

USABILITY IN M-COMMERCE

– CRITICAL FACTORS TO CONSIDER WHEN ADAPTING M-COMMERCE

Bachelor's thesis in Informatics (15 credits)

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Abstract

The electronic commerce is a phenomenon that has developed rapidly during recent years and has come to take larger part in the everyday life. The act of buying and selling products online is referred to as electronic commerce and today, this phenomenon is starting to take more space within the mobile devices which is called mobile commerce. The user no longer has to visit physical stores in order to make a purchase, it can now all be done from a device in the palm of the hand.

The aim with this research was to describe what the driving factors of m-commerce are from a usability perspective and how important different usability factors are to the customer when performing mobile commerce. This particular thesis was conducted with a quantitative approach in order to gain information about the consumer behavior when shopping through mobile phone as well as finding the most critical usability factors from the users point of view. The result was a self-completion questionnaire with a total of 200 respondents.

The results from the self-completion questionnaire points out that there are numerous critical factors that can have an impact on the users' decision whether to perform mobile commerce or not. Furthermore, the results from the questionnaire pictures that most of the consumers still prefer to shop in physical stores followed by shopping online through the computer. The reason why other methods before using the smartphone to make a purchase was chosen, was mainly because of the limited screen size and input mechanisms on the mobile phones. The result also shows that the majority of the participants would cancel their purchase if usability factors, like errors and poor site performance, are not thoroughly considered in the application. This shows the importance of including usability in the developing of applications and mobile websites.

This essay will provide companies and developers with important information that is needed for creating applications for mobile commerce with high user satisfaction. M-commerce is a rapid growing field of study which is important to research because of the impact it begins to have on business. For further research it would be interesting to continue the study of other factors that plays a big role when developing mobile applications for m-commerce. Security is one key issue in m-commerce and according to our empirical result it is of big importance for the users performing m-commerce and should be investigated deeper.

Keywords: E-commerce, M-commerce, M-commerce in Sweden, Usability, Mobile devices, Critical usability factors in m-commerce

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1. Introduction

Since 2000, the World Internet Institute has collected data on how the Swedish population uses information, communication technologies and how this affects individuals, families and society. This information is published in annual reports by the internet foundation in Sweden (Davidsson & Findahl 2016) and takes up issues like internet access, smartphone usage and trading in both e-commerce and m-commerce. The report (2016) showed that today, more than 90% of the Swedish population have access to internet and 81% of the whole population owns a smartphone and use internet through it. When looking at the first published report from 2000 only a half of the Swedish population had access to internet in their homes, 82% had never tried to shop something online and no information about mobile use was published. Nowadays people use their smartphone in many ways. They read the news, listen to music, use applications like Facebook and Instagram and other software tools. For companies this high usage of smartphones is extra relevant when it comes to their business decisions and strategies. The smartphone fills more and more roles in the purchase process for people. They use it to search information, make comparisons and have the possibility of making the purchase itself there (Staunstrup 2015).

As a result, e-commerce has been a growing trend during recent years and many people have experienced how convenient it is to buy a variety of products online. As mentioned before, the use of smartphones and other mobile devices like tablets increases strongly and almost all of the e-commerce growth nowadays is taking place within mobile devices. This term is called m-commerce and could be defined as "the delivery of electronic commerce capabilities directly into the consumer's hand, anywhere, via wireless technology" (Morris 1997). In 2017, 35% of the Swedish population had during each month completed one or more of their purchases through their smartphone (Postnord 2017).

As a further matter, an interesting observation made by the article "Sverige visar vägen för mobil e-handel" Sweden lies behind when it comes to m-commerce when compared to other parts of the world like Japan and South Korea, where most of the e-commerce is performed through a mobile phone (Stålbröst 2015). In a survey during mars 2016, it showed that countries like South Korea, China and India exceeded the global average for purchasing a product or service via mobile device. For example, in South Korea, 55% of the population had bought something online via the phone in the past month as of 4th quarter in 2016. In China it was found that 40 percent of the Chinese population had purchased something online via the phone during the measured period (Statista 2016). Continuing looking at China, the market share of the mobile phone is dominant, and it is possible to see a gap between the market share of desktop, mobile phone and tables. During 2017, 59,33% of the market were held by smartphones while the market share of desktops decreased to 38,63% and the tablets made up to only 2.04% of the market. In Sweden however, the market share is still dominated by the desktop computer that makes up to 56,37%, in comparison to the mobile phone which only is held by 34,18% (Statcounter 2017).

With an all-time increasing usage of smartphones and other mobile sources, it opens up for a whole new channel for already existing companies as well as startups. It becomes more and more essential for companies to adjust and adapt to this phenomena in order to meet the customer's expectations and develop in line with the society. This essay aims to help companies get a wider understanding of the topic m-commerce and how they can adopt this phenomenon to their business strategy.

1.1 Previous research

As many articles argue, the mobile commerce has become great in the everyday life due to its ability to simplify and make routine tasks more convenient. The article "E-handeln är Sveriges nya basnäring", describes how developments within the trade also leads to a structural change for the business community as well as for our cities. Unlike physical commerce, e-commerce is open 24 hours per day. This leads to a higher demand on companies to pack the orders as quickly as possible, even during night hours, to provide immediate and convenient delivery to the customer. Today, normal working hours in Sweden is between 8 and 17 during the week and limited opportunities for work at weekends. In order for Swedish e-commerce to be strong in global competition, collective agreements require that work hours must be renewed and arranged during the evenings and weekends as well since the fast delivery is an important competitive advantage (Ogvall 2017).

In the report "Företagen och digitaliseringen" Chirico Willstedt and Snellman (2016) discusses that the conditions and structure of trade lately have been altered by technical maturity and innovation. All companies in the trade, regardless of product, sales channel or brand affiliation are affected by the ongoing digitalization that changes all parts of society. Considering the development of mobile services and accessibility, this is a development that will continue in the future. The interesting insight here is that this development does not only change the way people can buy and sell but it also entails a fundamentally change in customer purchasing behavior.

M-commerce, like e-commerce, represents a huge opportunity for businesses to connect to consumers. Within m-commerce, the attributes usability and user interface experience is of great importance and an area that previously have been largely neglected. An important prerequisite for the success of m-commerce sites is ensuring that customers' experience, satisfies both their sensory and functional needs. Studies have shown, that user interface features such as page and content design, are key determinants of sales in online stores (Venkatesh, Ramesh & Massey 2003). Furthermore, Branki, Cross and Diaz (2008) takes up some key issues of m-commerce that need to be addressed: interoperability, usability, security and privacy. These issues will be further discussed in the section 2.2.2.

Zhang and Adipat (2005) stresses the importance of developing and adopting appropriate research methodologies that can evaluate the usability of mobile applications. Usability for desktop applications differs from the usability in mobile phones due to numerous factors. Therefore, in many cases, the usability principles for the desktop can not be applicable to the mobile phones before reconsidered, which many developers tend to overlook. The critical factors is the unique features of mobile devices in comparison to computers which can be smaller screen sizes, limited battery life as well as limited input mechanisms.

1.2 Problem discussion

The articles presented above are all supporting the fact that the usage of internet and different devices is increasing. Since the mobile commerce makes routine tasks more convenient the usage of mobile phones keeps growing. As Davidsson and Findahl (2016) published in their report as many as 65% of the Swedish population is connected to their smartphone daily. According to Postnord (2017) the smartphone has during a short period of time changed the consumers behavior fundamentally, both in e-commerce and the physical trade. Every fourth nordic consumer who have e-traded, have made a purchase from the smartphone.

The problem that is early identified is the fact that the acting company today has to work in many different channels to keep current customers, as well as attracting new ones. Postnord (2017) summarize in their report that it becomes more important for companies to have a clear omnichannel strategy, which means that the customer should be in the focus and should have the same experience no matter what channel they go through. The mobile phone is usually the device that is nearest at hand for consumers, and many e-commerce companies have been fast to develop customized sites and apps for smaller screens.

Chirico Willstedt and Snellman (2016) points out the issue that all companies in trade are affected by the ongoing digitalization. The expansion of mobile services and accessibility is a development that will continue in the future. This development does not only change the way people can buy and sell, it also entails a fundamentally change in customer purchasing behavior. Another issue that companies can encounter when they want to customize their business to m-commerce is that the cities we live in are not sufficiently developed for the fast-digital structure needed. Ogvall (2017) mention some important aspects in the article “E-handeln är Sverige nya basnäring”, that can prevent companies from succeeding in their entrepreneurship over the internet.

M-commerce offers a new roadmap for enterprises to gain strategic competitive advantages through up-to-date information and technology management. Internet is on its way to leave traces in all aspects of people's lives. Already today, mobile phones have become an indispensable part of our life as a source for all kinds of information and services. To keep up with these changes and adapt to the increasing use of m-commerce, key issues of interoperability, usability, security and privacy need to be addressed (Branki, Cross & Diaz 2008).

The commercial benefit of understanding and improving usability for wireless web interfaces, such as mobile phones, is enormous. The user interface is the environment where user perform communication, do information search and transactions. To success with both e-commerce and m-commerce it is important that customers experience via the interface satisfies both their sensory and functional needs. However, m-commerce faces new challenges. Mobile phones can provide access to many new applications, but, they impose limitations such as small screens, limited screen resolutions and difficult input mechanism (Venkatesh, Ramesh & Massey 2003).

M-commerce represents huge opportunities for companies to connect with consumers, but the advent of mobile devices has also presented new usability challenges. Zhang and Adipat (2005) highlighted that the user of m-commerce may be affected by environmental elements such as nearby people or objects that may distract them when using the application. This because the user is normally not tied to a single location when using mobile applications. Accordingly, models of usability that have been developed has more often a lack of consideration for mobility.

Companies that do not take this all-time increasing trend into consideration risk being driven out by companies that are m-commerce oriented. We have acknowledged the importance of usability in m-commerce and together with the articles presented above we have created a foundation to continue our research on how companies can evolve their m-commerce from a usability point of view.

1.3 Problem statement and purpose

During the investigation of the current research on mobile commerce, the red thread we found throughout the previous research is that the smartphone trend just keeps increasing and that Sweden is one of the countries that lead the mobile using league. However, Sweden is still the country that lies behind when it comes to completing purchases through the smartphone when comparing to other parts of the world. As a result, we want to investigate this topic and learn about the different factors that are important to acknowledge when it comes to developing m-commerce with high user satisfaction.

The purpose of this research is to describe what critical usability factors make consumers want to use mobile commerce in order to reach a wider understanding of the consumer behavior when it comes to shopping through the smartphone.

This leads us to the main question that our study will cover:

Which are the most important usability factors, according to consumers, that companies need to take into account when developing a mobile application for m-commerce?

1.4 Target group

The thesis will contribute with knowledge within the academic and practice applied field of m-commerce and especially from an informatics and usability point of view. It will also cover the users' habits and behavior when it comes to shopping through the mobile phone. This study is furthermore targeting companies in the retail section as well as developers of mobile applications. As the essay will find critical usability factors from the users' point of view, it is suitable when developing mobile sites and applications as well as for companies that want to expand their existing, or non-existent, mobile applications. The reader will further get an insight in what critical usability factors there are and how to incorporate these to build a mobile application or site to promote sales through the mobile phone.

1.5 Delimitations

This study will target the critical usability factors within the field m-commerce. As a result, the literature is limited within the frame of m-commerce. Literature about e-commerce, m-commerce, user experience as well as usability among others will therefore be studied. Furthermore, the stated research question will be addressed and answered with a combination of empirical data compiled by the respondents of the self-completion questionnaire as well as previous literature findings. The time-frame was roughly two months.

1.6 Disposition

Chapter 1 - Introduction

The introduction starts with presenting an overview of the background relating to e-commerce, m-commerce and how the Swedish population relates to these topics. Continuously, identified problems within the field of research are discussed through the use of previous theory. The chapter ends with presenting the purpose of this research and the research questions that the study will cover.

Chapter 2 - Theoretical framework

This chapter describes previous research and the most important concepts regarding the study area. The chapter starts with describing the concepts e-commerce and m-commerce. Thereafter, topics as user experience and usability and their relation to m-commerce are examined to provide a theoretical framework for the thesis.

Chapter 3 - Methodology

This chapter is intended to present the design, methodology and the overall content to fulfill the purpose of the report. The purpose is to give the reader an understanding of the methods and designs we have used in the collection of data and the methods we have used in our analysis.

Chapter 4 - Result & Analysis

In this chapter the results from empirical study, conducted from self-completion questionnaire, is presented. The chapter also analyses the collected empirical material along with relevant previous theory.

Chapter 5 - Discussion

This chapter will discuss the results of the analysis further and the study will be discussed in relation to previous research and research question.

Chapter 6 - Conclusion

In the last chapter of the thesis, the conclusions drawn by the study is summarized and presented shortly. Suggestions for further research will also be presented.

2. Theoretical Framework

2.1 E-commerce

Like any digital technology or consumer-based purchasing market, e-commerce has evolved over the years and has deeply affected everyday life and how business and governments operate. E-commerce, in general, is about maintaining relationships and conducting business transactions that include selling information, services and goods by means of computer telecommunications networks. E-commerce originated in a standard for the exchange of business documents, such as orders or invoices, between suppliers and their business customers (Zwass 2017).

E-commerce consists of business-to-consumer, business-to-business and consumer-to-consumer commerce as well as internal organizational transactions that support those activities (Zwass 2017). These take place in electronic marketplaces, which are cyberspace

locations where prospective sellers and buyers can effectively transact exchanges via interactions on electronic networks (Vanhoose 2011). Business-to-consumer transactions involve exchanges of goods and services that are transacted through computer networks and require sales by business to individual consumers. Business-to-business marketplaces have been created by companies such as Alibaba (Zwass 2017). It involves business firms on both sides of the transactions for example when a company submit an order from a supplier (Vanhoose 2011). Consumer-to-consumer marketplaces include large so-called e-malls such as Amazon and auction platforms such as Ebay. It is the sales between one individual to another (Vanhoose 2011).

Although e-commerce includes much more broader economic activity than only the trading of goods and services over the internet, it is usually the web shopping in particular that people refer to when talking about e-commerce (Zwass 2017). Until recently, most e-commerce transactions took place using a personal computer connected to the internet over wired networks. Lately, several wireless mobile alternatives have emerged like smartphones, tablet computers like iPads and dedicated e-readers like the Kindle using cellular and wifi networks. The use of handheld wireless devices for purchasing goods and services from any location is termed mobile commerce. Both business-to-business and business-to-consumer e-commerce transactions can take place using m-commerce technology (Laudon & Laudon 2014). As mobile devices became more popular, mobile commerce has become its own market.

2.2 M-commerce

Mobile commerce, or m-commerce, is the fastest growing form of e-commerce and the main areas of growth are retail sales with some areas expanding at the rate of 50% or more per year (Laudon & Laudon 2014). M-commerce is about the explosion of applications and services that have become accessible from internet-enabled mobile devices. It involves new technologies, services, and business models and is quite different from traditional e-commerce.

Today, our mobile phones are making it possible to access the internet wherever you go and as the internet finds its way into our purses or pockets. As a result, the devices used to access the internet are becoming more personal (Norman 2002). Mobile commerce applications have taken off for services that are time-critical, appealing to people on the move by permitting tasks to be accomplished more efficiently (Laudon & Laudon 2014). Transactions that are made available continues to grow and the term m-commerce includes the purchase and sale of a wide range of products and services such as online banking, bill payment, booking services and information delivery (Lerner 2013). For example, both Apple Pay and Android Pay allow customers to seamlessly purchase in stores or in mobile commerce applications (Investopedia n.d.). Furthermore, consumers usually initiate their online shopping searches through google, email and other social media which often leads the consumer to mobile browsers. Mobile commerce has furthermore accelerated in social media platforms, allowing users to purchase products and services. In 2015 Facebook, Instagram and Pinterest launched “buy” buttons on their mobile platforms (Investopedia n.d.).

However, it is not always simple to define m-commerce. What is important when defining m-commerce is that at least the initiation or the completion is carried out using mobile access via an electronic device. The primary criterion of mobility is the method of access. Not all mobile devices provide a mobile access to telecommunication networks. For instance, a laptop can interpret as a mobile device, generally uses stationary access to networks. Although laptop is

limited by factors such as size and weight while on the move (Enache 2016). However, m-commerce has some exceptional features. Gale (2009) note that m-commerce is characterized by some unique characteristics that equip it with certain advantages against conventional forms of commercial transactions. Those are:

- Real-time data and information access
- Authenticity
- Ubiquitous features
- Personalized contents
- Numerous communication functionalities
- Constant access

2.2.1 Benefits of M-commerce

As mentioned before m-commerce devices come with many advantages that enhance the convenience of conducting business through the internet without having access to fixed power portals and internet connections (Gale 2009). This is one of many reasons why companies choose to adapt m-commerce in their daily business. Enache (2016) brings up how the use of mobiles or wireless devices in the conduct of all business activities of a firm can both be useful internally or externally in relation with its customers, suppliers, partners and other stakeholders. Because of the instant connectivity, mobile devices are constantly in touch with the network since the introduction to General Packet Radio Service (GPRS). The time-consuming processes can therefore be avoided and as a result, convenience is brought to the user.

Furthermore, by offering immediate transactions it helps companies to capture the consumer in the right moment between the point of intention and that of actual purchase. This can also be done by using different technologies. For example, by using positioning technologies like the Global Positioning System (GPS), allows companies to specify the marketing and offer goods and services to the consumer specified to his or her current location. From the users' point of view, immediate transactions mean that the user can carry out transactions largely independent of his or her geographic location. This can be done on the move or standing in the store using the cross-check price technology (Enache 2016).

Lastly, one of the further main advantages of m-commerce is that it opens new avenues for push-marketing, such as content and product offers. Services like "Opt-in advertising" can be offered so that the user can choose products, services and companies that he or she wants to be kept informed about (Enache 2016).

2.2.2 Key issues of m-commerce

Some key issues of m-commerce that needs to be addressed is *interoperability*, *security*, *privacy* and *usability* (Branki, Cross & Diaz 2008). *Interoperability* is about the characteristic of a product, system or application, whose interfaces are completely understood, to work with other products, systems or applications. This both in the present or in the future, in either implementation or access, without any restrictions (GDT Interop, McCreesh & Daniel n.d.) For example, for two systems to be interoperable, they need to be able to exchange data and afterward present that data in a way that can be easily understood by a user (HIMSS 2013).

Security is another key issue regarding m-commerce. Mobile devices are increasingly used for m-commerce, and it's of great importance to ensure that users' data on such devices are kept secure. Mobile devices nowadays contain many of our personal and private information, since

we use them for all kind of activities, both personal and professional. This information is not always treated in a secure way and many applications tend to mistreat personal and sensitive data in the memory. It has been found that in some cases, credentials have been stored next to an identifier, for example a user's password has been stored right after the keyword "password". When developing m-commerce, security is a critical factor to consider (Kounelis 2015). It is important for retailers, banks, payment service providers etc. to work together to manage a good balance between creating a secure environment for users making online payments on their mobile devices and at the same time maintaining a good user experience (Srinivasan 2016).

When discussing security risks in m-commerce there is both Technical Risks (Direct security threats) and Non-Technical Risks (Indirect). Direct security risks are those who impact the users directly due to a technical, data or software issue. The security risks that are more specific to mobile computing are malicious users, security problems with data exchange, loss or theft of the device due to their small size or security problems due to location identification. With malicious users, the mobile medium actually provides very good cover. Wireless devices, like mobile phones, roam in and out of wireless zones; they have no specific geographic point and have the ability to go online and offline easily. This enables users to quickly disconnect from a network, and it is therefore difficult to trace a mobile user. Indirect security risks are for example concerned with privacy issues, personal information and government concerns. Wireless medium requires trust and cooperation between member nodes in networks. Device manufacturers and language developers for wireless applications should try to produce secure operating system models and secure models of computing before starting to go forward with business-critical and privacy-related wireless applications (Gururajan 2006).

Another important issue to consider is a user's *privacy*. M-commerce transactions often require buyers to enter large amounts of personal information, either for the purpose to complete a sale transaction or just because it's required by the company. Usually, consumers don't give much thought to how secure their information really is, who has access to it and how it will be used (Heaney n.d.). The use of mobile phones provides both personal and social advantages. However, those advantages also come with a series of threats and problems concerning the management of personal information. Solutions to the privacy issues should be identified and applied intelligently, so it's possible to eliminate or reduce the problem, but still maintain the advantages that is offered by mobile communication and computing (Taniar 2007).

When it comes to m-commerce, *usability* is an important factor for end users. The essentials and the particular characteristics of website development are a great challenge for designers and developers, and therefore this component can be documented by using usability patterns, which traditionally have been different guidelines (Branki, Cross & Diaz 2008). The commercial benefit of understanding and improving usability of web interfaces through mobile devices is huge. Mobile phones can provide access to a lot of new applications, but they also impose limitations like small screen size, limited screen resolution and more difficult input mechanisms. Surveys on mobile internet users, shows that usability is the biggest source of frustration (Venkatesh, Ramesh & Massey 2003).

2.3 Context to development

Software development is a process filled with challenges that is flexible and abstract. It is not just about writing code and making it work together. This process needs to be carefully planned with distinct techniques as well as systematic methods. However, it is easy to make changes to the software in the process. In the 1970's the importance of the user interface design in the software engineering was acknowledged. Since the majority of the software was aimed for interactive use, the focus was now strong on the end users and their requirements as well as preferences. Since the technology evolves continuously, the targeted user group is larger than ever before and as a result, also very distinct. Before the 1970's, the need for usability was not essential since the users of the systems most were computing specialists that worked with the systems for the sake of their companies (Rosson & Carroll 2002).

Today, the end users are huge in diversity. Their technological skills vary a lot, and this is now an aspect that is hugely taken into consideration when developing systems. The usability aspect is now included in the process by looking at the software from different usability factors such as user satisfaction, ease of learning as well as use. Furthermore, the usability has now been included in the development technique in many ways such as system and requirements testing. The user is now of value to give input on the systems performance in order to understand the users' requirements and the usability is also tested, also called human factors evaluation (Rosson & Carroll 2002).

2.3.1 Need for additional competence

During the 1960s, the software development challenges and issues became tremendous which led to the so called software crisis. The new hardware of the third-generation computers had facility for new applications. As a result, the software systems now became of larger ratio and complexity which led to failure such as exceeding the time of delivery, budget overrun as well as systems that did not meet the desired goals. However, these failures resulted in the appearance of software engineering as a professional regimen. Thus, this crisis has not yet been adjudicated in addition, the budget for the hardware is still often getting overrun with. Moreover, today a lot of the software engineering methods have been enhanced and more thought and consideration are put into the software. Nevertheless, there is not yet a direct developed solution technology or method for the crisis even though we have come far in that aspect (Rosson & Carroll 2002).

2.4 User Experience

User experience covers all aspects of the end-user's interaction with the company, its services and its products (Norman & Nielsen n.d.). The web has become one of the most important field in which a user experience design is applied. This type of design is a set of technologies which will increase the user satisfaction by improving both usability and other concepts related to the interaction between human users and computers (Orlova 2016). To create a good user experience, the first requirement is to meet the exact needs of the customer, without any hassle or bother. Next up is that simplicity and elegance create products that are both a joy to own and use. A great user experience goes far beyond giving customers what they say they want or just providing basic features. To achieve high-quality user experience, there must be a seamless merging of the services of multiple disciplines like engineering, marketing, graphical and industrial design, and interface design (Norman & Nielsen n.d.).

2.4.1 Components of User Experience

To fully understand what user experience design is, five core components of user experience the designers need to take into account when creating a mobile application, a web page or a physical product, can be discussed. The components are *Usability*, *Information Architecture*, *Interaction Design*, *Prototyping* and *Visual Design* (Ngai 2017) and will be examined more deeply below.

Usability deals with leveraging data to determine the validity of design decisions. It is the user experience designer's role to support the needs of a user and communicate any frustrations felt during the use of a product (Ngai 2017). Usability is a part of the user experience and is really the extent to which a person can use objects like websites, mobile applications etc. Usability will be discussed more thoroughly in the next section of this report.

To be in a building where you can't find the bathroom or visiting a company's website where you have to hunt for their phone number, can cause unnecessary frustration. As a result, to problems of this kind, *information architecture* has emerged over the last three decades to eliminate distinct issues. The information architecture is about helping people, in both real world and online, to understand their surroundings and help find what they're looking for (Information Architecture Institute 2013). Moreover, it is about connecting people to content in an easy way that is most understandable to them. It takes different types of information into context and organizes it in a way to make it easy to find content (Ngai 2017).

Interaction Design deals with the specific interactions between users and a screen (Ngai 2017). Interaction design is concerned with the designing of interactive digital products, environments, systems and services. This design discipline, like many others, is concerned with form. However, interaction design focuses on something many other traditional design disciplines do not often explore: the design of behavior. This design is useful when creating a digital product as well as a physical product and exploring how a user might interact with it. Common topics of interaction design include design, human-computer interaction and software development (Cooper, Reimann & Cronin 2007).

Prototyping is the way of creating a preliminary version, a prototype, from which other forms thereafter can be developed. It is useful when creating everything from mobile applications, physical products and websites. Prototyping offers a cheap and flexible way for designers to test what looks good and is fit for purpose, and what does not feel so good, in their design. It is important because it brings the designer closer to the final functionality of the product before investing more time, resources and money into development (Ngai 2017).

To improve the user's experience, *visual design* can be used by using the visual aspect of a product. It focuses on the esthetics of a site or application and its related materials by strategically implementing images, colors, fonts, and other elements. The topic of visual design can be polarizing, just because it is many times thought that if designers highlight aesthetics they sacrifice usability. In fact, great visual design can actually cause users to overlook usability problems. New research findings propose that aesthetics and usability can be viewed as being positively correlated (Ngai 2017).

2.4.2 User Experience in mobile devices

Earlier, companies with a website were considered as companies with a great accomplishment. Nowadays, the most important target in web industry is not just to develop and have a website, but to take into account the user experience when designing and develop your website (Orlova 2016). Mobile devices brought new challenges for designers when creating good user experience. Gone are now the consistent factors of desktop experience, large size of bandwidth and the user's focus and attention to the task. With mobile devices a lot of new things need to be considered.

Mendoza (2013) mentions four factors that he calls the “mobile equation”, that can be seen as the recipe of creating mobile experience for a user. The factors are the carrier, the type of device the user is using, the operating system and the screen size. These factors are examples of new and unique challenges that comes when creating mobile experience.



Figure 1. The Mobile Equation - By Mendoza, A., 2013, *Mobile User Experience - Patterns to Make Sense of it All*.

2.5 Usability

Usability is the ease of use and learnability of manmade objects such as tools or devices. The object of use can be, for example, a software application, website, machine, or anything that a human can interact with (CTI reviews 2015).

Websites is a good example when talking about usability of handmade objects. Not so many years ago the web was exciting to people. Today the web is a routine and often used as a tool. If the site or application on the web is convenient, people will use it; if not, they won't. With all the sites and pages the web offers, users only get less tolerant when something turns out to be difficult. Every design flaw means lost business and therefore usability have nowadays become more important than ever before. Usability can furthermore be described as a quality attribute relating to how easy something is to use. It refers to how quickly people can learn to use something, how efficient they are while using it, how easily remembered it is, how error-prone it is, and how satisfied users are using it. If people can't or won't use a feature, it might as well not exist (Nielsen & Loranger 2006).

Usability works just because it reveals how the world works. As soon as the designer can discover how people interact with the design, it is possible to make it better than the competitor's. Nielsen and Loranger (2006) outline some of the most important things when talking about usability in the web that may sound obvious, but is many times forgotten. First of all, design for the users and not for yourself, the manager or the CEO. The key to creating a good experience for users is to design with them in mind and for this the target users need to be addressed. Second, function comes before form. A creative design is satisfying, but don't

assume that people constantly wants to be stimulated. It's important to combine creativity and usability to create a pleasing and effective design.

A major objective when designing all kind of human-computer interactions is usability. Hoffer, George and Valacich (2014) discusses usability when designing forms and reports that is used as input and output when developing successful systems. Their definition of usability is that it is an overall evaluation of how a system performs in supporting a particular user for a particular task. A design should assist and not hinder user performance. Three characteristics that usually define usability are:

- *Speed*. Can the task be completed efficiently?
- *Accuracy*. Does the output provide what the user expected?
- *Satisfaction*. Does the user like using the output?

Hoffer, George and Valacich (2014) identify that when designing systems from a usability point of view, one of the key ingredients is consistency. Consistency influence users' ability to gain proficiency when interacting with a system. All design elements like titles, error messages, menu options etc. should appear in the same place and look the same on all forms and reports. Consistency also emphasis on that the same form of highlighting has the same meaning each time it is used, and that the system will respond in harshly the same amount of time when a particular operation is performed. Other characteristics are also very important when shaping a system's usability, for example, efficiency, ease of use, format and flexibility (Hoffer, George & Valacich 2014).

2.5.1 Difference between User Experience and Usability

By many people, the term usability is contrasted to user experience. User experience, in comparison to usability, is a broader concept. According to the International Organization for Standardization, usability is concerned with the "effectiveness, efficiency and satisfaction with which specific users achieve specific goals in particular environments" (ISO 9241-11). User experience, on the other hand, is concerned with "all aspects of the user's experience when interacting with the product, service, environment or facility" (ISO 9241-210). User experience goes beyond usability by including such issues as usefulness, desirability, credibility and accessibility (Mifsud 2011).

2.6 Usability in mobile applications

Today, almost every phone on the market is construed with technology that makes it possible for the user to access the internet through it. Usability is often by far is the most essential factor that carefully should be taken into consideration when developing mobile applications. By considering usability in the application, the application can be construed in such way that it meets the consumer's needs and also make the app easier and better which will help the sales grow (Hussain & Mkpojiogu 2016).

According to Nielsen (1994) there are mainly five attributes of usability that should be considered in every application to meet the consumer's expectations. These are *learnability*, *efficiency*, *memorability*, *errors* and *satisfaction*. Learnability is the first mentioned. It is of importance that the application is easy for the consumer to learn so that the customer easily can accomplish basic tasks and get started quickly (Nielsen 1994). All of these attributes can furthermore be measured before set to practice. *Learnability* can be measured by acknowledging the time needed for the user to accomplish the intended tasks the first time of

using the application or mobile web page. Moreover, other factors such as does any frustration occur when completing the task should also be taken into consideration (Zhang & Adipat 2005).

The next attribute is *efficiency*. The application should be easy to use and there should be an understanding of the aim with the application and of the intended user. Efficiency is about how fast the consumer can use the app to complete the intended task once the user has learned the design (Nielsen 1994). This attribute can be measured in the application by measuring the time the user takes to complete given instructions. Also, the time the user spends on each screen is another measure (Zhang & Adipat 2005).

Memorability is about the user interaction with the application when not using it for a while and then returning to it and how easily the user reaches proficiency again (Nielsen 1994). Memorability can be measured like the previous attribute, by measuring the time that it takes for the user to complete tasks after getting back to it after not using it for a while. Also, by considering the number of clicks, steps and pages that it takes for the user to finish given task (Zhang & Adipat 2005).

The fourth attribute mentioned by Nielsen (1994) is *errors*. The application should have a low error rate but if the errors occur, how many are they and how fast can the user recover from them. This attribute can be checked by counting the number of errors that the user will do while navigating the website. For example, does the user take a roundabout road to reach the desired goal and how many if so? Also, number of wrong clicks and answers is of interest and the overall percentage of correctly completed tasks (Zhang & Adipat 2005).

Lastly, there is the *satisfaction* attribute. Here the design should be taken into consideration and how pleasant it is to use it (Nielsen 1994). This is measured by acknowledging the users attitude towards the page or application when done using it. Listen to the user to gather information about the design, what they like and dislike about it and the level of difficulty of the application or site (Zhang & Adipat 2005).

2.6.1 Critical usability factors

An all-time increasing challenge for existing firms on the market is to incorporate mobile channels into their current strategies. Not only can this be expensive for the companies, it also requires a lot of investment of time and energy. However, it should be considered what makes an application or web page successful since the majority of developed applications are not as successful as desired and fails. To put this in numbers, one in four applications that are downloaded, are after the first use never used again. The authors argue that the importance of usability cannot be ignored. Usability is one of the most important factor when studying consumer behavior when it comes to declining the use of certain mobile applications (Hoehle & Venkatesh 2015).

When investigating further on the topic, the authors found that the absence of usability in many applications and mobile developed websites is due to many different reasons. A common read thread is that the application developers does not focus on the essential aspects of the application and design it in such way to make it easy for the consumer to navigate. Moreover, the content is often presented in an ineffective way which results in bad user experience since it does not contribute to making the user interactions effective. For example, many companies forget to think about the distinctive characteristics of mobile devices like the

small screens, limited input mechanisms and different resolutions (Hoehle & Venkatesh 2015).

From the user's perspective the design of the interface of the mobile app is one of the most essential components since it is here that the main interaction with the application will occur. There are many critical usability factors when it comes to the mobile devices and wireless communication networks. These factors, such as slow network connections, short battery life and smaller screens can have a huge effect on the m-commerce from a usability point of view. There is a lot to take into consideration when developing m-commerce. If the webpage of a firm is complicated and hard to navigate, customers will leave. Also, if having numerous errors and other usability issues customers will also leave which is beneficial for competitors. Usability does not only include the interaction process but also design (Hussain & Mkpojiogu 2016). One major mistake many companies make is that they replicate their current homepage and its content directly into mobile channels and here is where many go wrong (Hoehle & Venkatesh 2015).

2.6.2 Limitations for mobile applications

As presented in the section above, the m-commerce brings new challenges that require the traditional models of usability to be reconsidered. There are numerous of challenges that need to be considered when it comes to developing m-commerce through the phone. Zhang and Adipat (2005) argues that the use of mobile devices comes with a number of challenges and the five most critical are the *mobile context*, *connectivity*, *small screen size*, *limited processing capability and power* as well as *data entry methods*.

The first mentioned is the *mobile context*. The user is never tied to a single location when interacting with mobile applications. As a result, it is hard to take the surroundings into consideration. There is a high possibility that the user may be interacting with other elements such as people, devices and other environmental components that may result in a distraction of the user's attention (Dey & Abowd 2001). Another aspect that can be hard to take into consideration is the wireless network connection which brings us to the *connectivity*. The wireless network connection speed can be hard to control and can vary at distinctive time and place. However, the internet connectivity in Sweden is among the best in the world, in fact, the second best, year 2015. South Korea is the country with the fastest internet (Akamai 2015). Moreover, there is always a risk that there can be some network disturbance and as a result, different network conditions must be taken into consideration.

The third critical challenge that Zhang and Adipat (2005) describe is the *small screen size*. Since mobile phones are thought to be easily portable at all times, the screen size is often small and as a result, the information needs to be modified so it can be presented on the screen. This also challenges the usability work further since every aspect needs to be considered to fit the small screen and still be easy to navigate. Therefore, replicating a current homepage and expect it to work as good as on a computer on the phone, is not to recommend (Harrison *et al.* 2013). Due to the fact that the mobile phone needs to be portable, there is *limited processing capability and power*. Applications that take up a lot of memory and needs fast processing time should be considered by the developers and even disable some elements if needed. If the application drains the mobile battery, the user will not be too happy, and the application is of huge risk to be deleted.

Lastly, the *data entry methods* on mobile phones are limited. The mobile devices have limited input mechanisms in comparison to computers. Input mechanisms, such as keyboard and

mouse, are no longer practical for mobile devices. Therefore, providing input-strategies for the phone demands a high skill level. Due to the limited input methods, there is huge risk for errors as well as affecting the effectiveness when entering the data (Harrison *et al.* 2013), which can leave the user frustrated if not thought about carefully.

3. Methodology

3.1 Research strategy

In order to answer a research question, different research strategies can be used (Recker 2012). Creswell (2009) presents three different types of strategies which are qualitative, quantitative or a mixture of the two. These strategies are constructed to contribute with guidance in the intended research proceedings. The nature of the research question as well as the researchers own background can be used to select the suitable research approach. The difference between the two strategies, qualitative and quantitative, is often described in terms of working with numbers and close-ended questions (quantitative) rather than with words and open-ended questions (qualitative). The author further explains that since the quantitative research approach is about working with numbers, the analysis of the relationship between variables can help investigate objective theories. Through the usage of different statistical procedures, the numbered variables can be analyzed further.

For this particular research a quantitative research approach was of relevance to help answer the declared research question. In addition, a deductive approach was used since the aim was to test previous theory with new data. This method will be more discussed in section 3.3. Before going through with the strategy, information about critical usability factors as well as security factors in m-commerce was collected through investigation of relevant literature and previous study presented in the section above. This is to gather a wider understanding of the topic and crucial elements that is of huge importance for the customer in the decision making whether to perform mobile commerce or not. When these factors were identified through literature study, a quantitative survey was performed. Since the aim was to identify the importance of usability factors when performing m-commerce, close-ended questions were suitable for this matter. We were furthermore aware of the fact that this could cause some limitations for the respondent to the pre-given options in the survey. As a result, we chose to incorporate other factors that were not usability related in order to give the user the ability to choose, for them, other important aspects.

The results conducted from the quantitative survey helped identify the users' habits when it came to online shopping through the mobile phone as well as other devices. The collected data was further analyzed and correlated with one another to distinguish what the most critical factor, when it came to perform mobile commerce, was. In addition, relationships between the variables were examined. In order to achieve these results, the quantitative approach was most suitable for our research. Therefore, other methods will not be taken into consideration for this particular report since we believe that the quantitative approach correspond with our stated research questions the most. The chosen data analysis method will be further introduced and discussed in section 3.6.

3.2 Research method

As discussed in the section above, the selection of strategy and method can be complicated, especially when it comes to the social science which is a complex area. After examining relevant literature, critical usability factors as well as other factors with no link to usability

were identified and made up a foundation for the questionnaire. The aim was to examine consumers thoughts about these factors and reach an understanding of the importance of the factors. The results from the literature review presented that five usability factors were of huge importance when developing m-commerce applications, but other factors was just as important like distinct security aspects. These different factors were rated from 1-6 in the questionnaire where the user could give their opinion upon the importance of each and every factor. The questionnaires were further completed by the users through internet in order to increase the effectiveness of the research proceedings and further analysis of the data. The survey was shared through Facebook to reach out to as many as possible.

When the amount of collected data was of satisfaction, the data was further analyzed in SPSS which stands for Statistical Package for the Social Sciences and is one of the most used software for analyzing social scientists' quantitative data. This software provided a fair overview of the collected data and gives the opportunity to examine the different variables and possible patterns and relationships. This method will be further introduced and discussed in section 2.6.

3.3 Research design

The research design describes the different criteria that are used when appraising the research. This design comprehends a framework for the generation of data and the further process of analyzing and measuring it (Bryman & Bell 2011). Since this particular research was composed of a big variation of data of the users online shopping behavior as well as thoughts on different factors when it comes to performing mobile commerce, a research design concerning social research was seen to be appropriate. More precise, the cross-sectional design. This particular design concerns the collection of data from a population or several different cases at a specific point in time. The design is furthermore often named a social survey design and is very suitable for quantitative methods like questionnaires (Bryman & Bell 2011).

Furthermore, Bryman and Bell (2011) describes that the aim with the collected data (often through self-completion questionnaires) using a cross-sectional design is to compile a body of quantitative data in order to investigate possible relationships and pattern between two or more variables. The focus in this essay has mainly been on examining the relationship between theory and research. This can be done through three different approaches which are inductive, deductive and abductive (Recker 2012). When it comes to cross-sectional designs, the typical approach is deductive for investigating the link between theory and research. The deductive approach is targeting and evaluating theory (Bryman & Bell 2011) which is also the approach that has been used in this essay. After reviewing relevant theory regarding m-commerce and critical usability factors, the implications of the theory were tested with data. The data was as mentioned before, collected through a self-completion questionnaire (Appendix 2). The bigger part of the questions (Q8-Q20) in the questionnaire were to a major extent influenced by previous research presented in the second chapter as well as personal experience among others. By collecting information from people in our surroundings, different factors that was already presented in the theory was uncovered and gave us the opportunity to design questions regarding the theory we wanted to test.

3.4 Collection of information and data

Two of the most prominent criteria for the evaluation of business and management research are validity and reliability (Bryman & Bell 2011). These two are of importance when assessing the quality of a quantitative survey and the aim is to keep the study's reliability at a high level (Andersen 2012).

Validity is in many ways the most important criterion of research and is defined as the extent to which a concept is accurately measured in a quantitative study (Bryman & Bell 2011). High validity is achieved when the research and the data collection, results in data that is relevant for the aim of the research. Oates (2006) mentions two types of validity. The first one is content validity, which concerns how well the selected questions correspond with the area to be explored. In our case, we want to investigate how usability is experienced when conducting purchases through mobile devices. In order to achieve a high content validity in our survey it has been important to strategically choose the right kind of questions to get the right answers that can help collect the correct data. To achieve this, we have used literature and studied other questionnaires. The second type of validity that is described is construct validity, which concerns if the questionnaire measure what is intended to measure. It may therefore be necessary to compare the answers from one question to another in the survey or to other information to achieve a high construct validity (Oates 2006).

The concept of reliability is concerned with the accuracy, consistency and predictability of the results of the study. This means that if a survey is conducted more than once, the study should come out with same results (Bryman & Bell 2011). If the results, on the other hand, would vary widely, the study is considered lacking reliability as well as consistency (Recker 2012). This could be difficult since the chosen subject is constantly changing due to the rapid technology development and as a result, it might be harder to achieve high stability. To be able to achieve a higher level of equivalence we have used a very structured questionnaire containing closed-ended questions. The results have then been presented in a clear way in the study.

3.5 Data collection tools

To be able to answer the stated research questions and develop the research problem, scientific articles, books and previous research in relating areas have been studied to ensure that the theoretical framework created a stable foundation. The theory was collected through scholar search engines such as Google scholar and University of Borås search engine Primo. The keywords that have been used in our searches were mainly: e-commerce, m-commerce, m-commerce in Sweden, usability, mobile devices and critical usability factors in m-commerce. University of Borås also provided this thesis with relevant theory from the library.

Furthermore, the questionnaire was conducted online in Google Forms which is a questionnaire software tool that Google provides. This software tool is easy and convenient to use and to share with intended respondents.

3.5.1 Sampling

M-commerce is an international phenomenon which can reach almost everyone in developed countries such as Sweden. Consequently, it is impossible to gather data from an entire population in a country. According to Bryman and Bell (2011) the need to sample is one that is almost invariable encountered in quantitative research.

Convenience sampling is a main type of non-probability sampling and is used when there are only a few available members of the target population who can become the participants in the survey (Bryman & Bell 2011). This implies that some units in the population are more likely to be selected than others. The aim was to generate a sample that was representative of the relevant target population, which in this case were people who often bought products online and familiar with m-commerce. Furthermore, the ideal target group for us was to reach out to as many men as women in different ages. For this sample size, a stratified sample method would have been the best suited, which is a type of probability sample method. Probability sampling involves a lot of preparation and is therefore frequently avoided because of the difficulty and costs involved (Bryman & Bell 2011). Considering these two factors, a probability sampling was not an option for this study. Instead a non-probability strategy was considered to be more suitable.

We decided to send out and share the questionnaire via Facebook, for the reason that we could easily reach out to many people in the suitable target range. This also increases the chances of reaching out to mobile users, based on the assumption that people visit their Facebook through Facebook's own mobile application. The questionnaire was uploaded to different community groups on Facebook that consisted of members from all over Sweden who were considered to represent our target group. By uploading the questionnaire in these groups, we could reach out to a lot of people in a short period of time. This also allowed us to reach out to different types of consumers regardless of, for example job situation, based on the assumption that they would visit the web site during different hours.

We also sent out the questionnaire to friends and acquaintances on Facebook. This further segmentation aimed to reach out to people who were not members of these community groups which could help gain a broader picture of the consumer situation in the field of m-commerce. The aim of the survey was to get 200 of them answered and the process did not end until this was received.

3.5.2 Design of questionnaires

According to Robson and McCartan (2016) most surveys involve the usage of questionnaires which is a relatively simple and straightforward approach to study attitudes, values, beliefs and motives about a specific matter. It provides the researcher with large amounts of data in an extremely efficient way, at relatively low cost and in a short period of time. A self-completed questionnaire was found to be the best suited for this survey and is one of the main instruments for gathering data, using a social survey design (Bryman & Bell 2011).

Questionnaires offer only one chance to collect data from a single respondent. Therefore, deciding which data that is relevant, designing the questionnaire and formulating the questions well, is fundamental for answering the research questions and meeting the objectives (Saunders, Lewis & Thornhill 2009). The main interest in this research was to find out what the driving usability factors were behind the customers decision to complete a purchase through the mobile phone or not. In order to design the questionnaire with relevant questions, a literature review was done to gain knowledge of these factors. The questionnaire was then created according to Bryman and Bell's (2011) suggestions when designing questionnaires. This is in order to adopt well-established methods and to ensure credibility in our study.

The questionnaire was constructed in a way to capture the experience and attitudes of the respondents towards m-commerce. When designing the questions in the survey the ambition

was to follow the given recommendations with the goal of making it easy for the respondents to understand how to answer the questionnaire to eliminate the risk of misleading answers. Most of the questions in the questionnaire were designed to be close-ended. Close-ended questions permit the researcher to specify the answers to be suitable for the purpose and at the same time provide the respondent with an easy method of indicating his or her answers (Robson & McCartan 2016). The answers in the questionnaire in this study were stated and the respondents were given the opportunity to answer the questions by for example, checking in checkboxes or ranking a statement according to importency.

The first questions in the questionnaire of this research were designed to be easy in order to allow us to collect the basic data such as gender, age and occupation of the respondents. To present the subject of mobile commerce these opening questions were followed by a simple question about which electronic devices the respondent had access to, with three stated answer alternatives to choose from. After this part the following questions were more directed to specific data such as the respondent's attitude and behavioral factors. Questions that were included in the more behavioral section were the following three "*Have you ever purchased products online?*", "*How often have you, during the past 12 months, purchased products online?*" and "*How often have you, during the past 12 months, purchased products online through the smartphone?*" (Appendix 2 - Q5, Q6 & Q7).

The order of the questions was carefully considered in order to create a good flow for the respondent. Our aim was that one question would lead naturally to the next. As mentioned before, the questions were designed so the respondent could choose the answer from predetermined answers by checking checkboxes. According to Bryman and Bell (2011) it is of importance to always be clear on how the respondents should submit their replies when answering closed-ended questions. For example if the answer was ought to be "No" on the question "*Have you ever purchased products online?*", the information was clear about that the respondent could skip the following two questions and proceed to next section (Appendix 2 - Q5). If there are not clear instructions, the result may be misleading since the respondent can be unsure about how to reply and therefore make inappropriate selections in the survey.

The latter part of the survey consisted of questions concerning usability and other critical factors concerning m-commerce. Although the questionnaire was not too long or included too many questions the aim was to minimize the respondent fatigue. Therefore, these questions were placed in the end of the questionnaire in order to give the respondent the opportunity to reflect before answering. Appendix 3 shows how the questions and the different response options relate to research sources. The different response options were also influenced by people in our surroundings. The information gathered from people was through discussion on why he or she did or did not perform m-commerce.

3.5.3 Pilot test of questionnaires

As discussed in the section above, the questionnaire usually offers only one chance to collect the desired data. For this reason, it is necessary to execute a pretest of the questionnaire before it is used in a full-scale survey in order to help identify any mistakes that needs to be corrected (Bryman & Bell 2011). Therefore, a pilot study was held to ensure that the questionnaire as a whole was well functioning. The authors further argue that the pilot test should not be carried out on people who might have been members of the sample that would be employed in the full study. If possible, it is best to find a small set of respondents who are comparable to members of the population from which the sample for the full study will be taken. With this in mind a number of ten respondents were given the opportunity to answer a

draft of the questionnaire. By doing this pilot test the opportunity was given to identify errors and correct them in order to increase the chances of better response which leads to higher validity.

3.6 Data Analysis

When data from the quantitative research has been collected the data needs to be analyzed with a suitable method. Since a quantitative approach was used when collecting the data, the choice was made to use a quantitative data analysis method as well. Dudovskiy (2017) acknowledges that a quantitative data analysis involves critical analysis and interpretation of figures and numbers and attempts to find the logic behind the emergence of main findings. A comparison of primary research results to the findings of the literature review are also of importance. Analysis of data is necessary because the data often, in its raw form, does not speak for itself. The quantitative analysis stands for numbers and other data that can be transformed into numbers. For this analysis, descriptive statistics was used in forms of tables and visual displays of the collected data.

Throughout this analysis the software package IBM SPSS has been used to analyze the collected data. IBM SPSS is software tool for analyzing social scientists quantitative data and provides core predictive analytics capabilities. It gives the opportunity to examine the different variables and possible patterns and relationships. This further contributes to the discovery of new ideas and information. According to Recker (2012) data analysis relies on data that is coded appropriately and with coded data, multiple analysis can be conducted. Since data coding refers to converting raw data into appropriate numerical formats this was a suitable method to use when analyzing the answers from our questionnaire.

The first step was to convert the data that had been collected in Google Forms into Google Sheets where the answers could be changed to numerical values. For example, the responses received into different levels of satisfaction (low, medium, high) could be expressed numerically as 1,2 and 3 instead. After that, the data was converted to SPSS to be analyzed in more detail. With the help of SPSS several bivariate correlations tests could be performed to examine possible patterns and relationships between different variables.

To further enhance the credibility and reliability of the survey, Bryman and Bell's (2011) example of coding was followed. This was to ensure that the analysis of the collected data was done according to established methods.

4. Result & Analysis

4.1 Respondent segmentation

From our self-completion questionnaire, we collected answers from 200 respondents which are briefly summarized with percentage in figure 4.1.1. The first three questions in the questionnaire were strategically concerned with the easy and basic information of the respondent including gender, age and occupation. The answers presented that the majority of the respondents were women, who contributed with 145 answers out of 200. This makes up to 72,5 % of the total respondents. Meanwhile, out of these 200 respondents, men contributed with 52 answers (26%). The remaining three participants did not identify with any of the pregiven gender alternatives.

Furthermore, the respondents were divided into five different age groups from 15 to 64 or older. The larger part of the participants belonged to the age group 21-30, which contributed with 131 of the 200 answers (65,5 %). The following largest age group of respondents was 15-20, 30-40 and 41-64. None of the respondents were older than 64 (Figure 4.1.1).

Moving further to the question about occupation, the respondents that contributed to the survey were mainly students. The second largest occupation group consisted of full-time employees, and thereafter part-time employees (Figure 4.1.1).

From these results we can draw the conclusion that the typical person contributing to this particular survey is a female student with an age between 21 and 30. Since the approach on spreading this survey was through Facebook, where the questionnaire was sent to friends and acquaintances and published in different Facebook groups, this was an expected outcome. However, our goal was to get a fair division between the genders which we unfortunately did not get.

<i>Respondents segmentation</i>		
	<i>Count</i>	<i>Percent</i>
Total respondents	200	100 %
Gender		
	<i>Count</i>	<i>Percent</i>
Male	52	26 %
Female	145	72,5 %
Other	3	1,5 %
Age		
	<i>Count</i>	<i>Percent</i>
15-20	44	22 %
21-30	131	65,5 %
31-40	17	8,5 %
41-64	8	4 %
65+	0	0 %
Occupation		
	<i>Count</i>	<i>Percent</i>
Student	111	55,5 %
Full-time employee	60	30 %
Part-time employee	16	8 %
Retired	1	0,5 %
Unemployed/job-seeking	6	3 %
Other	6	3 %

Table 1. Table of Respondents segmentation

4.2 Online purchasing

The respondents were asked to answer if they had access to any of the following devices: mobile phone, computer and tablet. The result showed that all the respondents had access to a mobile phone, almost everyone (96,5%) had access to a computer and more than half (60,5%) had access to a tablet. Further investigation of this question, by using SPSS and looking at frequencies, presented that 59% had access to all three of the pre-given alternatives and 37,5% had access to mobile phone and computer. This shows that more than half of all the respondents have access to multiple devices. Only 2% of all the participants had access to a mobile phone only.

Previous research, presented in the theoretical section chapter 3, strengthen the data about the popularity of multiple devices even further. The Internet Foundation in Sweden (2016) presented that it is becoming more and more common for a person to own multiple devices such as a computer, tablet and a mobile phone. The article also points out how the use of mobile phones keeps increasing among the Swedish population. The study portrays that as much as 65 % of the Swedish population is connected to their smartphones every day. Figure 4.2.1 does not show how much the respondents use their phone but that all of the respondents have access to a mobile phone.

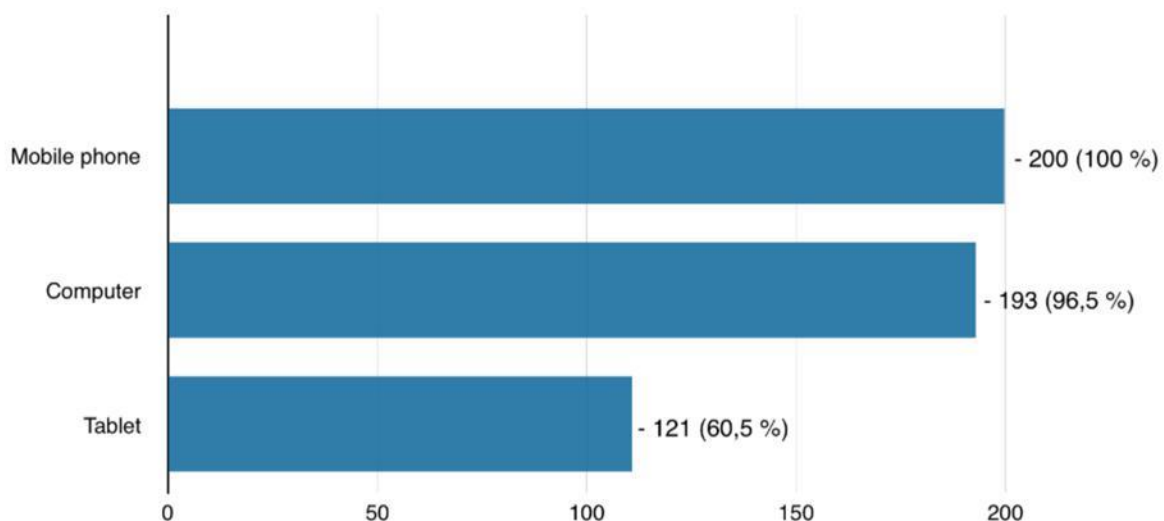


Figure 2. Q.4 Do you have access to any of the following devices?

From question 10 from the survey - *Where do you prefer to buy products?* (Appendix 2 - Q10), almost half of all respondents answered that they preferred to buy products in a physical store (49,5%). To buy products online via computer was the second most popular option (32,5%) and 15% preferred to buy online through the mobile phone. After examining the percentage data, a Bivariate Correlation test was performed to see if there were any correlations between what devices a person owned and where that person preferred to buy products. The value from the Pearson Correlation showed that there was no relationship between the two variables. The second value, the significance value, also showed that the result was largely dependent on chance (Appendix 1 - Q4*Q10). As a result from our survey, there is no link between what kind of products the respondents own and where they prefer to buy their products.

Question 5 in the survey - *Have you ever purchased products online?* (Appendix 2 - Q5), showed that all of the respondents had completed a purchase online. The assumption was made before that most of the respondents had purchased something online. Consequently, the question was asked how often, during one year, the respondents had been shopping online (Appendix 2 - Q6). To shop online a few times a month, regardless of device, was most common among the participants (40,1%). Previous research from Postnord (2016), also presents that 67% of the Swedish population is consuming through internet every month which strengthens the results. By performing correlation tests in SPSS, we could conclude that neither gender nor age was depending factors on how often a person shopped online (Appendix 1 - Q6*Q1 & Q6*Q2).

On the other hand, shopping online through a smartphone, was not as popular for the respondents as one may think due to the fact that Figure 3 presents that everyone contributing to this survey have access to a smartphone. The collected data presented that most of the respondents (39,9%) was shopping through the phone once or a few times a year. Moreover, the second most common alternative showed out to be to shop a few times a month (25,9%) closely followed by the alternative to never shop online through the smartphone (18,1%). However, studies show that the use of smartphones when shopping online is on the way to become more and more popular. According to Postnord (2017) 35 % of the Swedish population had during one month completed one or more of their purchases through their smartphone.

4.3 Usability in m-commerce

When it comes to designing the questions about the usability in m-commerce, the decision was made to involve other factors that do not concern usability to give a wider perception of what the consumer finds to be of importance when shopping through the phone. The questions were also designed to be answerable by persons who do not shop online through the phone so their point of view could be given as well. From the presented theory according to Nielsen (1994) there is five major usability factors that can decide whether the consumer will complete the purchase through the phone or not: *learnability*, *efficiency*, *memorability*, *errors* and *satisfaction*.

Our survey found that the most important factor when shopping through the phone was not a usability factor but a security factor. In question 11 "*If you were shopping via your mobile phone, how important is it for you that the site/application...*", the option that the application or mobile website "*feels safe to use*" dominated the answers with 74,1% of the respondents that choose this alternative to be "very important". The second most popular alternative for the respondents, with a total of 67% of the answers, was if the site was "*displaying good images of the product*". The third most important alternative for the participants was that the site provided a "*good overview of the cart before completing the purchase*" (Appendix 2 - Q11). These two alternatives can be linked to usability. Furthermore, the result showed that the overall design, like look and use of colors, of a mobile site was in fact not so important for the respondents. Although usability factors seemed to be more important than design factors, one does not exclude the other. According to previous research aesthetics and usability can be viewed as being positively correlated. Sometimes even a great visual design can cause users to overlook usability problems, and a site with great usability can overlook a not so great design (Ngai 2017).

When putting these usability factors in relation to other, they may not be seen to be of great importance. However, when moving on to the next question - *"What is the probability that you will cancel a purchase via a mobile phone if any of the following options occur?"*, the importance of the usability factors cannot be neglected. If not implementing usability factors when creating a mobile site or application, many of the participants would cancel their purchase. The survey showed that if the mobile site had a lot of errors, the majority (69%) of the respondents would cancel their purchasing. In addition, if the site was too slow, 39% would cancel their purchasing as well as if the site was too complicated 37,5% admitted that they would cancel their purchase (Appendix 2 - Q12-Q20). These situations may occur if usability is not considered and implemented when developing m-commerce. The usability is of big importance if the companies would like to have consumers that complete their purchase and becomes satisfied of the whole consuming process.

As presented in the theory section, our survey strengthens the theoretical background regarding the importance of usability factors in m-commerce. Even though our survey pictures the importance of other factors as well, it is proved through the survey that usability is among the determinative factors when it comes to the customer's experience of the application or mobile website. Usability is often the decisive factor for if a customer chooses to go through with a purchase or not. The theory section further shows that majority of the developed applications and mobile websites does not reach the desired results and often fails. Developers often fail to make it easy for the consumer to navigate the site or application and causes frustration since the shopping takes more time and energy than it should. When the application or website contains a lot of errors, the consumer will not feel safe using it and this will also lead to a failure when looking at the results from question 13 (Appendix 2 - Q13). As presented in theory, usability does not only include the interaction process but also the design. From our survey we can see that, question 16 *"Would you cancel the purchase if the site/application did not contain clear contact information like telephone number, email and address"* (Appendix 2 - Q16), 37% said they would cancel. This shows the importance of having this in mind when planning the design so that the user could easily find the information desired. Also, when looking at the *question 11* (Appendix 2 - Q11), the importance of the design is presented once again. 66,7% of the respondents answered that it is very important for them that the site or application provides a clear overlook of the cart before submitting the purchase.

Even though usability factors are very important to consider when creating mobile applications for m-commerce, the collected data from the survey still points out that security is the most important factor for the respondents. 78,5% of all the respondents choose that they would definitely cancel the purchase if the site was perceived as unserious (Appendix 2 - Q17). This can be connected to question 11 (Appendix 2 - Q11), result shows that the application or mobile website needs to feel safe to use for the customer in order for him or her to complete purchases through the phone. This can be interpreted in different ways. What makes a user feel like a website is safe to use can depend on numerous factors. In the theoretical section one factor that was discussed was the error rate. It is of huge importance that there are few errors and if there are any how easy is it to recover from the errors. Also, to create a good user experience there should be an elimination of errors and one of the first requirements is to meet the needs of the customer, without any hassle or bother. Another interpretation of the "feels safe to use" question is that the user is concerned about the personal information that the user may be sharing in order to go through with a purchase. It is of great importance that the application or mobile site ensures that the users data is kept secure since the mobile devices nowadays contains a lot of personal and sensitive

information. This survey shows that the user is aware of the security factors and wants to feel safe when shopping through mobile devices.

5. Discussion

The aim of this research was to find out what the driving factors of m-commerce are from a usability perspective and underline the importance of different usability factors that affects customers when performing online shopping through mobile phones. As a result of this study we found that the importance of including usability thinking in the development of mobile sites and applications cannot be neglected. Usability in applications is a critical factor when it comes to the customer's decision whether to perform a purchase through the mobile phone or not. In order to respond to the purpose of this research, the primary focus has been on answering the research question "*Which are the most important usability factors according to consumers, that companies need to take into account when developing a mobile application for m-commerce?*".

5.1 Usage of M-commerce

Even if m-commerce is becoming increasingly popular in Sweden, it is still not used as frequently as it could, given that a huge part of the Swedish population owns a smartphone with daily internet access. However, in other countries like China, a big part of the online retail sales is performed through a smartphone. This can strengthen what have been mentioned in previous theory; Even though all of the respondents from our survey had access to a mobile phone, the desktop computer is still dominant in the market share in Sweden, while the mobile phone is dominant in the market share in China (Statcounter 2017).

Almost all of the respondents in our survey had access to a computer and all of the respondents had access to a mobile phone. A correlation test was performed in SPSS to find out if there was any relationship between what kind of devices people had access to and how they preferred to buy products online. The result pointed out a negative correlation between the two variables which indicates that the availability of different devices has no effect on their shopping habits. One reason to why people in Sweden still prefer to purchase online through computers can be related to the big market share of computers that still dominates the marketplace for devices. Considering to statistics from Statcounter (2017) that points out that computers still have 56,37% market share in Sweden, retail companies in Sweden may still put most resources in e-commerce via computers, rather than via mobile phones. In China however, the mobile phones dominated on the market, which leads to that retail companies feel the need to elaborate m-commerce in the best possible way, to get to the Chinese consumers.

Swedish companies should be aware of the high mobile phone usage and the increasing trend of consumers preferring to shop online through their phones. Swedish people have for a long time been users of desktop computers, and this device is both comfortable and understandable for many users. Mobile phones are a newer field at the market. It can feel riskier for companies to start focus more on m-commerce, while Swedish people already are frequent computer users. Although, by putting more resources at m-commerce, this can lead to more competitive advantages. Companies who does not see and starts to adapt to this mobile trend, may lose on it in the near future.

5.2 Usability thinking in mobile applications

As said, it may be an important step for companies to adopt m-commerce; What may be even more important for them, is to develop mobile applications for m-commerce properly. There is a lot of factors to have in mind when developing mobile applications or sites that support mobile commerce, and usability is one of the most critical ones.

First of all, the companies need to recognize that there is a difference between developing applications for computers and for mobile phones. Mobile phones brought new challenges when creating good user experience and usability. The users of mobile devices is never tied to a single location when interacting with the applications and the wireless network connection speed can be hard to control. There is limited processing capability, memory, power as well as input mechanisms. The large size of bandwidth the computer provided are now gone and the challenge is to fit the application inside a much smaller screen.

The results from our survey showed that many of the respondents believed that the small screen size of the mobile phones was a challenge when shopping through the phone. Every aspect and function in the intended application or mobile site needs to be reconsidered. It is important to modify information and layout, so it fits the small screen size of the mobile phone in order to make the navigation easier. To replicate the current homepage on the web and expect it to work just as well on the phone is not a good idea. The large content is not suitable for the phone and as a result, the interface will be overburdened (Hoehle & Venkatesh 2015). This can cause frustration among the consumers and can be a reason to why many still prefer to make their purchases through the computer or in stores.

Many of the participants acknowledged that they thought that many mobile applications were differing too much from the original website on computers. Our survey presented that, when users find the mobile site or application differing too much from the original web page, they would consider leaving. Customers that have gotten familiar with a web page and learned how to navigate in it, do not want to face a completely different layout when accessing it from another device. For example, when a customer learns a company's product menu on a computer website, a completely differently presented product menu on the mobile phone may confuse the customer. This can be linked to both memorability and learnability, which is two critical usability factors (Nielsen, 1994). When users revisit a company's web page after a while, regardless of device, they should remember how to navigate and act in order to complete a purchase. For a user to remember how to use a site, it is important that the site and application is designed in an easy way so that the design is easy to learn and navigate in.

Many of the respondents of our survey also avoided trading via mobile phones because they felt that it was easier to make mistakes through the mobile phone, than it would be if they were shopping in a physical store or online via the computer. If a user makes a mistake through the mobile phone, like entering the wrong product category or adding to many t-shirts in the product basket, many respondents believed that it was harder to fix that mistake on a mobile phone in comparison to a computer.

This brings us to the further reason to why people avoid shopping using a mobile phone and it is associated with efficiency and errors. From the data collected through the self-completion questionnaire it was possible to get an understanding of the reason behind a cancelled

purchase. The result showed that the majority of the respondents would cancel their purchase if the mobile site contained lot of errors or was too slow. User satisfaction can be achieved by having an easy-to-use application, but one should not forget the importance of efficiency as well. If the user needs to wait too long because the site is loading, or many errors occur, it can easily lead to frustration and the user may decide to leave the site. If an error occurs, it is essential for developers to investigate how the user behaves and acts afterwards. An example is to see if the users makes any new attempts to complete the purchase after an error has occurred and if so, how many times the users tries before they choose to cancel the purchase. The act of going through errors in detail will most likely reduce the risk of same errors in the future.

5.3 The most important usability factors for consumers who perform m-commerce

Before mentioning the most critical usability factors, results from our survey indicated that the most important factor for users when performing m-commerce was not related to usability but to security. The results showed that users consider the security aspect (a key issue regarding m-commerce) to be the most important factor when considering shopping online through a mobile phone or not. According to this fact, lack of security has a big influence on consumers to not use a mobile phone when buying products because users feel insecure. This could be a reason to why m-commerce is still not fully adopted among the Swedish population. Based on these results it is of great importance for users to feel safe when they need to enter personal data into the application or site and that it ensures the users that the data are kept secure. Security risks that are more specific to mobile computing are malicious users, security problems with data exchange, loss or theft of the device due to their small size or security problems due to location identification. When developing mobile applications and websites, there needs to be a fair balance between creating a secure environment as well as maintaining a good user experience.

Moving on to usability factors in mobile commerce, it is presented that the design of the interface of the mobile application is one of the most essential components since it is here the main interaction with the application will occur. The user interface is the environment where user performs communication, do information search and transactions and it is important that the customers experience via the interface satisfies both their sensory and functional needs. According to the results from the survey, it was of great importance for the respondents that the application was not too slow, did not contain any errors and was not too complicated. Should any of these occur, there was a high likelihood that the user would cancel an ongoing purchase. The results of the study can therefore strengthen previous literature that the usability is of big importance if the companies would like to have consumers that complete their purchase and becomes satisfied of the whole consuming process.

Usability does not only include the interaction process but also design. Interface features such as page and content design are related to the user experience but is also important in some aspects when considering usability in applications. Previous theory mentions that for example too much information on a page, as well as too little information on a page, can reduce usability. Regardless, it did not hinder users to go through with a purchase. Likewise, other design issues like an application's look and use of colors was not that important for the respondents. On the other hand, something that was considered very important was that there were good product images on the page. Furthermore, the result showed that it is also very

important for the respondents that the site or application provides a clear overlook of the cart before submitting the purchase.

We have mentioned that our result pointed out that security in m-commerce was very important for the respondents. However, there is not always a clear distinction between different key issues in m-commerce. For example, the two issues usability and security can go hand in hand in many cases. What users consider to be of importance on a mobile site can be related to security aspects. If there are good and clear product images, it can give the customer a sense of security when they see how the product looks and they can therefore dare to order the product. It reduces the risk of buying the pig in the sack and the customer can feel safer when buying products online than they would do if there were pictures of poor quality or none at all.

In the case of a clear overlook of the cart before submitting the purchase, it may be assumed to be of security reasons because the buyer may wish to review the correct products in the cart before completing the purchase. But it can also be seen from a user-friendliness perspective since the user may want a clear overview to make it as fast and as smooth as possible when completing the purchase without getting tired and leave the site before completing the purchase.

6. Conclusion

By conducting this research, we have through the help of previous research and our own survey study achieved enough knowledge to make conclusions in order to answer the question:

- *Which are the most important usability factors according to consumers, that companies need to take into account when developing a mobile application for m-commerce?*

The importance of including usability thinking in the development of applications for m-commerce cannot be overlooked. According to consumers, it has been found that some usability factors are of greater importance than others. By ignoring these factors and not include them in the application development, it is highly likely that customers who intend to trade through the application will cancel the purchase.

The results of this research show the importance for retail companies to be aware of the distinct features of the mobile phones, when developing applications or sites for commercial purposes. Developing applications for mobile phones, rather than to computers, brings new challenges to be aware of like smaller screen sizes and limited ability to recover from mistakes. It has been shown that some companies tend to replicate their current webpage on the computer and expect it to work as well on the mobile phone. In that case, characteristics that the mobile phone has are being ignored and not included in the application or site development process. Consequently, usability factors are not considered.

Even though it is important for companies not to replicate the web page directly from the computer, it is just as important that the layout in the mobile phone does not differ too much from the desktop version. Consumers that have gotten familiar with a web page and learned how to navigate in it, do not want to face a completely different layout when accessing it from another device. Distinct features of mobile devices need to be taken in consideration when

developing applications; this to succeed in establish good usability in applications for the companies' customers.

The design of the interface of the mobile application is of big importance, since it is here the main interaction with the users and the application will occur. The site should be easy to understand and to navigate in. When consumers trade through mobile phones, they found it important that the site provided good product images and a good overlook over the product chart before completing a purchase. It is more important for them that the application is designed with the focus on making the site easy to use and allowing customers to complete a purchase effectively, rather than that the application have a cool design with flattering colors. In conclusion, when planning the application's page and content design, the developer must have in mind that the content will be presented in a good way for making it easy for users to navigate and use it in an effective way.

Companies should be aware of the problems that errors in applications or to slow loading sites can cause. According to consumers, both errors and slow loading sites in the application create a lot of frustration. If those problems would occur, many consumers would consider canceling their purchase and leave the site. Developers need to take this into account and make it easy for the user to recover from any possible errors. For example, there should be clear "return" buttons in the application and it should be simple erase items from the product basket. For a company to keep their customers and provide good user satisfaction, the process of purchasing products through an application should be uncomplicated and smooth. If mistakes occur, they need to be able to be solved efficiently.

6.1 Implications and limitations

As very common among most studies, this research has some limitations that need to be taken into consideration. First of all, even though an acceptable response rate was achieved, and we managed to collect 200 answers, the sample is relatively small. Because of this the result would appear differently if the study would have been included a greater number of responses. Furthermore, since a convenience sample was employed, the findings cannot be applied to the entire population. The chosen sample was of small age range, mainly women and were members of the same kind of community groups on Facebook or belonged to our own circle of acquaintance.

These are important aspects to mention, just because people belonging to the same social groups or that socializing with each other, tend to behave and act in a similar manner. It can therefore lead to a misleading result. The answers presented that the majority of the respondents were women, who contributed with 145 answers out of 200. Despite the fact that the results did not show any difference between men and women in terms of their shopping through mobile phones it would have been better if the study had a varied range of respondents.

6.2 Further Research

The field of study of mobile commerce is rapidly growing. This bachelor thesis has focused on describing what usability factors that is important to acknowledge when developing applications for mobile commerce. From the theoretical and empirical analysis, we come to find that other factors, in addition to usability, plays a big role for users when performing m-commerce. One key issue in m-commerce that had a big impact on the use of m-commerce for

users were security. An interesting area for further research would be to in depth examine security in mobile commerce. In addition, it would be of interest to examine the findings in the conclusion section further and investigate these conclusions on a wider range of people.

Furthermore, the focus has also been on consumers among the Swedish population. Some countries in Asia, especially China, have briefly been mentioned in the purpose to compare the use of mobile commerce between the countries. It would be interesting to investigate more on how m-commerce is used in other countries. For example, an in-depth comparison between m-commerce in Sweden and China would be interesting to do further research on.

As mentioned before, the most important factor for the customer in this particular research turned out to be a security factor and almost half of the participants still prefer to shop in stores. One interesting aspect that could be more deeply examined is if the customer does not trust the technology itself or the quality of the product that the customer will receive when shopping online and therefore prefers to touch and feel before making a purchasing decision. Moreover, there can be numerous of factors affecting the decision whether to buy online, especially through the phone, or not. As a result, this can be more examined in the future.

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Appendix 1 - Tables

Q4. Do you have access to any of the following? * Q10. Where do you prefer to buy your products? - Cross-tabulation

Correlations

		4. Do you have access to any of the following?	7. Where do you prefer to buy your products?
4. Do you have access to any of the following?	Pearson Correlation	1	,032
	Sig. (2-tailed)		,656
	N	200	200
7. Where do you prefer to buy your products?	Pearson Correlation	,032	1
	Sig. (2-tailed)	,656	
	N	200	200

Q6. How often have you, during the last 12 months, purchased products online? * Q1. Gender? - Cross-tabulation

Correlations

		6.1 How often have you, during the last 12 months, purchased products online?	1. Gender
6.1 How often have you, during the last 12 months, purchased products online?	Pearson Correlation	1	,067
	Sig. (2-tailed)		,353
	N	192	192
1. Gender	Pearson Correlation	,067	1
	Sig. (2-tailed)	,353	
	N	192	200

Q6. How often have you, during the last 12 months, purchased products online? * Q2. Age? - Cross-tabulation

Correlations

		6.1 How often have you, during the last 12 months, purchased products online?	2. Age?
6.1 How often have you, during the last 12 months, purchased products online?	Pearson Correlation	1	-,062
	Sig. (2-tailed)		,395
	N	192	192
2. Age?	Pearson Correlation	-,062	1
	Sig. (2-tailed)	,395	
	N	192	200

Appendix 2 - Self-completion questionnaire

Mobile commerce

This form has been developed for academic purpose and is designed to provide data for our Bachelor Thesis in Informatics at Borås University. The goal is to find out how consumers in Sweden relate to mobile commerce.

All participants are anonymous. Thank you for contributing to our survey!

***Obligatorisk**

1. Gender? *

Markera endast en oval.

- ☐ Female
☐ Male
☐ I don't identify with any of the options above

2. Age? *

Markera endast en oval.

- ☐ 15-20
☐ 21-30
☐ 30-40
☐ 41-64
☐ 65+

3. Main occupation? *

Markera endast en oval.

- ☐ Student
☐ Full-time employee
☐ Part-time employee
☐ Pensioner
☐ Unemployed/Job-seeker
☐ Övrigt: _____

4. Do you have access to any of the following?

Markera alla som gäller.

- ☐ Mobile phone
☐ Computer
☐ Surf tablet

5. Have you ever purchased products online (for example, clothing, electronics, interior design)? *

Markera endast en oval.

- ☐ Yes
☐ No

6. How often have you, during the last 12 months, purchased products online?

Markera endast en oval.

- ☐ Many times a week
- ☐ Once a week
- ☐ A couple times a month
- ☐ Once a month
- ☐ Once or a few times per year
- ☐ Never

7. How often have you, during the last 12 months, purchased products online through a mobile phone?

Markera endast en oval.

- ☐ Many times a week
- ☐ Once a week
- ☐ A couple times a month
- ☐ Once a month
- ☐ Once or a few times per year
- ☐ Never

If you in the question above answered that you were shopping via mobile phone ...

... once a month or more often - Only answer question 8

... once/a few times per year or never - Only answer question 9

8. Check the options below that are most consistent with why you choose to shop via mobile phone:

Markera alla som gäller.

- ☐ It goes fast via mobile phone
- ☐ It is easily accessible, as you always have your mobile at hand, no matter where you are
- ☐ Other apps needed to complete purchase are on the same device (eg Mobile BankID)
- ☐ It is tedious to get and connect to another device
- ☐ You are always online on the mobile phone. Not so dependent on Wifi
- ☐ Övrigt: _____

9. Check the options below that are most consistent with why you choose not to shop via the mobile phone more than you do:

Markera alla som gäller.

- ☐ The mobile page differs too much from the website you are used to seeing via a computer screen
- ☐ The screen on the phone is too small
- ☐ The pages I want to shop from are not mobile phone customized
- ☐ It feels easy to make mistakes from the phone
- ☐ It does not feel safe to provide personal information over the phone
- ☐ It feels too tedious with shipping returns
- ☐ Difficult to print out things like for example the order receipt
- ☐ I do not know. Rarely shop online
- ☐ Övrigt: _____

10. Where do you prefer to shop products? *

Markera endast en oval.

- ☐ In a physical store
- ☐ Online via computer
- ☐ Online via mobile phone
- ☐ Övrigt: _____

11. If you were shopping via your mobile phone, how important is it for you that the site/application...

Markera endast en oval per rad.

	Not important at all	Not so important	Pretty important	Very important
Feels safe to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have a nice design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For you, have pleasant colors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In an efficient and easy way, allows you to make a purchase	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have good product pictures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upon completion of purchase, you will be able to save or print a receipt/order confirmation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is easy to understand and after you've gone away for a while, you still remember how you did	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Offers customer support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fast loading time when clicking around on the site/application	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides a clear overview of the shopping cart before completing a purchase	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is the probability that you will cancel a purchase via a mobile phone if any of the following options occur?

Mark on future options how big or small the likelihood of discontinuing a purchase is for you.

1 = Not high probability.

6 = High probability.

12. The page/application is too slow *

Markera endast en oval.

19. The page/application contains too much information *

Markera endast en oval.

	1	2	3	4	5	6	
Not high probability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High probability

20. The page/application does not have a clear " Go back button" *

Markera endast en oval.

	1	2	3	4	5	6	
Not high probability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	High probability

Appendix 3 - Table of sources

Used sources when creating questions and response options for the self-completion questionnaire

Sources	Questions
Zhang & Adipat (2005) Research from Zhang & Adipat (2005) helped establishing many of the predetermined options in these questions. They mention some challenges that the mobile phone has brought, such as small screen size, connectivity and a new mobile context.	Q.8 - "Check the options below that are most consistent with why you choose to shop via mobile phone:" Q.9 - Check the options below that are most consistent with why you choose to not shop via mobile phone more than you do:
Branki, Cross and Diaz (2008) Statements regarding security and privacy were based on two of the key issues in m-commerce, that Branki, Cross and Diaz (2008), have examined thoroughly.	Q.11.1 - If you would make an purchase through your mobile, How important is it for you that the mobile website feels safe to use? Q.15 What is the probability that you will cancel a purchase via a mobile phone if the page/application required to much personal information?
Nielsen & Loranger (2006) In their research they mention different usability attributes that are important to acknowledge when developing mobile applications. These attributes are for example the ease of use, effectiveness and learnability of an application, as well as how error-prone it is.	Q11.2 If you would make an purchase through your mobile, How important is it for you that the mobile website is easy to use? Q11.5 If you would make an purchase through your mobile, How important is it for you that the mobile website in an efficient and easy way, allows you to make a purchase?