

Characterizing the differences of Online Banking User Experience on computer and mobile platforms

Zhulieta Lecheva

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Abstract

The aim of this thesis has been to investigate and characterize the online banking user experience on computer and mobile platforms. Different studies have been conducted on the topic of online banking, but none of them compares the user experience on different platforms. Accordingly, literature review was conducted, in order to outline the theoretical framework for characterizing the phenomenon of online banking user experience. A questionnaire was used for primary data collection. The quantitative data is analyzed and presented in this thesis report, in creating an understanding of the online banking user experience on computer and mobile platforms.

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1. Introduction

With the development and advancing of technology, new devices have been created with different purpose and use. From the computers to smartphones, tablets, and in recent years, smartwatches. In 2007, when the iPhone was introduced to the public, which started the big development of smartphones on the market and different companies started introducing their versions of smartphones (The Innovative Success that is Apple, Inc., 2012) (Martin, 2014). Accordingly, applications with different uses were created for the smartphones and are still creating, from games and social media to online banking and many more.

With the development of the websites and applications for different screen sizes and functions, the user experience (UX) became important factor for the success of the product on the market (Schrepp, M., Hinderks, A., & Thomaschewski, J., 2014). Companies and organizations started to expand and invest in the field of user experience, in order to provide better services to their users (Garrett, 2011, p. 12). The user experience focuses on gaining an understanding of the users, users' needs, values, abilities, and limitations. Accordingly, banks started focusing on user satisfaction, trust, ease of use of the product, accessibility, and usability in order to improve their online banking experience for their users (Lie 'bana-Cabanilla, F., Mun oz-Leiva, F., & Rejo n-Guardia, F., 2013).

Online banking is a banking which uses the Internet to conduct transactions. With online banking, the users can create bank accounts, pay bills, transfer money, etc. Online banking was introduced in the 1980s, at that time bank websites provided just small amount of information to their customers. In the 1990s the banks expanded their websites and added account services, by the 2000s many banks offered online banking services, but since then online banking has been under development and many changes have been made. (Chou, C., D. & Chou, Y. A., 2000) By the end of the 1990s, online banking was not very popular among the customers, as most of the people (around 73%) used ATMs or went to the physical banks and around 30% used online banking (Hoehle, H., Scornavacca, E. & Huff, S., 2012), but with the application of the third generation (3G) mobile communication technology, the number of mobile Internet users increased to 66% of the Internet population in China by 2011 (Zhou, 2012). Accordingly, in 2011 20% of bank account owners used mobile banking to access their banking services, which grew to 43% by 2015 (Board of Governors of the Federal Reserve System, 2016).

With the popularization of online banking and user focused development, the online banking is seen as user interaction, which needed to be as easy and as seamlessly as possible. The user interaction has evolved from face to face between the users, to users interacting with the interface of the online banking on computer or mobile device of choice. The users need to feel secure and in control of what is happening with their sensitive information and how their money is handled (Chiou, J-S. & Shen, C-C., 2012). The online banking is created as similar to the physical bank experience as possible, meaning the users can do almost the same number of tasks on their devices as being in a physical bank just without the help of bank assistant. The online banking is a good way to save time, as it takes just a few minutes to pay bills, transfer money, etc., furthermore, it contributes to reducing the tasks of bank assistants and less waiting time in the physical bank offices for the non-users of online banking. Subsequently, online banking diminishes the face to face interaction between the users and the bank assistants, contributing to higher user interaction with the interface of online banking. This aspect need to be taken seriously as it affects the relationship between the physical banks and their customers (p. 860).

Because of the missing help of bank assistants, the interface of online banking websites and applications need to be easy to use, not confusing to the users, and to have the needed information for the users to navigate and complete their tasks without problems. Therefore, the online banking should offer positive user experience to the users, otherwise the users will not use it. For this project, it is interesting to investigate what kind of user experience does online banking offer to their users, how satisfied the users are, and how this user experience is created.

With the introduction of new technology and user experience being important part of the design process, many aspects had to be considered, in order for the banks to provide the customers with the positive user experience on online banking on different platforms.

1.1. Motivation

As presented, the online banking or also known as internet, mobile or e-banking, was introduced in the 1990s and early 2000s, but was not embraced by many users until 2011 - 2012, after the adoption of 3G (Zhou, 2012). Since then, the number of online banking users has increased tremendously.

Online banking has been investigated by many researchers with different aims (Hoehle, H., Scornavacca, E. & Huff, S., 2012, p. 122). Accordingly, many of them have investigated online banking on mobile devices or on computers/ laptops (p.124). Some of the studies, present issues of mobile devices, but none of the studies examines the mobile devices in comparison to stationary computers or laptops. After performing a search on the topic, there was no matching article or other academic paper written, examining and/or comparing the online banking user experience on different platforms. The focus of these studies is on the security, acceptance, motivation to use online banking, the difference in use in different age group, and so on (p. 127), but none of them compares the user experience on these devices.

The user experience has been important element of the development process of new products, systems and services (Garrett, 2011). The user experience is concerned with the overall feeling and satisfaction, or the perception of the users when encountering new product (Schrepp, M., Hinderks, A., & Thomaschewski, J., 2014). Accordingly, with time the field of UX evolved and it can be used to evaluate any kind of product or system (Alber, W. & Tullis, T., 2013, p. 4), including the field of online banking. Online banking has its unique scope and context within the user experience. This is on account of providing security, privacy, trust, satisfaction, ease of use, and accessibility to the users, as online banking gives access to the user's private finances. Within the online banking, the UX has been used to improve or compare the products. It is interesting to investigate this topic as no similar research has been found or been conducted. As handling personal finances is important or everybody, because everybody has to do it at one point or another. Thus, finding a way to creating a good user experience will benefit the users. This will contribute to the understanding of the user experience, improvement of the online banking and will explore the user satisfaction of online banking on the different platforms. It will further contribute to better understanding of the users' feelings of using different platforms, also how and why they use them. This project will contribute to obtaining better understanding of users' perceptions and delivering the best user experience in terms of online banking possible across different platforms. Accordingly, the user experience in online banking can contain different elements than the user experience presented by museum or video game. For example, online banking is taken very seriously and private and mostly it is not shared with others, whereas user experience of museum or video game are enjoyable and can be shared with others. Meaning, the focus will be on different aspects when evaluating the user experience of online

banking and video games or museums. The context of use is a key factor of the user experience (Bargas-Avila, J. A., & Hornbæk, K., 2011).

1.2. Defining the scope

To understand the user experience on online banking platforms, theories of Information Architecture will be applied. The Information life cycle will be used, namely: content, context and users, as defining the main elements and to guide the data collection and analysis, where the main focus will be on the users and the context of use. Those guidelines will be used to examine the users and the content, in order to understand the context. The focus will be set on the difference of what online banking provides for their users on different platforms, accordingly the difference in the users' experience will be investigated by conducting a quantitative study. The quantitative study will aim to compare the use and the user experience on stationary computer/ laptop and mobile devices, such as tablets and smartphones.

This field can be argued to be interesting to investigate on account of that nobody has conducted similar study, namely investigating and comparing user experience on online banking platforms. Furthermore, this investigation can contribute to more unified user experience among the platforms, point out areas within online banking that need to be improved, and finally, gain deeper understanding of UX on different platforms within the same service.

From this investigation, the expected outcome is that the UX on mobile devices will be more positive than the UX on computers. Accordingly, the mobile devices will be used more often than computers. These are basic expectations of the outcome, derived from the investigated literature, the use and the access to online banking on these devices.

1.3. Problem formulation

The aim of this research is to evaluate and compare the user experience on online banking on stationary computers/laptops and mobile devices, in order to determine how the users use these devices and what need to be changed, in order to optimize the user experience. Accordingly, the following problem formulation is proposed:

"What characterizes the differences of User Experience on computer and mobile platforms?"

Alongside with the proposed research question, this thesis will also aim to investigate:

• What characterizes the user interaction?

- How do the users assess the user experience?
- What are the implications of the user assessment?

On account of the many terms used in different studies to refer to internet, online, mobile, virtual banking and so on, within this project the term 'online banking' will be used to refer to the overall field. Later trough the project the term computer banking will be used to refer to online banking on computers and laptops, and the term mobile banking will be used to refer to online banking on mobile devices, such as smartphones and tablets.

2. Literature review

Literature review was conducted to collect information and knowledge about the user experience on online banking on how, why, and what motivates or prevents the users to use online banking on different platforms. For this purpose, a variety of different academic sources were reviewed. The academic articles were searched and selected through different databases: the Aalborg University Library, Scopus and Web of Science. Several keywords were identified to research the topic, such as 'online banking', 'internet banking', 'e-banking', 'mobile banking', 'mbanking', 'user experience', and 'UX'. On account of not providing many academic articles, concerned with the topic at hand, the term 'UX' had to be removed from the search and only the term 'user experience' was used in combination with the first five terms for collecting academic literature on the topic. For the literature search, the terms were combined with the AND operator (online banking AND user experience), other combinations were tried combining the different terms. The academic journals were selected based on the publication date, as recent as possible, limited from the year 2000 to 2017, on account of the ever changing and developing technology, the user experience in online banking from five or ten year ago might not be the same as today. However, articles from the last one – two years were found as well as articles from ten to fifteen years ago and were selected. Furthermore, the articles were chosen on account of providing information on the topic, combining both areas of online banking and user experience, and accordingly, to inform for different methods and techniques used. Subsequently, 10 articles were selected, because the little amount of the literature, and the topic not being explored that much or on account of eliminating one of the keywords, less than a hundred related articles were found for most of the combinations.

Accordingly, the articles, mentioned above will be presented and reviewed below, in terms of the topic of the source and the contribution to the further process.

Factors affecting online banking adoption

Technology adoption is the choice of the users to acquire and use a new invention or innovation (Hall, B. & Khan, B., 2002), or within this project the choice of the user to acquire and use online banking on different platforms.

There are different factors affecting the users' adoption of online banking. Singhal and Padhmanabhan (2008) provide a framework of the factors, which are taken to assess the users' perception on online banking in India. Within the article fifteen factors responsible for the online banking, based on the users' perception about online banking and different demographic variables, like age, gender or occupation are presented and examined. These factors are examined with primary and secondary data, primary data collected with online structured survey sent to respondents via email, using convenience sampling; and secondary data was collected from review of literature. Accordingly, the items of the survey were measured with five-point Likert scale and later on analyzed with Statistical Package for the Social Sciences (SPSS). Based on the analysis of the results of the study, utility request, security, utility transaction, ticket booking and fund transfer are defined as major factors responsible for the internet banking. This study clearly indicates the factors responsible for online banking is flexible and convenient to use, and it is beneficial to the users. Meaning, it is becoming a 'need' for the users, with more and more people willing to use it instead of going to the physical banks.

Additionally, Santouridis and Kyritsi (2014), examine the determinants of online banking adoption in Greece. The authors conducted a field research by interviewer-administered questionnaire, based on Technology Acceptance Model (TAM). Within their study Santouridis and Kyritsi investigate the behavioral intentions of the users by focusing on the perceived usefulness, perceived ease of use, perceived credibility, and satisfaction. According to their findings, the most significant determinant is of behavioral intention is perceived usefulness. Perceived ease of use, credibility and satisfaction was also found to have significant effect, but changes in these areas will have less important effect on the behavioral intention of the users, than the perceived usability.

Furthermore Alavi & Ahuja (2016), study different mobile banking applications and segment the customers, based on their adoption and usage of the apps in India. They conduct an exploratory study with three research objectives, among which is an identification of the factors influencing the usage and adoption of mobile banking apps. Accordingly, their findings show that the adoption and usage of mobile banking applications is influenced by the perceived usefulness and perceived ease of use, supporting Santouridis and Kyritsis findings. Also, influencing the adoption and use factors are perceived as an alternative option, perceived risks and cost and need for information.

Age groups

With the development of technology, people in different ages have different preferences on the adoption of technology. Harris, Cox, Musgrove, and Ernstberger (2015) investigate the validity of the belief that younger people value and adopt more rapidly technology than older people, within which the purpose of the study is to determine if this is true in regard to banking practices. The study investigates a couple of age groups and their contact and daily use of computer technology. For the study, a survey was conducted with the aim to evaluate how important the mobile, online and physical banking is to the different age groups. Accordingly, the results were analyzed with factor analyses and analysis of covariance. For the study two age groups were used, the first generation first started using computer technology when they were around 40-50 years old (started using computers around 1985-1990, born in 1940s). Whereas, the second of the generations grew up surrounded with technology (born in 1990s), meaning this age group knows how to use the technology and is primarily interested in new technology. Harris et al. suggest that technology adoption depends on three measurements: cognitive decline, experience and on the technology. Older users prefer the traditional banking, whereas younger users prefer online banking, but all age groups are equally interested in technology. Which leads to difference in the use of technology and age is not a barrier for the adoption of technology. According to the project at hand, this study provides relevant knowledge about the technical knowledge of the participants of the questionnaire, used for data collection. This is on account of the questionnaire's need to be filled out by people in different age groups and not being limited to specific age group. The only need for participants age is to be 18 years old or more, in order to be able to have own bank account.

Security and privacy

Security and privacy (Casalo, L. V., Flavian, C., & Guinaliu, M., 2007) are two of the most important factors affecting the trust of the user in online banking system. Privacy is concerned with the protection of personal information, or the set of legal requirements and practices towards the handling of personal data. Whereas security is in means of ensuring that the legal requirements and practices are met effectively. These two elements can positively or negatively affect the trust of the user and consequently, the adoption of the online banking. As online banking can be used on variety of devices, the users may not feel secure using online banking on different devices. The security and privacy is on the same level on the different devices, in order to ensure the safety of users' data. Nonetheless, the users have different preferences on the devices and many of them do not use online banking on their mobile devices or computers, because they do not feel their data is safe. Accordingly, security and privacy affect users trust and trust affects the adoption of technology.

Within the project, a questionnaire is conducted with the aim of data collection. On account of the sensitive topic of online banking, many participants may not feel secure about their data and therefore not willing to fill the questionnaire.

Trust

"Trust refers to the belief that someone's promise can be relied on..." (Chiou, J-S. & Shen, C-C., 2012, p. 863), meaning that trust in online banking is built upon the conditions provided by physical bank to their customers.

Trust is one of the most important factors affecting the adoption of online banking. Zhou (2012) examines different literature concerning the adoption of mobile banking, where it is argued that offline banking trust, security and structural assurance are the main barriers for mobile banking adoption. Furthermore, Zhou connects the mobile user behavior with flow experience, or the enjoyment, perceived control and attention focus. The results of the study support that mobile banking user behavior is affected by both trust and flow experience. Trust is affected mainly by the structural assurance or the trust in the physical bank institution and flow experience is affected by the ease of use and ubiquity. Within this notion, the study is from five years ago, meaning it was conducted at a time when not many people used mobile banking.

Accordingly, the results of the study may be different if it is conducted today. Nevertheless, trust and flow experience are factors predicting the usage intention. Meaning, there need to be trust and flow experience in order for the users to adopt and use new technology. People who do not trust the technology will not use it.

A study by Chiou and Shen (2012) supports Zhou's findings, that users are more likely to use internet banking provided by their bank if they trust their physical bank, within which Technology Acceptance Model (TAM) is used. The results of the study show that the attitude towards internet banking depends on two variables, ease of use and perceived usefulness of the internet banking services provided by the physical bank. Furthermore, the study found that investment with the physical bank influences the attitude towards using internet banking. Accordingly, overall satisfaction with and perceived trust in the physical bank plays role in motivating the users to use internet banking. The user experience is affected by the ease of use and the perceived usefulness, meaning that this can affect the results of the project if people have problems using the technology or if it does not satisfy their expectations in terms of usefulness, contributing with negative feedback.

Trust is the most decisive factor on the intention of the users to use a new mpayment/mobile payment system or not (Liébana-Cabanillas, F., Muñoz-Leiva, F., & Sánchez-Fernández, J., 2015). In their study, Liébana-Cabanillas et al. investigate the behaviour of young users towards their acceptance of new methods of mobile payment. For the research an experiment was conducted involving short-message-service (SMS) mobile payment system among young users to determine the factors affecting the adoption of the new mobile payment system. The study examines factors affecting the adoption of the new payment system. Accordingly, ease of use and perceived risks have significant impact on the decision of the user to adopt m-payment or other online banking system. But, as the previous studies show, the most important factor affecting the adoption of online banking system is trust.

Satisfaction

Satisfaction can be interpreted as an evaluative judgement and/or emotional response by the user concerning a purchase, consumption or use of a product or service. (Lie´bana-Cabanilla, F., Mun˜oz-Leiva, F., & Rejo´n-Guardia, F., 2013, p. 753).

User satisfaction is a phenomenon which is of particular importance in the evaluation process of a usage experience, such as shopping, consumption, or service, and therefore it is important for long-term user responses (p.750). Lie bana-Cabanilla et al. investigate the user satisfaction in online banking perspective. For this aim, a self-administered web survey was used for data collection. The results support authors hypotheses that user satisfaction relates to trust, ease of use, usefulness, and accessibility, and all these four elements contribute to some extend to the user satisfaction. The user satisfaction is important part and it contributes to the overall user experience.

A study by Yoon (2010), investigates the antecedents of user satisfaction with online banking in China, and explores the effects on user experience. Accordingly, the antecedents of user satisfaction with online banking are defined as ease of use, transaction speed, design, security, information content, and customer support service. The results show that design, security, speed, information content, and customer support service had significant influence on the user satisfaction. Whereas ease of use did not have a significant influence on the user satisfaction.

Within the investigation of the articles, most of the literature is focused on the online adoption by the users, trust and security issues. Accordingly, several important factors affecting online banking adoption and the overall user experience of online banking arose in consideration to the problem formulation of this project. First, trust is the most important factor affecting online banking adoption. Accordingly, people tend to trust one device more than other, in terms of feeling secure, ease of use, and ease of access. Alongside trust, security & privacy and ease of use also have their effect on the technology adoption. Accordingly, the age of the user does not affect the adoption of online banking, if the user trusts and has good relationship with the physical bank.

Secondly, within the investigation of the articles, common methods were used for data collection and data analysis. On account of the topic with concerns of sensitive information, a survey was used for data collection through most of the articles, a few of the articles used interviews and most of the articles used literature review to collect secondary data. The difference was in the frameworks used for data analysis. Accordingly, the methods used for data collection in this project were inspired from the abovementioned investigated literature.

3. Theory

The following section will start with presenting definitions of online banking and platforms. Accordingly, the difference between the platforms will be presented in order to distinguish them better and to present their characteristics. The section continues with focus on the user and the context within which an information needs occur. Finally, the theories of usability and user experience are presented and elaborated on.

3.1. Online banking

Within the past three decades, the information and communication technologies within the financial industry have impacted the way banks service their customers, enabling banks to provide mediated electronic multi-channel strategies (Hoehle, H., Scornavacca, E. & Huff, S., 2012, p. 122). For the customers, the new technology provided a new ways of data access, analysis, and decision making regarding the individuals finances.

The self-service technology emerged in the 1970s with the automated teller machine (ATM). Afterwards, the telephone banking service was introduced in 1980s, followed by the online banking in 1990s, within which banks further developed their distribution channels with web-based banking applications. Finally, over the past ten years and the emerging mobile technologies, such as mobile phones, smartphones, and tablets, the banks were encouraged to provide mobile banking application. (p. 122)

Online banking or also known as internet banking or e-banking, is referred "... to the use of the Internet as a remote delivery channel for banking services." (Furst, K., Lang, W., W., & Nolle, E., D., 2002, p. 97), such services as creating a bank account, transferring money among different accounts, electronic bill payment, and many more, allowing the customers of the bank to receive and pay bills on the website of the bank (p. 97). Online banking gives users the flexibility to manage their finances anytime from anywhere (Chou, C., D. & Chou, Y. A., 2000). The main benefits from online banking to the users are speed, availability, accessibility, time, and convenience (Abbad, 2013, p. 682). On other hand, the benefits of online banking to the banks are improved efficiency, reducing costs, eliminating the physical location constraints, expansion of reach, and increased Information Technology reliability (p. 682). Accordingly, in order for the bank and the users to gain from these benefits, the users need to use online banking, which is up to the banks to promote and encourage their customers in doing so. In addition, there

are the issues of security, trust, ease of use, and satisfaction that need to be cleared up in order for the bank to maintain good relationship with its customers (Casalo, L. V., Flavian, C., & Guinaliu, M., 2007).

Online banking can be offered in two main ways by banks. Existing bank, with physical offices can create a website and offer its customers online banking as an addition to its traditional delivery channels. The second option is to establish a "virtual", "branches", or "Internet-only" bank. The Internet-only bank may have an office location to house the computer server, serving as a legal address. Furthermore, the customers of Internet-only bank can deposit or withdraw funds via ATMs or other remote delivery channels owned by other institutions (Furst, K., Lang, W., W., & Nolle, E., D., 2002, p. 97).

Mobile banking or m-banking can be defined as a channel through which customers interact with the bank through banking service application, using a mobile device (Hoehle, H., Scornavacca, E. & Huff, S., 2012). Mobile banking enables the users to conduct payments anywhere and anytime, which provides a great convenience to the users (Zhou, 2011, p. 528). The earliest mobile banking was in the form of short messaging banking, which started in the 2000, enabling the users to check their account balance and transfer money (Zhou, 2012, p. 27). With the development of the 2nd generation mobile banking protocol, the users were able to visit the bank's website and assess the payment services. After that, the banks started releasing mobile banking software, available for different mobile phone operation systems (p. 27). While online banking was quite popular among the users, mobile banking was not, this led to the investigation of factors affecting the mobile banking adoption. Accordingly, trust and security are among the most important factors affecting online and mobile banking adoption, whereas lack of awareness and understanding of benefits further affect the mobile banking adoption (p. 28). Nonetheless, with the application of third generation (3G), the mobile communication technologies have triggered rapid development of mobile commerce (Zhou, 2011).

3.2. Platforms

There are different understandings of platforms depending how and for what it is used. Within this project, the focus will be on technology and online platforms, on account of the project at hand.

A platform is the base unit, allowing to be built upon. A computer platform for example refers to the operating system and the computer hardware only. This platform allows the developers to develop software application for the platform (What is a Platform? - Definition from Techopedia, n.d.). As such, online platforms are defined as "... key delivering benefits to consumers and businesses ..." (Oxera, 2015, p. 1), meaning online platforms allow trades between the consumers and the producers, that would otherwise not be able to happen. According to the European Commission, the online platforms are defined as:

"... an undertaking operating in two (or multi)-sided markets, which uses the Internet to enable interactions between two or more distinct but interdependent groups of users so as to generate value for at least one of the groups." (Oxera, 2015, p. 12)

Within this definition, any website or an application that fulfills these conditions, can be considered an online platform. Accordingly, based on the user activities, there are five main online platforms: communication, entertainment, online marketplaces, comparison, and information platforms (p. 17). As online banking platform does not fit in any of these categories, it can be categorized as a service platform, which is "… internet-based and physical services that are available for the consumer …" (Schuh, G., Ryschka, S. & Kohns, C., 2015, p. 52)

Technology platform is understood a group of technologies that are used as base, upon which other applications, processes, or technologies are developed (What is a Platform? - Definition from Techopedia, n.d.). Accordingly, there are many more different platforms, on account of this project the technology platform will be understood as computers/laptops and mobile devices, like smartphones and tablets.

Within the delimitation of this project, the technology platforms will be represented with stationary computer or laptop and mobile devices, like tablets and smartphones. These two-main types of technologies are chosen on account of the users' daily use and activities performed on these devices.

3.2.1. Differences between technology platforms

The **stationary computer or laptop** can perform all of the its activities -inputs, processing, outputs, and storage – by itself, where the users perform these tasks on **mobile devices**. Besides

of the hardware and software differences, there are several main differences between the computers and mobile devices.

	Computer/ laptop	Mobile devices
Screen size	The screen sizes of computers can	The screen size of mobile devices is
	vary from 11.1 inches to usually	much smaller compared to the
	around 28 inches or sometimes more.	computers. The screen sizes of mobile
	This makes the information on the	devices vary from 2.5 inches to 12.9
	screen easy to view and navigate.	inches. The screen sizes are small
		making the information hard to view
		and navigate.
Storage	The computers and laptops have big	The mobile devices do not have that
	advantage, compared to mobile	much storage as the computers. Most
	devices, as the hard drives for the	of the mobile devices have from 8 to
	computers can contain more than 10	256 GB (gigabytes) of built-in storage.
	TB (terabytes) and there are	Some of them also have a slot for
	additional slots for adding extra	additional storage
	storage.	
Portability	The stationary or desktop computers	Mobile devices are defined as being
	are not designed to be portable.	able to fit in your hand, meaning they
	However, laptops are portable, but	are much smaller in size and are easily
	not the same degree as mobile	portable.
	devices.	
Connectivity	Most of the laptops and computers	The mobile devices have data plans,
	can connect to 3G and 4G, but they	that allow them to connect to the
	need additional equipment to do so.	Internet anytime, as long as the
	This is why most of the computers	devices receive signal from cell phone
	and laptops rely on Wi-Fi signal to	tower.
	connect to the Internet.	

 Table 1 Differences between platforms (Computer vs. Smartphone, 2017)

Data entry	Most computers and laptops use	The smartphones and tablets have on-	
and user	standard Qwerty keyboards for data	screen touch keyboards, that are much	
input	entry that most of the users are	smaller and difficult to use, which	
	familiar with and comfortable using.	leads to many typing mistakes and	
	Mouse is also easy to use and	often frustration for the users.	
	available for the users for scrolling		
	and clicking.		

It is essential to understand the difference between these platforms and what they offer to the users, in order to determine how they affect users' perception and the use of these devices. On account of the difference of accessibility, ease of use, mobility, connectivity, security, etc. these platforms are used for different things at different time and places by the users.

Accordingly, the use of the devices within online banking has different context for the users. This field can be further examined within the Information Ecology (content, context and users) of online banking (Figure 1). The information ecology elements will be further discussed in the following section.



Figure 1 Information ecology diagram (Morville, P. & Rosenfeld, L., 2015, p. 31)

The information ecology diagram is represented by the three components – content, context, users. These components highlight the interdependent nature of the content, context, and users within the information ecology (Morville, P. & Rosenfeld, L., 2015, p. 30). In other words, the understanding of the business goals, the available resources for design and implementation, the nature and the volume of the content need to be defined and how it changes, and the user

information-seeking behavior and needs of the major audience need to be learned, creates good information architecture (p. 31).

3.3. Users

On the base of information ecology model (Figure 1), the most important elements are the users and the context within which the online banking is used, which will be elaborated on further. Whereas the content will not be elaborated on further, on account of not being important part of the investigation of the problem formulation of this project. The content of the banking services is more or less the same, i.e. offering the same services to their customers, this is also applied for the mobile banking applications. Furthermore, the content of the online banking cannot be changed, as it presents standard information concerning the individual banks and the actions the users are able to perform using online banking. Accordingly, this project is more concerned with how the users assess the online banking on different platforms, not with the evaluation of the content. Within the problem formulation, this project aims to investigate the user experience on different online banking platforms, which involves the users and the context within the intended use of online banking. Therefore, the main focus is on the context and the users of the information ecology.

The users are the people who use the system, the website, or services, provided by organizations. According to Morville and Rosenfeld (2015, p.313), the users "... are the ultimate judges of our information environment.". If the users are confused and frustrated by the website or service, they will stop using it and will find another website or service that will help them fulfill their goals. This could excel to fail of the website or system and result in unnecessary expensive redesigns. Therefore, Morville and Rosenfeld (p.313) highlight the power of the users and the importance of user-sensitive design.

Nonetheless, the lessons learned from one website cannot be blindly applied to all websites. Therefore, the user population and the unique nature of the website need to be considered. There are different ways to study the user population, such as surveys, interviews, or observations. However, there is no single right approach to gather information about the users, their needs, priorities, and information - seeking behavior. In order to collect relevant and adequate information different approaches may be needed. (pp.313)

Therefore, an understanding of how the users navigate and search for information on webpages is needed. Accordingly, the context within which the users search for information is also of importance, as it the urge and the motive of the users to search for this specific information.

3.3.1. Context

Context has been defined in different ways, but Russell-Rose and Tate (2013) define the context as "... a user-oriented phenomenon that is focused more on the users' immediate surroundings that on their inner state.". Context can also be defined by its constituent parts (p. 48):

- Task referring to the goals, tasks, actions, or activities of the user
- **Spatiotemporal** represents attributes related to the current time, location, directions, and so on.
- **Personal** represents user's mental state, phycological context, preferences, and so on.
- Social represents user's role, status, and relationship with other individuals
- Environmental represents factors like temperature, light, humidity, and the information resources assessed by the user.

All these elements influence the context in a different way. The users have their assumptions and understanding of the context itself, meaning the context will be understood in different ways by the users (p. 49). Accordingly, the focus of this project is on banking context, which will be looked at from a phenomenological perspective.

3.3.2. Information-seeking behavior

Wilson defines the information behavior with the following statement based on his model "...information-seeking behaviour arises as a consequence of a need perceived by an information user, who, in order to satisfy that need, makes demands upon formal or informal information sources or services, which result in success or failure to find relevant information." (Wilson, 1999, p. 252). Within this paper, Wilson presents and analyses different models of information behavior where he suggests that information behavior may be seen as series of nested fields (Figure 2): within which the information behavior is the general field of investigation; with subset of a field represented by information-seeking behavior concerned with variety of methods

people employ to gain access to information resources; and information searching behavior is a sub-set of information-seeking behavior, concerned with the interactions between the user and computer-based system (p. 263).



Figure 2 Nested model of information seeking and information searching research areas

Information-seeking behavior is the way users search for information within a website or a system. The users find information using different methods like searching, browsing or asking, where the latter are the basic building blocks of the information-seeking behavior (Morville & Rosenfeld, p.46). Furthermore, there are two other aspects of the seeking behavior – integration and iteration. Russell-Rose and Tate (2013) define the different types of users and the importance of designing for all user groups, in order to create successful design. Russell-Rose and Tate distinguish between two main user groups "experts" and "novices". Accordingly, there are two types of expertise: domain and technical expertise. The domain expertise is defined with the user's familiarity to a given subject, whereas technical expertise is defined with the proficiency of using computers, Internet, search engines, etc. Consequently, in combination of the technical and domain dimensions of expertise, four user groups can be defined, the latter are presented on Figure 3.:

- Double experts
- Domain expert/ Technical novice

- Domain novice/ Technical expert
- Double novice



Technical Expertise

Figure 3 Two dimensions of expertise (Russell-Rose, T. & Tate, T., 2013, p. 5)

3.3.2.1.Double novices

Double novices share similarities with the practice of orienteering, where the participants have to find their way to the right location. Accordingly, in order to find information, the double novices face resistance along the way, opposed to the other user types. There are three main characteristics shared between double novices: frequent query formulation, going back, and more time spent. Meaning the double novices perform more queries with small changes, going back to the search page, and spending more time on a search than double experts.

As double novices, they need to be guided and supported, in order to find information. This can be done by providing them with list of related searches or providing them with a sense of location and a way to return to previous page.

2.3.2.2. Double experts

Unlike the double novice, the double experts take the "depth-first" approach and dive straight in to their destination. Double experts have the following three characteristics in common: more

pages examined, going deeper, less time spent. The double experts examine more pages than the double novices, rarely go back, and spend less time on the search as double experts reformulate their search queries less often.

In short, experts are more efficient and are able to teleport themselves to their destinations, opposed to novices. In order to support expert-friendly search, the interfaces can provide a faceted search or to allow the users to input domain-specific terminology.

The in-betweeners

There are two very distinct groups of experts and novice, but there are two other groups: with high expertise in one dimension and low in the other. Accordingly, these groups share common characteristics.

2.3.2.3. Domain expert/technical novice

This group uses the knowledge to construct effective queries and evaluate the search results, but lacks the technical determination to explore the search results. The shared characteristics are as follow: advanced terminology, effective evaluation, going back.

2.3.2.4.Domain novice/ technical experts

On the other hand, domain novice/ technical experts have the confidence to dive into the unknown, but have troubles determining the relevance of the content. Their main characteristics are: advanced formatting, confident exploration, and difficulty with evaluation.

With the presentation of the different novices and experts and their different and unique approaches to information seeking, it has to be notices that one group cannot be prioritized instead of the other. This is why it is important to know the audience group and the level of expertise, in order to develop design for both experts and novice alike.

The model presented by Russell-Rose & Tate (2013) is important within the project, as it is important to know the expertise level of the participants. The expertise level can have affects the overall experience of the users, for example, if the users are double experts, they will have no problem using online banking on different devices, meaning it may positively affect the overall user experience. Or seen from different perspective, the double experts may be more demanding in terms of functionality, content, etc., which may create more annoyance and create more

negative experience. Whereas double novice, having problems with the technology and finding what they need within the website or the mobile applications of online banking, it can be argued that will contribute more negatively to the overall user experience. Therefore, this model is used to determine the expertise of the participants.

3.4. Mobile search

The mobile information seeking behavior will be examined, as it differentiates from the information seeking behavior conducted on computers, and furthermore, to investigate the main differences in the users' searching behavior between these two platforms.

Because of the size of mobile devices, the design of the websites and applications must be simple so the users can easily focus on what they need. Nevertheless, the search behavior between the desktop and mobile device users is very similar, on account of the length of the queries and the queries per session. The latter can differ on account of users' information needs (Russell-Rose & Tate, pp. 219-222).

3.4.1. Information needs

Identifying the spectrum of *users' information needs* that mobile users encountered, will contribute to understanding what sets the mobile users apart from desktop users. The information need can be understood as desire to obtain specific information to satisfy a need. The information need has two dimensions that can be classified as search motive and search type (Russell-Rose & Tate, p.222).

The *search motive* dimension represents the refinement of information need, such as the degree of thinking that it involves, and the time commitment needed to satisfy it. Whereas, the *search type* dimension concerns the genre of the sought information. The two dimensions of information need spectrum do not provide much information about the needs occurring within the spectrum. A study conducted by Sohn and colleagues (2008) and Church and Smyth (2009), creates a matrix of mobile information needs, represented on Figure 4 (Russell-Rose & Tate, p. 224).

	Casual	Lookup	Learn	Investigate
Informational	'Window' Shopping	Trivia	Information Gathering	Research
Geographic	Friend Check-ins	Directions	Local Points of Interest	Travel Planning
Personal Information	Checking Notifications	Checking Calendar	Situation Analysis	Lifestyle Planning
Transactional	Acting on Notifications	Price Comparison	Online Shopping	Product Monitoring

Figure 4 Matrix of mobile information needs

Although there is an overlap between the information needs of desktop and mobile users, the matrix is a result of first-hand observations of mobile users (p. 224). Even though an information need occurs it is not guaranteed that it will be fulfilled. According to Sohn and colleagues (2008), 45% of the mobile information needs are fulfilled, where 25% of them are addressed later, and 30% of the information needs are never fulfilled. However, it is important to help users to fulfill their information needs (p. 225).

Information needs are ubiquitous, meaning they can arise on any topic, at any time and in any location. As different studies show, many of these information needs are never satisfied (Hinze, A. M., Chang, C., & Nichols, D. M., 2010). Accordingly, the mobile information needs can be divided into three categories: informational, geographical, and personal information management. Whereas, informational needs can be further classified as situated informational search and general information (Kassab, D., & Yuan, X., 2013).

3.4.2. Context

As the elements of context are already introduced, it is worth revising form a mobile search point of view (Russell-Rose, T. & Tate, T., 2013, p. 225). The task, physical, and social components are the most common triggers of information needs, whereas environmental context inhibits information needs form being investigated.

The context is important for all kind of users, but for the mobile users the context prompts new information needs that can be fulfilled by the time available, mental and physical scarcity of the user. Furthermore, the mobile seeking behavior of the users influences and guides the design of mobile applications. (pp.226-227)

It is important to understand the difference between the information needs on computers and mobile devices, as the users have different preferences and needs. Additionally, the context within the information needs arise and how they are handled by the users is important as part of the user behavior. In connection to the problem formulation, the user behavior is part of the user interaction with online platforms as well as the users' assessment of the device, service, or platform used.

3.5. Usability and User experience

The following section will address the theories of usability and user experience for the purpose of providing a foundation for creating and conducting a user experience questionnaire.

3.5.1. Usability

Usability and user experience are often referred to as synonyms (Hassenzahl, 2008). As these two terms may seem similar to many people, they are different. Usability is broadly referred to "… how easy a product is to use." (McNamara, N., & Kirakowski, J., 2005, p. 200). After a close examination, usability is understood as one aspect of User Experience, since usability is objective quality that can be measured, whereas user experience is subjective phenomenon (Lipp, 2012). On account of the above statements, usability is presented in this project, as it is important part of the user experience.

Within the fields of HCI (Human-Computer Interaction), CHI (Computer – Human Interaction), or UCD (User-Centered Design), Nielsen use the term 'usability', to create more meaningful understanding and to broaden the concept of "user friendliness" (Nielsen, 1994, p. 23). According to Nielsen, "Usability applies to all aspects of a system with which a human might interact, including installation and maintenance procedures." (p. 25). This is why Nielsen provides the following definition for usability "... usability is not a single, one-dimensional property of a user interface. Usability has multiple components ..." (p.26). Usability has the following five attributes - Learnability, Efficiency, Memorability, Errors, and Satisfaction.

• Learnability – represents how easy is for the users to learn to use the system.

- Efficiency after the users learn how to use the system, represents the level of productivity.
- **Memorability** the system should be easy to remember, so if the users do not use the system for a long period of time, the users should not have to learn how to use the system again.
- **Errors** the system should have low possibility for errors, meaning if the users make an error, they should be able easily to recover.
- **Satisfaction** represent how pleasant the system is for the users to use. (p.26)

Accordingly, Rubin and Chisnell (2008, p.4) present their definition for usability as "... when a product or service is truly usable, *the user can do what he or she wants to do the way he or she expects to be able to do it, without hindrance, hesitation, or questions.*". Furthermore, they present six usability attributes – Usefulness, Efficiency, Effectiveness, Satisfaction, Learnability, and Accessibility (pp. 4-5). Within this notion, only usefulness, effectiveness, and accessibility will be defined, as efficiency, learnability, and satisfaction have similar or the same definition as given by Nielsen.

- Usefulness concerns the degree in which the product enables the users to achieve their goals, and the overall willingness of the user to use the product at all.
- Effectiveness refers to the extent to which a product behaves, according to user expectations, and the ease of use of the product.
- Accessibility represents the degree to which the product is accessible for the users, in order to complete a goal. (pp. 4-5)

All these usability attributes contribute to the following understanding of the term - as the ease of use and learnability of devices, tools, software, and so on. According to the examined literature in the Literature review section, some of these usability attributes are important part of the user acceptance of online banking platforms, and also contributing to the user experience within the online banking field. Therefore, usability is important part of the user experience and the problem formulation of this project.

3.5.2. User experience

According to Hassenzahl and Tractinsky (2006, p.91), user experience (UX) is widely adopted term, which is associated with wide variety of meanings. Hassenzahl and Tractinsky state that the ideas behind UX are important, however not original and already expressed by the notion of usability. In addition, it is stated that the lack of empirical research on the topic of User Experience prevents the further development and understanding of the concept (pp.91-92). Hassenzahl and Tractinsky identify three major perspectives within the user experience: "... addressing human needs beyond the instrumental; a second thread stresses affective and emotional aspect of the interaction; and a third thread deals with the nature of experience." (p.92). With these three perspectives Hassenzahl and Tractinsky define user experience as "... a consequence of a user's internal state ... the characteristics of the designed system ... and the context ... within which the interaction occurs..." (p.95).



Figure 5 The facets of user experience (Hassenzahl, M., & Tractinsky, N., 2006, p. 95)

According to Hassenzahl (2008, p.11), "... a widely accepted, shared understanding of UX is still lacking.", and furthermore, the term 'user experience' is used as a synonym of usability and user-centered-design. Accordingly, many emphasize on the difference between usability and UX, but Hassenzahl pose the question whether UX truly is an extended and distinct perspective of the quality of interactive products. Hassenzahl connects the momentary feeling 'good-bad' of the use of the product with behavior regulations which is represented as 'physical currency', "... that allows for comparing qualitatively different experiences." (p.12).

Consequently, Hassenzahl defines UX as "... a momentary, primarily evaluation feeling (goodbad) while interacting with a product or service." (p.12).

Furthermore, Hassenzahl assumes there are two dimensions of how people perceive interactive products - *pragmatic quality* and *hedonic quality*. Pragmatic quality refers to the perceived ability of the product to support the achievement of the 'do-goals' (like buying concert tickets), setting the focus on the product. Whereas, the hedonic quality refers to the perceived ability of the product to support the achievement of the 'be-goals', setting the focus on the Self (like why people need, own and use a specific product). Accordingly, Hassenzahl proposes extension to his definition of UX stating:

"Good UX is the consequence of fulfilling the human needs for autonomy, competency, stimulation (self-oriented), relatedness, and popularity (others-oriented) through interacting with the product or service (i.e., hedonic quality). Pragmatic quality facilitates the potential fulfilment of be-goals." (Hassenzahl, 2008)

The author argues that positive experience is represented by the goal of the activity, where positive experience derives from something, and accordingly, the fulfilment of the begoals is the ultimate source of the positive experience.

Within his book, Hassenzahl (2010) connects user experience with emotion, stating "To me, it is beyond question that emotion is at the centre of experience. The most compelling argument for this is the observation that emotion, cognition, motivation, and action are inextricably intertwined." (p.3), and further linking emotion with action and motivation. Meaning experience can emerge from the interwinds of perception, action, motivation, emotion, and dialogue. Nevertheless, Hassenzahl states that emotion is the center of experience.

According to the International Organization for Standardization, user experience is described as "A persons perceptions and responses that result from the use or anticipated use of a product, system or service" (Lipp, 2012, p. 13). But according to the leading experts in the field, user experience is best outlined as "User Experience describes people's satisfaction while using an interactive product or service." (p. 13). There are several essential factors influencing the user experience: first it is about the way the product or service feel in the user's hands; how well the users understand how the product works; how well the product serves its purpose; and how well the product fits into the context in which the users use the product. all these factors are subjective

from person to person. Meaning the user experience is subjective by nature, on account of individuals performance, feelings, and thoughts about the product. Furthermore, the user experience is dynamic, as it can change over time (p. 13). The factors influencing user experience can be classified in three main categories: context, time-span, and users. As the UX varies from product to product, the UX is dependent on the context of the usage of the product. Furthermore, as the user experience can extend over time, there can be defined four types of user experience: anticipated, momentary, cumulative, and episodic. These time-spans contribute to the difference in the user experience according to the context of use and time. (p. 14) Lastly, related to the context, the user has strong impact on the UX. This depends on the mood, motivation, mental and physical resources, and the use expectations. Accordingly, the users age, education, frequency of use can further impact the overall user experience of a product or service. (p. 14)

Within their book "Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics", Albert and Tullis (2013) define the user experience as containing three characteristics:

- user is involved
- the user in interested in a product, service, or anything with interface
- the users' experience is of interest and is observable or measurable (Alber, W. & Tullis, T., 2013, p. 4)

Meaning that any product or system can be evaluated from a user experience perspective, as long as there is an interface for the user to interact with (p. 4). Furthermore, the authors outline the difference between usability and user experience. Accordingly, usability is considered to be the ability of the user to use the product or service to carry out a task successfully, whereas UX has more broader view, looking at the user's entire interaction with the product, including thoughts, feelings and the perception of the results (p. 5).

Within the notion of this project, both fields, usability and user experience, have important part. Usability is part of user experience, since the usability of the product influences the overall user experience. Furthermore, the purpose of usability is to reduce users' frustration. Consequently, the user experience is main field of investigation within the online banking on computer and mobile platforms.

After outlining the purpose of both fields, a method for measuring the user experience is in need in order to answer the problem formulation. Accordingly, there are many methods to for measuring the UX which will be presented in the following section, followed by the method of choice for data collection and measuring the UX chosen for the project.

4. Method

Within this section the chosen theoretical approach for the thesis will be presented on account of the topic and problem formulation. The methods for data collection, data analysis, ethical considerations, and source of error will follow. In the data collection section, the methods for collecting the data are presented.

For this project, the collection of Primary and Secondary data was needed on account of lack of academic papers on the topic. By Primary data is understood as data collected from interviews, questionnaires, focus groups, etc. or firsthand evidence. Whereas Secondary data is understood as already processed and summarized primary data, or data found in articles, books, etc. (literature review). Only one of the methods for data collection will be presented in the following subsections, as the literature review (Section 2) is used as part for setting the theoretical foundation of the project and to gather information concerning the topic.

4.1 Theory of science

The purpose of this project is to investigate and understand the user experience of online banking on computers and mobile platforms. With the main purpose of obtaining knowledge about the users' perception and contextual understanding of online banking, the project will take upon a phenomenological approach.

Phenomenology is a reflective study of prereflective or lived experience. Or in other words, the main characteristic of phenomenological tradition is the study id the lifeworld as it is immediately experienced, rather than as it is conceptualized, theorized, categorized or reflected on it. Accordingly, phenomenology is term that has different meanings depending on the theoretical and practical context. (Given, 2008, p. 614)

Phenomenology derived from the work of Edmund Husserl (1859-1938) and his followers. Phenomenology describes "... the basic human experience..." (Edgar, A. & Sedgwick, P., 2008, p. 239), with the attempt to describe how the world should appear. Or in

other words, phenomenology is concerned with the question of how people make sense of the world around them (Bryman, 2012, p. 30). With the years, the term has acquired broader meaning, as it has been developed as human science employed in professional disciplines as health science, education, law, and clinical psychology (Given, 2008, p. 615). Phenomenology may explore unique meanings of any human experience or phenomenon (p. 615).

Within the notion of the phenomenological approach, the phenomenon of user experience on online banking platforms will be investigated by means of a questionnaire, on account of the nature of the topic. Whereas the perspective is still to have the experience description. Meaning, the phenomenological approach will focus on describing the user experience on online banking platforms, collected with the questionnaire and analyzed in terms of creating an understanding of how users understand and perceive it.

4.2. Data collection

As the technologies evolve and are used by diverse set of users, the user experience has everincreasing role, as the products become more complex. Meaning, as technologies are getting more complex, more attention must be given to the user experience. Therefore, the UX metrics are becoming critical part of the development process in order to provide efficient, easy to use, and engaging technology. (Alber, W. & Tullis, T., 2013, p. 6)

In order to examine and evaluate the user experience, different methods can be used for data collections, such as: observations, interviews, questionnaires, usability testing, or eye-tracking. Usability testing is a great way to measure fi the audience can use the product or not (Goodman, E., Kuniavsky, M. & Moed, A. , 2012). In considerations to the problem formulation and the sensitiveness of the topic, a questionnaire was chosen as main method for data collection. Categorizing this research as of quantitative nature.

The approach taken within this thesis is a descriptive study. According to Kelly (2009, p. 26), "Descriptive studies are focused on documenting and describing a particular phenomenon.". The results of descriptive study can be used for comparison.

The problem formulation of the thesis is focused on assessing the user experience of the online banking on two platforms. This led to the descriptive side of the study of documenting and comparing the results of the questionnaire.

Accordingly, this section will present the user experience questionnaire, the tool used for its creation and distribution, the sampling of the participants, pilot testing, followed by the data analysis, ethical considerations, and the source of error.

4.2.1. User Experience Questionnaire

As already stated, the User Experience Questionnaire was used as the main method for data collection. According to Laugwitz, Helt and Schrepp (2008, p. 63), the questionnaires can be designed for product feature assessment or to evaluate usability problems. Furthermore, questionnaires can be used as stand-alone evaluation method, or can be combined with other methods for better results (p. 63). Accordingly, questionnaires are effective way to collect quantitative data to measure the product features.

The questionnaire was created with the aim to evaluate the user experience on computers and mobile devices, and accordingly, to compare the results of the user experience between the platforms. The questionnaire took point of departure from the User Experience Questionnaire (UEQ), which was created in 2005. The UEQ contains 26 items, covering six scales of user experience and usability. The scales are as follow: Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty.

Schrepp (2015, p.2) describes the different scales:

- Attractiveness the overall impression of the product
- **Perspicuity** how hard or easy it is to the user to learn to use the product
- Efficiency whether or not the user is able to solve the tasks easily
- **Dependability** the perception of the users of whether they are in control of the interaction
- Stimulation to what extend the product is exciting and motivating to use
- Novelty whether the product is innovative and creative, and whether it is interesting to the user

The questionnaire was created with focus on the hedonic and pragmatic qualities of the user experience, which is often compared with attractiveness. Perspicuity, Efficiency and Dependability are pragmatic qualities, while Stimulation and Novelty are hedonic quality aspects. Figure 6 represents the English version of the User Experience Questionnaire items.

Scale	English translation			
Attractiveness	annoying	enjoyable		
Perspicuity	not under- standable	understandable		
Novelty	creative	dull		
Perspicuity	easy to learn	difficult to learn		
Stimulation	valuable	inferior		
Stimulation	boring	exiting		
Stimulation	not interesting	interesting		
Dependability	unpredictable	predictable		
Efficiency	fast	slow		
Novelty	inventive	conventional		
Dependability	obstructive	supportive		
Attractiveness	good	bad		
Perspicuity	complicated	easy		
Attractiveness	unlikable	pleasing		
Novelty	usual	leading edge		
Attractiveness	unpleasant	pleasant		
Dependability	secure	not secure		
Stimulation	motivating	demotivating		
Dependability	meets expecta- tions	does not meet expectations		
Efficiency	inefficient	efficient		
Perspicuity	clear	confusing		
Efficiency	impractical	practical		
Efficiency	organized	cluttered		
Attractiveness	attractive	unattractive		
Attractiveness	friendly	unfriendly		
Novelty	conservative	innovative		

Figure 6 User Experience Questionnaire items

The UEQ was originally created in German and later on translated into English. As the participants in the questionnaire were international and Danish citizens, on account of the authors international background, and the distribution of the questionnaire, a Danish and English version of the questionnaire were used to collect data. The translation to Danish was based on the

English version and all 26 items were translated and can be seen in Appendix A, Table 11. Both versions were created in order to provide the participants with an option to choose a language they are most comfortable with using and understanding. The distribution of the questionnaire was made on account of the chosen sampling method. Therefore, different social media were chosen to administer the questionnaire.

	UX scales	Items corresponding to the scale		
1	Perspicuity	Easy to learn	Difficult to learn	
2	Perspicuity	Easy	Complicated	
3	Dependability	Predictable	Not predictable	
4	Dependability	Secure	Not secure	
5	Dependability	Does not meet expectations	Meets expectations	
6	Efficiency	Impractical	Practical	
7	Efficiency	Organized	Cluttered	
8	Novelty	Creative/innovative	Dull/conservative	
9	Stimulation	Valuable	Inferior	
10	Stimulation	Exciting	Boring	
11	Stimulation	Interesting	Not interesting	
12	Stimulation	Motivating	Demotivating	
13	Attractiveness	Bad	Good	
14	Attractiveness	Unlikable	Pleasing	
15	Attractiveness	Attractive	Unattractive	
16	Attractiveness	Unfriendly	Friendly	

Tahle	2 I IFO	items	used	in	the	auestion	naire
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Table 2 presents the items used in the questionnaire. From the 26 items, presented on Figure 6, only 16 items were chosen for the questionnaire. Two items were combined, belonging to the Novelty scale ('creative/ dull' and 'innovative/conservative'), and 9 items were removed on account of being similar to other items. These 16 items were chosen on account of providing more desirable answers, concerning the problem formulation. Accordingly, these items were also removed on account of similarity in the questions created for these items. The items had to be removed to minimize user confusion of the questions and to be able to answer all of the questions without misunderstanding the meaning of the questions (Table 3). Additionally, the size of the questionnaire had to be considered and the willingness of the participants to fill out a questionnaire with more than 50 questions. According to Bryman (2012, p.234), people are more likely to get bored if the questionnaire contains many closed-ended questions, therefore it is

important not to include many questions. Additionally, it is also important to avoid adding many open-ended questions, on account of the participants frequently not wanting to write a lot. With that in mind and the similarities of the items led to the decision to remove these 9 items of the questionnaire and reduce the prepared questions in order to ensure receiving more replies. The items are represented in the table below, Table 3.

N₫	Scale	English	Items	Danish items		
1	Attractiveness	Annoying	Enjoyable	Irriterende	Behagelig	
2	Attractiveness	Unpleasant	Pleasant	Ubehagelig	Behagelig	
3	Perspicuity	Not understandable	Understandable	Uforståelig	Let forståelig	
4	Perspicuity	Clear	Confusing	Let forståelig	Forvirrende	
5	Efficiency	Fast	Slow	Hurtig	Langsom	
6	Efficiency	Inefficient	Efficient	Ineffektiv	Effektiv	
7	Novelty	Inventive	Conventional	Opfindsom	Konventionel	
8	Novelty	Usual	Leading edge	Almindelig	Nyskabende	
9	Dependability	Obtrusive	Supportive	Hindrende	Støttende	

Table 3 Items deleted from the questionnaire

As shown on Table 3 and already explained, these 9 items were deleted in considerations to the participants and also in regard to the formulation of very similar construction of the questions.

In connection to the problem formulation, different questions were created for the participants to answer, in order to provide data about their knowledge, understanding, and evaluation of the user experience on online banking platforms. Therefore, the questions can be grouped in four categories platforms, user experience, users background or technical abilities, and controlled variables. The questions from the constructed questionnaire, that will be referred to, can be seen in Appendix B.

4.2.1.1. Platforms

First and foremost, it was important to establish if the participants in the questionnaire are using online banking. Therefore, a simple 'Yes' and 'No' question, asking if they use online banking was created (Appendix B, User experience questionnaire, Question 6). Meaning, if the participants use online banking, they will be at least familiar with the concept and consequently will use online banking on one or more devices. Leading to the creation of the following Yes/No questions concerning the platforms the participant uses for online banking "9. Do you use online

banking on your stationery computer/ laptop?" and "21. Do you use online banking on mobile devices (smartphone, tablet)?".

In order to be able to characterize the user interaction on both platforms, several questions about the tasks the users perform on these platforms were added. A question concerning the reasons of the participants not to use online banking one or the other platform. Accordingly, for these questions several answers were given to the users to mark the most relevant for them.

4.2.1.2. User experience

In relation to the user experience, the questions were created in correspondence to the scales, whereas the items were added as answers to the sub-questions, as presented on Figure 7.

How would you rate the learning process of using online banking on your computer/ laptop?



Figure 7 Question concerning the perspicuity scale (difficult to learn – easy to learn)

Accordingly, all questions concerning the six UX scales were created and visualized in the same way (Figure 7). First, the questions were grouped according to the UX scales and the answers were visualized with five-point Likert scale, where the answers on the left (1) were kept negative and on the right (5) were positive. This was done in order to have consistency, not to confuse the participants, and to provide the participants with fast and easy way to answer.

4.2.1.3. Users' technical background

Participants technical background or abilities are represented by their technical expertise. In order to determine the participants technical expertise, a few questions were constructed. These questions were created in consideration to the Russell-Rose and Tate's (2013) technical expertise model (Figure 3). Therefore, the participants were asked for how long time they have been using online banking, which tasks are they performing on the different platforms, and how often they use online banking. The answers of these questions and in consideration to the platforms used by

the participant for online banking, should provide knowledge of the participants technical abilities.

4.2.1.4. Controlled variables

Controlled variables are important, in order to determine how they influence the results of the questionnaire. As such, the participants were asked about their gender, age group, educational level, and occupation (Appendix B, User experience questionnaire, Questions 2 to 5).

4.2.2. Google Forms

The tool used for the User Experience questionnaire was Google Forms. Google Forms can be used for creating a variety of custom surveys and questionnaires. These questionnaires or surveys can be send by e-mail, via link, can be embed with HTML on a website, or shared on social media. A form can be created easy with options for variety of different question types and dragand-drop to organize and customize the questions. The tool gathers all the information in a spreadsheet, making the data easy to view and analyze. Google Forms can be linked to other Google tools, like Google Docs, Google Sheets or Google Slides, providing other methods for viewing, editing and analyzing the data.

4.2.3. Sampling

For this project, a non-probability sampling was used, or more precisely, a convenience sampling. A convenience sampling is a sampling that "...is available to the researcher by virtue of its accessibility." (Bryman, 2012, p. 201). For the project, a questionnaire was created with Google forms tool, and it was send on different social media, giving the chance to all people fitting the profile to complete the questionnaire. The participants for the questionnaire were identified according to one main criteria, which is for them to use online banking, in order to be able to fill the questionnaire and give reliable feedback. On the other hand, the participants who do not fit the profile, can contribute with a feedback of why they do not use the online banking, therefore everybody can fill out the questionnaire and contribute one way or another to the better understanding of the topic at hand.

On account of sharing the questionnaire on different social media, a few of the participants also shared the questionnaire on their profiles in different social media. Which can be argued to be the beginning of a snowball sampling. But on account of only 4-5 people sharing

the questionnaire, it is not enough to be categorized as a snowball sampling. Meaning, the sampling for this project is considered to be a convenience sampling.

4.2.4. Pilot Testing

Testing a questionnaire is important to be dine as early as possible, as it provides an overview of what to expect when participants try it out; where they might have difficulties; where they might have questions; what is confusing or does not make sense to them (Alber, W. & Tullis, T., 2013, pp. 182-183). Furthermore, the pilot testing provides valuable information on what data is going to be collected from the test and if there is a need for any changes.

In order to test the questions and the design of the questionnaire, series of pilot tests were conducted. The questionnaire was constantly tested during its' creation to ensure that the questions are placed in meaningful and logical way. Accordingly, the questionnaire was tested by one participant, whose feedback was taken into account and changes were made. The questionnaire was sent to the participant for pilot testing through social media, which also tested the distribution method of the questionnaire. During the testing, some issues arose and of the questions were restructured or removed on account of the participants' feedback. Accordingly, a few questions were removed, the answering methods for a couple of questions was changed, and a few questions were rewritten. This was done on account of reducing the time to answer all questions, some of them were very similar to one another and based on that removed from the questionnaire (Table 3). This ended up with removing confusion for the users and reducing the time for filling out the questionnaire.

4.3. Data analysis

The following section is concerned with management, analysis, and interrelation of the data. Accordingly, this section will present the data analysis of the results of the data gathered with the questionnaire. The analysis presented in this project are mainly descriptive. An overview of the demographic data collected will be made to present the skill level of the participants in the questionnaire. In addition, a comparison between the data from the different scales (attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty) on personal computer versus mobile devices will be presented. Accordingly, the section will also present the similarities and differences, and lastly an overview of the data in connection to the literature review.

4.3.1. Analysis of UX questionnaire data

The authors of User Experience Questionnaire have also created and included a tool with the aim of making the analysis of the questionnaire as easy as possible (Schrepp, 2015, p. 8). This tool is in the form of Microsoft Excel worksheet (Appendix D), which analyzes the data automatically, also containing comments explaining the different calculations. Accordingly, the data analysis tool orders the answers before processing the data, as the scales are randomized. This tool uses 7-point Likert scale to measure the responses for the semantic differential items of the questionnaire. Likert scales are common ratings for surveys, where participants rank quality from high to low or best to worst, using five or seven levels (Allen, I. E., & Seaman, C. A., 2007). Meaning, that half of the scale are with positive term and the other half with negative, from +3 to -3, and the middle is neutral, as presented on Figure 8.



Figure 8 Example of 7 - point Likert scale

When the data is collected, it is added to the data analysis tool where it is processed in different ways according to the tabs. Accordingly, the analysis tool calculates the means of the six scales and the consistency of the sales is measured (Schrepp, 2015, p. 9). According to Schrepp (2015), the higher the mean value of an item, the more consistent the answers for that item are. Whereas, if a value of a scale is small, it indicates that it should carefully be interpreted, considering that values > 0,6 or 0,7 are on sufficient level. The UEQ Excel tool also contains a compare scale means sheet, which was used for the analysis in this project. This sheet was also used for the final comparison between the computer and mobile platforms.

4.4. Ethical Considerations

The aim of this project is to investigate the user experience of online banking on different platforms. There are different ways to measure user experience, but considering the sensitive field of online banking, or banking at all, most of the people would not be willing to participate

in UX tests, to be observed, to be video/audio recorded, or even to give interviews on the topic. This was also observed in the papers examined in the Literature review, where the researchers, in order to protect the participants information, used a surveys and questionnaires to collect data. Therefore, many things had to be considered before and during the creation of the questionnaire, in order to ensure the participants that their data is protected. This is why, four ethical principles were applied through the data collection (Bryman, 2012, p. 135). The principles are as follow:

- 1. harm to the participants
- 2. lack of informed consent
- 3. invasion of privacy
- 4. is deception involved

According to these areas of the principles, the following measures were taken: first and foremost, the data of the participants had to be protected and questions concerning sensitive information about the bank accounts of the participants needed to be avoided. Therefore, a decision was made for the questionnaire all responses were anonymous and confidential. This ensures that the participants do not enter their names, address, e-mail, or other personal information that may connect them with the questionnaire in any way.

Secondly, a short message in the beginning of the questionnaire was used to inform the participants about the topic of the project, what is it for, and how their responses will be threated. Delivering an important piece of information to the participants, in order for them to make their own informed decision to fill out the questionnaire or not.

To avoid invasion of privacy, as already stated questions concerning personal information or information concerning the bank accounts of the participants were avoided. The questionnaire contains only one question, that might be considered invasive towards the user privacy, which is "Which bank is your main bank for private purposes?", and to try to avoid privacy invasion, the question was open-ended and an answer for the question was not required, making it optional for the participants to fill out.

To avoid deception, a short message in the beginning of the questionnaire stating its purpose was placed for the participants to read through.

4.5. Source of error

This section will address the sources of error that could have affected the results of the data collection. The sources of error were found during the analysis of the data.

The first and most important source of error is not using all 26 User Experience Questionnaire items (Figure 6) in the questionnaire, but using only 16 of the items (Table 2). As the 26 items define the six scales of user experience, this can result in not complete data and faulty results in the data analysis of the questionnaire. As mentioned before, this was done in order not to bore the participants with too many questions, to ensure the completion of the questionnaire, and more replies. On the other hand, there need to be a balance between all the responses for the items of each UX attribute in order to gather the most reliable data.

Another source of error is the way the questionnaire was distributed. The social media distribution contributes to collecting results from a certain age group and to similar educational level and/ or occupation. Furthermore, the social media distribution could influence the gender results.

There are other ways of distribution of questionnaire that could have been used, such as the snowball sampling. But as it is dependent on the users to share the questionnaire with others, and so forth, it is not very reliable in terms of collecting many responses. Another approach could have been to offer a small amount of money to the users, scattered all around the world, in exchange for them completing the questionnaire. But on account of the need for specific information concerning the Danish banking system, this would not have been useful.

Also on account of the social media distribution, a variety of different nationalities have filled out the questionnaire. After analyzing the data, six people have given a bank from their homeland as a primary bank of use and not a Danish bank. Meaning, these people could have answered the questionnaire in response to their primary bank of use, which are not the same as the Danish banks and therefore will have different experience for both banks. On the other hand, these people might have answered that their main bank of use is from their homeland, and on the other hand they might also use a Danish bank as well. Furthermore, there are only six people who have given other than Danish bank as their main bank, therefore these responses are used in the data analysis. The Danish version of the questionnaire can be considered as a source of error, as the language is not native nor fluently spoken or written by the creator of the questionnaire. Meaning, some of the questions may not have been formulated in the best way for the participants to understand. There is a big space for interpretation of the questions by the participants. Accordingly, after the analysis of the questionnaire, it was found out that the questions were answered in a very similar way to the English version of the questionnaire (Appendix A, Figure 29). There was more significant difference in the Stimulation and Novelty, which are quite individual for each person. On account of that, the Danish version was considered as not being source of error and the Danish answers were used in the analysis.

A source of error can be also considered to be the order of the answers (items) in the questionnaire, i.e. negative term on the left and positive term on the right. The participants can have an answering tendencies or paths to answer the questions, if they get bored answering the questions. This is the reason the terms in the UEQ are randomized. Meaning, that this can affect the overall results of the questionnaire, which is always a risk for this type of questions.

Lastly, during the data analysis it was noticed that in the Danish version of the questionnaire, concerning the question for computer platforms, one of the questions for dependability in terms of predictability was deleted instead of the question for perspicuity being understandable. Meaning, there are less answers for dependability and the validity of the data collected from the Danish version of the questionnaire is not complete. On the other hand, the questionnaire is missing 9 items, which is also a concern, but nevertheless, it is not considered to be a source of error as it does not affect the results for Dependability, as shown on the table of comparison between the Danish and English version of the questionnaire (Appendix A, Figure 29).

5. Data analysis

The data analysis presented in section 4.3 and the data analysis carried out within this project differed in a few ways. First, the UEQ presents the item scales with seven-point Likert scale, whereas the questionnaire used for data collection used five-point scale. Furthermore, not all 26 items from the UEQ were used in the questionnaire.

On account of difference in the scales (five-point scale) used to measure the responses and the ones used in the UEQ (seven-point scale), the difference in the data input, the structure of the questionnaire and the comparison of two data sets, this tool was not directly used for the data analysis. Accordingly, the data was analyzed the same way using Microsoft Excel worksheet, where all the responses are added and summarized. Subsequently, the same formulas were used to analyze the data for both uses of online banking on computer and mobile devices.

The data in the Excel worksheet tool is calculated in relation to the different items of the six scales of the User Experience Questionnaire. Accordingly, the consistency of the scales or the means of the scales are measured and calculated.

6. Results

This section will present the results from the questionnaire. The section contains four subsections, which will present the results as follow: data concerning the demography of the participants, the results of the questionnaire for computer platforms, the results of mobile platforms, and finally a comparison of the results from computer and mobile platforms. Both sections concerning the results of the questionnaire on computers and mobile devices will be structured as first presenting the overall results of the questionnaire, the confidence intervals, and lastly the consistency of the answers for the different scales will be presented. Accordingly, the comparison section between both platforms will present a table of the comparison of the mean scales.

6.1. Demography

Data from 101 participants was collected from the prepared user experience questionnaire. From the participants 77 choose to fill out the English version and 24 of the participants responded to the Danish version of the questionnaire.

The participants had different backgrounds, in regard to occupation and education. The participants were asked to fill their gender and to which age group they belong. The gender ratio is close to equal, where the women have 13 more responses than the men, as seen on Figure 9.





Figure 10 presents the participants among the age groups. The participants were in the age group between 18 (Under 20 years old) to 60 years or older. The minimum age is considered to be 18 years old on account of the participant to be able to have own bank account. The majority of the participants (85 participants) are in the age group between 20-29 years old, whereas the next largest age group is between 30-39 years and then under 20 years. There are only 3 participants in the age group between 40-49 years old, only 1 participant in the age group between 50-59 years and there are no participants in the age group of 60 years old or above.



Figure 10 Age groups of the participants



Figure 11 Educational level

As figure 11 presents the results, the majority of the participants have higher educational level, 38 participants have bachelor degree and 38 participants have Master degree, where only 5 participants have PhD and 3 participants have AP (Academic Profession) degree, and 17 participants have high school degree.



Figure 12 Occupation

Figure 12 represents the current occupation of the participants. Accordingly, most of the participants (48 participants) are students in the higher education or employed in the private (21 participants) or public (7 participants) sectors.

Figure 13 and Figure 14 present the percentage of the participants using online banking on the different platforms. Within the participants 92 of them used online banking on their computers and 66 of them used online banking on their mobile devices. Furthermore, 59 out of 101 participants use online banking on both platforms.



Figure 13 Online banking on computers



Figure 14 Online banking on mobile devices

Figure 15, shows for how long time the participants have been using online banking. Accordingly, most of the participants (41 participants) have been using mobile banking for 5 years or more, 31 participants have been using online banking between 3 to 5 years, 18 participant have been using online banking between 1 to 3 years, 6 participants have been using online banking from 6 months to 1 year, and only 1 participant have been using online banking for 6 months or less. These results indicate that most of the participants have good knowledge of how to use online banking on these paltforms.



Figure 15 Time of using online banking

Figure 16 presents the frequency of use of online banking on computers (in blue color) and mobile devices (in yellow color). Accordingly, the mobile banking is mostly used on daily or weekly basis, whereas the computer banking is used on monthly and weekly basis.



Figure 16 Frequency of use of online banking



Figure 17 Top 3 tasks performed on computer

Figure 17 presents the top 3 tasks the participants perform on their computers. Accordingly, the top 3 tasks are 'Balance check', 'Money transfers', and 'Paying bills'. The computer banking indicates that it is mostly used for money transfers, followed by balance check and paying bills. Whereas, the top 3 tasks performed on mobile devices are as follow 'Balance check', 'Money transfers', and 'Paying bills'. Indicating small difference of the use between both platforms.



Figure 18 Top 3 tasks performed on mobile devices

Figure 19 presents the reasons why the participants do not use online banking on their computers. Accordingly, the results indicate that the biggest issue is that it is time consuming. Furthermore, not being secure, flexible enough and not easy to access are the other reason for the participants not to use online banking on computer platforms.



Figure 19 Reasons for not using online banking on computers

Figure 20 presents the participants reasons for not using online banking on their mobile devices. These results indicate that the mobile banking have more issues than the one on computers, whereas the biggest issue on mobile devices is that is it not secure.



Figure 20 Reasons for not using online banking on mobile platforms

6.2. Questionnaire results – computer platforms

The results of the User Experience Questionnaire for computers are presented in Table 4. On the table, the mean values, the variance, standard deviation, and the number of responses for that part of the questionnaire are presented, as well as the items and to which scale they belong to.

	Items – computer							
			Std.					
Item	Mean	Variance	Dev.	N⁰	Left	Right	Scale	
1	1.2	0.7	0.9	91	Difficult to learn	Easy to learn	Perspicuity	
2	0.9	0.8	0.9	91	Complicated	Easy	Perspicuity	
3	1.0	0.6	0.8	69	Unpredictable	Predictable	Dependability	
4	1.3	0.7	0.9	91	Not secure	Secure	Dependability	
					Meeting my	Not meeting my		
5	1.2	0.6	0.8	91	expectations	expectations	Dependability	
6	1.2	0.9	0.9	91	Impractical	Practical	Efficiency	
7	1.2	0.6	0.8	91	Cluttered	Organized	Efficiency	
8	0.1	1.4	1.2	91	Dull/Conservative	Creative/Innovative	Novelty	
9	1.2	0.8	0.9	91	Inferior	Valuable	Stimulation	
10	-0.3	1.2	1.1	91	Boring	Exciting	Stimulation	
11	-0.3	1.2	1.1	91	Not interesting	Interesting	Stimulation	
12	0.0	0.8	0.9	91	Demotivating	Motivating	Stimulation	
13	1.4	0.7	0.9	91	Bad	Good	Attractiveness	
14	1.1	0.8	0.9	91	Unlikable	Pleasing	Attractiveness	
15	0.4	1.2	1.1	91	Unattractive	Attractive	Attractiveness	
16	1.2	0.7	0.8	91	Unusable	Usable	Attractiveness	

Table 4 Mean value and variance of the 16 UEQ items on computers

The positive mean values are indicated with green, neutral with yellow, and negative with red. According to the UEQ, values in the range of -0,8 to 0,8 are indicated as neutral rating, while rating below -0,8 are indicated as negative, and ratings above 0,8 are positive. As it can be seen from the Table 4, 11 of the 16 items are positive, 5 are neutral.

According to Schrepp (2015), values bigger than 0.6 or 0.7 are considered as sufficiently high, whereas measures lower than that need to be interpreted carefully. From Table 4, the Novelty item, three items of Stimulation, and one item of Attractiveness scales are around 0 or with negative values. These values are inconsistent and will need more attention during the interpretation.



Figure 21 Mean value per item

Figure 21 is a graphical representation of the mean value of the items in Table 4. The mean values of Novelty, Stimulation, and Attractiveness scales have inconsistencies. Three out of four items of the Stimulation scale are neutral, this brings down the overall results of the scale.

Figure 22 presents the results of the User Experience Questionnaire, indicating positive user experience of using online banking on computers. The scores for the computers on the Attractiveness scale is 0.997 (positive), Perspicuity 1.077 (positive), Efficiency 1.209 (positive), Dependability 1.176 (positive), Stimulation 0.159 (neutral), Novelty 1.209 (positive). The low score of the Stimulation can be on account of the nature of the study, as banking is private and might be considered as not very pleasant and motivating task.





On Figure 23, the Attractiveness, Pragmatic and Hedonic quality scores are presented. The Pragmatic or goal oriented quality consists of the Perspicuity, Efficiency, and Dependability, whereas the Hedonic (not goal oriented) quality consists of the Stimulation and Novelty. The Pragmatic quality has a score of 0.13, the Hedonic quality is 1.16, and Attractiveness is 1.0. This indicates positive user experience concerning non-goal oriented aspects, whereas the goal oriented aspects should be improved.



Figure 23 Attractiveness, Pragmatic and Hedonic qualities

The confidence intervals give an indication of the precision of the mean values of the scales. The smaller the confidence interval, the higher the precision is, and the results can be

trusted more. As presented on Table 5, the confidence values of the scales are relatively high, which indicates that the estimation of the mean values is not very precise.

Confidence intervals (p=0.05) per scale								
Scale	Mean	Std. Dev.	N	Confidence	Confidence interval			
Attractiveness	0.997	0.742	91	0.152	0.845	1.150		
Perspicuity	1.077	0.803	91	0.165	0.912	1.242		
Efficiency	1.159	0.749	91	0.154	1.005	1.313		
Dependability	1.190	0.662	91	0.136	1.054	1.326		
Stimulation	0.159	0.762	91	0.156	0.003	0.316		
Novelty	0.099	1.174	91	0.241	-0.142	0.340		

Table 5 Confidence intervals

When participant does not reply seriously or gives random answers, these answers are considered as inconsistent. Five out of the ninety-one participants have inconsistent answers. These inconsistencies are in the Attractiveness and Stimulation scales. The table with inconsistent answers can be seen in Appendix C, 2. Analysis of the results, Inconsistencies tab.

Table 6 presents the results of the benchmarking on computer platforms. The measured scale means are set in relation to existing values from benchmark data set. The results on Table 6 indicate that the results of the benchmark are positive.

Computer platforms						
Scale	Mean	Comparison to benchmark	Interpretation			
Attractiveness	0.997	Above average	25% of results better, 50% of results worse			
Perspicuity	1.077	Good	50% of results better, 25% of results worse			
Efficiency	1.209	Excellent	25% of results better, 50% of results worse			
Dependability	1.190	Excellent	25% of results better, 50% of results worse			
Stimulation	0.159	Bad	In the range of the 25% worst results			
Novelty	0.099	Bad	In the range of the 25% worst results			

Table 6 Benchmarking of computer platforms

6.3. Questionnaire results – mobile platforms

Table 7 presents the mean value, variance, standard deviation, number of participants answered the questionnaire for mobile devices, and the scale with their corresponding items. In the table,

there are three neutral, thirteen positive, and zero negative items in the results of the UEQ for mobile devices.

Items -mobile devices								
Item	Mean	Variance	Std. Dev.	Nº	Left	Right	Scale	
1	1.6	0.5	0.7	66	Difficult to learn	Easy to learn	Perspicuity	
2	1.5	0.6	0.8	66	Complicated	Easy	Perspicuity	
3	1.4	0.5	0.7	49	Unpredictable	Predictable	Dependability	
4	1.1	1.0	1.0	66	Not secure	Secure	Dependability	
5	1.4	0.6	0.7	66	Meeting my expectations	Not meeting my expectations	Dependability	
6	1.6	0.5	0.7	66	Impractical	Practical	Efficiency	
7	1.4	0.5	0.7	66	Cluttered	Organized	Efficiency	
8	0.9	0.9	1.0	66	Dull/Conservative	Creative/Innovative	Novelty	
9	1.5	0.6	0.7	66	Inferior	Valuable	Stimulation	
10	0.5	0.9	1.0	66	Boring	Exciting	Stimulation	
11	0.6	1.0	1.0	66	Not interesting	Interesting	Stimulation	
12	0.6	1.0	1.0	66	Demotivating	Motivating	Stimulation	
13	1.5	0.5	0.7	66	Bad	Good	Attractiveness	
14	1.4	1.0	1.0	66	Unlikable	Pleasing	Attractiveness	
15	1.1	0.8	0.9	66	Unattractive	Attractive	Attractiveness	
16	1.4	0.8	0.9	66	Unusable	Usable	Attractiveness	

Table 7 Mean, Variance, Standard Deviation for item

The graphical representation of the mean value for mobile devices is presented on Figure 24. The three neutral values are three items of the Stimulation scale boring/exciting, Not interesting/ interesting, and demotivating/ motivating. These items were also rated as neutral in the results on computer platforms.



Figure 24 Mean value per item

The results of the UEQ on Figure 25, indicate positive user experience of using online banking on mobile platforms. The score of Attractiveness scale is 1.359 (positive), Perspicuity scale is 1.604 (positive), Efficiency scale is 1.521 (positive), Dependability scale is 1.422 (positive), Stimulation scale is 0.832 (positive), and Novelty scale is 0.803 (positive).



Figure 25 UEQ scale results

The Attractiveness, Pragmatic, and Hedonic qualities of the mobile platforms have positive scores. The Attractiveness is 1.36, Hedonic quality is 1.52, and Pragmatic quality is 0.82. Accordingly, this indicates that the user experience on mobile platforms is positive.



Figure 26 Attractiveness, Pragmatic and Hedonic qualities

The confidence values for mobile platforms, presented on Table 8, have relatively high values, indicating that the estimation of the mean values is not very precise.

Confidence intervals (p=0.05) per scale								
Scale Mean Std. Dev. N Confidence Interval								
Attractiveness	1.359	0.160	66	0.039	1.320	1.397		
Perspicuity	1.604	0.224	66	0.054	1.550	1.658		
Efficiency	1.521	0.141	66	0.034	1.487	1.555		
Dependability	1.422	0.144	66	0.035	1.387	1.456		
Stimulation	0.832	0.149	66	0.036	0.796	0.868		
Novelty	0.803	0.154	66	0.037	0.766	0.840		

Table 8 Confidence intervals

Within the table of inconsistent answers for mobile platforms, only one participant is considered as giving inconsistent answers. The inconsistency is mainly in the Stimulation scale. The table with inconsistent answers for mobile platforms can be seen in Appendix C, 2. Analysis of the results, Inconsistencies tab.

The results on Table 9 of the benchmarking on mobile platforms indicate that the results are quite positive and almost excellent.

Table 9 Benchmarking of mobile platforms

Mobile platforms							
Scale	Mean	Comparison to benchmark	Interpretation				
Attractiveness	1.359	Excellent	25% of results better, 50% of results worse				
Perspicuity	1.604	Excellent	10% of results better, 75% of results worse				
Efficiency	1.521	Excellent	10% of results better, 75% of results worse				
Dependability	1.422	Excellent	25% of results better, 50% of results worse				
Stimulation	0.832	Above Average	50% of results better, 25% of results worse				
Novelty	0.803	Good	25% of results better, 50% of results worse				

6.4. User experience scales

To analyze the six user experience scales, 16 items were included in the questionnaire, the items are presented in Table 2, section 4.2.1. with the corresponding scale and number of how they were used in the questionnaire. Accordingly, an Excel stylesheet tool was used for the calculations of the results.

The results from the questionnaire indicate that the user experience of both platforms (computers and mobile devices) is positive. Accordingly, to compare both results, a table is created presenting the mean value, standard deviation, and confidence intervals for both platforms.

	Computer platforms – data set 1							Mobile platforms – data set 2						
Scale				Confi	Confidence					Confi	Confi	dence		
	Mean	STD	Ν	dence	Interval		Mean	STD	Ν	dence	Interval			
Attractiveness	0.997	0.742	91	0.152	0.845	1.150	1.359	0.160	66	0.039	1.320	1.397		
Perspicuity	1.077	0.803	91	0.165	0.912	1.242	1.604	0.224	66	0.054	1.550	1.658		
Efficiency	1.159	0.749	91	0.154	1.005	1.313	1.521	0.141	66	0.034	1.487	1.555		
Dependability	1.190	0.662	91	0.136	1.054	1.326	1.422	0.144	66	0.035	1.387	1.456		
Stimulation	0.159	0.762	91	0.156	0.003	0.316	0.832	0.149	66	0.036	0.796	0.868		
Novelty	0.099	1.174	91	0.241	-0.142	0.340	0.803	0.154	66	0.037	0.766	0.840		

Table 10 Comparison between both platforms

Figure 27 is a graphical representation of the comparison of the mean values of the computer and mobile platforms. From Table 10 and Figure 27, it is indicated that the mobile platform has higher positive scores than the scores of the computer platform.



Figure 27 Comparison of the scales between the platforms

The Figure 28 presents the Attractiveness score with the Pragmatic (consisting of Perspicuity, Efficiency and Dependability) and Hedonic (consisting of Stimulation and Novelty) quality measures of the user experience for both computers and mobile devices.



Figure 28 Attractiveness, Pragmatic and Hedonic quality comparison

7. Discussion

The assessment of the user experience on online banking platforms was accomplished with quantitative approach. A questionnaire was created and distributed on different social media in order to collect a sufficient number of responses. Accordingly, 101 responses were collected and analyzed according to the UEQ Excel tool, resulting in creating an overview and understanding of the phenomenon. Furthermore, these results were investigated in information architecture, user experience, and usability theories, in which results were interpreted to support the findings.

The creation of the questionnaire did not include all 26 items of the six scales, but only 16 items. According to Schrepp (2015), it is not advisable to change or leave out any of the items. This can result in difficulties in interpreting the data and not complete results. On account of that, it can be argued that the data collected with the questionnaire is not complete and more precise data collection will be needed including all 26 items.

The distribution of the questionnaire affected the data collection in terms of the sample population. Ideally, more distributed sampling in terms of age groups would have been preferable, as it would allow for more concrete analysis and interpretation of the results among the age groups. Nonetheless, the sampling population within this study is considered to be adequate in any aspect.

Within the questionnaire, a few people answered that they use a bank from their homeland as their main bank. Accordingly, their answers can be questioned, as on one hand these participants might have answered the questionnaire for their homeland bank. On the other hand, these participants might have answered for the Danish bank they use. There is no way to know for sure for which bank they answered. The removal of these responses was considered, but as there are only six participants answered with other than Danish bank and it is more important to create and overview of the results, the answers were kept as these six answers will have small to no affect the overall results.

As presented in section 6. Results, it a trend and relation can be seen between the age groups, occupation, and educational level of the participants. Most of the participants are in the age group between 20 - 29 years old. It can be argued that these results, shown on Figure 10 were expected on account of the distribution of the questionnaire on the social media and the age of the author (in the age group 20-29), meaning most of the people will be around the same age

in their 20s or early 30s. The results can for occupation of the participants can also be deemed as expected, as most of the participants are in their higher education or are employed. This can also be on account of the distribution of the questionnaire on the social media. Furthermore, as most of the participants belong to the age group between 20 - 29 years old, it can be argued that the results of the educational level and occupation in combination with the distribution of the questionnaire, were expected, where most of the participants are under higher education. Accordingly, it can be argued that the distribution of the questionnaire contributed to big extend to the sampling of the participants.

According to the two diagrams presented on Figure 15 and 16, showing for how long time the participants have been using online banking and the frequency of its use, are suggest that the participants are well familiarized and know how to use online banking on both platforms. The most of the participants have used online banking for 5 years or more and the next chart (Figure 16) suggest that most of the participants use online banking on weekly basis. According to Russell-Rose and Tate (2013), and on account that most of the participants use online banking on both platforms, it can be argued that the users can be considered to be double experts or in other words to be able to find information they need and complete their tasks fast and efficient.

The overall results of the questionnaire section 6.2, conserning the online banking on computers shows that the user experience on computer platforms can be considered relatively positive, according to the scores of the six scales. In terms of benchmarking the scores of the scales (Table 6), one scale has 'good' score, two scales have 'excellent', one scale has score 'above average', and two scales have 'bad' scores. The Stimulation and Novelty scales have bad scores, meaning that the online banking on computers is not exciting or motivating to use, neither it is considered to be creative or innovative by the participants. This can be connected to the thoughts and feelings of the participants of paying bill, rent grocerises, ect. or with management of their finances, which is not always a pleasant task. Another possible explanation for the bad results may be that the users do not perceive the online banking on computers as exciting or creative to use. On the other hand Efficiency and Dependability scales have excellent scores, meaning that the users are solving their tasks withouth unnecessary effort and have control of the interaction. even though the scores of Stimulation and Novelty are bad, they do not effect the Efficiency and Dependability of the online banking on computers. The Perspicuity

scale score is rated as good, meaning the users can easily get familiar with the product. Lastly, the Attractiveness scale is rated as above average. This means that the overall impression of the online banking on computer platforms is good an the users like it.

The results of the questionnaire conserning the online banking on mobile devices (section 6.3) shows that the user experience on mobile platforms is quite positive. As the benchmarking presented (Table 9), one scale has 'above average' score, one scale has 'good' score, and four scales have 'excellent' scores. Stimulation scale is scored aboe average, meaning that the excitement and motivation of the participants to use online banking on mobile devices can be considered to be more on the positive side rather to neutral. Novelty scale has good score, meaning that the online banking on mobile devices is considered to be creative and innovative. Accordingly, Dependability, Efficiency, Perspicuity, and Attactiveness have 'excellent' scores. Meaning that, the users feel they are in control of the interaction and complete their tasks withouth putting any effort. This is also partly contributed by the ease to learn how to use the online banking on mobile devices or the Perspicuity. Lastly, the overall impression of the online banking on mobile devices is excellent, meaning the users like the product.

Comparing the results of both platforms, it can clearly be seen that the mobile platforms have higer scores than the computer platforms, meaning that the online banking user experience is better on mobile devices than on computers. In considerations to the lower scores of the computer platforms, a suggestion for improvement can be made, concerning the goal oriented aspects of online banking. In order to obtain more information to what can be improved, different methods can be used to collect qualitative data, such as interviews or focus groups. First, a focus groups can be gathered, in order to raise the diversse and sensitive issues conserning the topic of online banking on computers. Afterwards interviews can be conductedm which can be structured or semi-structured, in order to explore the issues of the participants with the computer platforms. These methods for data collection can be considered as eticly appropriate if there are no direct questions concerning the users bank account or other sensitive information. Accordingly, the data provided by these two methods can be used to improve the online banking user experience on computer platofrms. Additionally, usability testing can also be considered, which will contribute with better understanding of how the users interact with the product, but again, on account of the sensitive information not many people will agree to

participating. Meaning that a prototype can be created with the purpose of conducting usability testing.

The overall results of both platforms suggest that the user experience is positive. Accordingly, the scales measured on mobile platforms is much higher that the scales measured on computer platforms. This leads to users preferring to use more often the mobile devices, for checking the balance of their bank accounts or money transfers, whereas the users prefer to use online banking on computers more rarely but with the aim of money transfers, balance check and paying bills. This can be linked to trust in the physical bank and good technology acceptance. Accordingly, the choice of device for use is considered on ease of use and accessibility.

There were some limitations to this study, which can be argued as influencing the results. First, because of the sensitive nature of the topic, the methods for data collection had to be carefully selected, considering the ethics, and the willingness of the people to participate in the study according to the chosen method. Because of that, the data collection was limited to questionnaire, alongside which a literature review was conducted in order to gain more information on the topic. Another limitation can be considered the time constrains, as each method takes time to prepare, with more time methods could have been conducted and accordingly, the data and results could have been more precise.

8. Conclusion

This study has investigated the user experience on online banking platforms, or more precisely on computer and mobile platforms. Within this notion, three questions were formulated to help investigate the problem formulation. The consistent use of mobile banking on weekly basis and monthly for computer banking, and on account of the top 3 tasks performed on both platforms are the same, meaning the users use both platforms for the same tasks, and variety of tasks performed on the platforms, contribute to characterizing the user interaction as easy and seamless on both platforms. Accordingly, the user experience on mobile platforms can be characterized as more accessible, faster and overall satisfying. Whereas the user experience on computer platforms can be characterized as more trustworthy and secure.

Accordingly, the users assessed the online banking user experience on both platforms as being positive. Whereas, the user experience on mobile platforms was deemed as more positive according to the results. The user experience on computers was also deemed as positive, which can be argued, as it the results are also close to neutral.

The implications of the user assessment indicate that the users are willing to use online banking on weekly basis on a mobile platform, on which they do not feel secure. Additionally, the users are willing to use the online banking on computer platforms, even though it is time consuming. These issues can be overlooked as long as the users complete their tasks successfully and have positive user experience.

In conclusion, the user experience on computer and mobile platforms can be characterized as easy and simple, based on the results from the questionnaire, whereas the individual user experience differ from person to person. Nonetheless, some improvements can be made in promoting the security on mobile banking in order to gain users trust. Accordingly, the time-consuming issue of some participants cannot be improved from service point of view, as the time to complete a task is individual.

Furthermore, future work of this study for user experience is to conduct a questionnaire, containing all 26 items, in order to fully measure the user experience scales. Accordingly, other methods can be added to the study, for more precise data.

9. References

Abbad, M. M. (2013). E-banking in Jordan. Behaviour & Information Technology, 32(7), 681-694.

- Alavi, S. & Ahuja, V. (2016). An Empirical Segmentation of Users of Mobile. *Journal of Internet Commerce*, 15(4), 390-407. doi:10.1080/15332861.2016.1252653
- Alber, W. & Tullis, T. (2013). *Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics.* Elsevier Science.
- Allen, I. E., & Seaman, C. A. (2007). Likert scales and data analyses. Quality progress, 40(7), 64.
- Althobaiti, M., M., & Mayhew, P. (2014). Security and Usability of Authenticating Process of Online Banking: User Experience Study. *In Security Technology (ICCST), International Carnahan Conference*, (pp. 1-6).
- Apari, T. G., Molu, F., Findik, N., & Dalci, M. (2013). User experience approach in financial services. In Technological Advances in Electrical, Electronics and Computer Engineering (TAEECE), International Conference, (pp. 400-403).
- Bargas-Avila, J. A., & Hornbæk, K. (2011). Old wine in new bottles or novel challenges: a critical analysis of empirical studies of user experience. SIGCHI Conference on Human Factors in Computing Systems (pp. 2689-2698). ACM.
- Bhatt, A. (2016). Factors Affecting Customer's Adoption of Mobile Banking Services. *Journal of Internet Banking and Commerce*, 1-22.
- Bryman, A. (2012). Social research methods. New York: Oxford University Press Inc. .
- Casalo, L. V., Flavian, C., & Guinaliu, M. (2007). The role of security, privacy, usability and reputation in the development of online banking. *Online Information Review*, 583-603.
- Chiou, J-S. & Shen, C-C. (2012). The antecedents of online financial service adoption: the impact of physical banking services on Internet banking acceptance. *Behaviour & Information Technology*, 859-871.
- Chou, C., D. & Chou, Y. A. (2000). A guide to the Internet Revolution in Banking. *Information Systems Management*, 47-53.
- Edgar, A. & Sedgwick, P. (2008). Cultural theory: the key concepts. London: Routledge.
- Furst, K., Lang, W., W., & Nolle, E., D. (2002). Internet Banking. Journal of Financial Services Research, 95-117.
- Garrett, J. (2011). *The elements of user experience, the: user-centered design for the web and beyond* (2nd ed.). Berkeley, CA: Pearson Education.
- Given, L. M. (2008). The Sage encyclopedia of qualitative research methods. Sage Publications.
- Goodman, E., Kuniavsky, M. & Moed, A. . (2012). *Observing the User Experience : A Practitioner's Guide to User Research*. Elsevier Science.
- Harris, M., Cox, K., C., Musgrove, F., C., & Ernstberger, W., K. (2015). Customer preferences for banking technologies by age groups. *International Journal of Bank Marketing*, 587-602.

- Hassenzahl, M. (2008). User Experience (UX): Towards an experiential perspective on product quality. *In Proceedings of the 20th Conference on l'Interaction Homme-Machine* (pp. 11-15). ACM.
- Hassenzahl, M. (2010). Experience Design: Technology for All the Right Reasons. Morgan & Claypool.
- Hassenzahl, M., & Tractinsky, N. (2006). User experience a research agenda. *Behaviour & Information Technology*, 91-97.
- Hinze, A. M., Chang, C., & Nichols, D. M. (2010). Contextual queries express mobile information needs. 12th international conference on Human computer interaction with mobile devices and services (pp. 327-336). ACM.
- Hoehle, H., Scornavacca, E. & Huff, S. (2012). Three decades of research on consumer adoption and utilization of electronic banking channels: A literature analysis. *Decision Support Systems*, 54(1), 122-132.
- Johnson, K., Li, Y., Phan, H., Singer, J. and Trinh, H. (2012). The Innovative Success that is Apple, Inc.
- Kassab, D., & Yuan, X. (2013). Understanding the information needs and search behaviour of mobile users. *nformation Research*, *17*(4).
- Laugwitz, B., Held, T., & Schrepp, M. (2008). Construction and Evaluation of a User Experience Questionnaire. *A. Holzinger*.
- Lie bana-Cabanilla, F., Mun oz-Leiva, F., & Rejo n-Guardia, F. (2013). The determinants of satisfaction with e-banking. *Industrial Management & Data Systems*, 113(5), 750-767.
- Liébana-Cabanillas, F., Muñoz-Leiva, F., & Sánchez-Fernández, J. (2015). Behavioral model of younger users in m-payment systems. *Journal of Organizational Computing and Electronic Commerce*, 169-190.
- Lipp, K. (2012). User Experience beyond Usability. User Behavior, 13-19.
- McNamara, N., & Kirakowski, J. (2005). Defining usability: quality of use or quality of experience? *Professional Communication Conference* (pp. 200-204). IEEE.
- Morville, P. & Rosenfeld, L. (2015). *Information Architecture for the Worl Wide Web*. Sebastopol, CA: O'Reilly Media Inc.
- Nielsen, J. (1994). Usability engineering. Elsevier Science.
- Oxera. (2015). Benefits of online platforms. Oxera Consulting LLP.
- Rubin, J. & Chisnell, D. (2008). *Handbook of Usability Testing. How to Plan, Desing, and Conduct Effective Tests.* Indianapolis, Indiana: Wiley Publishing, Inc. .
- Russell-Rose, T. & Tate, T. (2013). *Designing the Search Experience: The Information Architecture of Discovery*. Waltham, MA, USA: Elsevier Inc.
- Santouridis, I., & Kyritsi, M. (2014). Investigating the determinants of Internet banking adoption in Greece. *Procedia Economics and Finance*(9), 501-510.

Schrepp, M. (2015). User Experience Questionnaire Handbook.

- Schrepp, M., Hinderks, A., & Thomaschewski, J. (2014). Applying the User Experience Questionnaire (UEQ) in different evaluation scenarios. *International Conference of Design, User Experience,* and Usability (pp. 383-392). Cham: Springer.
- Schuh, G., Ryschka, S. & Kohns, C. (2015). Development of a Morphology for the Description of Business Models for Technology Platforms. *Engineering Management Research*, 4(1), 49-63.
- Singhal, D. and Padhmanabhan, V. (2008). A Study on Customer Perception Towards Internet Banking: Identifying Major Contributing Factors. *The Journal of Nepalese Business Studies*, 101-111.
- System, B. o. (2016). *Consumers and Mobile Financial Service 2016*. Washington, DC: Board of Governors of the Federal Reserve System.
- Wang, Y. Wang, Y., Lin, H., & Tang, T. (2003). Determinants of user acceptance of internet banking: an empirical study. *International Journal of Service Industry Management*, 14(5), 501-519.
- Weir, S., C., Douglas, G., Richardson, T., & Jack, M. (2010). Usable security: Use preferences for authentication methods in eBanking and the effects of experience. *Interacting with Computers*, 153-164.
- Wilson, D. T. (1999). Models in information behaviour research. *Journal of Documentation*, 55(3), 249-270.
- Zhou, T. (2011). An empirical examination of initial trust in mobile banking", *Internet Research*, 21(5), 527-540.
- Zhou, T. (2012). Examining mobile banking user adoption from the perspectives of trust and flow experience. *Information Technology Management*, 27-37.

Links

- *Computer vs. Smartphone*. (2017, 04 26). Retrieved from Computer hope: <u>https://www.computerhope.com/issues/ch001398.htm</u>
- Martin, T. (2014). *The evolution of the smartphone*. Retrieved from www.pocketnow.com: http://pocketnow.com/2014/07/28/the-evolution-of-the-smartphone
- *What is a Platform? Definition from Techopedia*. (n.d.). Retrieved from Technopedia: https://www.techopedia.com/definition/3411/platform

10. Appendix A

Item	<i>n</i> Danish translation					
1	Irriterende	Behagelig				
2	Uforståelig	Let forståelig				
3	Kreativ	Fantasiløs				
4	Let at lære	Svær at lære				
5	Værdiful	Infriør				
6	Kedelig	Spændende				
7	Uinteressant	Interessant				
8	Uforudsigelig	Forudsigelig				
9	Hurtig	Langsom				
10	Opfindsom	Konventionel				
11	Hindrende	Støttende				
12	God	Dårlig				
13	Kompliceret	Enkel				
14	Utilfredsstillende	Tilfredsstillende				
15	Almindelig	Nyskabende				
16	Ubehagelig	Behagelig				
17	Sikker	Usikker				
18	Motiverende	Demotiverende				
19	Lever op til forventningerne	Lever ikke op til forventningerne				
20	Ineffektiv	Effektiv				
21	Let forståelig	Forvirrende				
22	Upraktisk	Praktisk				
23	Organiseret	Overfyldt				
24	Attraktiv	Uattraktiv				
25	Venlig	Uvenlig				
26	Konservativ	Innovativ				

Table 11 Danish translation of the UEQ items



Figure 29 Comparison between the results of English and Danish versions of the questionnaire

11. Appendix B – Questionnaire

Appendix B contains the questionnaire created for this study.

12. Appendix C – Results of the questionnaire

Appendix C contains two files: 1. Responses of the questionnaire, and 2. The analysis of the results.

13. Appendix D – UEQ tool

Appendix D contains all files concerning the User Experience Questionnaire.