Internet as it passes through their borders. There are many reasons for doing this and these reasons vary from relatively justifiable ones to plain oppression of civic rights. Nations aim to force the Internet to adhere to local legislation and attempt to combat illegal actions such as intellectual property theft and cyber-terrorism. The problem with these controls is that while they are justified and only aimed at upholding adherence to international and local legislation, the Internet does not

follow geographical borders and all the tools used are reactive rather than proactive. (Villeneuve 2006)

One of the risks stemming from attempts at controlling the Internet is that once a national filtering system is in place, governments may be tempted to use this system as a technological solution to problems rooted in much larger social and political issues. In these modern times even most of the developing nations have managed to overcome the challenges of establishing a basic information technology and Internet infrastructure, but issues over usage restrictions are still commonplace. This moral hazard is always present because the blocking and filtering systems used to oppress civic rights and limit the operating possibilities of Internet businesses are the exact same systems that are used for the more justifiable kind of policing of the Internet. (Molla & Licker 2005; Villeneuve 2006)

In addition to the previously discussed moral hazard, filtering and blocking as tools of Internet regulation have other problems. Of special importance to businesses seeking to broaden their customer base to international markets via the Internet is the inherent tendency to either over- or under-blocking by filtering mechanisms. The problem with this technology is that it relies on filtering and blocking content based on a given criteria such as certain IP addresses or keywords. The Internet, however, is not that simple. Under-blocking is not a concern for companies, but over-blocking can be. These systems rely on block lists that are maintained with varying degrees of proficiency and speed. The problem with blocking IP addresses is that blocking one address or address tree in an attempt to block one site or service can lead to the inadvertent blocking of several other sites and services. An example of IP address blocking gone badly wrong can be taken from South-Korea where in an attempt to block 31 Web sites the local Internet service providers accidentally blocked 3167 unrelated domain names hosted on the same servers. Differing local filtering and blocking mechanisms are definitely something companies need to pay attention to when seeking to expand to new markets via the Internet. (Villeneuve 2006)

In the beginning of this chapter we touched briefly on the subject of security of transactions on the Internet. In addition to transaction in the e-tailing environment



being carried over public domain and the issues of encryption and network security this raises, another problem is that the separation of payment and delivery makes transactions among geographically distant strangers inherently risky. In e-tailing this risk is more prominent due to the inherent lack of interpersonal relationships and the resulting trust formed during the transaction combined with the facts that separation of payment and delivery is more common among e-tailers, especially Internet auction services, than brick-and-mortar retailers and that the terms of delivery often require payment in advance. (Grewal et al. 2004; You et al. 2011)

In an attempt to counter the problems resulting from these risks during the transactions, reputation systems have been used by e-tailers to instill trust into the consumers. Despite the widespread use of online reputation systems You et al. (2011) found that a significant amount of online fraud continues to be reported. In 2009 non-delivered merchandise or payment and auction fraud accounted for 30,2 percent of the consumer complaints regarding Internet crime. In China online auction frauds represented 23 percent of consumer complaints. Numbers this large point to weaknesses in the current reputation systems. This failure of current systems to effectively eliminate online fraud makes it harder for new and unknown entrants to gain a solid place in the online marketplace. Established players in the e-tailing environment can leverage all the benefits of the e-tailing business model, but can charge higher prices than the new entrants due to consumers being willing to pay extra for the added security that dealing with an established and reputable entity provides them. On the other hand, if the established players choose to price their products on the same level as the new entrants, then the consumers have no incentive to take on the added risk of dealing with an unknown operator. (Hart et al. 2000; Lee et al. 2003; You et al. 2011)

To counter the problems of the existing reputation systems, steps can be taken in the design process to ensure that the risk of online fraud is minimized. The easiest way to increase the effectiveness of any reputation system is to raise the cost of entry. Requiring identification information which links the real world identity with the virtual one raises the cost of setting up a new account and increases the trustworthiness of sellers. While this may drive away some potential users, more

in-depth requirements of registration and authorization have been increasingly accepted as a necessary cost of maintaining a well mannered and trustworthy online community. Other ways of increasing the effectiveness of these systems are raising the cost of the reputation score by factoring in variables such as decay over time and raising the cost of risk by imposing more severe punishments on those who are caught gaming the system. (You et al. 2011)

### **3 Statistical analysis**

This part of the thesis presents the findings of the conducted statistical analysis after elaborating on the reasons for using the chosen financial indicators and the process of choosing and filtering the data.

#### **3.1 Statistical analysis tools**

Before introducing the financial indicators and data used in the study, we will briefly touch upon the statistical analysis tools used in this portion of the study. At this time we will only briefly introduce the different statistical tests we will be using. To keep the structure of this study as clear as possible, more detailed explanations on the analysis tools are given before introducing the results of each test.

After introducing the financial indicators chosen to represent company performance and explaining the process of collecting and filtering the studied data, we will subject the dataset to the following statistical tests. Firstly we will use the f-test to analyze the differences in variance between the industry branches for the chosen financial indicators. This allows us to determine if the differences between industry branches are statistically significant.

Following the analysis of variance, a series of correlation analyses will be run on all the subsets of the data in an attempt to find the financial indicators which affect the profitability of the companies the most. The results of these correlation analyses will be used as a basis when deciding which financial indicators should be included in the last part of the statistical analysis.

After the results of the correlation analyses have been interpreted and the financial indicators with the highest correlation to profitability have been identified, these indicators will be used as explaining variables in a linear regression model which attempts to explain the differences in profitability based on other financial indicators. The determinants of profitability, which will be introduced next, will naturally be excluded from this regression model.

### 3.2 Financial indicators

Because the sample data is collected from companies all over Europe and the differing jurisdictions result in differing taxation and interest policies and the study attempts to find if there are differences between the operational profitability of online- and offline retailing, earnings before interest and taxes was chosen as a measure of profit. Earnings before interest, taxes, depreciation and amortizations was considered as an alternative, but was rejected as a result of it removing too much information from the profits. Earnings before interest and taxes, hereafter referred to as EBIT, eliminates the differences between taxation and interest rates across jurisdictions while still giving enough information about the companies' profit.

Return on assets is used as a measure of profitability because it is the best indicator of how efficiently the company manages to use its assets to generate profits and thus is the best indicator to answer our primary research question. How does the profitability of online retailers differ from the profitability of offline retailers. We calculate the return on assets, hereafter referred to as ROA, by dividing the company's EBIT by its total assets as shown in the formula below.

$$ROA = \frac{EBIT}{Total\ assets} \quad (1)$$

Total assets were chosen as the denominator in our ROA calculations because this study attempts to find differences in profitability that are rooted in the way online- and offline retailers operate. By using total assets in determining the ROA of a company we exclude the effects of differing capital structures between companies and concentrate on measuring the rate at which the companies use their assets to generate earnings.

### 3.3 Data collection and filtering

This study uses financial data over five years from 2008 to 2012 collected from the Amadeus database. The companies were chosen based on their branch of business defined by their NACE codes. The business branches chosen for the

study were retail sale of textiles and sporting equipment, retail sale of books, newspapers and stationary and retail sale via mail order houses or via the Internet. Book stores and clothing and sporting goods retailers were chosen to represent the brick-and-mortar retailers, because they serve markets where delivery times are not a critical factor in consumers' purchasing decisions and e-tailing has served these markets long enough for consumers to be used to e-tailing as a valid option. Online bookstores such as Amazon have been challenging the offline bookstores since the 1990s and even though online retailing of clothes and other textiles has begun to seriously challenge the offline operations only more recently, nowadays consumers are well aware of the online alternative.

These business branches are also well suited to pitting the two biggest strengths, location and visibility, of offline retailing against the two biggest strengths, convenience and low prices, of online retailing against each other. It is interesting to see if the high-street presence and brand recognition of offline bookstores and textile retailers results in higher profitability over the low cost and low price online competitors. By including both bookstores and textile retailer we also include the different offline store layouts in the study. While bookstores are usually arranged in a grid layout, textile retailers typically employ either a freeform or a racetrack layout. By dividing the offline retailers into two different groups, we have the possibility to compare bookstores that provide consumers with products of standardized format to textile retailers providing products of non-standardized format. This division allows us to examine if there are differences in how the nature of the product range affects the profitability of offline retailers compared to e-tailers. The examination of these kind of possible differences is exiting because based on the theory of previous literature, retailers offering products of non-standardized format should be better protected against online competition than those offering products of a standardized format.

The following NACE codes were used as search criteria in Amadeus to find companies representing the chosen industry branches. Code 4751 for retail sale of textiles in specialized stores, 4761 for retail sale of books in specialized stores, 4762 for retail sale of newspapers and stationary in specialized stores, 4764 for retail sale of sporting equipment in specialized stores and 4791 for retail sale via

mail order houses or via Internet. The data was further filtered based on the trade descriptions available from the database so that e-tailers could be separated from other types of mail order houses. In some cases where the trade description proved inadequate, a visit to the website of the company was needed to determine the nature of their business. After this first round of filtering the result was 740 companies.

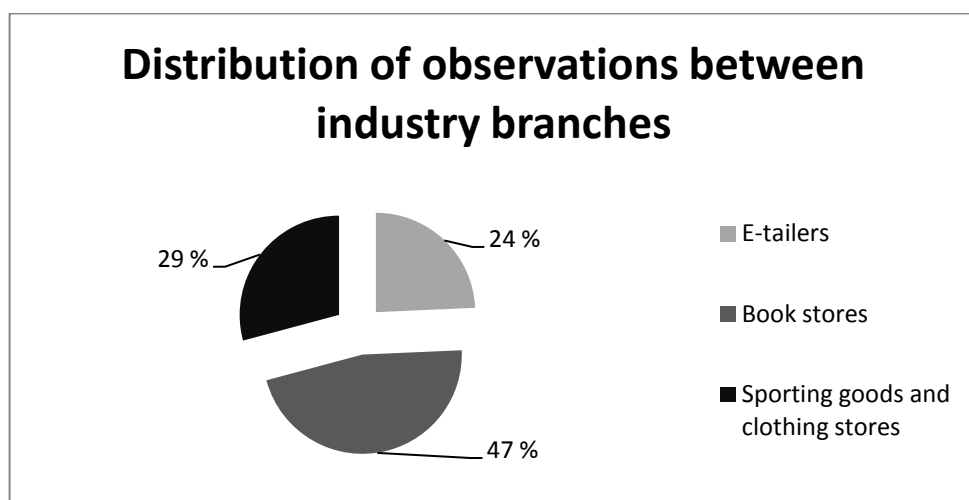
After removing companies with missing key financial details from the data set, the resulting 233 companies were divided in three categories and given an industry type code based on their NACE codes and trade descriptions. Group one includes all businesses that operate only online. Group two includes all companies involved in retailing books, newspapers and stationary. Group three includes the companies retailing sporting goods and clothing.

The data was sorted to three different categories rather than just e-tailers and brick-and-mortar retailers to allow us to divide the offline retailers in two subsets and make comparisons between not only online and offline retailing but also between offline retailers serving two different markets and providing consumer with products of different nature. Comparisons between the two different offline markets are important because they allow us to better understand if the benefits of online and offline retailing have different effects based on the goods that are sold. Due to the lack of detail in information provided by the NACE codes and trade descriptions, online retailers could not be divided into subsets and are therefore all classified simply as e-tailers.

The data set was adjusted for outlier variables in earnings and return on assets. This was achieved by calculating lower and upper quartiles for the variables, using these to calculate the inter quartile range and removing values that were either over the upper quartile or under the lower quartile by more than three times the inter quartile range. Further filtering of the data was deemed counterproductive as the diminishing number of observations would compromise the robustness of the data set in statistical analysis and this outweighed any benefits resulting from further filtering. After the removal of outliers the data set consisted of 145 different companies. 35 of these companies were classified as e-tailers, 67 as book stores

and 43 as clothing and sporting goods stores. The distribution of observations is represented in figure 2.

While the final data set of 145 companies represents only 20 percent of the original number of observations, it was deemed large enough for statistical analysis to be conducted and generalizations to be made based on the results. However, consideration must be used when interpreting the results of statistical analysis between subsets of the data.



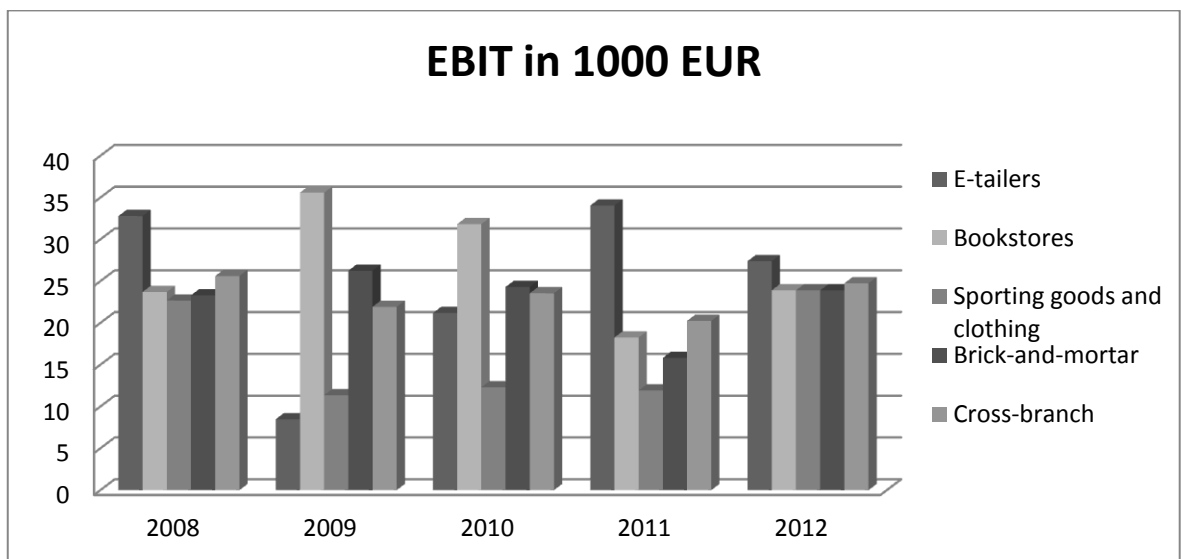
**Figure 2** Distribution of observations between industry branches

### 3.4 Description of key financials

Before embarking on the statistical analysis portion of this thesis, we will first examine how the financial performance of companies in different business branches compare to each other and averages across business branches. The purpose of this is to describe the differences in the financial indicators used in the statistical analysis and create a foundation from which to start answering the research questions of this thesis.

As previously stated, the data is gathered from five years starting from 2008 to 2012. A five year span is quite short for creating projections based on the data and therefore we concentrate on describing the behavior of the chosen financial indicators rather than making any projections as to future development. We also found that the year to year fluctuation on these indicators are fairly large and show no clear trends over the time span of this thesis. The years from 2008 to 2012

have been a time of worldwide economic uncertainty and Europe has been one of the regions where uncertainty has been very high. Economic downturns and uncertainty have a negative impact on consumer confidence and as all the companies in this study operate in a business to consumer market, offering goods the purchase of which people can postpone without sacrificing quality of life, we suggest that varying levels of consumer confidence are one of the factors explaining these fluctuations.

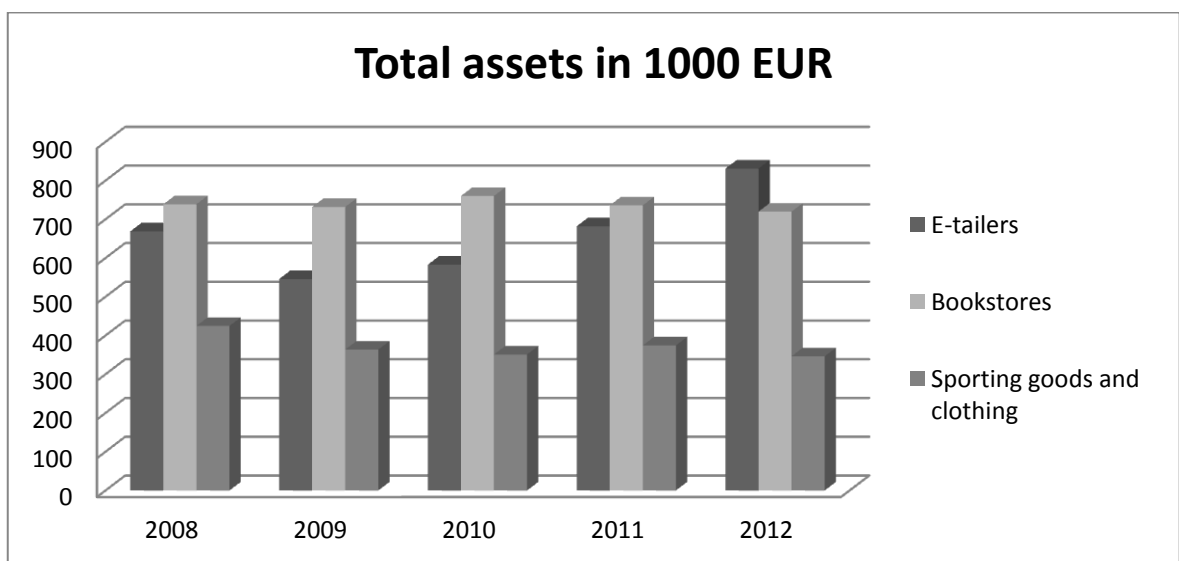


**Figure 3** Earnings before interest and taxes from 2008 to 2012

Figure 3 displays the development of EBIT in different business branches as well as the development of the cross-branch average. We can see that the fluctuation of average earnings is quite large across all branches but especially large for e-tailers. It is interesting to note that while 2009 saw earnings for e-tailers and sporting goods and clothing stores drop drastically, bookstores saw the highest earnings of the five year period in the same year and have since seen their earnings drop to almost half in 2011 before recovering again in 2012. At the same time e-tailers took the largest hit in 2009 but have since rebounded and passed the brick-and-mortar retailers. The recovery from the 2009 earnings drop for sporting goods and clothing retailers has been much slower before recovering to their 2008 levels in 2012. During our timeline e-tailers seem to have the highest earnings but also the largest fluctuations.



The total assets committed to businesses appear to be relatively stable over the time period of this study showing a decrease of seven percent over five years in brick-and-mortar retailers and an increase of 24 percent in internet retailers during the same time period. Figure 4 displays the year to year changes and shows that the percentages do not tell the whole story especially when it comes to e-tailers. The year to year fluctuations have been quite small and only year 2012 has seen a fairly large hike in total assets for internet retailers.

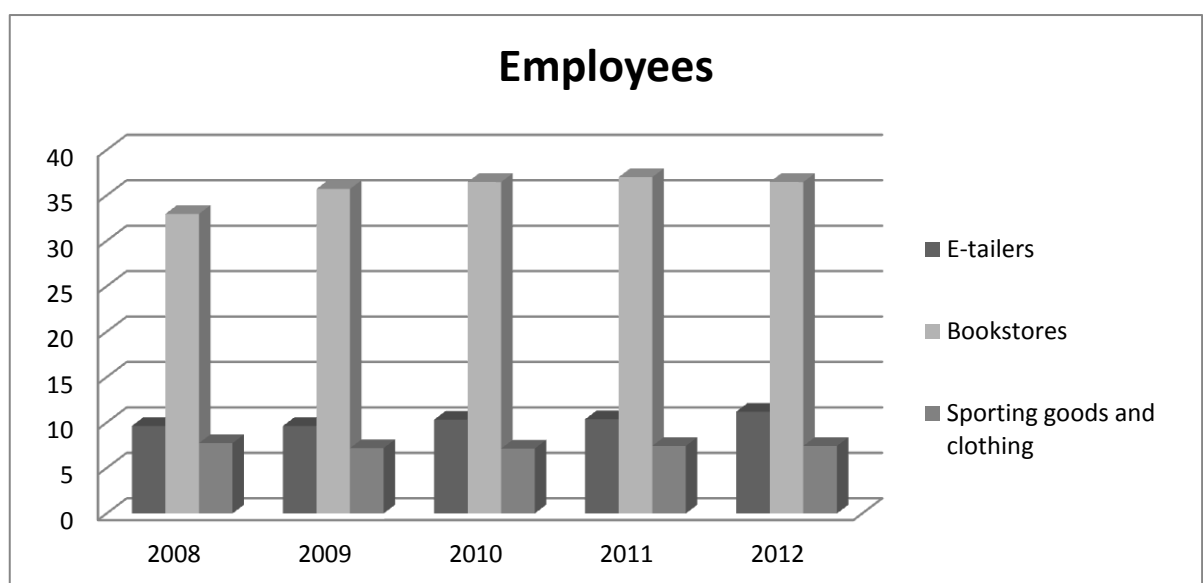


**Figure 4** Total assets from 2008 to 2012

While total assets for both bookstores and textile retailers have been steady, we can clearly see that the total assets for bookstores are much higher than they are for sporting goods and clothing retailers. This difference between the brick-and-mortar retailers offering different products would suggest that bookstores are on average larger businesses compared to textile retailers, but comparing the total assets to yearly earnings displayed in Figure 3 would also indicate that the retail of books is more resource intensive than the retail of clothes and sporting goods. The larger fluctuations in total assets displayed in internet retailers appear to follow the changes in earnings indicating that e-tailing offers better chances of adjusting the assets committed to business compared to offline retailing where assets committed the business are harder to adjust. This leads us to expect smaller fluctuations of return on assets for online retailers.

As was the case with total assets, the average number of people employed by the companies has remained steady from 2008 to 2012. The number of employees has remained the same for most of the years for both e-tailers and clothing and sporting goods retailers with the average only going up by one for e-tailers in 2012 and down by one for textile retailers in 2009. The same pattern holds true for bookstores apart from an increase of three in 2009. This is not surprising considering the average number of employees for sporting goods and clothing stores has been approximately seven and approximately ten for Internet retailers. Of the business branches bookstores have the highest average number of employees at approximately 36 employees in a company.

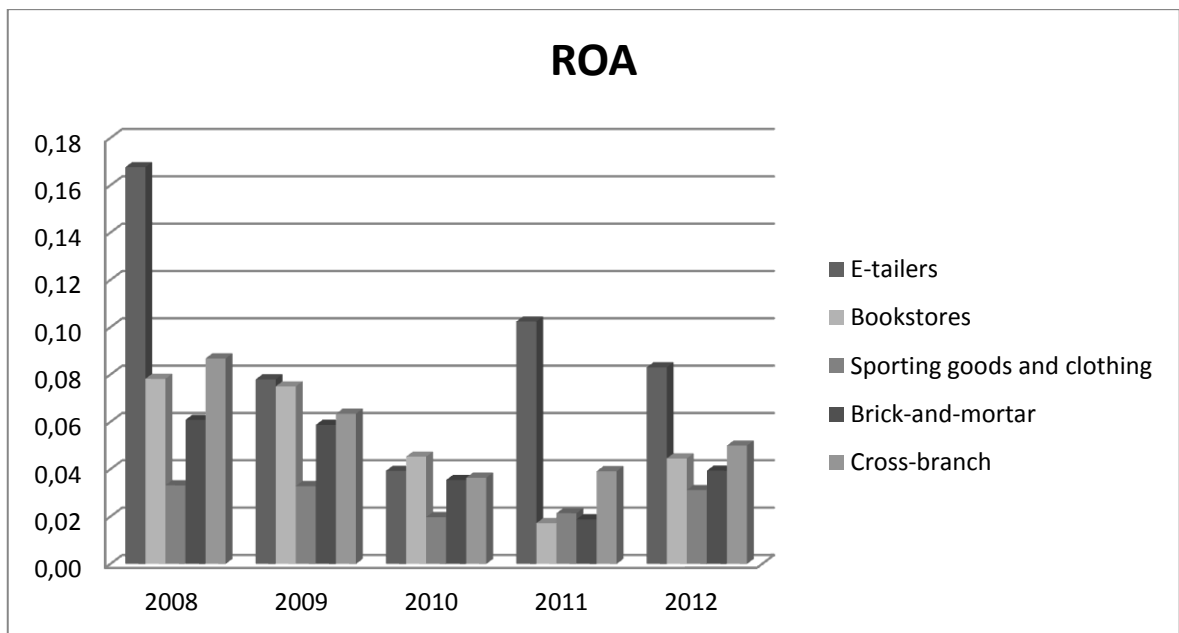
Comparing the average number of employees displayed in Figure 5 and the total assets committed to companies supports our previous notion of bookstores being on average larger companies and the textile retailers consisting of smaller operators. This comparison also points to e-tailing demanding much less workforce compared to operating a brick-and-mortar retail outlet. This discovery is not surprising at all considering the differences in these to business models that were elaborated on in the theoretical section of this paper. It does, however, show that the characteristics of the companies in the sample data are consistent with the theoretical basis of the study.



**Figure 5** Average number of employees from 2008 to 2012

Contrary to what was suggested previously, return on assets sees the largest fluctuations in e-tailers, showing that the largest changes in total assets fail to counteract the large fluctuations in earnings. E-tailers display the highest ROA every year apart from 2010 when bookstores had the highest ROA of all three branches. However, e-tailers outperform the cross-branch average even in 2010. Sporting goods and clothing stores display the smallest variations of ROA, but also consistently the lowest return on assets consistently performing under cross-branch average and outperforming the average ROA of brick-and-mortar retailers in 2011.

As seen in Figure 6 e-tailers saw their best ROA values in 2008, which were followed by much smaller values in 2009 and 2010 before jumping up again in 2011. Online retailers' apparent advantage in returns over their offline counterparts indicate that the previously discussed lower prices of online retailers are due to factors other than diminishing profitability and give further motivation to studying if these differences are statistically significant.



**Figure 6** Return on assets from 2008 to 2012

Perhaps somewhat surprisingly, bookstores consistently outperform textile-retailers in ROA measures suggesting that there are differences in the way these two branches of brick-and-mortar retailing operate. Employee numbers and total

assets suggested that the bookstores included in the sample data are on average larger than the sporting goods and clothing stores. This difference must be kept in mind while attempting to explain the differences in ROA as it is possible that the larger bookstores are able to leverage benefits of scale over the smaller textile retailers. The statistical section of the study will attempt to find answers as to the significance of company size in determining returns for brick-and-mortar retailers. Profit margins and stock turnover rates between different product selections are also likely explanations for the differences in ROA, but determining the influence of these factors is outside the scope of this research. For the purposes of the following statistical analysis of the sample data it is important to make note of these differences between brick-and-mortar retailers offering differing products.

In summary the sample data consist of 145 different companies across three industry branches. The companies range from small one person businesses to medium sized businesses employing over 200 people, but the bulk of the companies employ 20 to 50 people. There appear to be significant differences in earnings, total assets and ROA between the industry branches with e-tailers outperforming others in return on assets. These differences warrant the attempt to determine if these differences are statistically significant and what are the major factors contributing to these differences.

### **3.5 Analysis of variance**

In the previous section we determined that there are differences in the key financial indicators between the three industry branches we have chosen for this study. In this part of the paper we attempt to determine if these observed differences are statistically significant.

In an attempt to determine whether the observed differences between the return on assets values between the different business branches were statistically significant, the data was divided in three groups based on the industry types they were previously classified in and the f-test was used to determine if the variances of these different data sets were the same. The null hypothesis for this test was that the variances of ROA in all classes were the same.

After the division of the data, four different f-tests were run on the data. Firstly the ROA values of e-tailers were compared to all the offline retailers to determine if the differences displayed in Figure 6 between e-tailers and brick-and-mortar retailers were statistically significant. After this f-tests were run on different subsets of the data. The second test compared the ROA values of e-tailers to those of bookstores, the third test compared e-tailers against sporting goods and clothing stores. The fourth test was run on the data of brick-and-mortar retailers comparing bookstores to sporting goods and clothing stores. The f-tests were run on these subsets in addition to comparing just online- and offline retailers because in studying business performance based on return on assets, the differences found between the ROA values of brick-and-mortar retailers selling different goods were large enough to warrant further study comparing the branches. One of the research questions of this study was if there are statistically significant differences between online- and offline retailers. To accurately answer this question, it was pertinent to determine if the differences between these two sectors held true across all subsets of the data or if they were true only for some of the subsets. When interpreting the results for these subsets, it must be taken into account that the diminishing sample size compromises the robustness of statistical tests based on them and the results are less reliable than the results from test where the entire data was used.

The results of the f-tests displayed in Table 3.1 lead us to reject the null hypothesis of the variances of ROA being equal in online- and offline retailers. The resulting p-value of 0,002 in comparing e-tailers to brick-and-mortar retailers means that the differences in mean values between these two groups are statistically significant at a 95 percent confidence interval. In Tables 3.1 and 3.2 the statistically significant values are marked by an asterisk preceding the numerical value.

When examining the f-test results between different subsets of the data, it is notable that the differences in mean values are statistically significant for all subsets apart from e-tailers and sporting goods and clothing retailers. The results for comparisons of e-tailers and bookstores were as expected, but the test results between e-tailers and textile retailers were surprisingly not statistically significant.

It was also unexpected that there appears to be a statistically significant difference between the mean values of ROA for brick-and-mortar retailers offering different goods.

**Table 3.1** Results of f-test for ROA values

<b>F-test</b>	
<b>Online - Offline</b>	<b>*0,002223</b>
<b>E-tailers - Bookstores</b>	<b>*0,000108</b>
<b>E-tailers - Sporting goods and clothing</b>	<b>0,142537</b>
<b>Bookstores - Sporting goods and clothing</b>	<b>*0,008073</b>

While the robustness of the test results for these subsets of the data is somewhat compromised by the smaller sample size, they still offer us some insight into the differing performances of all three business branches. It appears that the mean values of ROA for bookstores are significantly different to all others and sporting goods and clothing retailers perform closer to e-tailers than was expected. As a result, we can conclude that there are statistically significant differences between online and offline retailers, giving an answer to the primary research question of this study. While our primary research question has now been answered, the mixed results for the later f-tests emphasize the importance of answering the secondary research question of our study. Do these differences point to a competitive advantage stemming from internet retailing as a business model.

Because we rejected the null hypothesis of equal variances of ROA between e-tailers and brick-and-mortar retailers, but did not reject it for the variances of online and textile retailers, it is important to find the key factors in the businesses that influence the ROA values. Only through these factors we can determine if the differences in profitability are due to quantifiable advantages in online retailing as a business model or if they are due to differing product selections across our sample group.

After analyzing the variances of ROA between the industry branches, the next step was to analyze the differences in the two determinants of ROA. Further f-tests

were run on the EBIT and total asset values. The division of data for the tests run on EBIT remained the same as in the ROA tests. First e-tailers were compared to brick-and-mortar retailers and after that the subsets of data were compared to each other. The purpose of examining the EBIT and total asset values was to find if the two determinants of ROA exhibit similar differences to our previous tests. If statistically significant differences are found in these values, it gives us further information on whether the profitability differences are driven by earnings or assets. If no significant differences are found in these values, it points towards a unique combination of the two influencing the higher ROA values in e-tailers and leads to searching for the explanation from other financial indicators.

When examining the f-test results for EBIT we found that there is a statistically significant difference in earnings between online and offline retailers. The p-value of 0,003 leads us to reject the null hypothesis of variance between the groups being equal. Comparisons between subsets of the data gave similar results to the previous ROA tests. Table 3.2 displays the p-values for all the tests and from these values we can see that the differences between e-tailers and bookstores are statistically significant and lead us to reject the null hypothesis. The f-test indicates that the differences in earnings between e-tailers and textile retailers are not statistically significant. Once again there appears to be a statistically significant difference between the values for bookstores and sporting goods and clothing stores.

After this the f-test was run on the total assets values between e-tailers and brick-and-mortar retailers. The resulting p-value of 0,39 leads us to conclude that the null hypothesis of similar variances between these two data sets holds true and there are no statistically significant differences between them. Further f-tests for subsets of the sample data were once again run and they indicated statistically significant differences between all subsets. However the value of these findings for this study were deemed negligible. Differing asset values between companies with different product selections was not a surprising result and as divisions based on product selection in the sample data can only be made between brick-and-mortar retailers, comparisons like this hold little value apart from confirming the obvious differences between different offline retailers.

**Table 3.2** Results of f-test for EBIT values

<b>F-test</b>	
<b>Online - Offline</b>	<b>*0,003438</b>
<b>E-tailers - Bookstores</b>	<b>*0,00021</b>
<b>E-tailers - Sporting goods and clothing</b>	<b>0,476728</b>
<b>Bookstores - Sporting goods and clothing</b>	<b>*0,001554</b>

The results of the conducted f-tests expand our understanding of the differences that were found in studying the key financial indicators between the business branches in the sample group. As a result we can now state that the differences in ROA and EBIT values are statistically significant at a 95 percent confidence interval. The primary research question of the study was answered by the results and further emphasis was bestowed on the secondary research question. The statistically significant differences in EBIT values give us some explanation as to the reasons behind the differing ROA values.

After answering the primary research question and determining the statistical significance in the differences of the key determinants of profitability the focus of this study now shifts to finding other explanatory factors from the financial information of the companies. The next part of the study will attempt to elaborate on these determinants by analyzing correlations between other financial indicators and ROA.

### **3.6 Correlation analysis of determinants of profitability**

Previous parts of this study have elaborated on the differences in key financials found between the chosen industry branches in the sample data. Analyzing the variances of these financial indicators led us to conclude that the observed differences were statistically significant. This part of the research attempts to find explanations for these differences by analyzing the correlations between the previously described financial indicators and other financial information.

We begin by comparing the correlations of EBIT and total assets with return on assets in the entire sample data and then in all the subsets individually. While it



may seem redundant to study the correlations of the numerator and denominator of the ROA formula with the end value, it does offer some information about the weight of each factor to the end result. The primary aim of these correlation tests is to determine whether there are differences in correlations between the subsets. While making assumptions based on the findings of these tests, it must be kept in mind that the sample sizes in the subsets are rather small and this does compromise the robustness of the results. We determined that despite this, the information would be helpful in answering our secondary research question and thus running these tests benefits the research despite the problems.

When studying the correlation of EBIT with ROA, as was expected, we found a significant positive correlation between these two financial indicators. The correlation coefficient for the entire data was 0,49. The deviations from this correlation coefficient by the correlation coefficients of the subsets were not large. It appears that sporting goods and clothing stores have the most significant correlation between EBIT and ROA at 0,54. E-tailers displayed the smallest correlation coefficient at 0,45 with bookstores falling in the middle at 0,51. When comparing the correlations for all brick-and-mortar retailers, the coefficient was 0,52. The results of the correlation analysis are displayed in Table 3.3. In addition to analyzing the correlations for the entire five year span, the analysis was also done for each year individually to determine how the variations of EBIT across the years affect the correlation coefficients.

The observed variations in correlation coefficients between the years were relatively small for all observations apart from e-tailers. The correlation coefficient of only 0,14 in year 2008 for e-tailers deviated significantly from other results suggesting that 2008 saw some other significant factor affecting the ROA of online retailers. This is also the year when the ROA value for e-tailers achieved its peak. The other high ROA years were 2011 and 2012. In all these years e-tailers enjoyed high EBIT values and high ROA values, yet the correlation coefficients between EBIT and ROA for these years are the smallest suggesting that other factors apart from increasing earnings played an important role in the profitability of internet retailers during these years.

**Table 3.3** Correlation analysis - EBIT and ROA

<b>Correlation analysis EBIT - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	0,36	0,54	0,57	0,53	0,52	0,49
<b>E-tailers</b>	0,14	0,62	0,66	0,46	0,46	0,45
<b>Bookstores</b>	0,43	0,47	0,56	0,60	0,51	0,51
<b>Sporting goods and clothing</b>	0,48	0,64	0,52	0,54	0,62	0,54
<b>Brick-and-mortar</b>	0,45	0,54	0,55	0,53	0,54	0,52

The correlation coefficients for brick-and-mortar retailers remained relatively steady through the entire time period with only the year 2008 deviating from the five year average by more than 0,02. The correlation coefficients for 2008 appear to be the smallest of any year for all the companies but the differences for brick-and-mortar retailers are much smaller than they were for e-tailers. This common trend across all subsets of data leads us to question if there was something special about the year 2008. As was previously pointed out, the global financial crisis could be one of the key forces outside the companies affecting their financial indicators. This would explain to some degree why observations from 2008 differ so largely from the observations of from the rest of the time period.

The analysis of the correlations between EBIT and ROA point to a difference in how earnings affect the return on assets of online and offline retailers. While there are small differences in correlation coefficients between bookstores and textile retailers, these differences are much smaller compared to the differences displayed by e-tailers. As a result we can conclude that the earnings of the companies have a more significant impact on the profitability in offline retailing than they have in online retailing.

The next step of the study was to compare the correlation between total assets and ROA. The correlation coefficients were again calculated for all the observations in the data and after that individually for each industry branch and each year. When studying the results for all observations, we found a very low negative correlation coefficient of -0,06 across the five year period. Year 2008 was once again significantly different compared to the rest of the years. The correlation

coefficient for all the observations in 2008 was -0,13, which differs significantly from the five year average and all other years of the time period with the next greatest value being -0,08 in 2009 and the other values being between 0,01 and -0,04.

There was a noticeable difference in the correlations between total assets and ROA for e-tailers and brick-and-mortar retailers. Over five years the correlation coefficient of these values for internet retailers was -0,17 while it was only -0,02 for offline retailers. The correlation coefficients for bookstores and textile retailers individually were slightly higher at -0,06 and 0,08 respectively. What was surprising about these results was that the correlation coefficient for sporting goods and clothing stores was positive rather than negative. It seems at the very least counterintuitive that the denominator of the formula would have a positive correlation with the end value, however small that correlation is.

When examining the correlation coefficients displayed in Table 3.4 for individual business branches on specific years, we find that the previously mentioned difference between the year 2008 and other years are very large for e-tailers and bookstores whereas the value for textile retailers is in line with observations from other years. The correlation coefficients for sporting goods and clothing stores are so small that this probably explains to some degree why the deviation of the 2008 value is as small for them as it is. In addition to having the highest correlation coefficients, e-tailers also display the largest variations of the values across the years with the highest coefficient being -0,32 for 2008 and the lowest -0,01 for 2010. There appears to be a significant negative correlation between the total assets and ROA of e-tailers. The correlation coefficients for textile retailers for most years and across all five years are small enough to be called negligible. The same is true for bookstore despite both categories displaying one relatively high coefficient value for one of the years.

As a result of these correlation analyses we can see that earnings play a larger role in the changes of ROA values for offline retailers than they do for online retailers and at the same time total assets appear to have a larger effect on the return on assets of e-tailers than brick-and-mortar retailers. These differences

suggest that the ways in which the profitability of online and offline retailers are comprised from the determinants are different with earnings being the key determinant for offline retailers and changes in total assets being fairly insignificant. While earnings play a large role in determining the profitability of online retailers, changes in total assets are also a significant factor in determining ROA for them.

**Table 3.4** Correlation analysis - total assets and ROA

<b>Correlation analysis total assets - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	-0,14	-0,08	0,01	-0,02	-0,04	-0,06
<b>E-tailers</b>	-0,32	-0,18	-0,01	-0,20	-0,15	-0,17
<b>Bookstores</b>	-0,16	-0,10	-0,01	0,03	-0,05	-0,06
<b>Sporting goods and clothing</b>	0,09	-0,01	0,10	0,04	0,17	0,08
<b>Brick-and-mortar</b>	-0,08	-0,05	0,02	0,03	0,01	-0,02

When we remember the fluctuations of total assets displayed in Figure 4, this is not a surprising result. The total assets for brick-and-mortar retailers have remained stable over the time period of the study whereas e-tailers displayed larger fluctuations in asset values. When this difference was first noticed, it was noted that these fluctuations could be indicative of differences in how online and offline businesses are structured and these fluctuations suggest that the asset structure of online retailers is less rigid and can be more readily adjusted based on the current situation of the markets. We postulate that one of the more significant factors in the rigidity of brick-and-mortar retailers' asset structure is the need for physical retail locations. If brick-and-mortar retailers own their business premises, it is either impossible or very hard to adjust the property values on their balance sheet. Even companies that operate in rental premises have fixed real estate expenses, whether they are entered in expenses, assets or some combination thereof. Conversely e-tailers are not depended on physical retail locations, thus decreasing the real estate burden on their balance sheet and facilitating a less rigid asset structure.

Having determined that there are differences in how the determinants of profitability affect the end value between the business branches and postulating some possible explanations for these differences, we shall next attempt to find explanations for the differing profitability from other financial indicators. We shall also attempt to find evidence either supporting or rejecting the postulations made about the differing asset structures.

### **3.7 Correlation analysis of other financials**

Having previously determined the statistical differences between key financial indicators and established the differing effects of the determinants of profitability in the sample groups, we now move on to analyzing the correlations between other financial indicators and profitability in an attempt to find explanations for the differences.

When attempting to explain the differences in profitability between online and offline retailing, the natural starting place is the number of employees. By studying the correlations between the number of employees and return on assets for all observations and different subsets of the data, it is possible to determine if the number of employees has an effect on company profitability and if there are differences in these effects between business branches. The number of employees is a natural starting place, because it best describes the differences in the characteristics of e-tailing and brick-and-mortar retailing. Physical sales locations require sales personnel to be present for transactions to be made whereas the defining characteristic of e-tailing is the lack of sales personnel. The interesting question here is whether the number of employees displays a positive or a negative correlation for all observations and subsequently if there are differences in the direction of correlation between online and offline retailers.

The most important result from these test is the direction of the correlation rather than the value of the correlation coefficient itself. We don't expect to find large correlation coefficients for any of the datasets. While larger companies employing more people could benefit from their scale compared to their smaller counterparts, the number of employees is not expected to explain a large portion of the

variations in profitability. If the correlation coefficients are positive, this can be interpreted as a sign of the benefits of scale playing a role in the profitability of retailers. On the other hand negative correlation coefficients would indicate inefficiencies in larger retail organizations that outweigh any benefits received from larger volumes. E-tailers of course are a bit more complex a group to analyze in this context due to the number of employees being less related to actual size of the organization.

The correlation analysis was carried out in the same formula as was previously done with EBIT and total assets. Correlation coefficients were calculated for all observations over five years and for each year individually. After this all the subsets of the data were treated in similar fashion. The analysis ended with mixed results as can be seen in Table 3.5. Interpreting these results is complicated by the fact that the correlation coefficients are very small and seem to explain very little of the variations in profitability. As was previously stated, the primary offering of these tests is the direction of the correlation rather than the actual coefficient, but in some if the coefficients appear too small to be taken into account at all.

**Table 3.5** Correlation analysis - the number of employees and ROA

<b>Correlation analysis employees - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	-0,04	0,07	0,12	0,02	0,03	0,04
<b>E-tailers</b>	-0,25	-0,14	0,02	-0,18	-0,05	-0,12
<b>Bookstores</b>	0,00	0,12	0,14	0,13	0,08	0,09
<b>Sporting goods and clothing</b>	-0,08	-0,08	0,24	0,20	-0,04	0,04
<b>Brick-and-mortar</b>	0,04	0,13	0,15	0,09	0,06	0,09

When studying the correlation coefficients for all the observations in the data, there appears to be a positive correlation between the number of employees and profitability. However, the correlation coefficients for the five year time span and all years individually, apart from 2010, appear so small as to be insignificant. From these numbers we can draw the conclusion that across the industry branches the number of employees appears to have no significant explanatory power as to the profitability of the companies.

These results would indicate that benefits of scale, when number of employees is used as a measure of scale, do not significantly increase the profitability of retailers. However, further study of the correlations between employee numbers and profitability for all industry branches individually reveals more about the effects of employee numbers and suggest that they might explain some of the profitability variations after all.

The correlation coefficients for e-tailers have the highest values of all the industry branches and a bit surprisingly display a negative correlation between the number of employees and ROA. The negative correlation between these values for e-tailers could be indicative of two things. Either the smaller and more specified internet retailers manage higher profitability by concentrating on niche markets and restricted product offerings. Some of the previous literature on the subject suggested that this might be true, but the result was still unexpected as benefits of scale were expected to provide large advantages in the logistical chain of internet retailing. The other explanation for this negative correlation would be that the number of employees is a very poor indicator of scale for e-tailers. While larger operations do need always need increasing amounts of labor, it is possible that the relationship between the size of an internet retail operation and the amount of man-hours required is much less linear than with traditional retail channels.

Bookstores display a positive correlation between the number of employees and ROA with correlation coefficients ranging from 0 to 0,14 and reaching a value of 0,09 for the entire five year time span. These results would suggest that of all the industry branches bookstores have the largest gains from benefits of scale. This result was to be expected as the number of employees is a good indicator of scale for bookstores and the sales of standardized products offer more benefits in large scale purchases and centralized stock management.

The correlation coefficients for sporting goods and clothing stores display great variation and even the direction of the correlation changes between different years of the observation time period. The correlation coefficient for the entire five year span at 0,04 matches that of all business branches and can be interpreted as insignificant. This interpretation is further supported by the changes in the direction

of correlation between different years. As a result we can conclude that the number of employees does not hold any significant explanatory power over the profitability of textile retailers.

When analyzing the correlation coefficients of all brick-and-mortar retailers, we found that there was a positive correlation between the values during the entire time period and every year individually. The correlation coefficients range from 0,04 to 0,15 and despite our previous conclusion of non significant effects of employee numbers on the profitability of textile retailers, we are inclined to conclude that for brick-and-mortar retailers as a whole, the number of employees is an explanatory factor of the differences in profitability.

All the correlation coefficients of these tests were quite small and are definitely not the primary explaining factors of the differences in profitability, but they do offer us some insight into the differences between the two business models. In traditional brick-and-mortar retailing investing in more workforce appears to offer results even in the form of slightly increasing profitability whereas expanding the workforce for internet retailers appears to decrease profitability and investments into expansion are better spent in other areas.

Having analyzed the correlations between employee numbers and profitability without finding significant coefficients we turn our attention to other financial indicators starting with fixed assets. We analyzed the correlation between tangible fixed assets and return on assets to find out how long term fixed investments correlate with profitability. Tangible fixed assets were considered a good indicator of the resource intensiveness and scale of the companies as different stock circulation times between retailers or other variable assets would not affect these numbers.

As can be seen in Table 3.6, the correlation coefficients for both e-tailers and brick-and-mortar retailers were negative. The numbers for bookstores and e-tailers appear to be fairly similar whereas sporting goods and clothing stores display a positive correlation between fixed assets and ROA. These results suggest that textile retailers are the only group of businesses in the sample data that display increasing profitability with increasing fixed assets. These results are in line with



our previous results from correlation analysis between total assets and ROA. However the differences between the correlation coefficients of different business branches appear to be smaller for fixed assets than they were for total assets but the only notable difference is the drop from -0,17 to -0,10 for e-tailers. The correlation coefficients displayed fairly large fluctuations throughout the years with the year 2008 once again appearing to differ the most from the average. For e-tailers the analysis displays consistent negative coefficients even if the values do fluctuate from year to year. From the values we can see that fixed assets do explain some of the variation in ROA for e-tailers, but the coefficients of approximately -0,10 are considered weak and the coefficient of -0,02 for brick-and-mortar retailers insignificant.

**Table 3.6** Correlation analysis - tangible fixed assets and ROA

<b>Correlation tangible fixed assets - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	-0,14	-0,09	0,01	-0,01	-0,02	-0,05
<b>E-tailers</b>	-0,20	-0,11	-0,01	-0,11	-0,08	-0,10
<b>Bookstores</b>	-0,22	-0,15	-0,03	0,05	-0,01	-0,07
<b>Sporting goods and clothing</b>	0,06	-0,03	0,10	0,03	0,02	0,03
<b>Brick-and-mortar</b>	-0,10	-0,08	0,02	0,04	0,01	-0,02

As a result of the correlation analysis between fixed assets and return on assets, we can conclude that fixed assets do not display significant correlation with ROA for brick-and-mortar retailers and only weak negative correlation for e-tailers. Removing current assets did not appear to significantly increase or decrease the correlation for offline retailers, but the correlation coefficient drop for e-tailers would suggest that including current assets does strengthen the negative correlation between assets and profitability.

After finding the correlation coefficients between fixed assets and ROA mostly negligible, the next step was to analyze the correlation between current assets and return on assets. Current assets were chosen as an indicator of the company's liquidity. The reasoning behind using liquid assets to explain overall profitability was that a company that is able to effectively turn their stock into cash inflows could display greater profitability. The pitfall of using liquid assets to explain

profitability in retail environment is that most of the stock would be classified in this category and the stock turnover does not get included in the numbers.

As we can see in Table 3.7, the correlation coefficients are once again very small and only e-tailers display a correlation coefficient large enough to be notable. Surprisingly the correlation between current assets and ROA for e-tailers appears to be negative. This was an unexpected finding and goes against the reasoning that increasing liquid assets would increase profitability. It appears that decreasing liquid assets are an indicator of increasing profitability for e-tailers. Possibly suggesting that small liquid assets are a sign of efficient stock management. Only sporting goods and clothing stores display a positive correlation coefficient between current asset and ROA, but at 0,08 the value is almost too small to take into account.

**Table 3.7** Correlation analysis - current assets and ROA

<b>Correlation current assets - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	-0,11	-0,06	0,02	-0,01	-0,03	-0,04
<b>E-tailers</b>	-0,27	-0,23	0,02	-0,13	-0,11	-0,12
<b>Bookstores</b>	-0,13	-0,07	-0,01	0,02	-0,06	-0,05
<b>Sporting goods and clothing</b>	0,09	0,01	0,09	0,04	0,18	0,08
<b>Brick-and-mortar</b>	-0,06	-0,04	0,02	0,02	0,01	-0,01

The correlation coefficients for all the business branches combined, brick-and-mortar retailers and bookstores were negative and too small to be considered significant. While the coefficients were too small to be considered significant, we can still draw some conclusions from the numbers. It appears that when it comes to the ties between liquid assets and profitability, the product range plays a more significant role than operating online or offline. It seems that for bookstores and e-tailers decreasing liquid assets increase profitability while for textile retailers increasing liquid assets increase profitability. One possible explanation for these differences is the seasonal nature of sporting goods and clothing retailing. Sporting goods and clothing tend to be season specific and if retailers are forced to carry a larger portion of the seasons entire product selection in their stock at any given time.

Studying the correlation between current assets and ROA gave rise to some new questions. If liquid assets display negative correlation with profitability for bookstores and e-tailers but positive correlation coefficients for textile retailers, how does taking into account the current liabilities affect the coefficients. To determine if including current liabilities into the analysis has an effect on the correlation coefficients, the same correlation analysis was run between net working capital and return on assets.

Table 3.8 shows the results for this correlation analysis and we can see that there is indeed quite a significant difference in the correlation coefficients between working capital and ROA and current assets and return on assets. We can see that the correlation between working capital and ROA is positive for all subsets of the data over the five year time span.

It appears that there is a weak but significant positive correlation between the working capital and return on assets for sporting goods and clothing retailers. Over five years the correlation coefficient settled at 0,12 peaking at 0,23 in 2012 and at 0,22 in 2008. These higher values were contrasted by the insignificant values of 2009 and 2011. The correlation coefficients for bookstores were significantly smaller at 0,06 over five years and peaking at 0,13 in 2008.

**Table 3.8** Correlation analysis - working capital and ROA

<b>Correlation working capital - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	0,07	0,03	0,08	0,03	0,02	0,04
<b>E-tailers</b>	0,09	0,07	0,09	0,02	-0,03	0,02
<b>Bookstores</b>	0,13	0,05	0,09	0,08	-0,05	0,06
<b>Sporting goods and clothing</b>	0,22	0,02	0,13	0,00	0,23	0,12
<b>Brick-and-mortar</b>	0,13	0,03	0,08	0,05	0,06	0,07

For e-tailers it seems that the correlation between working capital and return on assets is not significant with the correlation coefficient being only 0,02 over the time frame of the study and only reaching a peak value of 0,09 in 2008 and 2010. The correlation coefficients for brick-and-mortar retailers fluctuated less than for any individual industry branch with a value of 0,07 over five years and a highest

value of 0,13 in 2008. Based on these numbers we can determine that short term liquidity and cash reserves are more important for brick-and-mortar retailers than they are for e-tailers.

After concentrating on short term liquidity and finding differences between business branches but no strongly correlating metrics, it is interesting to move on to more long term metrics to determine whether these could give us better insight into the determinants of the differences in profitability between e-tailers and retailers. Shareholder's funds was chosen for this purpose in the hope that, being a measure of shareholder's investments and retained earnings, it would be an indicator of the companies' long term financial position.

**Table 3.9** Correlation analysis - shareholder's funds and ROA

<b>Correlation shareholder's funds - ROA</b>						
	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>5 yr.</b>
<b>All</b>	-0,04	-0,04	0,04	0,02	0,03	0,00
<b>E-tailers</b>	-0,15	-0,06	-0,01	-0,12	-0,08	-0,09
<b>Bookstores</b>	-0,07	-0,05	0,06	0,14	0,04	0,02
<b>Sporting goods and clothing</b>	0,28	-0,08	0,31	0,12	0,35	0,20
<b>Brick-and-mortar</b>	0,03	-0,01	0,11	0,11	0,10	0,07

As we can see from the results of the correlation analysis displayed in Table 3.9, the correlation coefficients display significant differences between the different business branches. When studying the results for e-tailers and brick-and-mortar retailers, we can see that the correlation coefficient between shareholder's funds and ROA for internet retailers is actually negative whereas the coefficient is positive for offline retailers. At -0,09 the correlation coefficient for e-tailers across the five year span is weak but worth noting. At 0,07 the coefficient for brick-and-mortar retailers is very weak, but the opposite direction of correlation compared to e-tailers makes this result noteworthy.

When the brick-and-mortar retailers are divided into bookstores and sporting goods and clothing stores, the numbers start getting more interesting. The correlation coefficient for textile retailers is 0,20 across five years peaking at the high value of 0,35 in 2012 and reaching 0,28 in 2008. In comparison it appears

that the correlation between shareholder's funds and ROA is not significant for bookstores with a value of only 0,02 over five years and fluctuations from negative to positive numbers between individual years. Based on these numbers it would seem that while for textile retailers larger shareholder investments and retained earnings display one of the strongest positive correlations with ROA encountered in this study, for bookstores the correlation between these variables is insignificant and for e-tailers the correlation is actually negative. These results suggest that there are significant differences in how the companies in these business branches treat their earnings. The positive correlation between ROA and shareholder's funds for clothing and sporting goods stores suggests that a large portion of the profits generated by the company are retained in the company and not invested or distributed to shareholders.

For e-tailers the opposite seems to be true and the most profitable companies either invest their earnings or distribute them to their shareholders. For bookstores there seems to be little to no difference in retaining or distributing their earnings between the more and less profitable companies. When interpreting these numbers it is important to remember that e-tailing as a business model is much younger than brick-and-mortar retailing and one contributing factor to the negative correlation between profitability and shareholder's funds could be that the businesses are not mature enough yet to start retaining their earnings, but rather invest them in growth. It is also possible that the smaller size of sporting goods and clothing retailers compared to the others contributes to the higher correlation between shareholders' funds and return on assets. A small family shop would be more likely to retain earnings to bolster the company's assets and help through any possible rough patches.

### **3.8 Summary of correlation analyses**

We have analyzed the correlation between return on assets and several financial metrics from the companies balance sheets. These analyses have not revealed any one determinant that would explain the differences in profitability between online- and offline retailers. Due to this lack of clarification from these previous analyses it was decided that attempting to create a regression model to explain the changes in profitability should be the next step. To create said model we must first pool together all the information we received from the correlation analysis so that we can decide which variables should be included in the regression model.

When analyzing the correlation between the determinants of ROA and return on assets itself, we found that earnings played a much larger role in determining the ROA value than total assets did with a correlation coefficient of around 0,50 for all business branches. This was to be expected, but it is not reasonable to include either of the determinants of ROA in our regression model. The correlation analysis between total assets and ROA revealed surprisingly low correlation coefficients between -0,10 and 0,10.

The number of employees displayed weak but notable negative correlation with ROA for e-tailers and positive correlation for brick-and-mortar retailers. This analysis revealed the first significant differences between brick-and-mortar retailers and e-tailers, suggesting that while there is some positive correlation between number of employees and profitability for offline retailers, the opposite is true for internet retailers and a growing number of employees actually correlates with diminishing returns. We attributed this difference between the branches to the very different operating models and the ability of online retailers to grow with much smaller investments in new employees.

Having determined that there were differences in how human resources correlated with ROA between the business branches, it was determined that it would be beneficial to study the correlation between tangible fixed assets and profitability in an attempt to explain the differences found in the correlation coefficients for number of employees and ROA. This analysis, however, did not provide any more

clarification to the matter. The correlation coefficients were, surprisingly, negative for both online- and offline retailers with e-tailers displaying the most significant coefficient at -0,10 and the other business branches displaying insignificant correlations.

Having failed at explaining the differences in profitability with long term fixed assets the next chosen step was to attempt to explain them with differences in short term liquid assets. Correlation analysis between current assets and ROA displayed a negative correlation between the variables for all other data groups except for clothing and sporting goods stores. The negative correlation was strongest for e-tailers at -0,12. For bookstores the result was -0,05 and for textile retailers 0,08. For brick-and-mortar retailers as a whole the correlation coefficient was -0,01. These results indicate that current assets have a larger negative correlation with profitability for e-tailers than for brick-and-mortar retailers.

After studying the correlation between current assets and ROA, it was decided to include current liabilities into the analysis by studying the correlation between net working capital and return on assets. The correlation coefficient was largest for textile retailers at 0,12 and 0,06 for bookstores. For brick-and-mortar retailers as a whole the correlation coefficient was 0,07. The results indicated a higher correlation for offline retailers than online retailers as the coefficient for e-tailers was only 0,02.

The last financial metric included in the correlation analysis was shareholder's funds. This item was included in the analysis as an indicator of the companies long term financial position. This analysis provided larger differences between the business branches than the previous balance sheet items. The correlation coefficient for sporting goods and clothing stores was 0,20 and at the other end -0,09 for e-tailers. The result for bookstores was 0,02. Brick-and-mortar retailers as a whole displayed a correlation coefficient of 0,07. It appears that profitable e-tailers operate on a smaller shareholder's investments or are less likely to retain earnings compared to brick-and-mortar retailers.

### 3.9 Regression model

Having failed to determine any one explaining factor for the profitability differences between e-tailers and offline retailers in the correlation analysis, it was determined that a regression model should be created to attempt to explain the differences by including several balance sheet items as explaining variables.

The variables included in the model were chosen based on the result of the correlation analysis discussed in the previous section. The direct determinants of ROA were excluded from the model to avoid explaining profitability with profitability. Based on the results of the correlation analysis, the first explaining variable chosen to be included was the number of employees. The number of employees was the first variable that displayed differences in correlation between different industry branches. The differing correlations between industry branches and the fact that number of employees is not a determinant of profitability made choosing the number of employees as the first variable in the regression model a logical choice.

The next variable chosen to be used in the regression model was shareholder's funds. The correlation analysis revealed that the differences in correlations between industry branches were more significant than they were for other indicators of the companies' financial position. This in addition to shareholders' funds serving as an indicator of how eager the companies are to retain their earnings made it a good choice as a variable in the regression model.

Current assets were included as the third explaining variable in the regression model as there was a notable negative correlation between it and ROA for e-tailers. The negative correlation coefficients for current assets and ROA indicated that decreasing current assets improved profitability for e-tailers whereas the opposite was true for textile retailers. In addition to the correlation coefficients, current assets were seen as a good indicator of the short term liquidity of the companies and thus a relevant variable to be included in the regression model

The last variable to be included in the regression model was tangible fixed assets. After number of employees, shareholders' funds and current assets, tangible fixed



assets displayed the strongest correlation coefficients. Additionally this variable serves as an indicator of the companies' long term financial position in the regression model. Each of these four variables serves as an indicator of a different area of the companies' balance sheets and also displayed somewhat significant correlation coefficients with return on assets for one or more business branches. Considering the decreasing significance of the correlation coefficients for other balance sheet items included in the previous section of the study, it was decided that adding more explaining variables to the correlation analysis would be counterproductive.

Having decided on the variables to be included in the regression model, the model itself was built and tested. The linear regression model used in this study, creates a regression line based on the chosen explaining variables and compares the actual values of ROA from the data set to the values found on the regression line. Comparing the predicted values of the regression line to the actual ROA values found in the data set allows us to see how closely the actual values follow the regression line. The closer to the line the values are, the more accurate the regression model. This gives us the  $r^2$  value or the coefficient of determination. The  $r^2$  value tells us how accurately the values of ROA can be calculated based on the explaining variables of number of employees, shareholders' funds, current assets and tangible fixed assets.

Having chosen the variables with the strongest correlation to ROA to be used as explaining variables in the regression model, the desirable and expected result of the model was for it to result in high  $r^2$  values, giving the model power to explain the dependent ROA values based on the chosen balance sheet items.

In preparation to calculating the regression lines and comparing the actual ROA values to the values on the line, the data was once again arranged in the previously determined industry branches so that the analysis could be run on these subsets in addition to running the calculations on the entire data and separately for online retailers and brick-and-mortar retailers. Having made all the necessary preparations, it was time to move on to calculating the regression line

and the following values for the coefficient of determination. These values are displayed in Table 3.10.

**Table 3.10** Coefficient of determination for the regression models

<b>Coefficient of determination</b>	
	<b>r<sup>2</sup>-value</b>
<b>All</b>	<b>0,008</b>
<b>E-tailers</b>	<b>0,035</b>
<b>Brick-and-mortar</b>	<b>0,027</b>
<b>Bookstores</b>	<b>0,037</b>
<b>Textile retailers</b>	<b>0,044</b>

After the calculations for the regression models for the entire dataset as well as all the subsets were completed, the results from the test turned out to be, disappointingly but in retrospect perhaps not quite that surprisingly, inconclusive. The regression model was first calculated for the entire dataset and the resulting coefficient of determination was only 0,008.

Because the coefficient of determination for the entire data set was only 0,008, the next step was to examine the results of the regression analysis on different subsets of the data. Dividing the data into e-tailers and brick-and-mortar retailers resulted in the r<sup>2</sup> value increasing to 0,035 for e-tailers and 0,027 for brick-and-mortar retailers. Further separating brick-and-mortar retailers into bookstores and textile retailers led to the r<sup>2</sup> value increasing to 0,037 for bookstores and 0,044 for textile retailers.

While the division of the data into smaller subsets based on their industry branch resulted in increased coefficients of determination, the r<sup>2</sup> values still remained insignificant and thus it was decided that in an attempt to increase the explanatory power of the model, each of the explaining variables should be removed in turn to find out if this would lead to an increased coefficient of determination. However removing explaining variables from the model only led to even smaller r<sup>2</sup> values for the entire data set and different subsets.

Based on the results of the different variations of the regression model, it is apparent that the return on assets of the companies in the data set cannot be predicted based on the chosen balance sheet items. Because removing explaining variables from the model only weakened its explaining power and even dividing the data into subsets based on the industry branches only led to a small increase in the  $r^2$  values, it appears that with the given data set, the regression model approach to explaining the differences in profitability is a dead end. As such no further discussion of the regression model results is warranted.

### **3.10 Discussion of analysis results**

The statistical analysis portion of this paper aimed to answer three questions. The primary question of the study was how the profitability of online and offline retailers differs. In the description of key financials it was established that online retailers appear to have higher ROA values than their brick-and-mortar counterparts. Combining this information with the statistical significance of these differences established in the analysis of variance leads us to conclude that e-tailers appear to be more profitable than offline retailers. Further analysis of variance on the determinants of ROA indicated that these differences in profitability are driven by statistically significant differences in earnings.

The first of the two secondary research questions was whether the differences established while studying the key financial indicators are statistically significant. Based on the analysis of variance it was concluded that there are statistically significant differences between the profitability of e-tailers and brick-and-mortar retailers. However it also became apparent that there were statistically significant differences in the ROA values of offline retailers offering different products.

The third and final question this study attempted to answer was whether the differences in profitability between e-tailers and brick-and-mortar retailers point towards competitive advantage stemming from internet retailing as a business model. In an attempt to answer this question, a series of correlation analyses were run between return on assets and various balance sheet items including determinants of profitability and other key financials. These correlation analyses

were followed by a regression model in which several balance sheet items were used to explain ROA values. Based on the results of the correlation analysis, it was not possible to determine any single balance sheet item that would account for the differences in profitability. The purpose of the linear regression model was to predict the ROA values based on chosen balance sheet items in an attempt to find a combination of explaining variables in the balance sheet that would account for the differences in profitability.

Having failed to find any single explaining variable or a combination of explaining variables from balance sheet items to account for differences in ROA values, we were forced to conclude that based on the results of the analysis, there is no specific balance sheet item or combination of balance sheet items that accounts for the differences. The differences in profitability between these two retail methods are a result of a combination of factors that cannot be determined solely based on balance sheet items.

The findings of the study in this regard are in line with previous research which has indicated that, when implemented correctly, internet retailing can be a successful strategy, but going online in and of itself does not guarantee success. Much like other aspects of e-commerce, internet retailing can help companies achieve their strategic goals if e-tailing is implemented properly and the overall strategy makes use of the possibilities offered by online retailing channels.

## 4 Conclusions

This research set out to explain how the profitability between online and offline retailers differs by building a theoretical foundation based on previous literature on the subject and conducting a series of statistical analyses on a sample data gathered from European small and medium sized enterprises.

Opinions vary greatly on the effects and importance that Internet retailing has had and will have on the retail environment. Lee et al (2003) established that compared to their offline counterparts, online retailers offer products at lower prices. This motivated us to find out if these lower prices are achieved by cutting into the profitability of the companies or by leveraging advantages provided by e-commerce technology.

This concept was refined into three questions that served as the primary and secondary research questions of the study. The primary research question was: How does the profitability of online retailing operations differ from that of brick-and-mortar retailers? The secondary research questions were: Are these differences statistically significant and do these differences point to online retailing being inherently more or less profitable than brick-and-mortar retailing.

While studying the previous literature on the subject, it was found that opinions on the profitability advantages of internet retailing compared to offline retailing vary from Ashworth (2012) suggesting that a portfolio approach to online business can help significantly in leveraging competencies and improving profitability to Grewal et al. (2004) who suggest that the profitability benefits of e-tailing are often exaggerated.

The most prominent strategic benefits of e-tailing are improved convenience and the ability to respond to consumers' perceived lack of time. Koivumäki et al. (2002) found that time savings made shopping online lead to increased purchases in Web stores. At its best an Internet shopping mediums can provide an inspiring and immersive shopping experience with around the clock service, while remaining very easy to scale to fit the needs of the company. On the other hand concentrating too much on the front-end functionality can lead to neglecting the

back-end functionality and operating costs spiraling out of control. (Enders & Jelassi 2000; Grewal et al. 2004; Koiso-Kanttila 2005; Manasseh et al. 2012)

E-commerce has a turbulent past with extreme highs and lows. Despite being touted as a revolutionary technological development that would forever change the balance of power in the world of retail, after the initial boom, the growth of internet retailing has slowed down and many small companies are not interested in participating in the more sophisticated e-commerce solutions that larger companies are focusing on. The rapid rate of progress and environmental turbulence make the Internet an unpredictable marketplace where only the ones who are capable of adapting to changes in the environment survive. (Javalgi et al. 2004; Lewis & Cockrill 2002; Reynolds 2002; Wrigley & Currah 2006)

While the Internet has clearly changed the way many companies do business, many still see it as nothing more than enabling technology and there are widening gaps between large and small companies in terms of investment and strategy towards e-commerce. So far only certain pure-play internet retailers have truly flourished and the threats internet retailing poses to the traditional transnational retail corporations are limited to particular sections of general merchandise. (Javalgi et al. 2004 Kotha 1998; Lewis & Cockrill 2002; Keen et al. 2004; Lumpkin et al. 2002; Wrigley & Currah 2006; Zheng et al. 2004)

Information security especially regarding the reliability and privacy of payment transactions that take place over public domain are a major concern for all parties doing business over the internet medium. The fast access to abundant information has resulted in more informed consumers, streamlined e-commerce processes, and diminishing switching costs but they come at the price of security and usage problems inherent to the design of the Internet. (Grewal et al. 2004; Lumpkin & Dess 2004; Lumpkin et al. 2002; Reynolds 2002; Villeneuve 2006; You et al. 2011)

Previous research seems to indicate that successfully utilizing the right e-commerce and e-tailing solutions as a part of a strategic process can lead to improvements in profitability. However, the inherent profitability of internet retailing as a business model compared to brick-and-mortar retailing is disputed by some research results. Previous research also indicates that some sectors of traditional

retailing are under more pressure from Internet retailers than others. According to this theory, brick-and-mortar retailers offering goods that are of a standardized format such as books should suffer more from competition from the Internet than retailers offering products of a non-standardized formats.

Statistical analysis was performed on a data set consisting of 145 small and medium sized European companies. 67 of these companies were offline bookstores, 43 offline textile retailers and 35 were online retailers. Studying the key financial figures of the companies it was found that over the five years from 2008 to 2012 Internet retailers displayed the highest return on assets followed by bookstores and textile retailers displayed the lowest values of ROA. While the internet retailers in the study had the highest fluctuations in the profitability, they consistently outperformed the brick-and-mortar section over the five year time span of the study.

Analyzing the variances of the ROA values between the different industry branches using the F-test revealed that the differences in profitability between online and offline retailers are statistically significant at a 95 percent confidence interval.

Correlation analyses performed between return on assets and other key financial indicators revealed that between the two determinants of ROA, earnings and total assets, earnings correlated strongly with ROA, displaying a correlation coefficient of 0,49 while the correlation coefficient between total assets and ROA was insignificant at -0,06. Correlation coefficients for other financials and ROA turned out to be insignificant being 0,04 for number of employees, -0,05 for tangible fixed assets, -0,04 for current assets, 0,04 for working capital and zero for shareholders' funds.

Due to the weak correlations between return on assets and other financials, a regression model was created in an attempt to explain the differences in profitability with a combination of other variables. The financial indicators included as explaining variables in the regression model were number of employees, shareholders' funds, current assets and tangible fixed assets. The resulting coefficient of determination of the model turned out to be insignificant at 0,008 and

as a result the regression model was rejected as a way to explain the differences in profitability.

The results of the statistical analyses lead to the conclusion that while there are statistically significant differences in the profitability of online and offline retailers, these differences could not be explained purely based on financial data. These findings are in line with previous research and suggest that the profitability of online retailers is not a result of online retailing being inherently more profitable. It appears that the improved profitability is a result of including online business models into strategic decision making and integrating streamlined e-commerce solutions to business processes.

The results of this research conform with the results of previous research relating to the subject of profitability in online retailing and suggest that profitability gains can be made by implementing well thought out online business models into the strategy of the company. Further research on the subject could be conducted in the form of detailed case studies concentrating on the strategic decision making of online retailers from a profitability and sustainability perspective.



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