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MASTER THESIS

Understanding APPropriation:
A study of everyday use of smartphones in two age groups

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Abstract

This thesis examines the use of smartphones within two different age groups and makes an attempt to understand how people appropriate smartphones and integrate them into their everyday life. The thesis also tries to illuminate whether the smartphone technology has become part of the user's daily activities. It was conducted a quantitative survey of two user groups between 20-30 years and 46-56 years, to gain an overview and map their use of smartphones. Then qualitative interviews were performed with a smaller group of users, to dig deeper into how they appropriated the smartphone. The interview questions were expansions of the survey questions. The findings revealed similarities and dissimilarities regarding acquisition of the smartphone, downloading and use of apps, patterns of use, lacks of features, and daily situations and activities where the smartphone became insufficient. Theories have been presented in attempt to understand how technology augments people in their daily life.

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Content list

1.0 Introduction

The smartphone has in recent years become a popular communication tool, and procurement of the smartphone has increased in a large extent. This growth has especially occurred the last few years. Global mobile statistics show that the worldwide growth rate of smartphone use from year 2011 to 2012 is 46.6 percent (mobiThinking, 2013), and the adoption of smartphones is in constantly growth.

Global research performed in 2012 shows that Google's Android is the dominant smartphone operating system, followed by Apple's iOS, BlackBerry's BlackBerry OS, Nokia's Symbian and Microsoft's Windows Phone (IDC, 2013). These were also the operating systems the participants in the research were dealing with.

The smartphone has opened for a new digital world, with easier access to Internet with the possibility of reading news, using social networks, listening to radio, checking email and mobile bank on the go, regardless of where the user is located. The smartphone represent the most recent step in evolution of portable information and communication technology (ICT) (Oulasvirta et al., 2011a) and is the most rapidly growing platform of computers. The smartphone is approaching personal computers (PCs) in technical sophistication and computational power (Oulasvirta, Wahlström & Ericcson, 2011b). The phones used today are in many ways no longer a supplement to the PC, and the smartphone is almost on par with the PC in technical features and capabilities.

This thesis examines the use of multi-touch smartphones within two age groups, and presents the results of a questionnaire conducted in fall of 2012, followed by interviews of voluntary questionnaire respondents and smartphone users in winter 2012/2013. The purpose of the examinations was to both gain overview and a better understanding of smartphone appropriation across age groups. Appropriation is in this context described as the way that users evaluate and adopt, adapt and integrate a technology into their everyday practices (Carroll et al. 2002).

The questionnaires also intended to explore how the smartphone contributes in organizing users' daily life and how addicted the users are to their phone. The data is based on the answers of 103 respondents for the questionnaire and 16 participants for the interviews. The two groups are age 20-30 and age 46-56. In this context, these age groups are also defined as two age groups.

To limit the scope of the thesis, this research deals with smartphones with multi-touch interface, which stands out from other smartphones by enabling users to perform multi-touch finger gestures, such as pinching the screen for zooming in, or spreading the screen for zooming out (Oxford Dictionaries, 2013).

1.1 Background of research

The reason why this study was conducted was because of the researcher's notice of differences in use and attitudes towards the use of smartphones in the researcher's social circle, which consists of people within a wide age range. The researcher wanted to find out more about how the smartphone technology impacts the users in their daily life, and extract usage patterns, habits, similarities and dissimilarities within the use of smartphones, across various age groups.

Several studies show that there has been an increase in smartphone owners the last years, like data from Pew Internet shows in a report. The increase concerns both of the age groups that this thesis has studied (Smith, 2012).

1.2 User groups

The user groups are two age groups with participants between 20-30 years and 46-56 years. The respondents were both male and female smartphone users. Due to the scope and goal of the thesis, gender and age are variables that this thesis takes into account. Both internal use and use across age groups were being researched, which includes the respondents' gender. Gender has been taken into account to get a broader overview and mapping of smartphone usage. Differences between genders have, however, only been discussed where there have been remarkable inequalities within appropriation of the smartphone, its apps and its functions.

Research from 2012 shows that 66% of Americans between the ages 18-29 own a smartphone (Rainie, 2012), and statistics show that the largest user group of smartphones were in fact the groups 18-24 years and 25-34 years. The younger user group was therefore a cross between these two groups.

The idea was to investigate the group of most frequent smartphone users and compare it with their parents' generation. To define the age of the parents' generation, statistics from Statistics

Norway (2013) were used to identify the average age of their parents when the respondents in the younger user group were born (Statistisk Sentralbyrå, 2013). The respondents in the younger user group were born between the years 1982 to 1992. That means that their parents today are between 46 and 57 years old (Statistisk Sentralbyrå, 2013). To limit the number of participants and the scope of the thesis, the ages of the two groups that have been researched was set to be age 20-30 years and age 46-56 years.

There was no focus on the participants' socioeconomic status, as data like education, occupation and income were not goals of measurement in this research. The thesis focused on people's use of smartphones, regardless of their status and place in society. There was however a part of the questionnaire asking why the respondents acquired the smartphone, where *in relation to work* was an option, but not with the intention to separate smartphone users who work and those who do not. It was just to cover the reasons for getting a smartphone.

1.3 Mobility in everyday life

The need for people to be mobile and available may prove to be greater today. The regular cell phone gained a foothold as a voice based communication system (Stuckey, 2004), but new technologies, like the smartphone, have opened a new way of communicating and have changed the way people orient to group coordination. The smartphone shares several of the PC's technological features, and while the PC supports their users in a wide range of desk-bound activities, the smartphone is more readily to hand. This means that these computer-based tools are increasingly moving off of the desktop and into our everyday lives (Pascoe & Thomson, 2007).

The smartphone makes it easier to connect with other people by offering increased flexibility and more choices in terms of communication services beyond SMS, like Skype, Facebook Messenger and other instant messaging-services. The mobile phone has been described as an anywhere/anytime Internet terminal (Stuckey, 2004), and the development of the smartphone supports this description to a large extent. This mobile technology breaks the barriers of time and space, offering applications (apps) and features which can satisfy people's various deficiency needs, related people's esteem, love/belonging and safety. Apps are in this case described as small, individual software units which serve to provide users with similar services to those accessed on PCs (Technopedia, 2013).

1.3.1 Everyday life

This thesis seeks to determine how people utilize their smartphone in their everyday life. To get a clear understanding of what "everyday" means in this context, it will be presented three definitions:

"The ordinary or routine day or occasion" (The free dictionary, 2013),
"Encountered or used routinely or typically" (Merriam-Webster, 2013), and
"Of or for ordinary days, as contrasted with Sundays, holidays, or special occasions" (Dictionary.com, 2013).

These three definitions of "everyday" suggest that "everyday life" should be understood as consisting of work, school, traveling, spare time and spare time activities, which are situations that affect and are affected by the use of the smartphone.

2.0 Research questions

This thesis will seek to understand how the smartphone is used in daily context and whether there exist differences in the appropriation and use of the smartphone and its features, within two different age groups. The main research question will therefore be:

> *How do users in two age groups appropriate the smartphone and adapt it to their everyday life?*

As there are a wide range of smartphone users, the thesis is limited to deal with users within two age groups. In order not to narrow both the thesis and the number of users too much in, it will be focused on the smartphones in general and their common properties and not one particular smartphone model. The main research question will however be divided into smaller parts, in order to more easily answer the main research question. Part a) wants to examine the background and purpose of the acquisition of the smartphone:

a) What are the differences between the age groups in how people acquire smartphones and learn to use them?

Part b) deals with the actual use of the smartphone and apps in everyday situations.

b) What are the differences between the age groups in how people utilize smartphones and mobile apps in their everyday life?

Part c) identifies whether or not there were features that were insufficient or which the users felt the smartphone was missing.

c) Are there any features, which people in each of the age groups feel their smartphones are missing? If yes, what are these features?

3.0 Theoretical perspectives

There exist several theoretical frameworks supporting and explaining the human activities in interaction with technology, and the technology's role in the world. This section introduces and emphasizes two main theories relevant for this research, which are applied to provide a general orientation in the object of study and identify the issues to be explored in the survey and interviews. The theories presented are the Activity Theory and Distributed Cognition. These theories will be presented in relation to use of technology in general.

These theories have helped determining the focus of the study, and it has helped to frame the work. The way they emphasize the importance of integrating technology into the users' everyday life has led to curiosity around the integration of smartphone technology to people's everyday life, and how users and the technology influence each other.

3.1 The importance of integrating theory to the research

Mobile technology has to a greater extent become part of the users' everyday life, and has gained a more expanded area of use after the smartphone was introduced. The theories provide a way to understand how the technology becomes a part of the user and extends the user in daily activities. They also provide an understanding of how the technology not only shapes the users and their environment, but that there exist a mutual influence where the users and their environment also shapes the technology.

The reason why activity theory was seen as an appropriate framework in this context is because it provides an understanding of why the user performs an activity. The activity is composed of subjects, objects, actions and operations, where the subject/user's actions are goal-directed processes which are motivated by the object/artifacts to perform an operation. Behind the object, there is a need or a desire which the whole activity aims to meet. This theory will also try to help understanding why the participants in the current research make use of the smartphone in their everyday life, and what purpose it serves for them to fulfill their general needs.

Instrumental genesis is an approach, proposed by Pierre Rabardel, which springs from the activity theory (Kaptlinin & Nardi, 2006). It illuminates how the users make changes to artifacts, and adjust and adapt them to their specific needs and daily activities. It was suitable to include this approach in this context, where there is a need to understand why the users expand their smartphone by downloading certain apps, and why they feel the smartphone is missing features unity.

Distributed cognition is an approach which shares several properties with the activity theory, but focuses to a greater extent on the interaction between users and artifacts in an environment, including all the elements that could affect the use.

The technological artifacts have developed from being stationary to flexible, mobile and available at hand. They have, or contain, flexible features which can be modified by users and adjusted for various tasks. Computation becomes ubiquitous and the environments are enriched with new possibilities for communication and interaction (Hollan, Hutchins & Kirsh, 2000). Along with this development, there are several new aspects to take into account, both in terms of designing artifacts, the technology's position in an environment, and understanding the interaction between a person and an artifact.

3.2 Designing for an expanded use of technology

When creating tools and technological artifacts today, one has to take into account that people and artifacts influence one another. They are no longer two separate entities. The focus in design has changed from designing for a stationary worker using a desktop computer, to collaborative uses of technology by groups and the larger society, varied virtual and physical contexts, an expanded set of activities, and human experience in general (Kaptelinin & Nardi, 2006).

As technology develops, new areas of use emerge and change the view of the users and their role in interacting with technology. The use of technological artifacts has changed from being chained to a desk to using them as tools in the everyday life. When designing a new artifact, it can be easy to only look at one or a few aspects of its use, and forget other user needs and areas of use. The users must be understood in context with their activities in their environment.

3.3 The activity theory approach

There exist several approaches of understanding how technological artifacts get integrated into people's lives and what affects the use of these artifacts. Activity theory was at first constituted by the psychologists Leont'ev, Rubinstein and Vygotsky in the 1920-30s. It supports the development of moving out from the computer as the focus of interest to understanding technology as a part of the larger scope of human activities, and seeing subjects and objects in unity (Kaptlinin & Nardi, 2006).

Traditional analytical thinking has assumed that the subject and the object must be understood separately, while the activity theory emphasizes the activity itself, and maintains that no properties of the subject and the object exist before and beyond activities. The subjects live in the world, and have needs that can be met only by being and acting in the world. The activity is an activity of a subject. The subjects are not only acting with the world, but they are interacting with the world "through the interface" (Bødker (1991), cited in Kaptlinin & Nardi, 2006).

Activity theory seeks to understand the mental capabilities of a single individual, including the context surrounding human actions, like for instance the environment, history of the person and the role of the artifact (Kaptlinin & Nardi, 2006). The activity theory also emphasizes the importance of studying the real-life use of technology as a part of human interaction with the world. Activity theory is therefore described as "an approach that aims to understand individual beings as well as the social entities they compose, in their natural everyday life circumstances, through analysis of the genesis, structure and processes of their activities" (Kaptlinin & Nardi, 2006).

3.3.1 Principles of activity theory

To summarize the key concepts of the activity theory, its basic principles will briefly be summed up. The first is *object-orientedness*, claiming that all human activities are directed toward their objects. Everything people do is directed to something in the world, the objects direct how people interact with the world by affordances and resistance, and influence the relation between the subject and the object.

The second, which is *the hierarchical structure of activity*, analyzes the subject-object relation at different levels: activities, actions and operations. Actions are goal-directed processes that must be undertaken to fulfill the object, while the operations correspond to the way the action is actually carried out (Kaptlinin& Nardi, 2006). The constituents of activity are not fixed, but dynamic, and can change as reality changes.

Internalization and externalization are processes that relate the human mind to its social and cultural environment. Internalization provides a means for people to consider potential interactions with reality through mental simulation, without performing any actual manipulations with real objects. Externalization transforms internal activities into external activities. Internal activities cannot be understood if they are analyzed separately from external activities, as they transform into each other.

Mediation. Tool mediation includes social and cultural factors into an activity. Tools shape the way people interact with reality, and can reflect the experience of other people who tried to solve similar problems earlier and invented or modified the tool to make it more efficient and effective. Tools are a connection between people and the objective world, and define how people interact with the world.

The principle *development* emphasizes that activity is not a static, but a dynamic concept in constant development. Activity theory requires that human interaction with reality should be analyzed in the context of development (Kaptelinin & Nardi, 2006). It is important to understand how tools are used over time, in order to make them more useful and efficient.

3.3.2 Artifacts become instruments in daily life

Before taken in use, an artifact is just a technological device, or a tool. When used in human activities, the artifact becomes an instrument. The instrumental genesis approach is a hybrid of

the activity theory and French ergonomics, and focuses on the integration of artifacts into the structure of human activities. It claims that the genuine appropriation of artifacts by people does not happen all at once, but is an outcome of developmental transformations of artifacts, individuals and social interactions.

For the artifact to become an instrument, transformations of both artifacts and persons take place in a process. The individuals make changes to artifacts and customize them for their needs and conditions, which is called instrumentalization. When making use of the artifacts, they also develop skills and abilities regarding how to operate the tool, how to decide which tasks can be performed with the tool, and which methods should be applied to perform tasks effectively, which is called instrumentation (Kaptlinin & Nardi, 2006). Through this instrumentalization and instrumentation, the artifact becomes appropriated and develops into an instrument.

The approach also plays an important role in terms of design, where it claims that artifacts should be designed so that they can be transformed efficiently into instruments in user practice. It also concludes that the designers have to take into account the actual transformation of practices and the need of the users over the course of the appropriation of an artifact.

3.4 The distributed cognition approach

While activity theory places the activity in center, distributed cognition focuses on the people and the tools used, and their relationship to each other in an environment. For a long time, the focus has been on single individuals interacting with individual tasks, while there has been a need to better understand the emerging dynamic of interaction. The work environments in which people pursue their goals in collaboration with elements of the social and material world have been fundamental when Edwin Hutchins developed distributed cognition in the mid-1980s (Hollan, Hutchins & Kirsh, 2000).

Cognitive distribution is tailored to understanding interactions among people and technology. This approach extends the reach of what is considered cognitive beyond the individual to encompass interactions between people and with resources and materials in the environment (Hollan, Hutchins & Kirsh, 2000). It also looks for cognitive processes on the basis of the functional relationships or elements that participate together in the process. Distributed cognition

views the computer and its interface of not being outside of cognition, and does not posit a gulf between cognitive processes and the external world.

The approach finds it important to observe human activity "in the wild" and the analysis of distributions of cognitive processes. It focuses on distributions of cognitive processes across members of social groups, coordination between internal and external structure, and how products of earlier events can transform the nature of later events (Hollan, Hutchins & Kirsh, 2000).

4.0 Related work

This section presents research, studies and other work related to this thesis' theme and research question. It is intended to help lay a foundation and create a framework for this research project. The section may also help explaining why the conditions of this current research are as they are today, considering the different uses of the smartphone, usage at different times of day, obstacles to use all smartphone functions, and different preferences regarding app usage and downloading.

What methods other researchers have used for collecting data have also been included, as it is relevant to this thesis to see that other research has applied much the same methods and similar type of research objects/participants. The methods have also been included because it is interesting to see what other methods have been used to investigate the use of smartphones and new technology.

4.1 Studies in human-computer interaction

Human-computer interaction has been defined as a way of studying how people design, implements, and use interactive computer systems and also how computers affect individuals, organizations and society (Tripathi, 2011). The aim of this research was to study the use of smartphones and the interaction between humans and the technology in society, which is a small part of the area human-computer interaction. People use tools, and in this case technology, to ease the tasks they need to perform in order to survive and to support their needs (Tripathi, 2011). The questionnaire results show people's habits and use of smartphones to satisfy their general needs at various levels, and that the technology, especially apps, need to be easy to learn and use

to get used in the first place. A user will not invest in learning to use a computer when such learning is disproportionate to meeting those needs and desires (Tripathi, 2011).

4.2 Usability goals

As people have become more frequent users of their mobile phone and use the smartphone to streamline their everyday life, it is important that the smartphone is user-friendly. One focus in this thesis has been to look at how user-friendly the participants think their phone is. A product's usability can affect both the desire to use the product, how much it is used, how effective it is for the user, and the user's self-esteem in contact with the product.

The product should meet certain usability goals to a large extent to let the users get the most out of their use. These usability goals consist of the product being effective to use, efficient to use, safe to use, having good utility, being easy to learn and being easy to remember how to use (Sharp, Rogers & Preece, 2007). The researcher had the usability goals in mind when creating several of the questions for the survey and the interviews. It has been created both specific and non-specific questions about usability in this thesis.

4.3 Utilizing a mobile device - technology adoption and adaption

As research shows, there has been an increase in smartphone users the last years, while the amount of regular cellphones has decreased. This is shown in research conducted in the US in 2011 and 2012 (Smith, 2012). Although the amount of regular cellphone owners is still dominant, it turns out that the amount of smartphone users will raise. More people are adopting smartphones, and the largest increase in percentage from year 2011 to 2012 turns out to be in the age groups 18-24 years with 18% raise and 45-54 years with 16% raise (Smith, 2012). Mobile telephony has in several years been regarded as a technology that is quickly finding its niche (Stuckey, 2004).

The reliable and easily accessible technology has in many countries become a taken-for-granted part of the social landscape (Stuckey, 2004). In several areas, it is conceivable that mobile technology has changed in line with developments in society and trends, but society is also changing in line with mobile phone development. More public services have established that one can make use of their services using smartphones, in terms of shortcuts through QR codes,

mobile versions of websites and apps created for their company or services. For instance, mobile banking, public transportation and newspapers are examples of services that are customized smartphones and are commonly used, which were also visible during the surveys.

4.4 Diversity among smartphone usage

Studies have shown that there exists great diversity among smartphone usage, in terms of different purposes and different frequencies of use (Falaki et al., 2010). There have been conducted studies of how users interact with their smartphone, both in terms of app use and regardless of the apps used. Falaki et al. (2010) conducted a study where they gathered two datasets from loggers on smartphones with operating systems Android and Windows Phone. The logger recorded start and end time of each application.

The researchers were interested in finding out how often a user interacts with the phone and how long an interaction lasts, how many apps the user run, and how much traffic that was generated. To determine this could also be a key to understanding which mechanisms than more effectively could improve the user experience. The user experience is looking at the individual's entire interaction with the thing, as well as thoughts, feelings, and perceptions that result from that interaction (Tullis & Albert, 2008).

The research found that individual users interact with their smartphone anywhere between 10 to 200 times a day at average, and that session length varies across users in the range of 10-250 seconds (Falaki et. al., 2010). They also found a clear pattern in which daytime use is much higher than nighttime use, and that usage at night is low but not completely zero.

4.4.1 Motivation for acquiring, and appropriation of smartphone

Bødker and Christiansen (2012) conducted a study of smartphone appropriation, motivated by an interest in understanding the new opportunities brought to use by app technologies available on devices. Among desk research, they performed interviews on 12 iPhone users, both men and women, within the age range 19 to 62. Some of the participants were also re-interviewed a year later. The research found that people make the iPhone and its associated apps their own to the extent that they use the phone as a port to exercising personal interests.

The research also showed that the participants had different reasons for purchasing their smartphone. Someone wanted to renew themselves, some had practical reasons, someone wanted a phone that worked, and someone thought of the iPhone as a brand which several friends also had. Some participants also had the simple reason of buying the smartphone because it "would do the job as telephone and messaging device" (Bødker & Christiansen, 2012). It was indicated that the smartphone was trendy and gave signals to the users' surroundings, showing that the users are "in". Some participants also wanted to get a better organizer/calendar, both for collaboration and for individual reasons.

The users' background, along with their expectations, affected how well they liked the phone and how well they were able to use it. For some, the expectations were not always met when using the smartphone, neither in short term or a longer perspective. Others got what they expected, especially when it came to organization and calendars. The size of the smartphone was mainly a matter to those who expected a "cool" phone, and text messaging, which is a critical function to many, was the most predominant cause of complaint.

The participants' experience with other Apple products seemed to have fewer problems with the setup and use of the iPhone. PC users (in contrast to Mac) also had problems with setting up or connecting to their phone, and participants who had previously owned iPod Touches mentioned very few issues. Some people thought they did not have time to explore the phone, and missed having a manual to read (Bødker & Christiansen, 2012).

4.4.2 Various user level within smartphone usage

As explained, people have different approaches to the smartphone, both in terms of the way they use it and the time of day it is used. Given the increasing frequency of use of mobile technology, like the smartphone, and the business world's growth of solutions that support the type of technology, it is important to look at how good people are using these mobile technologies. The user level can determine whether the user gets the full benefit of the smartphone. Oulasvirta, Wahlström and Ericsson (2011b) conducted an investigation of what it meant to be good at using a mobile device, where 24 users at various levels were compared to each other at how good they were at using smartphones.

The participants belonged to different groups, or levels of skill, which were determined in advance. 10 of the participants were casual users, 10 were novice users and 4 professional users. The casual users were regular owners of smartphones with at least three months experience of using their current smartphone, the novice users lacked experience with smartphones, and the professional/expert users were help desk workers and supervisors, working with helping people with smartphone problems (Oulasvirta, Wahlström & Ericsson, 2011b). The study included interviews focusing on their prior experience and their engagement in various related learning and problem-solving activities, and also measurement of task performance while thinking aloud.

The research showed that casual users' learning occurs mainly during routine use. Expert users' learning was more regular as it occurred upon the introduction of every new phone. Both casual and expert users were faster than novice users in completing the tasks and more successful in completing the tasks. The casual users' and the experts' performances did not differ significantly from each other. Novice users carried out more actions that were unnecessary for completion of the assigned tasks, such as going to the wrong folder or executing the wrong command. The novice users also asked more questions to themselves and showed more expressions of uncertainty (Oulasvirta, Wahlström & Ericsson, 2011b).

4.4.3 Smartphone habits and frequency of use

People carry the phone with them in most contexts, and with the phone that is always at hand, they have easy access to Internet from anywhere. With the persistent network connectivity and support of installation of new apps, the smartphones have the potential to produce new habits related to Internet use. Oulasvirta et al. (2011a) conducted a study where they investigated the habit-forming nature of smartphones, what habits are, and what their role is in HCI. To do this, they looked at frequent behaviors across users by performing usage tracking studies, a field experiment and a diary study followed by an interview and a questionnaire.

In the tracking studies, the usage sessions were recorded and logged via software on the smartphone. The sessions were all user actions recorded between two events: the user activating the device from the idle or screensaver mode, and the next time the phone was idle or locked again. The duration in seconds, the apps launched, frequency and order of individual apps

launched, and the average duration for each app were measured in each session (Oulasvirta et al., 2011a).

The research found that mobile devices are "habit-forming" in terms of that the users received quick access to rewards, like social networking, communications and news. These rewards help users avoid boredom and cope with a lack of stimuli in everyday situations (Oulasvirta et al., 2011a).

The condition "checking habit" was extracted from the findings, which was behavior where the device was quickly opened to check the standby screen or information content in a specific app. The habits were triggered by various different cues outside the device, like for instance situations and emotional states. In the qualitative part of the research, it was found that the users not necessarily described habit-formation as problematic, but rather as slightly annoying. Many users also described positive experiences of repetitive use, relating to entertainment, time-killing, and diversion.

The logging studies showed that the smartphones could be used as much as 2.7 hours per day, which were longer than traditional forms of computing. The apps that were associated with checking behaviors included the home screen, contact book, email, social networks, and news. The results also showed that smartphone use is significantly shorter in duration, more evenly spread throughout the day, and nearly twice as abundant as laptop use (Oulasvirta et al., 2011a). The diary study revealed that smartphone use habits are tightly associated with a particular triggering context, like for instance in lectures, on bus trips, and home.

Bødker and Christiansen (2012) found differences in frequency of use and habits. In the early stages of use of the smartphone, there were an intensive pursuit of new apps and functions, but over time there came to be a small core of apps that were used frequently. Some used their smartphone to surf or using social networks whenever they had a few available minutes, and some did not distinguish between work use and private use. Some participants felt the iPhone moved from being just a new phone to fulfilling an entirely different set of purposes. The iPhone did not only expands the users' actions and routines, it also mediated new activities with new motives.

Some participants mentioned that their smartphone was a useful tool on the go, and several participants said that some apps helped them for a particular time period, where they had interest in a particular activity. There were found that travel planning, calendar use and note-taking were all about purpose, taking off through exploration of apps, and the development of routines. There was then a focus on narrowing of function in the iPhone appropriation (Bødker & Christiansen, 2012). The participants developed new routines, in particular for using the Internet at home and when being on the move. This had to do with purpose, individual experiences and preferences.

4.5 Smartphone apps usage – popularity and patterns

Smartphone apps have increased as gateways to network services along with the growing rate of adoption of smartphones. The existence of app stores also contributes in making it more attractive for some developers to implement apps rather than complete web-based services (Xu et al., 2011). There exists a large amount of apps in the app stores, and with the constant growth there is a challenge for the users to find interesting apps. The user downloading an app is a weak indicator of whether the user likes that app, especially if the app is free and the user only wants to try it out (Yan & Chen, 2011). It could be challenging to measure both when the app is being used and whether the user actually likes the app. Here it is presented ways to figure out how to find interesting apps to the users, how apps are utilized, and which apps are most popular during the everyday.

4.5.1 App usage throughout the day

Research with focus on diversity in smartphone use has found that app popularity is not stable throughout the day, but has a diurnal pattern (Falaki et al., 2010), which means that the popularity of an app is different for different times a day. Though there were a large number of apps installed by the users, it was not an indication that they used them equally. The app category that dominates throughout the day is definitely Communication (exchanging all kinds of messages), but the popularity of each app category slightly varies between students and workers. Through the research it was also found that the number of apps used by users varies significantly between 10 and 90.

Böhmer et al. (2011) also conducted a study which supports that app popularity has a diurnal pattern. They logged detailed app usage information from 4100 Android-device users, by using a

data collecting tool called AppSensor which indicates the current used app in a given time. The study found some interesting results, showing that the users spent 59.23 minutes per day on their device, and that the average app session lasted only 71.56 seconds. Each session was measured from opening an app to closing it. The most used apps, measured in usage time, were the integrated apps of the OS, and had a much longer average session than for instance the games category. The most popular games used were Angry Birds, Wordfeud Free and Solitaire. The least popular category was the Finance category.

There were also found distinct contextual differences. The total app usage, in terms of launches, is at its maximum in the afternoon and evening, around 6pm. The app usage minimum is around 5am. The users starting using their apps in the morning from 6am and 7am, and the usage increased until 1pm. With regard to the time people spent with an app once they opened it, the peak is 6.26 minutes of average app usage time, which was around 5am. The minimum usage time was 40 seconds, which was around 5pm. The average app session through the day was, however, less than a minute (Böhmer et al., 2011). When people actively started to use their device in the day, they spent less time with each app. One has to take into account that this can be apps that people leave active while sleeping with standby-mode prevented.

Over the course of the day, there was observed a change in the relative use of the app categories, based on the number of app launches. The Communication category was most likely to be used every hour of the day (Böhmer et al., 2011), especially in the afternoon and evening. The News category had the highest probability of being used in the morning, followed by the Finance category. Late in the evening, when the use of the Communication category has decreased, the Games category has the highest probability of use, along with the Social apps category. In the early morning, when total app usage is at its lowest, people mostly use apps of various categories, while the Communication category is minimized.

Do, Blom and Gatica-Perez (2011) collected data from non-intrusive client software installed on smartphones which was running in the background from the startup of the phone. The study was conducted on 77 participants over 9 months of actual use. They investigated the use of both integrated and downloaded apps during the data collecting period. A subset of the most popular apps was selected for the further study.

They found that the top four most used apps were SMS, Voice Call, Web and Multimedia. For several of the other apps, the percentage of people who use them were low, and there were big differences between the number of users who tried them and the number of users who actually used them (Do, Blom & Gatica-Perez, 2011). The Email app was however an app that the users were likely to continue to use.

Xu et al. (2011) conducted a study of the use of smartphone apps, focusing on traffic volume, access time, unique subscribers and locations. They found that some apps had a likelihood of co-occurrence on smartphones, meaning that when a user uses one app, the user is also likely to use another one. The users also used several alternatives for the same type of app, trying to optimize their user experience.

As other research show, there were also found diurnal patterns of different app categories. Around 1am - 2am the total traffic volume and access time are at their minimum, and reach their maximum around noon. Apps are more actively used during the daytime than at night. The most popular app categories at night are however radio, entertainment, healthcare and books. Weather and news apps are most frequently used at early morning, social networks during the whole day, sports apps in the early evening, and games after standard work hours (Xu et al., 2011).

4.5.2 Places and social context as variables

Do, Blom and Gatica-Perez (2011) found that two variables determined the use of apps, which were places and social context. The top four most popular places of app use were "Home, Work, Other and Friend-home", which covered 96.7% of all location-detected usage events. SMS and Voice Call were the top applications in most locations, but it turned out that SMS was highly used in many indoor locations, while Voice Calls were preferred in moving contexts. On holidays, Camera and Web dominated the most, along with the Map and Voice Chat apps.

Xu et al. (2011) also found in their study that a considerable number of popular apps were local, meaning that the apps were limited to certain geographical areas. The most popular known local app categories were news, music and weather. The study also looked at whether individual users used some apps across larger geographical areas than others. The most popular known travel app categories were social networks, games and music. These findings could contribute in helping to understand what kinds of apps that needed to be more robust to variations in network quality.

By network operators understanding the impact of app mixes in different geographical areas, their network could be optimized to giving better user experience.

4.5.3 Finding interesting apps

Yan and Chen (2011) saw a problem in finding interesting apps among the hundreds of thousands of apps in the app stores, and created a system, called AppJoy, which could make personalized app recommendations by analyzing how the users actually used their installed apps. At first they analyzed the number of apps installed by AppJoy users, and found that the user's number of installed apps was from 3 to 910, with a median of 61.

AppJoy measured how the apps were actually used, and the usage scores were then used by a filter, suggesting individualized apps. The results showed that despite the availability of many apps, the users tend to only interact with a small number of apps. The more categories a user installed apps from, the more exploratory the user was, and would likely install more apps in each category (Yan & Chen, 2011). With regard to how long an app was kept on the smartphone after being installed was at least 11 days for 50% of the installed apps and 30 days for 27% of the installed apps. They also found AppJoy to be effective as the users interacted with recommended apps longer than other apps.

Smartphone apps recommendation systems can be quite important, and if they learn user interests and habits across apps, they can identify more appropriate apps for users (Xu et al., 2011).

4.5.4 Different motives for using apps

Verkasalo et al. (2010) conducted a research where they studied users and non-users of smartphone apps. They collected data from 579 active panelists, men and female, students and employees, in various ages. The participants answered both an online questionnaire and then downloaded the research software, reflecting how the participants used the devices in real life. The services that were used in the study were mobile Internet services, mobile games and mobile maps. Mobile Internet services were the standard app of a web browser, mobile games included all sorts of games, and map services included all apps that related to positioning, navigation or simple map viewing. The goal of the research was to find out what drives the intention to use these apps across users and non-users.

The research showed that there were differences regarding what drives the usage of the different mobile apps. Map apps and mobile Internet services were driven by more utilitarian motives, while games were driven by more hedonic motives, based on enjoyment and pleasure (Verkasalo et al., 2010). For the use of mobile Internet services, perceived enjoyment appeared important and perceived usefulness appeared less important for the non-users. For the use of games, perceived usefulness was less important to both the users and non-users, while perceived enjoyment was the key variable.

For the use of map services, there were no significant relationship between perceived enjoyment and intention to use. Perceived enjoyment was not relevant to users, but it was relevant to non-users. This implied that smartphone users are driven more by the utility of the service with regard to utilitarian services (Verkasalo et al., 2010).

4.5.5 App categories

With an amount of more than 775,000 apps in Apple's App Store (Apple.com, 2013) and more than 600,000 apps in Google Play (Google Play, 2013), there has to be created categories to sort and separate the apps. This makes it much easier for smartphone users to find new and related apps, and also for developers to distribute their apps.

The apps the participants said in this current survey and the interviews that they use, will be divided into app categories because of the great amount of apps and to easily analyze the use of them. The app categories are based on how iOS and Android phones categorize their apps, and also how other researchers have divided the apps.

These app categories will used when analyzing integrated apps. *Communication* (exchanging messages – email, SMS, IM, voice calls), *Browsing* (web browser, search and social networking apps), *Media* (apps for consuming or creating media content – pictures, music, videos), *Productivity* (apps for calendars, alarms, viewing and creating text documents – Office, PDF reader), *System* (apps for changing user preferences and viewing system state – File explorer), *Games*, *Maps*, *Other* (apps that could not be included in any of the other categories because of unknown function) (Falaki et al., 2010).

By year 2013, Apple's App Store had reached 40 000 billion downloaded apps (Statista, 2013), and with even more downloads from Google Play, it was natural to divide the apps in the app

stores into categories. Earlier in 2013, the ten most popular apps in Apple's App Store were, in the following order, Games, Education, Entertainment, Lifestyle, Books, Business, Utilities, Travel, Music and Reference (Statista, 2013). Google Play had Entertainment, Personalization, Books & Reference, Tools, Lifestyle, Education, Brain & Puzzle, Travel & Local, Music & Audio and Business, as their top ten categories (AppBrain, 2013). Based on these categories, there will be created new app categories when analyzing downloaded apps.

4.6 Technology adaption and adoption

Despite the increase in the use of smartphones, not everyone gets to utilize all of the smartphone's features. The degree of use varies, and while some find their usage suitable for their purposes, there are people who for various reasons are unable to use the phone fully. At the same time, there are users who wish they could use the phone to more than it can offer and that the phone had more features, which appeared in the survey.

Several users have little experience with the smartphones and its properties, before they get their own phone. Some people are reluctant to adopt new technology, and others have both experience and interest in adopting new technology. This can affect how people, in this case, choose to approach and use the smartphone.

Rogers (1962, cited in Bødker & Christiansen, 2012) maintains that there are a number of intrinsic characteristics of innovations that influence an individual's decision to adopt or reject an innovation. These characteristics are related to how improved an innovation is over the previous generation, the level of compatibility that an innovation has to be assimilated into an individual's life, if the innovation is too difficult to use, how easily an innovation may be experimented with as it is being adopted, and the extent that an innovation is visible to others. Rogers claims that an innovation that is more visible will drive communication among the individual's peers and personal networks and will create more positive or negative reactions.

In this section, it will be presented other studies people have done concerning factors that could affect the adoption and adaptation of technology and smartphones. Research shows that adults also are in a group of frequent smartphone users (Smith, 2012), but it is reasonable to assume that younger people both accept new technology and use it, like for instance the smartphone, to a

greater extent than older users. It will therefore be focused especially on how older users are taking advantage of the smartphone.

The concept of using touch screens have existed for a long time, where people are familiar with using touch screens in daily situations. Several studies show inequalities across age within use of touch screens, and Jin, Plocher and Kiff (2007) conducted an experiment, investigating the optimal button size and spacing for touch screen interfaces intended for use by older adults. This experiment dealt with people between 53 and 84 years, which is in excess of the older group in this thesis. On the other hand do several of the participants in the older group belong in the age group of the experiment, and the experiment is also relevant for the aging users of the smartphone.

The experiment has found that bigger buttons are preferred by older users, but larger spaces were not the most effective, which in fact was predicted to improve the touch screen performance. Manual dexterity had a significant effect on speed and a slight effect on the accuracy of selecting and touching a target button embedded in a row of adjacent buttons (Jin, Plocher & Kiff, 2007), which also is relevant in this case with smartphones. These design elements can therefore affect the use and adaption of smartphones, and especially for older adults.

Gelderblom, van Dyk and van Biljon (2010) wanted to get a better understanding of older adults' current level of mobile phone adoption, as the population of older people is growing and older people are more active technology users than before. They were also assessing how well existing adoption models captured the acceptance level of this user group, which were assuming that a user either would reach a point of rejection or acceptance of the technology.

The researchers captured mobile phone usage through observation, a questionnaire and informal interviews. Though their user group was 46 users aged 60 to 87, the study is relevant for this thesis both because it is interesting to find out how people in general accept technology, and also because it is relevant to see how yet an age group makes use of mobile technology.

Gelderblom, van Dyk and van Biljon (2010) determined the participants' levels of acceptance of the technology, how they acquired the phone, how long they have owned it, how often they used it and which functions they used. These were also conditions that were determined in this current research. The researchers found that most participants in the sample had not reached full

adoption, but had not rejected the technology either, and they could thereby conclude that part of the research was not consistent with the results of previous research.

There was found that age related limitations posed a challenge to full adoption, and that one third of the participants, who had neither rejected nor accepted mobile phones, used it because it served a purpose. The participants also used mobile phones mostly in terms of communication and safety value, where value is influenced by the usefulness and ease of use it offers to the user.

They also found that the origin of ownership of the mobile phone seemed to be a strong indicator of future use, in terms of frequency and depth of use. Most of the users who received the phone as a gift were considered to be rejecters or neutrals, which was reflected in their low frequency of use (Gelderblom, van Dyk & van Biljon, 2010). The frequency of use was a good predictor of the depth and with of its use. The age of the users showed also a good correlation with the owner's attitude towards use, and use of the phone.

At least, they observed that almost all the older users needed training before they would use more than the two basic functions of a mobile phone, which was to send and receive phone calls. The elderly users were not comfortable with exploring the possibilities of their phone (Gelderblom, van Dyk & van Biljon, 2010).

4.6.1 Barriers to adopting technology

Despite good interfaces, there may be several reasons why people do not make use of information and communication technologies (ICT) to a greater extent. Al-Senaidi, Lin and Poirot (2009) conducted a study in Oman, where they investigated barriers to adopting ICT in higher education. One hundred faculty members participated in the study. Research shows that the increase of ICT has reshaped the teaching and processes learning in higher education, and although ICT for education is more important now than before, the adoption of ICT at university is often poorly implemented.

The researchers aimed to expand the existing research and identify the barriers to adopting technology (Al-Senaidi, Lin & Poirot, 2009). They performed a survey in which participants were to indicate to what extent they agreed or disagreed with several statements that were made for the study. There were five factors that were believed to contribute in creating barriers to the

use of ICT, namely lack of equipment, lack of institutional support, disbelief of ICT benefits, lack of confidence, and lack of time. The results from the survey showed that lack of institutional support and lack of time were the two areas that most obstructed the faculty members from adopting technology.

There were also considered four grouping variables in the study, where the researchers believed gender, academic field, academic rank, and frequency of the ICT usage could affect the use of ICT solutions. Gender was also an interesting factor in terms of this current thesis and research. Al-Senaidi, Lin and Poirot (2009) found that these grouping variables were not significant determinants of perceived barriers. It was however found interaction effects of gender and technology usage on lack of equipment, disbelief of ICT benefits, and the overall perception of barriers. Male technology users indicated more barriers than female technology users, unfortunately without exactly knowing why. The most important implications of the study were the need for more institutional support, technical training, and personal time for the faculty members to learn and upgrade their knowledge and skills in educational technologies (Al-Senaidi, Lin & Poirot, 2009).

4.6.2 Design implications of smartphone usage

Do, Blom and Gatica-Perez (2011) discovered in their study that SMS was preferred to use in stable and stationary locations, and that voice calls were mostly used in moving contexts. They saw this as an indication that people preferred synchronous communications to handle coordination related activities. To enable this, a design requirement emerges, which involves ensuring that the device supports coordination and synchronous communication. By supporting this design requirement, people can get more from their smartphone and use it in multiple ways and contexts.

The research also found that some locations were associated with using the smartphone in a multitasking way, like for instance the holiday-related location, as mentioned earlier. One suggestion to support this was to bring a differential set of apps and functionality forth in the phone user interface, based on the context the use is in at any given time. More research must however be conducted to create a solution that is user-friendly and intuitive, where the

motivational factors behind the contextual usage are taken into account (Do, Blom & Gatica-Perez, 2011).

Hardy and Rukzio (2008) have investigated the limitations of mobile phones with displays, claiming that the limited screen size and resolution of current mobile devices can be problematic for the usage of several apps. Although there have been an improvement in large screen displays in the last years with increased size and higher resolution, the user has an inability to view and interact with a large amount of information at once. This was especially the case for map, multimedia and browsing apps.

4.6.3 The use of smartphones versus other technological artifacts

The smartphone has found its role among other artifacts in everyday life, but when it came to using the smartphone versus other technical tools, Bødker and Christiansen (2012) found that the PC was preferred in several cases. This was for instance when reading email, as the keyboard was better for that purpose. Others used their PC for study notes or listening to music. Several used their smartphone in combination with their PC, like for instance taking notes on the smartphone and sending it to their PC. Several found their smartphone suitable for activities through their daily life, like when they were working out, when they were going to places and needed a map, or when they had to use a camera. Some answered that they had everything they needed at hand and did not need to use a computer.

5.0 Methods

This section presents the methods used for gathering data about smartphone appropriation, the reason for the choices that were made, alternative methods and how the researcher got started. It will also be a small discussion of what could have been done differently during the creation of questions and execution of survey and interviews.

5.1 Gathering basic information about smartphones

Based on recent statistics, there was found that the most popular smartphone operating systems in 2012 were Google's Android, Apple's iOS, BlackBerry's BlackBerry OS, Nokia's Symbian and

Microsoft's Windows Phone (IDC, 2013. Based on these statistics, the study began with exploring and identifying smartphones within these operating systems, and their associated apps.

5.2 Gathering information about smartphone usage

To establish a foundation for the study of smartphone appropriation, there was conducted an analysis of litterature and theory which was relevant for this current research. This laid the foundation for the later investigations and observations of smartphone users. When examining earlier research, the background for this study was explained better, different research questions were raised and identification of problems in the research area was made. This also contributed in understanding why people use this expanded form of mobile technology, which was important for this particular research about differences in smartphone appropriation.

5.3 Choice of methods for data collection

There are several different ways to perform data collection, both qualitative and quantitative methods. One can relate to one of these methods, or use a combination. In this study it was interesting to map basic information about smartphone use within the different age groups, and also get to know the respondents' thoughts and opinions about their appropriation, and then compare the two age groups. It was chosen a triangulation of methods, using multiple methods to obtain data that was needed to try to answer the research question. In this way the researcher could both get basic data on the smartphone appropriation and also dig deeper to determine the participants' opinions about their adaption of the smartphone and the background for downloading and using apps.

Technological advances are constantly changing, and therefore it was natural to believe that there are differences between what has been found in previous research and the actual conditions today. This thesis dealt with users' utilization of smartphones, and it was natural to obtain an overview and mapping of today's appropriation of smartphones, and thereby using a quantitative approach. To achieve this, it was created a questionnaire for users within the given age groups to answer. When choosing methods, it was taken into account that the participants were geographically dispersed.

In this context, the term survey and the term questionnaire will be mentioned interchangeably, even though the questionnaire only is the list of questions and an element of the study. This is because the survey was made of and is based on the questionnaire.

For getting a better understanding of appropriation of smartphone, and also how and why people adopt and adapt to smartphones, interview was chosen as a qualitative and empiric method. One has to assume that some ways of using the smartphone changes over time, and are related to habits, life situations, and the excitement of that something is new. One can also assume that some types of usage depend on coincidences. To get hold of how the participants use their smartphone, there had to be conducted a survey on how reality is and what experiences the participants have made themselves right now. This should therefore be captured by an empirical approach, and in this context interviews were chosen. An empirical approach is a good way to examine the actual conditions at the time the investigation was conducted.

The study first started with a pilot study with few participants, to get feedback on the questions and formulations in the survey. This contributed to creating good formulations related to the research question, to acquire the desired answers. Then the final survey was created with a questionnaire for smartphone users to respond, to map their use and obstacles regarding smartphone appropriation. In the end, interviews with a sample of the survey respondents were conducted to dig deeper into their appropriation.

5.4 Survey/questionnaire as a research method

Surveys, as a quantitative method, have the ability to get a large number of responses quickly from a population of users that is geographically dispersed, and allows the researcher to capture the "big picture" of conditions relatively quickly (Lazar, Feng & Hochheiser, 2010). By using surveys, the exact same information will be shared among the dispersed participants. This was important for this research, where there was expected to be a large number of respondents participating in giving the researcher a broad overview of the research area. Much of the data collected in a survey will be number-based and may therefore be easy to present and analyze. This can be an advantage in this context where great amount of data will be collected and used to form a comprehensive understanding of the conditions.

When creating the questionnaire, the challenge was to make well-written, non-biased questions which would be easy for the respondents to understand, as they were filling in their responses by themselves (Lazar, Feng & Hochheiser, 2010). The structure of survey question can either be open-ended questions, closed-ended questions with ordered response options or closed-ended questions with unordered response options (Dillman (2000), cited in Lazar, Feng & Hochheiser, 2010).

In this questionnaire, a combination of the structures was used based on the type of question and the information that should be extracted. Several of the questions with unordered response options also gave the respondents flexibility in letting them expand the response option list. The respondents could add another option, if they felt that it was more suitable.

The structure of the questionnaire had to be self-explanatory, so the respondents would make sure how to respond. It was made instructions in the beginning of the questionnaire and during the questions. This was in the form of small navigations explaining when there were expected more than one answer, and also extra space for participants to answer the open questions.

The survey was primarily focusing on age, gender and type of smartphone, and was not focusing on region and ethnicity, as this was not essential to the objective of this study. The respondents were anonymous. When creating the questionnaire, it was not emphasized whether the users had a brand new or a slightly older version of the smartphone, and the questions were created independently of smartphone model.

5.5 Individual qualitative interviews as a research method

There are also various ways to conduct qualitative research, and it was considered separating the respondents into focus groups and conducting interviews of the groups. The reason was that several of the interview questions could have been interesting to discuss within the same age groups. On another hand, several of the questions were individually oriented, and discussions of these questions would have occurred to a lesser extent. Another factor was that the survey was not made for a group of users who were geographically and age-related constrained. It was rather made for two greater age groups, where the probability of the respondents being geographically scattered was very large. It would, therefore, been very difficult to gather the volunteers for interviews at the same place at the same time.

On the basis of the responses from the questionnaire, and the interest to participate further in the research process, it was established two groups separated by the age of the respondents, who should attend in the interviews. This was done to perform individual qualitative interviews with smartphone users within each of the two age groups.

The purpose of the interviews was to go deeper into the use of smartphone and apps, as well as getting the opportunity to ask more questions, both premade and follow-up questions. It was therefore performed a semi-structured interview of each participant individually which actually has the advantage of the researcher being able to ask follow-up questions if that was necessary. This would also serve as an advantage if the researcher failed to capture the participants' complete answer and had to ask over again to elaborate the answer. The interviews was performed by asking a set of questions regarding the participants' appropriation of smartphones, and then supplementing with additional questions, such as "how?", "when?" and "where?", if something was unclear or had to be specified more.

A clear benefit of choosing a semi-structured interview was that it is flexible and the researcher can dig through the interviewees' comments, to look for opportunities to gain additional insight and understanding (Lazar, Feng & Hochheiser, 2010).

A usable alternative to the semi-structured strategy would be a fully structured interview, which was considered in advance of the interviews. A fully structured interview has the advantage of being easier to analyze, as the subjects are being asked exactly the same questions (Lazar, Feng & Hochheiser, 2010). However, there is a risk that important and relevant information is ignored if one uses this strategy, and because of the small number of participants in this part of the research, there were reasons to believe that asking and collecting follow-up questions would not necessarily provide too much clutter in presenting the data.

When presenting and analyzing the interview data, a challenge will be to make sense of the great amounts of data. One then has to reduce the volume of information and identify significant patterns for conveying the essence of what the data reveals (Rajendran, 2001). As there were conducted semi-structured interviews, the analysis will be harder to perform, as opposed to a fully structured interview, where the questions are closed. In this case, the researcher will have to try to tie together comments made at very different times in very different contexts.

In advance of the interviews and with regards to the analysis, sound recordings were considered and could serve as a good way of collecting all the data from the interview. Considering the time available and the magnitude of the research, this method was opted out. One should not underestimate the written notes, as a semi-structured interview gives the opportunity to re-ask and to fill in imprecise answers. Used properly, the written notes should be good enough to analyze the responses of the interviewees, and this method would most likely catch the researcher's thoughts and comments among other important details.

The interview questions were to a greater extent focusing on individual situations for using apps, the background for downloading apps, organizing apps on the smartphone et cetera. The interview was not supposed to count how many of the participants had the same or different opinions within use (Ryen, 2002), but to find out how participants experience the use of their smartphone, both in terms of the smartphone's capabilities and obstacles.

5.6 Obtaining participants

To get volunteers to answer the questionnaire, the technique snowball sampling (Lazar, Feng & Hochheiser, 2010) was performed, a technique which could contribute in recruiting large numbers of individuals. The participants do not only respond to the survey, but also recruit others to take part in the survey (Sue & Ritter (2007), cited in Lazar, Feng & Hochheiser, 2010). This was an advantage in this case where an outside researcher should recruit as many as possible to the survey. By using snowball sampling, the acquaintances could share the questionnaire with other users that they believed were appropriate and willing to participate in the survey. This was particularly important for recruiting participants in the older age group.

People within the researcher's acquaintances were notified of the questionnaire, which was distributed through email, and also published on social networks, such as Facebook (Facebook, 2012). A reason why Facebook would be a proper place to look for participants was that Facebook is a social network where several people within the chosen age groups have an account, and therefore it could be easier to reach out to potential smartphone users.

It was taken into account that not all people possess a Facebook account, and it was, as mentioned, particular difficult to reach out to smartphone users in the older age group through

social networks. The questionnaire was printed in multiple copies and distributed via snowball sampling, resulting in several more answers from the age group 46-56 years.

With the aim of obtaining attendees for the interviews, the participants were not randomly selected. The participants for the interviews were extracted from the survey, based on the interest to participate. Although the number of volunteers was not so high, the responses received were considered valid and the people reliable to participate in the interview.

The participants should be a selection of non-professional users of smartphones and apps, since there are reasons to believe that they represent the average users of this mobile technology. Non-professional users are defined as the majority of present-day users who do not rely on their electronic devices as their primary tools for professions, and can also be referred to as "casual users" (Oulasvirta, Wahlström & Ericsson, 2011b). Due to the lack of interest in participating in the interviews, one could not select the volunteers who would fit into the "casual users" category. Yet, the selection was still a good diversification of people with different motives for acquiring and using their smartphone.

5.7 Execution of pilot study

At first, there was created a questionnaire with about thirty questions regarding several areas within smartphone appropriation. The question set covered a quite wide range to map people's smartphone use in daily situations. The questionnaire was then sent to the researcher's supervisor and a group of people by email, along with information about the study and the research question, to get their opinion on the amount and formulations of the questions. Several comments were received through email and phone conversations, especially regarding the number of questions that most of the respondents thought were too many, if people would bother to answer the questionnaire.

Some questions were also suggested to reformulate, as they were seen as difficult to understand, unclear or too long. Other questions were mentioned being too detailed for a questionnaire and for contributing in mapping smartphone usage, and were proposed to be included in the interview part instead. The questionnaire was rewritten, containing most of the proposed changes. The

questions that were omitted from the questionnaire were included in the set of interview questions.

After creating the first question set for the questionnaire there was created a set of interview questions that focused in more detail on smartphone appropriation. The question set was also sent to the researcher's supervisor and the group of people. The feedback led to a set of questions with a better structure and language. The new question set were based on the questions from the questionnaire, but dealt, to a greater extent, with the use of both integrated and downloaded apps in everyday life, obstacles in use, and use of applications in certain periods/situations.

5.8 Execution and analysis of questionnaire

The questionnaire was created through Google Docs (Google, 2013), a program that could offer different layouts for response options, and that made it easy to gather the response options in tables for further evaluation and analysis, and to provide data validation. Online survey was also chosen because it is easy to distribute. One could also get access to smartphone users online, which in this case was quite relevant as several of users within the age groups could be reached through for instance social networks. Online surveys can also contribute in cutting out potential respondents who do not have access to a computer or a network (Lazar, Feng & Hochheiser, 2010).

The questionnaire was then created in Microsoft Word (Microsoft, 2013), which was further printed and distributed through the snowball sampling technique. A combination of paper-based and online surveys was used in order to make sure that as many target users as possible were reached (Lazar, Feng & Hochheiser, 2010).

5.8.1 Creation of survey questions

The purpose of the survey was to get an overview and mapping of the appropriation of smartphones within a wide range of users. When creating the questions for the survey, the idea was to make quite general questions, not digging too deep into the various aspects within appropriation. The reason was that it was expected to be a large amount of users responding to the survey, which would provide various interesting responses there would be no opportunity

asking follow-up questions to. The responses would therefore become quite superficial and give little descriptive findings.

After the subject of research was determined and theories chosen, the theories contributed in shaping questions that could help understand the smartphone technology's role in people's everyday life. The questions were placed in premade categories, which attempted to provide an overview of the use. The categories dealt with biography and personal use, areas of use, organization, and frequency in use.

The questionnaire consisted of seventeen questions, both open and closed in structure. The structure of the questionnaire was made slightly different, depending on whether it was made in Google Docs in Norwegian or English or in Microsoft Word. This was due to a little distraction from the researcher. The differences, however, only applied to the first question referring to the respondents' gender. The online questionnaire in English and the paper questionnaire had an open question about gender. The online questionnaire in Norwegian had the respond options "Girl/Woman" and "Boy/Man". Further explanation of the questionnaire is based on that gender had open response options.

Three of the questions were closed, multiple choice questions with no ability to add additional information. The response options were fixed and premade. Five of the questions were "multiple choice" questions with premade response options, but also with the possibility of filling in additional information or another option through the respond option "Other:" or "If you answered yes to the previous question – in what way (…)". This was where the researcher believed that the response options could be insufficient and the respondents would like to add a more suitable answer, or respond more detailed. Nine of the questions were open questions. The open questions gave the respondents opportunity to write their own thoughts and opinions.

Questions of multiple choices were chosen on the basis that they were easier to review and analyze, as the respondents would respond to exactly the same questions (Lazar, Feng & Hochheiser, 2010). That was important when creating the questionnaire, as it was expected that a large amount of people would answer it.

In the end of the questionnaire, the respondents were given the ability to "sign up" for participating in interviews, which were the qualitative part of this research. The selection of

participants could not be anonymous, which the respondents were informed about in a background letter.

5.8.2 Execution of the questionnaire

In the questionnaire, the respondents were first introduced to a background letter. The letter contained a short introduction of the researcher, the purpose of the research, how long it would take to answer the questionnaire, how many questions to answer,
confirmation that the participant is anonymous, and how to voluntarily sign up for interview. It also contained a definition of a smartphone, for those who were unsure if their phone was a smartphone. On some of the paper-based questionnaires, the background letter also contained photos of different smartphones, so the respondents who were unsure whether they had a smartphone could compare their phone with the photos to get it confirmed or disproved. The whole background letter, including the photos, is presented in Appendix 1.

The letter was created to achieve accurate understanding of what was expected of the respondents and also for them to know what they were answering to. Since the study aimed at a wide range of users the researcher should not have direct contact with, it was important that the questions were concise, eloquently and self-explanatory.

The questionnaire and the background letter were both created in Norwegian and in English. Norwegian was considered to be the native language of the majority of the respondents, but it was also created in English to reach out to as many participants as possible. The respondents were also given the opportunity to either respond in English or Norwegian to avoid linguistic misunderstandings or confusions around the questions or answer options for those who did not feel completely confident in one of the languages. It was important to translate the questionnaire to English in a way in which the language did not lead to any misunderstandings, like for instance because of bad translation (IMDI, 2010). That could give wrong perception of the questions or the respond options and lead to misinterpretation and incorrect data.

5.8.3 Analysis of the questionnaire and its questions

After collecting the data, it was processed before analysis of it could be conducted. This was because the data may contain errors which could contaminate the data set (Lazar, Feng & Hochheiser, 2010). Before reviewing the responses it was feared that the responses had errors

that could be unreliable data. Like for instance inappropriate age numbers or frivolous answers, deliberate errors where too young or too old people have responded to the survey, the same people answering several times, incomplete answers, and also misprints that could be misunderstood by the researcher. The data had to be cleaned up and organized. This was done by creating frequency tables in Microsoft Excel and Microsoft Word, and extracting quotes, more detailed answers, or responses to "Other".

In retrospect, one could see that the data contained some flaws and errors, but fortunately not to the extent that it influenced the results considerably. These errors were for instance respondents who had forgotten to write what type of smartphone they owned, but that could be solved by looking at other answers, where certain apps or their app store revealed what operating system they were using. There was also a participant who claimed he was ten years younger than the limit of the younger age group, but based on rest of the user's replies, it was clear that he had pressed the wrong button and should be ten years older.

Some of the respondents had also responded incompletely to the questionnaire, and left some of the questions unanswered or partially answered. This was especially the case for the paper questionnaire, where it was possible for the respondents to move on to the next question without answering the previous one. These responses were included in the analysis, partly because of the other completed answers, and partly because the researcher needed all the incoming data to analyze.

During the study, the researcher also became made aware that there were confusions around some of the questions. The first was regarding how long the users had owned a smartphone, as some of the respondents were unsure whether the question concerned their current phone or how long they had owned a smartphone in general. The other was regarding why the user bought the smartphone. This was because several of the respondents had received the smartphone from their workplace, and not purchased it themselves.

Errors in the questionnaire could be prevented by creating constraints to the questionnaire and better question formulations, which would reduce the chances of making mistakes or to prevent the respondents to skip questions. This was however practiced to a greater extent in the online

questionnaire, where constraints were practiced by not letting the respondents proceed to the next page of questions before all the questions on the current page were answered.

The question about how long the respondents had owned a smartphone should have been reformulated to how long the user had owned their current smartphone, as the rest of the questions aimed at the use of that smartphone. A follow-up question should also have been added, regarding what phone they had owned previous to their current smartphone. This could give the researcher better indication of the respondents' smartphone experience. The question about why the respondents bought the smartphone should also be reformulated to why the user acquired the smartphone or why the user started to use the smartphone. The question had, among other options, the two response options: "it was a gift" and "in connection with work", but there should also exist "received it from workplace" which would give the user a clearer and more appropriate way to respond to.

The first question in the questionnaire, regarding the respondents' gender, should have been more consistent throughout the questionnaire, regardless of the language and format. It should not have been an open question, but rather the option "Female/Male". In that way it would be easier to review and analyze the responses, not having to spend time translating responses like "F", "she", "woman" and "girl" to "female" in the end. The response options "Girl/Woman and "Boy/Man" were also unnecessary, as the respondents' age revealed which age group the user belonged to.

As this was a study in which the respondents knew that they were anonymous, there was a chance that some would not take the survey so seriously. One had to be aware that a small number of responses may be excluded from the survey. A few respondents had in fact responded unserious and misunderstood the questions in such a degree that their responses had no effect on the research and had to be discarded. There were also put some limitations in the background letter and where the link to the survey was published, describing the target users for the survey. This was appropriate to prevent respondents who were not targets for research and could provide erroneous data.

The questionnaire was conducted and completed in fall of 2012.

5.9 Execution and analysis of interviews

When the questionnaire was conducted and the data reviewed, the volunteers for participating in interviews were extracted from the list of questionnaire respondents and sorted by age group. The researcher had hoped to get between six and ten participants from each age group who would attend the interviews. The result was eight volunteers from each age group. In the questionnaire, the participants were encouraged to write their name and phone number if they wanted to attend the interviews. After listing up the volunteers, the researcher contacted them by phone, and either performed a phone interview there and then or made an appointment for a face-to-face interview or a phone interview. The interview process occurred in winter 2012/2013.

The question set for the interview was created in Microsoft Word in Norwegian, as only Norwegian speaking respondents from the questionnaire had signed up for participating in interviews.

5.9.1 Creation of interview questions

The interview questions were based on the questions and answers from the survey, with the purpose to expand the survey and its themes. The interview had twenty-nine questions, and the majority of them had additional questions. Eight of the questions were multiple choice questions, which the researcher found important to create a picture of the participants' skills within the use of and expectations to the smartphone.

A couple of the multiple choice questions were also related to use of Internet on the smartphone. Five of the multiple choice questions were closed, while the remaining three gave the participants the possibility of filling in additional information through asking the participants questions like "Why?" or giving them another option by listing "Other" as a response option. Twenty-one questions were open questions, which laid the basis for discussions and follow-up questions.

The question set was constructed within the context of smartphone appropriation in everyday life, and contained the rest of the questions that were too detailed for the questionnaire. The questions were divided into categories, regarding the actual use of the smartphone, use of integrated and downloaded apps, how the users organize the apps on their smartphone, questions about the

usability of the smartphone, expectations to the smartphone and use of Internet. Then there were questions about use of other tools in addition to or as a substitute for the smartphone, and also the respondents' frequency in use of the smartphone.

5.9.2 Execution of interviews

Each interview lasted for about twenty-five to forty-five minutes, depending on the pace of the conversation, if the participants had a lot of questions around the research and the interview questions, how much the participants had to say, and how much it was talked about other topics than the interview. At first the participants were informed about the purpose of the interview and the amount of questions, along with a confirmation that they were still anonymous to anyone other than the researcher and that their responses would be presented anonymously in the thesis. Then the interview started.

Some of the interviews were conducted face-to-face and some by telephone, depending on the geographical distance and what the participant desired.

One of the interviews had to be done by email, as the volunteer respondent from the survey should be away for several weeks. The research did therefore not get the same relation or confidence to the participant that was gained through conversation with the other participants (Ryen, 2002). A challenge was therefore that the participant did not have the same opportunity to verbally ask the researcher if any questions were unclear. One advantage, however, was that the participant could respond to the interview when he himself had time, in his apparently hectic everyday life. The participant also had time to think about the questions in a different way than when talking in the phone or face-to-face with the interviewer, and may feel that he has to respond under time pressure.

5.9.3 Analysis of the interviews and the interview questions

The purpose of the analysis is to produce findings, and to achieve this one has to analyze, interpret, and present the findings, which are the culminating activities of qualitative surveys (Rajendran, 2001). The goal is to generate an accurate representation of the interviewees' responses (Lazar, Feng & Hochheiser, 2010). The analysis of the interviews was conducted as soon as possible after it had been performed, as it was still fresh in the researcher's mind. This

contributed to remembering details that most likely would be forgotten as time passes. The data from the interviews was transcribed and organized in Microsoft Excel and Microsoft Word.

During the interviews, it was again noticed that some of the questions were a bit vague or poorly formulated for some of the participants, and needed further explanation. This was for instance the question regarding whether some of the apps were used in a given period and if the use of that app/those apps had reduced. It concerned also the question regarding whether there existed apps the user only in certain contexts in everyday life. The feedback concerned that the questions were too similar, and that it was unclear what a "given period" meant.

The third question that should have been rephrased was the question about usability, which was a bit tricky presented. The response options that were ranked from "Not user-friendly" to "Very user-friendly" user should rather be ranked from "Disagree" to "Totally agree". The question should also have follow-up questions about why the participants agreed or disagreed that the smartphone fulfilled the usability goals regarding learnability, efficiency, memorability, safety and utility (Sharp, Rogers & Preece, 2007). It could also have been asked more specific questions regarding the use of certain features and apps, but then the participants had to been given the same questions, which could be difficult considering that the users' smartphones had different operating systems with different features and apps.

As mentioned, participants must be asked the same interview questions. The same stimulus produces the same response, and it is therefore important to stick to the same introduction, the same sequence of questions and the same formulations (Ryen, 2002). The participants had the same opportunity to ask if something was unclear, and some of the participants had to get a better explanation of the questions in order to obtain the same understanding as the other participants.

When explaining some of the questions, it was challenging to remain completely neutral and not rephrase the question to a leading question. This was particularly important when the participants wanted examples to understand the question better. Leading questions allows the researcher to give the interview direction and may cause the participant to automatically accepting the researcher's view and responds based on the researcher's expectations (Ryen, 2002). It is important to give the participants space to think for themselves.

The relationship between researcher and the participants should be relaxed and good and both parties had to use the same vocabulary to achieve a mutual understanding (Ryen, 2002). The researcher appeared friendly and responsive, and if it was noticed that some of the participants were embarrassed or insecure, it was given confirmation that there was no definitive answer, and that the participant's answer was as important as the others' answer. It is important to have a trusting relationship between researcher and participant. Despite the time available to build a relationship of trust, this went relatively fine.

6.0 Presentation and analysis of findings

This section presents the results from the survey and the interviews, conducted in fall of 2012 and winter of 2012/2013. One hundred and three smartphone users, divided into four groups, responded to the questionnaire. There were 32 female users and 43 male users in the age group 20-30 years, and 13 female users and 15 male users in the age group 46-56 years responding the questionnaire. There were 5 female users and 3 male users in the age group 20-30 years, and 4 female users and 4 male users in the age group 46-56 years participating in the interviews.

The data from the questionnaire are presented in relation to age groups and gender, but some responses are also presented in terms of the users' smartphone OS. These were responses where it was interesting to see the difference in usage in relation to the type of smartphone that was used, and where the choice of smartphone and its features could actually have an impact on the usage. The smartphone operating systems were mainly compared to each other and not with the various age groups and genders, as it was not relevant to the thesis. In other cases, the operating systems are mentioned for informational purposes only.

The data from the interviews are presented in terms of age group, and not gender. Gender is only included to show that there was a fairly equal distribution within the groups.

Table 1 shows the division of age groups and gender for the questionnaire. Table 2 shows the division of age groups and gender for the interviews.

	Female	Male	TOTAL
Y-group	32	43	75
O-group	13	15	28
TOTAL	45	58	103

Table 1. Division of age groups and gender for survey.

	Female	Male	TOTAL
Y-group	5	3	8
O-group	4	4	8
TOTAL	9	7	16

Table 2. Division of age groups and gender for interviews.

How much and how detailed the participants answered the open questions or the response option "Other" varied to a great extent. This concerned both the survey and interviews. It was not seen a clear pattern in which user group that had the most detailed responses. In some cases could even short answers be more satisfying than long answers.

The results of the survey will first be presented and analyzed, and then the results of the interviews will be presented.

6.1 Presentation of the survey data

The survey was conducted to map the use of smartphones within different age groups and across gender, and to identify any marked differences in smartphone appropriation. The data will be presented in frequency tables and the most interesting findings will then be further discussed. Some results will be given percentages, to clarify the diversity found in the study. Where the percentage is discussed, it will be rounded to the nearest integer.

As there are four different groups based on age and gender, the respondents will be anonymous and the groups will be given codes. The users within the age group 20-30 years will be referred to as "respondents in the younger group", and the users within the age group 46-56 years as "respondents in the older group", and "Y-group" and "O-group" in the tables

Individual respondents will be given the codes "YF", "YM", "OF" and "OM", which stands for "Younger group Female", "Younger group Male", "Older group Female" and "Older group Male". In the survey, the participants were asked to write their gender and age so that they could

be placed in one of these four groups. Where quotes or comments from any of these users are presented, it will only be shown what group they belong to, for example, "*YF1: user quote*". The number of users will also be presented with integers, like the way it is presented in the tables.

6.1.1 Acquisition and ownership of the smartphone

Based on the data collected in the questionnaire, one could see that men dominated in responding to the survey (see Table 1). However, there is no indication that more men than women own a smartphone, but rather a coincidence based on access to the questionnaire, both the paper-based and online, as well as the desire to participate in the study. There was no gender discrimination in the distribution of the survey.

There were significantly fewer respondents in the older group than in the younger group, and one can assume that the reason was that there exist several more of the younger smartphone users than older smartphone users. A factor that is also previously mentioned is that it was easier to reach out to the younger group via for instance social networks. People in the younger group may feel more confident to answer an online survey than people who belong to the older group. Based on these reasons, people got the opportunity to respond to a paper-based survey.

Table 3 shows the division of age groups and gender in relation to smartphone OS, for the questionnaire.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
iOS	18	8	8	10	44
Android	13	32	4	5	54
Windows Phone	0	1	1	0	2
Symbian	1	1	0	0	2
BlackBerry	0	1	0	0	1
TOTAL	32	43	13	15	103

Table 3. Division of age groups, gender and smartphone OS for survey.

The table shows that Android and iOS are the dominant smartphone operating systems in this research, where 54 respondents claimed they owned an Android smartphone and 44 said owned an iPhone. As there were only five users of the other three operating systems, the focus and discussions will mainly regard users of iOS and Android and those operating systems. The users of the other three operating systems are so few that they will not have a significant useful value in

this current research. They are however included in the presentation, to show how they are used and how the users utilize those operating systems.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
0-1 years	4	7	6	2	19 (18.5%)
1-2 years	15	7	4	3	29 (28.2%)
2-3 years	9	11	3	6	29 (28.2%)
3-4 years	3	10	0	3	16 (15.5%)
4-5 years	1	8	0	1	10 (9.7%)
TOTAL	32	43	13	15	103 (100%)

Table 4. Ownership of smartphone, measured in years.

The majority of the respondents answered that they had owned their smartphone in from 1-3 years (about 56% in total). Across the groups, one could see that the respondents in the younger groups had owned their smartphone in several more years than the respondents in the older group (Table 4).

One of the survey questions dealt with the reason for acquiring the smartphone. This was a multiple choice question which allowed the respondents to answer more than one option. One hundred and three participants gave a total of 132 responses to this question in the form of check marks, in addition to several responses to the option "Other". As presented in Table 5 and Table 6, the main reason for acquiring a smartphone is because it suits the respondents' needs. About half of the participants chose this option. What is noticeable, is that none of the participants in the older group acquired the smartphone because it was trendy, nor to become more available. Except from the fact that the smartphone suited their needs, the only other reason for the men in the older group (OM) to getting a smartphone was in connection with work.

	Y-group Female	Y-group Male	TOTAL
It was a gift	8	9	17
It is trendy	2	5	7
In connection with work	1	4	5
To become more available	7	8	15
Was recommended	6	7	13
It is well suited to my needs	17	29	46

TOTAL	41	62	103

Table 5. Purposes of acquiring a smartphone, Y-group.

	O-group Female	**O-group Male**	**TOTAL**
It was a gift	4	0	4
It is trendy	0	0	0
In connection with work	1	9	10
To become more available	0	0	0
Was recommended	4	0	4
It is well suited to my needs	4	7	11
TOTAL	13	16	29

Table 6. Purposes of acquiring a smartphone, O-group.

In other research, Bødker & Christiansen (2012) found that people have purchased an iPhone because it was "in" and because other friends owned that brand. This research shows that if the smartphone is trendy has a small, but not a remarkable influence on the acquisition. This regards both for the users of iOS and the other four operating systems (Table 7). There were also 13 respondents who were recommended their Android smartphone, in contrast to 5 iOS users and 1 BlackBerry user.

	iOS	**Android**	**Windows Phone**	**Symbian**	**BlackBerry**	**TOTAL**
It was a gift	11	9	1	2	0	23
It is trendy	4	3	0	0	0	7
In connection with work	9	5	1	0	0	15
To become more available	6	9	0	0	0	15
Was recommended	5	13	0	0	1	19
It is well suited to my needs	18	33	1	1	0	53
TOTAL	53	72	3	3	1	132

Table 7. Purposes of acquiring a smartphone, based on smartphone OS.

Some respondents also chose to add another respond or respond more detailed to the question, by making use of the "Other" field. The respondents in YF and YM gave these concise responses:

> YF1:"The last phone was broken."
> YF2: "I inherited my dad's old work phone."
>
> YM1: "Good price."
> YM2: "I'm a hobby app-creator."
> YM3: "Needed a new phone."
> YM4: "Internet is always available."
> YM5: "Because of functions that don't exist on traditional phones."
> YM6: "Borrowing it from HTC."

The reasons varied from the choice of getting a new phone, to more technical reasons, like being available through Internet, creating apps and wanting functions traditional cell phones cannot offer.

Three of the respondents in OF and OM responded this on "Other":

> OF1: "Inherited the phone from my 18years old daughter."
>
> OM1: "The old one was outdated, and I wanted access to new apps."
> OM2: "It was exciting to try new technology."

One can see that none of the groups differed particularly in reason to acquire a smartphone, but it was interesting to see that some of the respondents in OM were interested in the technology itself.

6.1.2 Use of smartphone and apps

The respondents were asked what they used their smartphone for and were given options based the smartphone's general features and built-in apps, but also what areas other researchers had chosen to look at. This was also a multiple choice question, where the respondents were able to check off several options or add additional information. Table 8 and Table 9 show the distribution of how the smartphone preferably is being used. The percentage shows the

proportion that chose that option in relation to the number who responded to the survey. That is a total of 75 respondents in the younger group and 28 respondents in the older.

	Y-group Female	Y-group Male	TOTAL
SMS/phone calls	30	38	68 (90.7%)
Surfing	29	38	67 (89.3%)
Social networks	30	36	66 (88.0%)
Music/videos	23	29	52 (69.3%)
Organizing daily life	19	31	50 (66.7%)
Other downloaded apps	17	31	48 (64.0%)
Games	14	29	43 (57.3%)
TOTAL	162	232	394

Table 8. Use of smartphone, Y-group.

	O-group Female	O-group Male	TOTAL
SMS/phone calls	12	15	27 (96.4%)
Surfing	10	12	22 (78.6%)
Organizing daily life	8	12	20 (71.4%)
Social networks	6	11	17 (60.7%)
Music/videos	4	11	15 (53.6%)
Other downloaded apps	6	9	15 (53.6%)
Games	7	3	10 (35.7%)
TOTAL	53	73	126

Table 9. Use of smartphone, O-group.

The majority of the respondents in both groups used their smartphone for sending SMS and making phone calls, which were the option with the most replies. Of a total of 103 possible responses, 95 of the respondents had chosen this option. Surfing, by using a web browser, was the second most frequent activity in both groups. For the younger group, these two activities and using social networks are almost equally popular to use. The respondents in the older group are a bit more interested in using their smartphone for organizing their daily life than the younger group, with 71% contra 67%.

Fifty-seven percent of the younger respondents are using their smartphone for playing games, which also were the lowest percentage of responses. Games were also the option with the fewest responses within the older group, with only 36% of the responses. This also applies to the use of audio and video features on the smartphone, where the younger respondents have a higher

consumption than the older respondents. One can also see that the younger group uses their smartphone for entertainment more than the older group, which is not surprising. Both groups have a relatively high proportion of using other downloaded apps, which will be further discussed.

Some of the youngest respondents also mentioned other apps than was listed as options:

YM1: *"Maps."*
YM2: *"Taking pictures and videos. Flashlight."*
YM3: *"Flashlight, alarm, camera, bus routes, calculator."*
YM4: *"Ebook."*

6.1.2.1 Utilizing PC for Internet search, contra the smartphone
Smartphones share many of the PC's features, and although it may have several restrictions in relation to for instance interface and capacity, it also expands the PC with being more mobile and handy. In the survey, it was asked whether the respondents utilized PC in lesser extent to conduct search on the Internet, when they had a smartphone. The results are shown in Table 10 and Table 11.

	Y-group Female	Y-group Male	TOTAL
YES	20 (62.5%)	18 (41.9%)	38 (50.7%)
NO	12 (37.5%)	25 (58.1%)	37 (49.3%)
TOTAL	32 (100%)	43 (100%)	75 (100%)

Table 10. Whether the PC is utilized to a lesser extent to search on the Internet, Y-group.

	O-group Female	O-group Male	TOTAL
YES	5 (38.5%)	8 (53.3%)	13 (46.4%)
NO	8 (61.5%)	7 (56.7%)	15 (53.6%)
TOTAL	13 (100%)	15 (100%)	28 (100%)

Table 11. Whether the PC is utilized to a lesser extent to search on the Internet, O-group.

Table 10 and Table 11 shows that there is no marked difference in whether the respondents in the younger group utilize PC in a greater or lesser extent for Internet search when having a smartphone. Those who use the computer less for search is a slightly higher proportion than those who do not. Internally between the genders, the YF utilizes the PC to a lesser extent than the YM,

with 63% contra 42%, which can be understood that the younger females find the smartphone more suitable for Internet search than the males.

Table 11 shows a bit larger differences, where those who do not utilize PC to a lesser extent is a higher proportion, with a total of 54% contra 46%. Between genders, the difference is larger between the women who utilize the PC to a lesser extent and those who do not, with a distinction of approximately 24% where the majority is not utilizing the PC to a lesser extent. The men are more equal in numbers, where there is only one more respondent who claimed he utilized PC to a lesser extent for Internet search.

It is noticeable that the YF dominates in utilizing PC to a lesser extent, unlike the OF, who dominates in not utilizing PC to a lesser extent, and which has a proportion of approximately 62%. These differences emerge both between OF and YF, and between OF and OM. It has been assumed that younger people have a greater acceptance of new technology and ways of using it. It has not been presented similar research in the area, but one can also assume that men, and in this case OM, are more likely to experiment with technology than women.

	iOS	Android	Windows Phone	Symbian	BlackBerry	TOTAL
YES	32 (72.7%)	18 (33.3%)	0 (0%)	0 (0%)	1 (100%)	51 (100%)
NO	12 (27.3%)	36 (66.7%)	2 (100%)	2 (100%)	0 (0%)	52 (100%)
TOTAL	44 (100%)	54 (100%)	2 (100%)	2 (100%)	1 (100%)	103 (100%)

Table 12. Whether the PC is utilized to a lesser extent to search on the Internet, based on smartphone OS.

Table 12 shows how the distribution looks like based on which operating system is used. The differences emerge in the use of iOS and Android, which is natural since the number of users of the other operating systems was so small. The majority of the iOS users utilized PC to a lesser extent for Internet search, unlike Android users where the majority did not utilize PC to a lesser extent. What is causing this may both have to do with personal preferences, the web browser used, as well as the smartphones' interface.

6.1.2.2 Use of integrated and downloaded apps

Regarding the amount of downloaded apps, there was great inequality. The range started at 0, and the largest number of apps downloaded was 165 for one person. The distribution is presented in

Table 13. The average number of downloaded apps per group is then presented, with the number of downloaded apps in parentheses, which is divided by the number of respondents in each group.

	Female	Male	TOTAL
Y-group	33.2 (1062/32)	26.6 (1145/43)	29.4
O-group	13.7 (178/13)	22.5 (337/15)	18.4

Table 13. Average amount of downloaded apps per person.

YF had in total downloaded 1062 apps from the app stores, while YM had downloaded 1145 apps. The average number of apps was then 33.2 and 26.6 each, which gives an average of 29.4 apps per person for the younger group. OF had a total of 178 downloaded apps, while OM had downloaded 337 apps in total, which gives an average of 13.7 and 22.5 apps per person. The average number for the older group was therefore 18.4 apps per person.

As one can see there is a difference of about 11 apps per person, across the age groups. Younger smartphone users download more apps than older smartphone users. Table 8 and Table 9 showed that a higher proportion of respondents in the younger group used more downloaded apps than the respondents in the older group. The amount of downloaded apps can also be connected to what the respondents use their smartphone for, and in Table 8 and 9 it was apparent that the younger group is using the smartphone more to entertainment than the older group.

It was also interesting to see the differences in the amount of downloaded apps across the different operating systems. From Table 14, one can see that iOS users have the largest average of downloaded apps, with 32.3 apps per iOS user, while Android users have an average of 23.6 apps. iOS users downloaded in total 1422 apps, while the Android users downloaded 1275 apps in total. The number of apps downloaded is divided on the amount of users within each OS.

iOS	Android	Windows Phone	Symbian	BlackBerry	TOTAL
32.3 (1422/44)	23.6 (1275/54)	6.5 (13/2)	3.5 (7/2)	5 (5/1)	26.4 (2722/103)

Table 14. Average amount of downloaded apps, based on operating systems.

Of the total 2722 downloaded apps, there were a number of 166 apps that were most used in total by the respondents. The apps should be divided into categories, before being analyzed and presented. Apps with two or more users in total have therefore been the basis when dividing into

categories. These are here seen as the most popular apps, and the reason for the sorting is to create constraints in the myriad of apps.

The app categories created for this analysis, based on previously mentioned app store categories, are *Social* (social network apps), *Communication* (apps for exchanging messages, like email, SMS, IM), *Music & Audio* (apps related to music listening, radio channels), *Travel* (apps related to traveling and for obtaining information about places, weather and people), *Browsing* (web browsers), *Productivity* (apps for creating and reading text documents, calendars, file sharing), *Finance* (apps for mobile banking and currency), *Games* (game apps for single and multiple users), *Entertainment* (apps for entertainment in daily life, videos and television channels), *Tools* (apps for tools and gadgets), News & Magazines (apps for news, daily newspapers and magazines), *Health & Fitness* (apps for food, fitness and diet) and *Books & Reference* (apps for books and encyclopedias).

Of the 166 most used apps, there were 42 apps that were used by two or more users in each age group, which will be divided into the categories and further discussed. These 42 apps had a total of 300 responses of use. Table 15 and Table 16 present the distribution of app categories of downloaded apps, where the percentages show the amount of users in each category.

	Y-group Female	Y-group Male	TOTAL
Social	41	36	77 (32.9%)
Communication	18	23	41 (17.5%)
Music & Audio	17	18	35 (15.0%)
Travel	6	9	15 (6.4%)
Browsing	2	12	14 (6.0%)
Productivity	1	12	13 (5.6%)
Finance	5	6	11 (4.7%)
Games	6	4	10 (4.3%)
Entertainment	6	4	10 (4.3%)
Tools	1	2	3 (1.3%)
News and Magazines	0	3	3 (1.3%)
Health and Fitness	0	2	2 (0.9%)
TOTAL	103	132	234 (100%)

Table 15. Distribution of most used app categories of downloaded apps, Y-group.

	O-group Female	O-group Male	TOTAL
Social	7	8	15 (22.7%)
Travel	6	4	10 (15.2%)
Communication	2	6	8 (12.1%)
Entertainment	4	4	8 (12.1%)
Music & Audio	2	4	6 (9.1%)
Games	4	2	6 (9.1%)
Browsing	1	2	3 (4.6%)
News and Magazines	1	2	3 (4.6%)
Finance	3	0	3 (4.6%)
Productivity	0	2	2 (3.0%)
Tools	1	1	2 (3.0%)
TOTAL	31	37	66 (100%)

Table 16. Distribution of most used app categories of downloaded apps, O-group.

The app category Social, with the use of social networks, is the most popular category for downloaded apps. This applies for both of the groups.

The Communication category, consisting of apps like WhatsApp, Viber, Facebook Messenger, Skype, Gmail and GO SMS Pro, also had more downloads in the younger group than in the older group. These are apps who offer free communication/message exchange. There are reasons to believe that younger people are better at finding and using alternatives to communication and the integrated Phone and Message apps. This can be affected by the studies and that they are students, where both classmates and people in relation with the studies may be in other countries. Several of these communication services also offer group conversations, which young people, students and non-students, use in a large extent.

The older group was a bit more interested in downloading apps in the Travel category than the younger group. The most popular apps in this category were apps for checking weather, and phone books. The younger group had a much higher ratio for downloading apps regarding Music & Audio. When the respondents in the younger group downloaded travel apps, these apps were route information for public transportation, weather checking, and maps. The older group had a couple of users of the Health & Fitness category, which means that the older group had two or more users of one less app category than the younger group.

Some respondent responded the "Other" option, which is presented in Appendix 4, Q10. A respondent in YF said she had not downloaded any apps, other respondents in YF, YM and OF said they had downloaded games, while one in the OM said he had downloaded a tool app because of the broken buttons.

Comparing the five most used single apps, within downloaded apps, the younger group had most downloads of Facebook (Social category), Spotify (Music & Audio category), Instagram (Social category), WhatsApp (Communication category) and Twitter (Social category). This is presented in table 17. The older group had the most downloads of Facebook (Social category), Yr (Travel category), Spotify (Music & Audio category), Wordfeud (Games category) and WhatsApp (Communication category). This is presented in Table 18.

For the older group, this shows a wide variety in the use of app categories in terms of which single apps that are most used, within downloaded apps. The younger group uses mostly social networks in their everyday life and has a small variety of app categories in terms of which single apps are most used, within downloaded apps.

	Y-group Female	Y-group Male	TOTAL
Facebook	24	23	47
Spotify	13	17	30
Instagram	11	5	16
WhatsApp	5	10	15
Twitter	5	7	12

Table 17. Most used single apps, within downloaded apps, Y-group.

	O-group Female	O-group Male	TOTAL
Facebook	6	5	11
Yr	4	4	8
Spotify	2	3	5
Wordfeud	2	2	4
WhatsApp	1	2	3

Table 18. Most used single apps, within downloaded apps, O-group.

In terms of most used integrated apps, the amount of apps was in total 44 different apps, which had 390 responses of use. Twenty-five of these 44 apps were used by more than two users and got 371 responses in total. These apps could be placed in the app categories which were discussed

earlier. Based on the apps' functions, the category "Other" is replaced with "Tools". The distribution of use of integrated app category is presented in Table 19 and Table 20, where the percentages show the amount of uses in each category.

	Y-group Female	Y-group Male	TOTAL
Communication	37	40	77 (29.8%)
Productivity	29	28	57 (22.1%)
Media	30	21	51 (19.8%)
Browsing	23	24	47 (18.2%)
Maps	6	9	15 (5.8%)
Tools	6	5	11 (4.3%)
TOTAL	139	135	258 (100%)

Table 19. Distribution of most used app categories of integrated apps, Y-group.

	O-group Female	O-group Male	TOTAL
Communication	12	19	31 (27.4%)
Media	10	17	27 (23.9%)
Productivity	8	15	23 (20.4%)
Browsing	7	7	14 (12.4%)
Tools	8	3	11 (9.7%)
Maps	2	5	7 (4.4%)
TOTAL	48	68	113 (100%)

Table 20. Distribution of most used app categories of integrated apps, O-group.

For both groups, the app category "Communication" is the most used category within integrated apps. This category regards apps for exchanging messages, like for instance the apps Email, Messages and Phone. This matches the responses earlier, where both groups replied "SMS/ phone calls" as the most used activity. The second most used category is Productivity for the younger users and Media for the older users.

The younger group uses their web browser in a bit larger extent than the older group, which can indicate searching the web, surfing, replacing apps with Websites, or using Websites for products/services which do not offer an app.

6.1.3 Use of apps and functions for organizing daily life

The smartphone, with its functions and access to myriad of apps, offers several opportunities for more easily organizing the users' daily life. Smartphone do not only share or expand the functions of other technological artifacts, it also shares the same properties as other non-technological items. These items include clock, alarm clock, notebook, calendar, music player, voice recorder et cetera. The respondents were asked what integrated and downloaded apps they used for organizing their daily life, and if there were any functions they felt the smartphone was missing.

Table 8 and Table 9, which are dealing with the use of the smartphone, show that using the smartphone for organizing the daily life was not the respondents' main usage area. The older group responded that using the smartphone for organizing their daily life was the third most common activity of seven options, contra being the fifth most common activity for the younger group. Table 21 and Table 22 present how often the respondents use smartphone apps for organizing their daily life.

	Y-group Female	Y-group Male	TOTAL
Daily	25	34	59 (78.7%)
Sometimes	5	8	13 (17.3%)
Never	2	1	3 (4.0%)
TOTAL	32	43	75 (100%)

Table 21. Use of apps for organizing daily life, Y-group.

	O-group Female	O-group Male	TOTAL
Daily	7	11	18 (64.3%)
Sometimes	6	4	10 (35.7%)
Never	0	0	0 (0.0%)
TOTAL	13	15	28 (100%)

Table 22. Use of apps for organizing daily life, O-group.

One can read from the table that both age groups dominates in using the smartphone for organizing their daily life, but that there is a greater proportion of the younger group that use it daily for this purpose. Three of the respondents in the younger group also responded that they

never used it for organizing, while all of the respondents in the older group either said they used it daily or sometimes.

Regarding what integrated apps were used for organizing, the younger group mentioned in total 18 apps, while the older group mentioned 13 apps. This was an open question, where the respondents had the opportunity to write whatever they had in mind. Table 23 shows the integrated apps used for organizing daily life.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
Calendar	21	30	4	10	65
Clock/Alarm	15	22	5	3	45
Email	4	14	1	5	24
Notes	10	4	4	1	19
SMS	2	2	2	3	9
S Memo	1	6	0	0	7
Calculator	2	3	1	0	6
Reminder	2	2	1	0	5
Phone book	0	4	0	1	5
Browser	1	2	0	1	4
Maps	0	3	0	0	3
S Planner	1	2	0	0	3
Phone	1	1	0	1	3
Camera	0	0	1	1	2
Photos	0	0	1	1	2
Adobe Reader	0	1	0	0	1
iCal	0	1	0	0	1
Facebook	0	1	0	0	1
PDF Reader	0	1	0	0	1
Voice recorder	0	1	0	0	1
Music	0	0	1	0	1
TOTAL	60	100	21	27	160

Table 23. Integrated apps used for organizing daily life.

The calendar was used by 51 of 75 in the younger group, and 14 of 28 in the older group, which means about two third of the younger and half of the older respondents. The respondents' use covers an expanded range of tools meant to organize and facilitate the daily life of the users. On the other hand, there are relatively few users of each of the apps, besides within the use of calendar, clock/alarm, email and notes, which were the apps with most users in both groups.

The two groups made use of 10 common apps for organizing, which means that the younger group made use of 8 unique apps and the older group 3 unique apps for organizing.

One respondent in YF, two respondents in YM and three respondents in OM also replied that they did not use any apps for organizing their daily life. As this was an open question, and because of lack of restrictions or sufficient guidance, some respondents also left the question unanswered. This is interpreted that the respondents did not use or could think of any integrated apps to organize their everyday.

The respondents were also asked which downloaded apps they used in relation to organizing their days. Fifty-four apps were mentioned, where only 15 of them had two or more users in total between the groups.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
Facebook	4	7	1	0	12
Viber	2	3	1	0	6
Calendar	0	2	0	2	4
WhatsApp	1	3	0	0	4
Clock/Alarm	2	1	0	0	3
Dropbox	0	3	0	0	3
Facebook Messenger	0	3	0	0	3
Email	0	1	0	1	2
Facebook Birthday calendar	2	0	0	0	2
Yr.no	1	0	0	1	2
Google Calendar	1	0	0	1	2
Business calendar	0	1	0	1	2
Gmail	0	2	0	0	2
Evernote	0	2	0	0	2
TOTAL	13	28	2	6	49

Table 24. Downloaded apps used for organizing daily life.

Table 24 shows that there are relatively few users of downloaded apps for organizing. It also shows that there is only one or two in the older group who use each of the downloaded apps for this purpose. The most popular downloaded app for the younger group is the Facebook app. Four of the 15 apps are alternative calendar apps, which are almost equally distributed between the

groups. The calendar app was also the most used integrated app, and is obviously the most important app with regard to organization.

Nearly half of the most used downloaded apps are apps for communication, offering the types one-to-one, one-to-many, and many-to-many communication. These apps are Facebook, Viber, WhatsApp, Facebook Messenger, Email and Gmail.

The table also shows that more than double of the male respondents use downloaded apps for organizing their daily life, compared to the female respondents. This applies to both age groups.

A few respondents in each group also wrote that they did not use any downloaded apps for organizing, and some explained their choice of apps a bit further.

> YF1:*"None."*

> YM1: *"None.*
> YM2: *"WhatsApp, to be in contact and make appointment with other people."*

> OF1: *"None."*
> OF2: *"Facebook and Viber to keep in touch and plan stuff."*

> OM1: *"None".*
> OM2: *"Google Calendar (which is synchronized with PC), a calendar for each*
>   *family member and for work situations. I cannot be without it!"*

6.1.3.1 What functions the users feel the smartphone is missing
Despite constantly improved smartphones and expanded features, it is clear that the users are not completely satisfied with their smartphone. The respondents were asked what they think the smartphone was missing, which they would want it to have/contain in the future. The majority would like additional or modified features on their smartphone.

It was received a lot of feedback related to the smartphone the way it is today and how it could/should be improved. This applied to both design, user interface and integrated features. The total overview of responses is presented in Appendix 4, Q14.

> YF1:*"Lighter, stronger (not to be broken so fast)."*
> YF2: *"Better music sound."*

YF3: *"Better battery-life."*

YF4: *"It should not be made of glass."*

YF5: *"Better battery."*

YM1: *"Longer battery-life, but the lithium batteries can't get better. It's more the processors, screen and OS to use less power. The phones today are smarter, faster and easier to use than some computers - meaning that we have "peaked" over the evolution of technology."*

YM2: *"Larger screen, better resolution, more apps to download."*

YM3: *"Longer battery-life. Higher speed."*

YM4: *"Thinner, lighter, more shock proof and waterproof."*

YM5: *"More waterproof."*

YM6: *"Increased processing power and better video/audio integration."*

YM7: *"Better music player."*

OF1: *"Better camera zooms."*

OF2: *"Design; smaller but still easier to take notes etc. Color choice."*

OM1: *"A slightly larger screen."*

OM2: *"Improved memory, the phone is nearly exhausted because of little space (even though I have added as much as possible on the SD card)."*

OM3: *"Improved battery capacity, I have to charge it every day."*

OM4: *"Waterproof."*

One can see that the battery capacity is mentioned several times. The design is also listed up a couple of times, where the users would wish for a lighter, smaller and stronger phone with larger screen. Being waterproof is also suggested, as well as improved media functions.

Several of the respondents were missing improved or additional functions for communication, study related situations and for organizing their everyday. This was particularly the case for the younger users.

YF1: "My phone is missing a good way to write down notes or reminders (only got Calendar, and messages)."

YF2: "Better notes system, better reminder system."

YM1: "Mine cud need a 2-way camera for usage of Skype and video chat."

YM2: "Integrated mini projector."

YM3: "A built in mini projector, so if you wanted to show a video to say 5 friends you could just point the phone at the wall!"

YM4: "Maybe a small projector."

YM5: "Maybe a payment function?"

YM6: "Payment solution for bus, stores etc."

YM7: "Hologram projector (Yes, like in Star Wars)."

YM8: "Voice control that works properly. (Note, I don't have ICS on my phone)."

YM9: "Voice control that can work on multiple user-defined languages simultaneously. For me, it is Norwegian and English (without going into the settings and have to switch between languages)."

YM10: "Easy printer functionality."

YM11: "Use it as VISA card."

OF1: "I miss a feature that the old Nokia touch phone had, an overview of the tasks that constantly lie in the screensaver (sorted by date, chronologically)."

OM1: "Voice control."

OM2: "That the most used apps were automatically put on the front page."

YM is dominating in dissatisfaction regarding using the smartphone in study situations and for organizing their daily life. Several payment solutions are mentioned, as well as a better solution for writing/taking notes. Integrated projector is a feature several of the respondents would want for their smartphone. A useful voice control, which also was mentioned from one OM respondent, is also wanted. A respondent from OM expressed a desire to add widely used items on the front screen. A respondent in OF would want to place written tasks on the front screen, while a respondent in OM would want the smartphone to put the most used apps on the front screen.

Some of the respondents suggested other extensions and functions. Some of them were not necessarily regarded themselves, and some had more technical purposes. Most of them were useful in everyday situations, and some respondents were really thinking outside the box.

YF1: "USB port for opening files on USB stick."

YF2: "My phone does not have the functionality for pairing with smart TVs. Like iPhone has...."

YF3: "More possibilities to change how things look on your phone."

YF4: "More correlated with each other (brands), minor differences from phone to phone, connect to the TV (on an easier way, bigger screen without having major phone)."

YM1: "Potato peeler on the side."

YM2: "Seamless integration with all other units (computers, other gadgets)."

YM3: "Integrated support for turning the phone into a Bluetooth mouse (I once had an old Sony Ericsson phone that had this integrated)."

YM4: "Better integration for tablets, PCs, TVs, etc., in addition to that everything already have more concurrent operating systems (e.g., both PCs and phones share the same OS, but mobile phones often have a "Lite" version instead)."

YM5: "Something that replaces the most useless communication technology ever: Bluetooth."

YM6: "Interaction between other furniture, e.g. that the mobile phone is laid on a table and then one can use a touch table to see and manage content on your mobile phone."

YM7: "Java, Flash, to change exactly what you want to change on the phone."

OF1: "Voice telling visually impaired users what they are doing on their phone."

OF2: "How about a keyboard for blind users?"

OF3: "Voice function for disabled people if they have problem with typing."

OF4: "Whistle function to find where one has placed the phone."

OF5: "Beer opener."

> *OM1: "Lights on the phone (for example for finding key locks)."*
>
> *OM2: "More seamless communication with other electronic equipment."*

Several respondents wanted more seamless integration with other gadgets, and to pair, or more easily connect their smartphone to other devices. Some also wanted to expand the smartphone's functionality. The smartphone should contain a USB port, it should offer a pen to write with, and some wanted to turn the phone into a Bluetooth mouse, while others wanted to replace the Bluetooth function with something else. Respondents in OF were more concerned about people who were visually impaired or had a disability.

There were also a couple of creative and a bit surprising wishes from the respondents. One from the YM group suggested a potato peeler on the side, and a woman in OF suggested a beer opener. This might indicate that they feel their smartphone has everything they need.

A set of users also express a bit clearer their satisfaction with their smartphone, showing that it has what they need.

> *YF1:"I think it works very fine now, but when something new comes, I would*
> *probably want it."*
>
> *YF2: "Nothing is missing for my use."*
>
> *YF3: "I am satisfied with the way it is."*
>
> *YM1: "They have the most now, so now it's more about making things faster and more*
> *reliable."*
>
> *YM2: "Is quite satisfied."*
>
> *OM1: "It is already a PC!"*
>
> *OM2: "I feel that it has got what I need."*

6.1.4 Smartphone habits and frequency in use

As predicted, and as Table 8 and Table 9 shows, sending SMS and making phone calls were the activities most users performed on their smartphone, with 91% of the younger respondents and 96% of the older. The response options "Surfing", "Social networks", "Music/videos", "Organizing daily life", "Other downloaded apps" and "Games" also had a relatively high percentage of users, and more than half of the younger respondents used the phone for these

activities. More than half of the older respondents also used the phone for these activities, in contrast to playing games, which had a slightly lower proportion of users.

The respondents were asked in the survey how many hours a day they used their smartphone to activities other than making calls and sending SMS/instant messages. The majority of the respondents in both groups said they used their smartphone for these activities up to one hour a day, with 42.7% in total, while almost as many said they used it from one to two hours a day, with 39.8% in total. 21 of the 28 respondents in the older group said they used it up to one hour a day. Table 25 shows this distribution.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
0 to 1	7	16	10	11	44 (42.7%)
1 to 2	19	17	1	4	41 (39.8%)
2 to 3	3	6	1	0	10 (9.7%)
3 to 4	3	4	1	0	8 (7.8%)
TOTAL	32	43	13	15	103 (100%)

Table 25. Amount of hours spend on other activities than making phone calls/sending messages.

On a question about whether the respondent felt distracted by the smartphone in their everyday, the majority of the younger participants said they did, while the majority of the older participants said they did not. Table 26 shows the distribution of responses.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
YES	21	19	1	2	43 (41.8%)
NO	11	24	12	13	60 (58.2%)
TOTAL	32	43	13	15	103 (100%)

Table 26. Amount of participants who felt distracted by their smartphone is their everyday life.

Most of respondents in the younger group who had responded "Yes", added additional information about in which situations they were distracted and in what way. Several mentioned games and social networks as activities which disturbed them, often in work and school contexts. Several of the respondents also said they were distracted by the notifications from games, social networks and other apps, and that they had to check the phone regularly to see if there was anything new. The smartphone was always at hand and served as an always available tool.

YF1: "I have easy access to the smartphone when I'm doing other things, like reading
*   or watching movies. The phone is always there."*

YF2: "There is always something you can check."

YF3: "I have to check if anything new has happened, if I have received any IM, mails etc. Since I am more connected to people with a smartphone."

YM1: "One is too mobile."

YM2: "Feeling a need and an addiction to constantly check your phone for new emails, text messages, instant messages, etc.. It takes the focus away from both work and school, and probably affects the results both places, by being left behind and out of focus in work. However, it is awful to be without the mobile phone."

YM3: "It is an always available tool. If it distracts is thus a question of definition."

The total overview of responses is found in Appendix 4, Q16.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
YES	15	10	1	0	26 (25.2%)
NO	17	33	12	15	77 (74.8%)
TOTAL	32	43	13	15	103 (100%)

Table 27. Whether the respondents felt they spent too much time using their smartphone in their daily life.

40 of the participants in Y-group said they did not think they spent too much time using the smartphone in their daily life, in contrast to 25 who claimed they did. Table 27 shows that the difference in O-group was even greater with only 1 respondent feeling she spent too much time using the smartphone, in contrast to 27 respondents who claimed they did not.

6.2 Presentation of the interview data

This section presents the data and responses from the interviews of sixteen participants. Here it will be looked at the differences and similarities in use across age groups, regardless of gender. The group with the participants between 20 and 30 years is referred to as "Y-group", and the participants as "the younger users". The group with the participants between 46 and 56 years is referred to as "O-group", and the participants as "the older users". Individuals among the participants will be referred to as "he" or "she", without it having any impact on the use.

The majority of the questions were open questions, and some of the questions offered options to choose from, with the opportunity to expand the answer if necessary.

Of the 16 participants for the interviews, 12 of them owned an iOS and 4 owned an Android phone. None of them owned a smartphone with one of the other operating systems. Table 28 shows an overview of age groups and gender in relation to smartphone OS.

	Y-group Female	Y-group Male	O-group Female	O-group Male	TOTAL
iOS	5	1	3	3	12
Android	0	2	1	1	4
Windows Phone	0	0	0	0	0
Symbian	0	0	0	0	0
BlackBerry	0	0	0	0	0
TOTAL	5	3	4	4	16

Table 28. Division of age groups, gender and smartphone OS for interviews.

6.2.1 Experience with smartphones

The interviews started with a few questions regarding experience with smartphones and use of apps, to expand the information already received in the survey. The participants were first asked how much experience they had with smartphones, before they got the one they had today. Four participants in Y-group had barely touched a smartphone before and four had tried others' smartphone. Six participants in O-group had also barely touched a smartphone, while one had a lot of experience and the last one had tried others'.

6.2.2 Use of integrated and downloaded apps

The distinction between integrated and downloaded apps is in this case is that integrated apps were "integrated" or came with the phone, when the phone was acquired. Downloaded apps are downloaded from the app stores. Y-group was using between 3 and 11 apps daily, while O-group was using between 4 and 12 apps daily, which also was determined by the situation. The app consumption between the groups was quite similar.

6.2.2.1 Purchasing and downloading apps

On a question about how often the participants downloaded a free app, the Y-group responded in a broad specter with once in a week, once in a month, twice in a month, six in a year and four in a

year. O-group claimed to download free apps once in a week, once in a month, twice in a month, and twice in a year.

Regarding how often the participants paid for an app, it was not much of a difference from the free apps, but some claimed that they never paid for apps. Two users in Y-group responded never, while the others said once in a month, six times a year, twice in a year, and once in a year. O-group responded once in a month, four times a year, and twice a year.

On the question about what it would take for them to pay for an app, the participants in Y-group needed good reasons for buying it. They would have to want it very much, they would have a great need for it, it had to be useful in the everyday, it had to have good additional features and have gotten good feedbacks. It also depended on the price and if it matched very well what the user was looking for. It had to be a very useful and serious app, which would be used often. The first of the two participants who had never paid for an app said that he would need good reasons for that, and that one could not know in advance if the app was good. The other said it had to been something that fits his interests, which would be used every day and which would have a practical function in his everyday life.

> *"If it matches very well what I am look for. The app must be very useful and serious."* *(Y-group)*

> *"For purchasing an app, the app must be highly recommended by others, or give me more than a free alternative would." (Y-group)*

For O-group, it was said that the app had to be useful and very interesting, and there had to be a need for it. One responded that he could pay for a useful app where there existed no free alternative. One mentioned that the advertising which appears on the free apps did not affect whether he would pay for it or not. One participant said he would pay for an app if it provided professional advantage and/or could streamline the daily life. It was also mentioned that the app must have gotten good reviews. One response stood out, claiming that the app had to be cool and that the price was insignificant.

> *"It must be a little cool. If I really want it, the price is immaterial." (O-group)*

The participants were asked how they got to know about the apps they downloaded, and how they found them. 6 out of 8 of the participants in Y-group used App Store or Google Play to find the apps, either by looking them up or looking at recommended apps. One of them also said he looked for apps based on what needs he had, and then he chose by the highest rated apps. Recommendations from either friends or the app stores, as well as rankings from other app users also seemed to have a clear impact on what app that is to be downloaded. One participant also mentioned how current websites recommend downloading their app:

> *"I find them on App Store or on the Internet. When I'm visiting a website, it often appears an app to that current webpage which I can install on the smartphone."*
> *(Y-group)*

Four of the participants in O-group claimed they got to know about the apps through friends, colleagues and others, who also showed them where to find the apps. The other participants said they got to know about the apps through media, Internet, newspapers, magazines, technical websites, and via advertising. One said he also read app reviews online, and another claimed he looked for apps based on his needs.

> *"I get to know about them through the media, the Internet, newspapers, magazines and friends." (O-group)*

6 out of 8 participants in Y-group claimed they kept more than 60% or most of the downloaded, while one kept about one third of the apps. One participant said he deleted most of the apps he downloaded. 5 out of the 8 in O-group said they kept more than 80% or most of the downloaded apps. One said he kept approximately half of the downloaded apps, while the last two said they kept all of the downloaded apps.

Regarding why the participants deleted the apps, the responses were quite varied. Some of the participants in Y-group said it was because the apps did not satisfy their needs, while some deleted the apps if they were not being as expected or just because they were not used. Apps were also deleted if there were no need for them or if they seemed to be useless and sent too much push notifications. One of the participants had downloaded many apps because of her children, and deleted them when the smartphone became messy because of too many apps.

O-group also had a variety in reasons for deleting downloaded apps. They were deleted if there were no use for them and if they were not used at all, also if the apps annoyed the user or if the user was tired of the app. One participant claimed he deleted apps if the interface was poor. It was also mentioned that if the apps did not satisfy needs, it would be deleted and replaced by other apps. One of the participants said he was trying apps to see which suited him best.

"I keep all. But apps are carefully evaluated before they are downloaded." (O-group)

"I delete apps if they do not give me what I'm looking for. It is difficult to know how the app actually is until it is tried out, and often do apps have obscure reviews. I try and fail and look at user reviews/experiences, especially if there are several similar apps." (O-group)

6.2.2.2 Use of apps through the day

The participants were asked about their most used downloaded apps from the survey, and why they downloaded the apps. These apps were again divided into the same categories as in the survey, where the categories of downloaded apps for Y-group were Social, Music&Audio, Games, Entertainment, Travel, Finance, Productivity, Browsing and Communication, ranged from most to least used. Some of the participants responded in general why they downloaded the apps. That was because they felt the apps were practical and needed, and because they were used every day and several times a day. One respondent said she downloaded them to keep up with the times, and another said those apps were part of her daily routines.

Other respondents gave reasons for downloading some specific apps, where the most interesting responses will be presented within some of the categories. The Social apps were downloaded to keep themselves updated in the everyday, to keep in touch with friends and to be social. Some said they felt addicted to the apps and downloaded them because everyone else had them, but also to become more available. One participant made it clear that those apps only had entertainment value. The games were used as pastime activities, because they were fun and because some of them were social, in relation to playing with others.

Some of the Travel apps were downloaded because the integrated apps were not satisfying enough and some were downloaded because they had practical value. The Finance apps were

important and worked as tools which were often used in the everyday. One respondent said it was convenient to have mobile banking at hand and were more used than on the PC:

> *"Mobile banking is convenient to have by hand. I use the phone more than pc and it is easily accessible. Moreover, the app is simple and less complicated than the browser on the PC." (Y-group)*

Browser was used by a participant who was not satisfied with the web browser that came with the phone and had therefore downloaded another web browser.

O-group also used a broad variety of app categories, only within a different order. These categories were Social, Productivity, Communication, Travel, Games, Finance, Entertainment, Health&Fitness, News&Magazines and Browser. Some respondents in O-group also responded in general to the question of why they chose to download those apps. It was said that the apps eased the everyday, were useful, and also entertaining in downtimes and during traveling. Some said the apps were a part of the user and were widely used in private contexts, while some apps were professionally related. One respondent said he was addicted to those apps.

> *"It eases my everyday life to have these apps. They keeps me in activity in downtimes, and it is nice to be entertained, for instance during traveling." (O-group)*

Most of the apps that were mentioned by the O-group, regardless of category, were downloaded on the smartphone because they were used daily and were good to have readily available. The downloaded Communication apps were good alternatives to the integrated SMS and phone call app when keeping in touch with people abroad. The participant who used an app within the Browser category said he did not like the integrated web browser and needed a web browser that supported tabs.

Regarding use of apps throughout the day, most of the participants in Y-group said they used their downloaded apps through the entire day, while some others used them outside work. This was especially the case for the Social category. Some specified that Music&Audio apps were mostly used in the morning and the evening, and Games and Finance in the afternoon/evening. Some apps were context sensitive, like the apps in the Travel category.

"They are used throughout the day. Wordfeud is mostly used in the evening and P4 radio in the morning and evening." (Y-group)

The participants in O-group also claimed they used the downloaded apps during the day, but mostly outside work. Some also said they used their apps mostly in the afternoon and evening. These were apps within the Social, Music&Audio and Health&Fitness categories.

Regarding the most used integrated apps, apps within the following categories were the most popular in Y-group; Communication, Media, Productivity, Browsing, Maps and Other. Communication was the most dominating app category with 19 of the 40 most used apps, followed by the Media category with 8 apps and Productivity with 6 apps.

For O-group, the most used app categories regarding integrated apps, were also Communication, Media, Productivity, Browsing, Maps and Other, but also the System category. Of 34 most used apps, both the Communication and the Media category had 9 apps each, followed by the Productivity category with 7 apps.

The apps in the Communication category were used through the whole day for all of the participants in Y-group, while one participant claimed he used the email in the afternoon/evening. The Productivity category was used in the morning and the Media and Browser categories was preferably used in the afternoon/evening. One participant used the Media category through the day, and another used the Browser through the day.

Four of the participants in O-group claimed they used the integrated apps through the entire day, while two said they used them in their spare time. One participant said he mostly used the apps within the working hours, while another said he did not use the email app when he was at home, when he had his PC available. Another participant also mentioned that he preferred using alternatives to the smartphone for using email, calendar and maps, like on a PC or a tablet.

"I do not use email when I'm at home, when the computer is easily accessible." (O-group)

6.2.2.3 Learning how to use the apps

When asked about how the participants learned about and how to use the integrated apps, all of the participants in Y-group said they learned how to use the apps by examining, exploring and experimenting with the apps. Four of the participants also said the apps were simple and intuitive,

logically structured and self-taught. One participant had already some experience with one of the apps, while another had some issues with connecting to the Internet:

> *"I learned how to use the apps by myself, by "learning by doing". One problem*
> *I had was how I was going to get online, or connect to the Internet. I had to get some*
> *help to figure that out. But when I got online, the web browser was easy to use."*
> *(Y-group)*

None of the participants read any user guide to learn how to use the apps. One of the participants pointed out that this was not necessary.

Half of the participants in O-group received help and advice from others to get to know and learn about the integrated apps. The other half explored the apps themselves and one participant also claimed that they were intuitive.

Regarding how they learned about and how to use the downloaded apps, all eight participants in Y-group said they used to explore the apps, and four of the eight participants also said they never read about the apps or their description. The other three of the eight participants said they also read about them, for instance in the app store, or were taught by others. One of the participants also said she did not use it if was too cumbersome or complicated.

Five of the eight participants in O-group said they explored the apps, and one of them also said the downloaded apps often were self-explanatory. Two of the five also said they sometimes read about the apps on the Internet, in magazines or their description in the app stores. One of the five said he never read about the apps he downloaded. The rest explained that they got help from family members to learn how to use the apps.

> *"I read about them online, and I also read their description on the App Store. I also just*
> *try and fail." (O-group)*

6.2.2.4 Periodically use of apps

The participants were asked about how many apps they used in their everyday, what integrated and downloaded apps they used the most, and also when they were used. It was also interesting to find out whether the participants had a periodical use of apps, and in what contexts they were used.

Four of the participants in Y-group mentioned apps that were used in their spare time, which often were related to their hobbies, interests and lifestyle. These apps were more or less used due to their entertainment value. One of the participants said she used an app suited for pregnant women during the months she was pregnant. Three respondents said they used certain apps in school or work contexts, for instance Dropbox for file sharing and Skype for group meetings. Together with Goodreader and Dictionary, these were also apps in which were only used when at school and not in their spare time.

Two participants said they used certain apps when traveling, like maps and route information for public transportation. Most of the participants agreed in that the apps were used sporadically, which were not necessarily reduced by time. Three participants said the use of these apps could reduce, depending on the period and how motivated one was to use the apps. One could also be addicted to a new app for a period, and then the enthusiasm could fade by time.

> *"In periods where I exercise I am motivated and I use the app. If I am not in that period, it is not tempting to use the app either. But I delete none of them. I get easier tired of Game apps, which are more likely to be deleted." (Y-group)*

Six of the eight participants in O-group said they used certain apps when traveling, like maps, weather apps, Spotify, camera, and some communication apps. Two of the participants also used games, social networks and apps for exercising in periods. Regarding if the use had decreased, seven out of eight disagreed, and two of them even said the use had increased. One participant said the use of these apps varied, and whether he was using them at work or in his spare time was not decisive for the frequency of use. The same concerned whether he was traveling or not. A couple of participants also mentioned that some apps were only used in work contexts, and that the smartphone's features were not fully utilized.

> *"At the office, I use the phone only for sending SMS and making phone calls. Then I do not use it as a smartphone." (O-group)*

6.2.3 Organization of apps

In the interviews, it became evident that all of the participants in Y-group had a system of arranging their apps. One out of eight said he placed the most important apps on the first page of the smartphone. Three out of eight said they sorted the apps by placing the most used apps on the

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first page and the rest of the apps on the next pages, depending on frequency of use. One of these four also said she did not place apps in folders, while another said she first placed the most used apps in folders, and then sorted the folders alphabetically, but the apps in which were rarely used were not placed into folders.

Three participants said they sorted their apps by placing them into folders. One of them had folders for games, music, tools, diverse, navigation, photo and mobile. The other had folders for files, photo and music. The third had folders for photography, weather, tools, music, lifestyle, games and unused apps.

> *"I put the apps I use most on the first page. Then they are placed on the next pages depending on how much I use them." (Y-group)*

Those who chose to place the most used apps on the first page said they did it because it was very effective, because they wanted their most used apps available, and because it had to be easy to find them. Those who had created folders said they chose that system because it was easier to find their apps when they were organized and because the phone became less cluttered. A couple of those who did not choose to place apps into folders said it was because they were lazy or not structured, and that they tried to sort the apps better instead.

It also became clear that the participants in O-group were not that interested in arranging or grouping their apps as Y-group. Three out of eight said they did not have a system. Another three said they placed the most used apps on the first page, where one of them specified that the other apps were placed on the next pages, depending on frequency of use. One of these three also said he placed all the banking apps in one folder and all the Google apps in another folder. One participant said she had folders for news apps, games and social apps, while another said he grouped the apps by theme.

The participants in O-group who placed the most used apps on the first page said they wanted the apps easily available and did not want to spend time looking for apps when they were needed. Those who placed them into folders said it was easier to find the apps when they were in folders and to get a better overview, while one who did not use folders said he got a better overview of placing the apps one by one. The participants without any system said they had not thought about it, or had too little knowledge of or interest in organizing the apps.

On most smartphones, it is possible to attach apps to the menu bar, which act as shortcuts on the phone. The participants were asked if they had chosen to edit the menu bar and attach other apps than those that came with the phone. Five of the respondents in Y-group had attached the apps they used the most, which had to be available from anywhere, regardless of what page they were at on the phone. Those who did not change the menu bar had not thought about it.

Four of the participants in O-group said they had not changed the menu bar, either because the apps that came with the phone were used a lot, or because the user did not find it necessary as she did not use apps that much. A third participant said she had too little experience with her phone. Three of the participants in the group had changed the menu bar. One on them liked to adapt the phone to his needs, while the other two edited it by their frequency of use and because their most used apps should be easily available. The last participant was going to change it, as the app in the menu bar which came with the phone did not suit him.

> *"I try to have a system, and rank them after use. It should be easy to come quickly to the apps I use a lot." (O-group)*

6.2.4 Getting to know the smartphone and apps

Six of the participants in Y-group thought the smartphone was very easy to get to know and learn how to use. Some of them had experience with information technology or Apple products in advance, witch laid the foundation for getting to know their smartphone. Some mentioned that the iPhone's interface was intuitive and fun to use, and that the iPhone also had an easy setup. One did also compare her iPhone with her previously Android phone, saying the Android phone was more complicated to use. Another participant said his Android phone was intuitive.

> *"Very easy! iPhone is generally easy to use. I have experience with other Apple products, and when you have first tried one product, you understand the others easily." (Y-group)*

Two respondents thought their smartphone was quite easy to get to know and learn how to use. One of them had an Android phone and thought it was difficult to configure the email. He also said the settings were difficult to understand and that the phone gave him little freedom of choice. The other participant had an iPhone and said the phone was properly cleaned when he got it, and that he needed an instruction manual to get started, which did not come with the phone.

Seven out of the eight participants in O-group said the smartphone was very easy to get to know. Six of them said the phone was self-explanatory, had an uncomplicated and logical setup, a good user interface, and that it was easily comprehensible and intuitive. One of them had previously owned an Android phone and thought the iPhone was much easier and more logical to use. Another, who owned an Android phone, said it opened up a new world to him.

Seven out of the eight participants in Y-group said they were not receiving any help or guidance when they started using their smartphone, and spent about one day understanding the smartphone's basic functions and a couple of weeks before they understood it well. One participant said she liked to find out how things worked by herself, while another said she had still not utilized it fully because of limited needs. Half of the participants in O-group said they did not receive help or guidance when they started using their smartphone, and most of them only used one to a couple of days to understand its basic functions.

6.2.4.1 Expectations to the smartphone

Regarding what expectations the participants had to the smartphone when they got it, the level of expectations varied to a large extent, from none to very high expectations for the participants in Y-group. One of the three with no or low expectations said he had only heard a lot about touch phones, but he did not like the keyboard buttons on the regular cell phones, while the other said he did not expect much because of its low price. The third said he thought the smartphone would be more difficult to use, but it was rather easier to use than he had thought and it suited his needs.

> *"I have never had the iPhone before, thus I had great expectations. But iPhone was popular. I did not know as much about how it was structures, so therefore I had no specific expectations to its features." (Y-group)*

Some of the participants mentioned their specific smartphone brand and how the attention around it influenced their expectations. One of these participants said he had no experience with iPhone and did not know much about it, but iPhone was a popular brand, so he thus had great but no specific expectations to it. Two others had great expectations as they had heard a lot about iPhone, including the attention it had received in the media. "Everyone" should have this phone!

One participant in Y-group said he expected to have more opportunities and freedom of choice to perform actions on the phone, and not being locked into using one function. He would like to use

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functions he himself felt was intuitive and user-friendly and expected a flexible interface. The last participant had very high expectations and wanted more easily access to the Internet.

> "My expectations were very high. I had never had a smartphone before, and I was
> looking forward to use the Internet more and have easier access to it from anywhere."
> (Y-group)

For most of the participants in Y-group, the smartphone and its feature correlated to their expectations.

Five the eight participants in O-group had great expectations to the smartphone in advance. One of them mentioned that media and other users had presented the iPhone as a good phone, which influenced his choice and purchase of phone. Another said her iPhone was expensive and widely used internationally, and that it had to be a reason why it was so popular. She also had a wish for easier access to Interned when she purchased the phone. A participant said he had great expectations when switching to iPhone, and all of them were met.

A couple of participants said they had expectations to the user friendliness of the phone and the interface. One of them expected that the phone was more user-friendly and had better image quality than on previous phones. Another thought the smartphone would simplify things and that he would be more independent of the PC. He was also excited about the smartphone features, which did not exist on regular phones, such as maps, locations and everything else within we access. One participant said she had high expectations for the smartphone to have bigger screen, and hoped it had better camera and an easier way to write SMS than the regular phones. One participant also claimed he had no expectations and was open-minded.

> "I had great expectations about simplifying things, update email and be independent of
> PC. I was curious about the functions that do not exist on other, "regular" phones, such
> as maps, location and everything else with web access." (O-group)

Most of the participants claimed their smartphone met their expectations to a great extent. One participant argued, however, that some things did not correspond completely, meanwhile another was pleasantly surprised.

The participants were asked how often they had to get help from others to perform actions on their smartphone when it had been a while since the last time they performed these actions. Four of the eight participants in Y-group and six of the participants in O-group said they seldom needed help from others, while four in Y-group and one in O-group claimed they never needed help. One participant in O-group said he occasionally needed help.

6.2.4.2 Getting to know new apps and functions

In a question about what determined how long it would take to learn how to use new, downloaded apps, the responses varied in terms of the user's interests and the interface of the app. Three of the participants in Y-group said the interface and design of the app affected how fast they learn to use the app. If it was illogical and cumbersome, it would not be used. It had to be easy to learn and self-explanatory, or else they would try to find an alternative app.

> *"The app must be easy to learn, and it should be self-explanatory. I will not spend time learning it. If it is too cumbersome, it will be deleted." (Y-group)*

Three participants said it depended on how interesting and fun the app was, and whether it could satisfy their needs. Another participant said it affected how interested she was in the app and how easy it was to set up. The last participant said it depended on how much she used the app, and whether it had a practical meaning and entertainment value.

Four of the participants in O-group said the apps had to capture their interest, had to be self-explanatory and have a good interface. They had to be understood immediately. If they had a difficult or illogical design, else they would not be used. Two of the participants said it depended on their need for and interest in the app. The last two claimed their time available and patience affected how fast they would learn the app, and also the frequency in use. If the app was frequently used, it would also be quickly learned.

> *"What is decisive is whether the app captures my interest. If it is recommended, and I get it explained, it is easier to learn." (O-group)*

6.2.4.3 Opinions of the smartphone's usability

In a question about usability, the participants were asked how easy the smartphone was to learn, how easy it was to use, how easy it was to remember its functions/integrated apps, how easy it was not to make mistakes, and how user-friendly the design of the phone was. For Y-group,

seven of the eight participants thought the phone was very easy to learn and one thought it was quite easy to learn. Six thought it was very easy to use, and two thought it was quite easy to use.

Six also thought it was easy to remember its functions/ integrated apps, and one added that it was very easy as long as no changes were made to the apps. Two participants said it was quite easy to remember its functions/apps. Six responded that it was very easy not making mistakes, while two said it was quite easy, as one could by accident touch the other buttons. Six of the participants also thought the design of the phone was very user-friendly, and it was mentioned that the screen was big, with a comprehensive interface and menu. Two thought it was quite user-friendly, where one mentioned that it could be a problem that it was made of glass.

> *"It has a quite user-friendly design, but it is inconvenient that the phone is covered by glass. It is easy to lose it, and then it will crush. The phone is a little big, but that is not a problem. I think it is good that is has few buttons and big screen." (Y-group)*

Seven out of the eight participants in O-group found their smartphone to be very easy to learn, and the eight found it quite easy. All the eight participants also thought it was very easy to use, while only half of them thought it was easy to remember its functions/integrated apps. The other half said they were quite easy to remember. Five out of eight said it was very easy to not make mistakes on their smartphone, while three thought it was quite easy. One of those three also told that it was due to the transition to a new phone, and that he had to familiarize with it, and especially the keyboard.

Seven of the eight in O-group also found the design very user-friendly, where one mentioned that it was a good customized phone. One found it a bit slippery to hold, while another thought it was a bit heavy, but solid. The eight participants said it had a quite user-friendly design. None of the sixteen found their smartphone less than quite easy to use.

6.2.5 Use of Internet

Fifteen of the sixteen participants said it was very important to have access to the Internet via their smartphone, while one participant in O-group said it was not important for her at all. All of the sixteen participants in Y-group and O-group said it was indifferent whether they connected to the Internet via Wi-Fi or cellular network, but preferred Wi-Fi both due to economic reasons and network speed.

The context also had an impact of use, where Wi-Fi was preferred at stationary locations, like at home, at work and at the cottage. Cellular network was used if necessary and in moving contexts, like when traveling. The one, who claimed it was not important with access to the Internet via the smartphone, said she could use the cellular network if it was very necessary.

Surfing, social networking and reading news were three very common activities, across the groups, when using the Internet on the smartphone. The participants were asked about their use of these activities, and what they mostly used their browser on their smartphone to. All eight participants in Y-group said they used it for surfing and social networks, while six of them also used it for reading news. Three participants added that they used it for checking their email, using mobile banking and using maps.

Six of the participants in O-group said they used the Internet for surfing, while seven said they used it for social networks and reading news. One of the participants also said he used it for checking his email.

6.2.6 The smartphone as an everyday tool

The participants were asked if there were situations in their everyday life where the smartphone was insufficient and they had to use other external tools as a substitute or in addition to the smartphone. Six of the participants in Y-group had clear examples of situations or actions they had to use external tools, and the PC was mentioned being a good substitute for the smartphone.

Word processing and use of email was mentioned a couple of times, where the smartphone was too small to write long texts or emails, which was a time-consuming process. The users had better control and overview, and were writing faster by using a PC with button keyboard. A couple of users also thought the smartphone was cumbersome to use when sending shared emails, sending several photos together or moving multiple files in emails. It was much easier to do this by PC, where they could use computer mouse and have greater navigation possibilities.

> *"I cannot send more than one image at a time, or moving multiple files in the email. The interface is cumbersome. I use PC instead. It is easier to use the mouse and it offers greater navigation possibilities." (Y-group)*

Mobile banking was also mentioned being useful when checking balances, but when performing complex actions the PC was preferred, as the smartphone screen was a bit too small and there was a risk of pressing wrong buttons on the screen. One participant mentioned that some mobile versions of websites were not enough user customized and were lacking information, and that she would rather use a PC in those situations. She also thought the PC was easier to use when doing web search, as it was faster to perform such actions on the PC in contrast to the smartphone.

> *"Yes, if I shall read the news or do my homework, I use the PC. The mobile version of the webpage does not always display the whole content of the webpage. It is also easier to use the computer for web search. I do things faster on the PC, if I have it available."*
> *(Y-group)*

One user said the smartphone screen was too small for watching movies and TV-series, and that the PC or an iPad was better to use for those purposes. The smartphone camera was also insufficient in important situations where it was essential to take good pictures. An external photo camera was brought in those cases. The GPS function was also inaccurate on the bus app, and the user preferred checking the bus timetable in the bus shelter instead.

Several of the participants in O-group also mentioned word processing and accounting as cumbersome on the smartphone. Writing emails and notes were insufficient actions, and a PC, iPad or a Mac was used as replacement. One of these participants also said the smartphone was not a working tool, and one could only use it for writing short texts, like SMSs.

The smartphone camera was also mentioned by several of the participants in O-group, where the zoom function was limited and it was easy to get a finger in front of the lens. The quality of the photos and videos was also not top quality, and external video and photo camera were used instead. One user said the smartphone screen and the keyboard were limitations in general, and he preferred using a tablet or PC if those were available.

> *"The screen is a limitation, and the keyboard. I prefer tablets over smartphone and computer before tablet, if it is available. The phone is always a poorer option."* *(O-group)*

One participant said that some mobile versions of websites were slow, too small for the smartphone and were missing features. If she was ordering products or performing more complex actions on websites, the preferred using a PC or a MAC.

6.2.7 Frequency of use and new areas of use

Several of the participants had found themselves using the smartphone is situations or for purposes they had not thought they would use it in, when acquiring the smartphone. They may have had idea of how to use it, and then discovered new apps, functions and areas of use. One user in Y-group said he did not know about the possibilities of using video conferencing on Skype, or that he would make use of Google Maps and GPS in such an extent. Another participant also mentioned map as a more frequent used function.

Another participant said there were several of apps and functions he had started to use when acquiring the smartphone, like Facebook, bus timetable, games, and email. He did though prefer tablet because of larger screen and buttons. Email was also more often used by two of the other participants, who thought the app would be more complicated to use. Otherwise, file management, health apps and mobile banking were other apps and functions that were mentioned being more frequently used. Another participant said she did not though she would use Internet as much.

> *"I did not think I was going to use it for mobile banking. Before, I used the PC. I also thought it was too advanced to use email on the smartphone." (Y-group)*

Two participants said they did not use the smartphone in other situations or for other purposes than was intended. One of them had great expectations for the phone and used it for what she had thought. She also believed there were several other things she could have used it for, but she did not have time or interest to figure it out.

Five of the participants in O-group said they were using more media apps than they thought they would, like taking pictures and listening to music and radio. A couple of the participants also said they did not know about all the apps and possibilities the smartphone could offer. Another said he had not thought he would use the smartphone that much when exercising, while a woman said she did not think she would use it for playing games, which she did a lot.

> *"I was not aware of certain apps that exist, and I use the camera, email and radio more than I had thought." (O-group)*

A few other users said they used the smartphone for what they thought they would, like for instance using communication apps like Skype and WhatsApp.

The participants were also asked if there were functions or apps they would wish their smartphone had, or which they could not find in the app stores. The responses varied in a great amount, from being satisfied with their smartphone to be missing apps or functions customized their interests or needs. One participant wished for a better file management system, which he believed was necessary for the smartphone to replace the PC. He also wanted a more flexible interface. Another participant said he missed Java on his phone, and an app to create codes for opening the smartphone from the lock mode, which Android phones had.

> *"I would like a better system for file management, like an app for flexible handling of files. Then the smartphone can replace the PC! I also want a more flexible interface." (Y-group)*

One participant wanted a function to prevent incoming calls from certain phone numbers, while another would like a function for recording conversations, which would be useful for instance in school contexts. A payment solution for smartphones was also mentioned, which would serve as a replacement for the VISA card. He argued that the smartphone is always ready at hand. Two participants could not think of any apps or functions their smartphone was missing, or any special needs it could not satisfy.

Two of the participants in O-group said they knew about some apps or functions they would like to have, which they had not found yet. This was an app for mobile banking, and a function for sending audio files/voice recordings to email. One participant mentioned an app to find the location of food and items in grocery stores, while another would like more available cookbooks on the phone. The last four could not come up with any apps or functions they would like to have.

It emerged from the interviews that the smartphone was widely used when the participants were bored. Most of the participants in Y-group used the smartphone for social networking, surfing, playing games or watching videos. It was however mentioned that the screen was a bit too small

for watching videos. One participant said it was easy to just use the smartphone when being bored, as it was easily accessible. Another said he tried to avoid using the smartphone in those situations, as he did not like people being antisocial with their phones. He said one did not always have to be entertained.

Most of the participants in O-group also said they used their smartphone in situations they were bored. The activities that were mentioned were playing games, using social networks, listening to radio, surfing and reading news. Some also said they did not use it for playing games if they were bored, but tried to spend their time on more sensible activities. One participant said he did not use his smartphone if he was bored, but liked to have it available in waiting and travel situations.

7.0 Discussion of findings

This section will extract the most important findings obtained through the survey and the interviews and discuss them in relation to the previously mentioned researches that have been found in the area. As the interviews expand the survey, the findings will be discussed together. The aim of the discussion is to illuminate and attempt to explain the actual conditions and differences in smartphone appropriation, before answering each parts of the research question. The various parts will together contribute to answer the main research question, which will be discussed in the end.

The smartphone users participating in the survey and the interviews will interchangeably be referred to as users, respondents or participants in this discussion part. The research question and its sub questions will be repeated below to give clarity:

How do users in two age groups appropriate the smartphone and adapt it to their everyday life?

a) *What are the differences between the age groups in how people acquire smartphones and learn to use them?*

b) *What are the differences between the age groups in how people utilize smartphones and mobile apps in their everyday life?*

c) *Are there any features, which people in each of the age groups feel their smartphones are missing? If yes, what are these features?*

Sub questions a), b), and c) are addressed below in part 7.1, 7.2, and 7.3, respectively. The main, overarching research question of the study as a whole is discussed in section 7.4, and is composed of the findings in part 7.1 - 7.3.

7.1 Acquisition of and introduction to the smartphone

The thesis aimed to understand various levels of appropriation of the smartphone, which included the reason for acquiring the smartphone and what expectations the users had in advance.

There was a much lower number of older smartphone users responding to the survey than younger users, which may be of a random cause, or the fact that older cellphone users has a lower raise in adopting smartphones (Smith, 2012) and are in fact in a minority. The users in the older group had also owned their smartphone in a shorter period than the younger group, and one can assume that the younger users more quickly adopted the new technology smartphone when it arrived on the market.

Similar research found that several characteristics influenced the decision to adopt an innovation, like for instance how improved an innovation is over the previous generation, the level of compatibility that an innovation has to be assimilated into an individual's life, how easily it may be experimented with, and that it is visible in the society (Rogers (1962), cited in Bødker & Christiansen, 2012).

Gelderblom, van Dyk and van Biljon (2010) also found that slightly older users used a mobile phone because it served a purpose to them. Those findings correspond to what was found in this current research, where the majority of the smartphone users in both groups acquired a smartphone because it suited their needs. Receiving the smartphone as a gift was the second largest reason the younger participants, while the older users claimed they got it in connection with work. The third largest cause for the younger users was to become more available, while the older users said they got it as a gift or was recommended by others.

A surprisingly low proportion of the younger users also acquired the smartphone because it was trendy, or "in". Whether the smartphone was trendy or not had no influence on the acquisition for the older group, which rather saw the utility of using it in private and work contexts. Bødker and

Christiansen (2012) found, on the other hand, that the users were concerned about the brand of their phone.

Bødker and Christiansen (2012) also found that the users' background and expectations affected how well they were able to use it. Experience with a smartphone in advance could have an influence on the acquiring of the smartphone. In this research, three quarters of the users in the older group contra half of the younger group said they had barely touched a smartphone before they got their own. Based on these responses, it was obvious that this research dealt with a great variety of novice and casual smartphone users. There are reasons to believe that there have been little experimenting with the technology in advance, and that not all the participants knew about the possibilities the smartphone could offer.

7.1.1 Expectations to the smartphone

The degree of expectations to the smartphone varied across the age groups, but they also shared some common denominators regarding what triggered their expectations. Other users' opinions and the attention the smartphone had received in media have had an impact on the expectations to the smartphone and reason for acquiring a smartphone. This applied for both groups.

The older users expressed especially great expectations to the interface, the features and the user-friendliness of the smartphone, which they compared to their previous cellphone. The younger users had to a lesser extent expectations to the smartphone, but desired greater flexibility for the smartphone. It emerged that the users' previous cellphone obviously was more cumbersome to use and did not give the users the flexibility they desired. Most of the participants in total said the smartphone met their expectations to a great extent.

7.1.2 Learning how to use the smartphone, and finding the apps

Three quarters of the younger users found the smartphone being very easy to get to know and learn how to use, seven of the eight users said they did not need external help or guidance when starting to use the smartphone. Half of the group also claimed they never needed external help when performing actions on their phone when it had been a while since last time. The other four said they seldom needed external help in those situations.

Seven of the eight older users also found the smartphone being very easy to get to know and learn how to use, but only half of the group said they did not need external help or guidance when

getting started with it. Six of the users said they seldom needed external help when performing rarely used actions, and only one said he never needed external help in those situations.

This can have to do with the interface not being intuitive enough, the frequency of use, or the interest in using technology.

All of the participants in the younger group learned how to use the integrated apps by "learning by doing". The thought the apps were intuitive and simple. There was no necessity for external help or reading user guides. Half of the participants in the older group needed external guidance. This correspond to the findings of Gelderblom, van Dyk and van Biljon (2010), which observed in their study that elderly users of mobile phones need training before using more than its basic functions.

This distinction in use can also contribute in revealing the level of skill of each participant or user group. Oulasvirta, Wahlström and Ericsson (2011b) claimed that casual users' learning often occurs during routine use, and that casual users learned faster than novice users. Novice users needed more help and were more uncertain when performing tasks on the smartphone.

Regarding the downloaded apps, a number of the participants in both groups supplemented with external help for learning how to use them, while a larger part of the participants in the older group learned how to use them by exploring them. This change for the older users in learning to use different types of apps may have to do with the smartphone users' built up knowledge about the smartphone and integrated apps. It may also have to do with the participants being more critical to the apps they were about to download, and were therefore more interested in knowing how they worked.

7.1.3 Organizing apps

It was evident that the younger participants were more interested in organizing the apps in a system on the smartphone, where eight contra five users admitted they had a system. The younger users were also more interested in placing the apps in folders. The reason why users within both age groups chose those systems was to easier find the most used apps on the smartphone, and to keep them available. The older participants with no system had not thought about it or had too little knowledge about the smartphone to create a system.

The younger users had a greater amount of apps on their smartphone, which provides a good reason for sorting and organizing the apps. Although there was no major difference in the amount of apps used daily, there are reasons to believe that the organization included more than the most frequently used apps. The participants also said they created the systems to separate the most used from the least used apps.

Gelderblom, van Dyk and van Biljon (2010) also found that the origin of the ownership of the phone also could have an impact on the frequency and depth of use, which was especially the case if the users had received the phone as a gift. The researchers also claimed that the age of the users contributed in determining the level of acceptance and use. Older users were not that interested in exploring the possibilities of the smartphone.

The layout of the smartphone could have an impact on why the older users did not know how to create a system. The fact that some of the older users got their smartphone in connection with work or as a gift could also influence the interest in creating a system.

7.1.4 Summary

The majority of the younger users acquired a smartphone because they expected it to suit their general needs, while the second largest reason was because they received it as a gift. This was followed by to become more available and because the smartphone was recommended. The majority of the older users claimed they got the smartphone because it suited their needs, but almost as many also said they got it in connection with work and because it was recommended.

The majority of the users within both groups found the smartphone to be very easy to get to know and learn how to use. There were however a slightly higher proportion of the older users who needed help with getting started with the smartphone, and also for performing actions on their smartphone when it had been a while since last time.

When getting to know the smartphone apps, the younger users became familiar with the integrated apps by themselves, while a larger amount had to resort to external assistance for getting to know the apps they downloaded. This differed from the older users' familiarization with apps, where half of the users needed external guidance to get to know the integrated apps, but were mostly able to get to know the downloaded apps by themselves.

Regarding getting to know smartphone functions, like organizing the apps, it emerged from the results that younger users were more interested in creating a system for their apps. The users within both groups who created a system wanted more easily access to their most used apps. An amount of the older users was not that interested or had too little knowledge to know how to do it.

7.2 Use of the smartphone and apps in several contexts and for several purposes

How the smartphone is used across the age groups and what apps and features are most used in their users' daily life will be discussed in this section, along with diurnal patterns and periodicity of apps use.

The survey results revealed that beside sending SMS, making phone calls and surfing the web, using the smartphone for organizing the daily life was a more preferred activity for the older users than the younger ones. While all of the older participants either used their smartphones daily or sometimes for organizing their everyday life, a few of the younger users also said they never used it for that purpose.

It was obvious that the older users were interested in using their smartphone for organizing their daily life, and make use of integrated apps for that purpose, while a larger proportion of the younger users also downloaded apps in addition. The distinctions in use of apps for organizing the everyday could have to do with the selection of suitable apps available on their type of smartphone, but also people's ability to utilize the smartphone's full functionality and the ability to find relevant apps.

Though there were a fairly high percentage of users who used their smartphone to organize their daily life, the younger users would rather prefer to use it for entertainment, like social networking and multimedia related activities. This corresponds with what for instance Do, Blom and Gatica-Perez (2011) found in their research, where the most used apps were SMS, Voice Call, Web and Multimedia.

Except for sending SMS and making phone calls during the day, the majority of the younger users claimed they used their smartphone to other functions and activities from about one to two

hours a day. The majority of the older users said they used other functions and apps up to one hour a day. Younger users spend more time performing activities on their smartphone other than making use of its basic functions. Those activities regards for instance surfing, social networking and use of multimedia apps, which will be further discussed below.

This indicates that older users are not that interested in spending too much of their time using other than the smartphone's general features. Sixteen of the younger users, contra two older users, also spent more than two hours a day on other activities than the general. This can have to do with boredom, easily access to the phone, much spare time during the day, adaption of certain apps into daily activities, or the ability to find and make use of apps.

The majority of the users within both groups did respond in the interviews that they used their smartphone when they were bored, and often made use of downloaded apps for that purpose. It was also revealed that a few more of the older participants said they tried to spend their time on more sensible activities than on the smartphone, when being bored. This may contribute in explaining the difference in frequency of use of other functions and apps across the groups.

In the interviews, it also became clear that there was no major difference between the age groups in the number of apps used daily per person. The amount ranged from three to twelve apps used daily and concerned both integrated and downloaded apps.

7.2.1 Use of integrated apps

The survey revealed that within use of integrated apps, both age groups made use of most apps within the Communication category, while the second most used category for the younger users was the Productivity category, and the category Media for the older users. This was a bit surprising as there are reasons to believe that younger smartphone users use their smartphone for taking pictures and listening to music in a greater extent than older users. In this case, that was disproved.

In another way, the category Productivity regards apps for calendar, alarms, viewing and creating text documents, which are widely used by for instance students who often depend on their phone as an alarm clock. It is reasonable to believe that a great amount of the respondents in the younger group are students and that they use their phone for taking small notes. Other research

has also showed that people use their phone for taking study notes (Bødker & Christiansen, 2012), which may explain why the app category was so widely used.

7.2.2 Use of downloaded apps

Regarding the amount of downloaded apps, there was a difference of about 11 downloaded apps per person, across the age groups. Younger smartphone users download more apps than older smartphone users.

From the survey, one could see that the most used downloaded app category across both age groups was the Social category. These findings are not surprising for any of the groups, as there has been a growth of social networks, which people are quick to adopt and try out. It is also known that a great amount of older people use social networks today (Duggan & Brenner, 2012).

The Communication category was more popular within the younger group than the older group, and consists of downloaded apps that offer free communication/message exchange. There are reasons to believe that younger people are better at finding and using alternatives to the integrated communication apps, though the integrated apps for communication still dominate in use for both age groups, over the use of downloaded apps for communication.

The difference in use across the age groups can be affected by the fact that most of the younger users are students, and both classmates and people in relation with their studies may be in other countries. Several of these communication services also offer group conversations, which young people, students and non-students, use in a large extent. It could also be a factor that these apps run via the Internet, and do not provide extra charges. It may also be a possibility that the younger age group is less satisfied with the integrated apps, like the phone app, message app and email app. These apps may not be sufficient for their use.

The category with second highest number of downloads within the older group was the Travel category, which came further down the list for the younger users. This may indicate that older users are good at using smartphone to a greater variety of activities than the standard operations one does with a mobile phone. This was not anticipated in advance, but is strengthened by the results of the most widely used single apps, where the older users made use of a much wider

spread of categories. It is clear that the older users utilize a wider range of app categories, although there is not a large frequency in use of the apps within each category.

Regarding the younger users' most used single apps, the survey revealed that younger users dominated in using apps within the Social category. This is consistent with previous findings, where it was apparent that the highest number of downloaded apps was in the Social category, but also that younger users use the smartphone for entertainment more than older users.

The interviews revealed that there was a variation of reasons for downloading the apps they used the most, but no cause stood out across the age groups. The most frequently mentioned reasons across the groups were that the apps were practical and needed in the everyday, and had become part of the daily routines. Some participants also said the apps eased their everyday, that they had become addicted to the apps, and that some apps had entertainment value. Some of the older participants also said they downloaded some apps for private use and some apps for professional use.

Verkasalo et al. (2010) found various reasons for what drives the use of different apps, and that the users could either have hedonic or utilitarian motives. This means that the users either download apps for luxury purposes, to use apps for pleasure and enjoyment, or they could download apps for more practical reasons, based on their needs. This corresponds to a large extent to the motives of all the users within in this current research.

7.2.3 Diurnal pattern for use of integrated and downloaded apps

Falaki et al. (2010) and Böhmer et al. (2011) saw patterns with regard to use of apps through the day. Similar to their research, this current research extracted that apps within the Communication category were used through the whole day by all of the younger users and some of the older users. The younger users also claimed they used most of their integrated app through the whole day, but they preferred to use apps within the Productivity category in the morning and the apps within the Media and Browser categories in the afternoon and evening. Half of the older users also said they used their integrated apps through the whole day, while the others used them mostly in their spare time or at work.

Regarding the downloaded apps, most of the younger users claimed to use the apps through the entire day, which especially concerned apps within the Social category. Some app categories

were also linked to certain times of day, like the Music&Audio apps which were mostly used in the morning and evening, while Games and Finance apps were used in the afternoon and evening. Xu et al. (2011) also found Social category apps to be used during the whole day, while Böhmer et al. (2012) found apps within the Social category to be most used in the evening.

The older users also claimed they used their downloaded apps during the whole day, but mostly outside the working hours. Apps within the Social category, the Music&Audio category and the Health&Fitness category, were preferably used in the afternoon and evening. It seemed like younger users to a greater extent than the older users used their apps in general through the whole day, regardless of situations and other activities.

Since most of the younger group proved to be students, it is easier for them to make use of their smartphone in between the studies. Students also have more spare time through the day, with the opportunity to perform other actions and activities. Falaki et al. (2010) also found that the popularity of app categories varies between students and workers. The frequency of use also seemed to deal with habits, and more specifically "checking habits", which will be discussed later.

Falaki et al. (2010) and Böhmer et al. (2011) also found in their researches that app popularity is not stable throughout the day, and has a diurnal pattern. Böhmer et al. (2011) saw that integrated apps were more frequently used throughout the day, compared to some downloaded apps, such as games.

This current research also found places and social context as variables for use, where home, at school, at work and while traveling contributed in determining use of apps. Do, Blom and Gatica-Perez (2011) also found that at home and at work were two of the most popular places of app use. Travel situations also determined to a large extent the use of certain apps, which where weather apps, route information for public transportation, and maps. Xu et al. (2011) also found that a considerable number of popular apps were limited to certain geographical areas, like weather and news apps.

7.2.4 Periodically use of apps

It was clear that the participants in both groups used certain apps periodically, which were not part of their daily routines, but were occasionally used. These apps were used in periods related

to their hobbies, interests and lifestyle. Bødker and Christiansen (2012) also found reasons for that, saying that people make the smartphone and its associated apps their own to the extent that they use the phone as a port to exercising personal interests.

The participants in the younger group were more likely to get tired of the apps, especially if the users were not "in that period" for certain reasons. This supported the research of Bødker and Christiansen (2012), who also found in their research that people used their smartphone for a limited time period, where the users had interest in a particular activity. The users in the older group were more likely to continue using those apps for periods, and could even increase their use. Bødker and Christiansen (2012) also said the use of certain apps could increase along with the development of new routines. Some of the older users especially mentioned apps related to traveling, like maps, music apps, certain communication apps, weather apps, camera and some game apps.

One can assume from this that younger users more easily get tired of apps, perhaps because they use them more frequently in periods. Right after downloading apps, users find them interesting and use them effectively, but then the usage can decrease over time (Bødker & Christiansen, 2012).

7.2.5 Purchase of apps

There were found several reasons for downloading and purchasing apps in general, and a variety in frequency of downloading apps across the age groups. The younger users downloaded free apps and purchased apps a bit more often than the older users, but also had a higher rate of not paying for apps. The users seemed very critical and considered carefully the need for the apps before they purchased them. The apps really had to be useful, and the users seemed reluctant to pay for apps they did not know how was working. The older participants seemed to have a more relaxed attitude towards purchasing of apps, but the apps had to be useful and needed.

There are reasons to believe that the older users were employed and were therefore in a different financial situation than younger users. The older users may therefore find it easier to pay for apps, but may also be better at reading about and investigate apps in advance, which emerged in the interviews.

Most of the participants in the younger group found the apps they wanted to download in the app stores and were also recommended by friends and other users. The participants in the older group made use of several more sources which recommended and rated apps, and therefore had a broader market of app evaluations than the younger users. There are reasons to believe that the older users are better at probing and evaluating apps and the app market before they choose to download apps, which give them more knowledge about the quality of the apps in advance.

Most of the older users also kept a greater number of their downloaded apps than the younger users did. This may again be a consequence of the fact that the older users had wider knowledge about the apps that existed before downloading them. The age groups did not differ in reasons for deleting apps they had downloaded, and the reasons mostly involved that the apps were not as expected or were not being used.

7.2.6 Habits, frequency in use and new areas of use

A distinctive feature of the smartphone is the easy access to the Internet, whether the browser is used for web search or surfing, or certain apps which are dependent of Internet connection are used. Previous research has also found that mobile devices are habit forming, and with easy access to the Internet and freedom to download apps, the users may develop new habits related to Internet use (Oulasvirta et al., 2011a). The interviews revealed the importance of having access to the Internet via the smartphone, where all the participants except one in the older group found it very important.

The context of use seemed to have an impact on and determined how the participants connected to the Internet, but not necessarily for what purpose the Internet was used. The findings revealed that it did not matter whether the participants connected to the Internet via Wi-Fi or cellular network, but that economic reasons and network speed determined, if they had the opportunity to use both.

This shows that the majority of the users to a large extent make use of the opportunity the smartphone offers regarding use of Internet on the go. This easily access to Internet supports Bødker and Christiansen's (2012) research, which is saying that people develop new routines for using the Internet at home and being on the move.

The smartphone users found themselves using the smartphone for other purposes than intended when they acquired the smartphone. Users within both groups mentioned apps, functions, and smartphone possibilities they did not know existed. The younger users mentioned for instance some productivity apps that were more frequently used than assumed, while some of the older users said they more frequently used apps within the Music&Audio category and apps for entertainment. A few users in each group also said they used the smartphone for purposes that were intended.

This corresponds to the findings of what the users mainly use their smartphone for, which was entertainment for the younger users, and the organization of everyday life for the older users.

Slightly more than half of the younger smartphone users also claimed in the survey that the smartphone distracted them in their daily life, while a clear majority of the older users said it did not. The younger users who felt distracted mentioned that notifications and reminders from games, social networks and other apps were reasons for being distracted. This can be explained by looking at the distinction between the amounts of apps the participants had on their phone. Although not all of the apps are used, there are many of them that provide notifications and reminders to the user. The more apps, the more interference. The younger users also admitted spending more time using their smartphone than the older users, which can be a distracting factor itself.

A great portion of the older users also claimed they acquired their smartphone for using it in connection with work and some said they used integrated apps within their working hours. This may indicate that older users are better at separating use and apps related to work and apps for entertainment. The younger users, consisting of a large amount of students may, as earlier mentioned, have more spare time during the day and opportunities and interest in using and checking their smartphone. The older users do not seem to have this need for checking their phone constantly.

Constantly checking the phone regularly to see if there was anything new may be another reasons for being distracted. Oulasvirta et al. (2011a) saw in their research that mobile devices were habit-forming, and helped users avoid boredom and cope with a lack of stimuli in everyday situations.

Oulasvirta et al. (2011a) extracted the condition "checking habit" from their findings, noticing that the users were triggered by cues outside the device and had to check the smartphone's standby screen or the content of certain apps. The survey results revealed that the younger users felt the need to constantly check if there was something new, and if they got a message or a notification, their work stopped. Context also seemed to affect and trigger the habits of use, both in this current research and in the research of Oulasvirta et al. (2011a), like in lectures, reading situations, while traveling and performing other everyday activities.

Despite the frequency of use of the smartphone and the downloading of several of apps, most of the younger participants felt they did not spend too much time using the smartphone in their everyday. The users in this current research expressed annoyance over being disturbed all the time by the phone, but it did not seem to be a big problem. This is confirmed by saying they do not spend too much time using it. Only one of the older participants felt she spent too much time using her smartphone, which also reinforces the assumptions about the older users being better at separating and minimizing their use.

7.2.7 Summary

Disregarding the use of general features, the younger users are more concerned about using their smartphone for entertainment, which they spend twice as much time utilizing than the older users. Older users prefer using the smartphone for organizing their daily life, and would rather use the integrated apps for that purpose than downloading new apps. There was however no great difference across the age groups in the amount of most frequently used apps during the everyday, which concerned use of both integrated and downloaded apps.

When taking a closer look at the use of integrated and downloaded apps, the most used app categories within both age groups were the Communication category for integrated apps, and the Social category for downloaded apps. It was revealed that the older users make use of a wider spread of app categories in their everyday, in contrast to the younger users who had a higher frequency of use of communication and entertainment apps.

There were no remarkable differences in the reasons for downloading apps, across the age groups. Users within the groups had both hedonic and utilitarian motives, while some of the older users specified that they also differed between downloading apps for private and professional use.

Younger users also downloaded and purchased apps more frequently than older users. The older users had a more relaxed attitude towards purchasing apps, which could have to do with them using a greater variety of sources to get to know and learn about the apps in advance.

Both younger and older users said they used integrated and downloaded apps through the entire day, but a greater portion of older users used their downloaded apps mostly outside the working hours. It was hence seen a diurnal pattern for app use across the groups.

Besides from using apps within the Communication and Social categories through the entire day, the younger users said they used apps within the Productivity category in the morning, Music&Audio apps in the morning and evening, and apps within the Media, Browser, Games and Finance categories in the afternoon and evening. The older users preferred to use apps within the Social, Music&Audio and Health&Fitness categories in the afternoon and evening.

Both the younger and older users also used apps in periods which were related to their hobbies, interests and lifestyle. The main difference in use between the groups was that the younger users were more likely to get tired of the apps by the time, while older users were more likely to continue using those apps for the periods, and could even increase their use.

Fifteen of the sixteen smartphone users found access to the Internet via their smartphone very important, while one of the older users stood out, claiming that it was not important. None of the groups differed greatly in the choice of using cellular network or Wi-Fi, but the majority preferred using Wi-Fi due to network speed and economic reasons.

Several users within each group admitted they used the smartphone for other purposes than first intended. Younger users used more productivity apps, while older users used more apps for multimedia and entertainment.

There was a clear distinction between the groups in whether the users felt distracted by the smartphone in their everyday life. More than half of the younger users claimed the smartphone disturbed them, contra the majority of the older users who claimed it did not. The younger users do have more apps on their phone, with the potential to disturb them, and they spend more time during the day using their smartphone and apps. They also have a greater urge to check their phone regularly.

7.3 The smartphone as an everyday tool

The smartphone has found its niche within several areas in the users' everyday life. It has given expanded opportunities in terms of ways to communicate, to socialize, to streamline everyday life and to entertain. There are however certain features the users feel are missing, and areas in the everyday where the smartphone becomes insufficient.

7.3.1 Lack of functionalities and properties

Both younger and older users had clear opinions on what they wished the smartphone should offer or contain in the future. It was obviously more responses from younger users, but there was still no big difference in the content of proposals from both groups.

Users within both groups mentioned certain aspects of the user interface and the design of the smartphone, like larger screen and better resolution. In advance, there were reasons to believe that the older users put more emphasis on such characteristics than the younger users. Previous research has found that the size of the buttons and the screen may affect the adoption and use of touch screen interfaces, especially for older users. Like Hardy and Rukzio (2008) who found in their research that limited screen size and resolution can be problematic for the usage of several apps.

Improved battery capacity, the phone being waterproof, the phone being smaller in design, and other technological features were also were repeated as missing features across the groups. This shows that both younger and older users care for both the design and technological features.

The younger smartphone users were also more concerned about features which could improve their student life and help organizing their everyday in a better way. This may contribute in explaining why there currently were a lower percentage of younger users compared to older users who said they used their smartphone for organizing their daily life. It may also explain why it was a larger number younger than older users who downloaded apps in conjunction with organizing everyday life. The integrated apps are not sufficient enough for the younger users, and these proposals indicate that there is a lack of suitable apps in the app stores too.

Some of the older users wished to make more out of the screensaver and the front screen, for instance with a feature for placing "To do"-tasks to the screensaver, or a feature which automatically put most used apps on the front page.

Users within both groups wanted more seamless integration with other technological gadgets, and expressed that their smartphone was inflexible and could offer little freedom of choice in integration with other devices. The younger users also wished for more flexibility in customization of features. Many of the suggestions were quite technical oriented, indicating that the users in both age groups desired a device which were more similar to the PC and could offer more of the same features than the smartphone already does today.

Some of the older users wished for a more universal design for the smartphone, which were more including for various types of users. This regarded people who were visually impaired or had a disability. It is conceivable that these users both knew people who would have benefited from it, or that the users thought about how it would be for themselves using the smartphone with reduced senses.

The survey also revealed that there were situations where the smartphone was insufficient, which there was a need for PC or another tool as substitute or supplement. This will be highlighted below.

7.3.2 The smartphone versus other tools

The survey results revealed that the younger users had a slightly higher proportion of utilizing the PC to a lesser extent for web search than the older users. More than half of the older user still preferred using the PC for web search. Previous research has shown that older users of touch screens preferred bigger buttons when they used touch screen (Jin, Plocher & Kiff, 2007) and the screen size also had an impact of the use.

It has also been found that the PC is preferred in many areas, especially in the writing situations (Bødker & Christiansen, 2012). This can contribute in explaining why the majority of the older respondents still prefer to use PC for search.

Despite the constantly improvement of screen displays and design features, previous research has found that users of devices with touch screens have difficulties viewing and interacting with a

large amount of information at once. Bødker and Christiansen (2012) found in their research that the PC was preferred in several cases, especially in use of email.

For several of the users within both groups, word processing, use of email and mobile banking on the smartphone were cumbersome actions. The younger users mentioned especially when performing more advanced actions outside the standard procedures the apps and features could offer, the smartphone became insufficient. The users could perform simple tasks when using mobile banking, but handled more complex actions on the PC. The younger users said they felt they had better control and overview, and were writing faster by using a PC with button keyboard.

Users within both age groups mentioned the smartphone's limited screen size and small keyboard, and emphasized that the limitations made the users afraid of pressing the wrong buttons and making mistakes. The older users also said they preferred using their PC or Mac for more advanced actions, and that the smartphone did not serve as a working tool and was always a poorer option if the PC was available.

The screen size was also too limited when it came to watching videos and TV-series, where younger users preferred using an iPad or their PC instead. Despite the smartphone's layout and interface, users within both groups were also not entirely satisfied with the quality of for instance the camera, and preferred using an external camera when taking pictures of more important motives.

It was not only the apps which were insufficient when consuming large amounts of information, but the mobile versions of websites often lacked information and features which the users could find on the original websites on their PC. As previously mentioned, most of the users said they had high expectations for the smartphone, which could have affected their dissatisfaction with the phone not fulfilling all their areas of use.

In another way, when comparing with their previous cellphone, the users also said the smartphone did meet their expectations to a great extent. There are therefore reasons to believe that these lacks are not major concerns in the users' everyday life. Despite lacks in design and information providing, this current research and previous research also revealed that several users

of the smartphone were satisfied with it the way it was, and that it was good enough for purposes when on the go.

7.3.3 Summary

There were found certain areas with the smartphone which the users were not satisfied with or would want to have improved. Users within both age groups emphasized the design and quality of the smartphone today, and wished it to be more robust, both in terms of inner features like the battery capacity, and external characteristics like the surface of the smartphone. Users within both age groups also mentioned that the touch screen could have been bigger.

Regarding the smartphone's functions, younger users were missing features which could ease their student life and help them in organizing their everyday life, like better solutions for taking notes, integrated projector and payment solutions. Users from both groups also wished the smartphone could offer voice control. Some of the older users wanted easier access to items on the front screen or screensaver.

Some respondents came up with extended features the smartphone could offer, where some were on par with the properties of a computer, like USB port, Java, Flash, and a replacement for the Bluetooth. Users across both age groups also desired the possibility for more seamless integration with other technological gadgets. Some of the older users also suggested a more universal design, customized people who were visually impaired or had a disability.

There were also found situations where the smartphone was insufficient and had to either be replaced or used in conjunction with other technological tools. This was especially the case in situations with word processing, use of email and use of mobile banking, where users within both age groups preferred to use a PC or a Mac instead. The younger users said the smartphone became insufficient when performing more advanced actions within these mentioned situations, and the older users added that the smartphone always was a poorer option if they had the PC available.

The problem was located in the size of the screen and the visual keyboard, which made it easier to make mistakes. Users within both age group preferred their PC or Mac for more complex actions or when handling advanced word processing, and that such actions were easier and safer to perform on a larger screen with button keyboard.

7.4 Smartphone appropriation and adaptation in the everyday life

This part of the discussion will summarize the discussion in part 7.1 - 7.3 in order to respond to the overarching research question.

There were found both equalities and differences across the age groups in the appropriation and use of the smartphone and its features. More specifically, they illuminated patterns of use, frequency of use, adoption of the phone to various daily contexts, habits and satisfaction with the smartphone features.

Users within both groups differed in the main reasons for acquiring the smartphone, but shared the desire that the smartphone would satisfy their needs. The users' background and reasons for getting a smartphone can affect how and to what extent it will be adapted into people's everyday life. These factors may also have influenced several aspects of the way they used it.

The interviews revealed that there were found inequalities internally and across the groups in how the user learned to use and how they actually used the smartphone features and various types of apps. All of the younger users got to know the integrated apps by themselves, while half the older users needed external guidance. When getting to know the downloaded apps, an amount of the younger users got external guidance, while the older users mostly got to know them by themselves.

This could be explained by the fact that older users are more critical to the apps they download and make use of several more sources which recommended and rated apps. In this way, they are able to understand the apps' purpose and area of use.

Both the younger and the older users had a high frequency in use of the basic apps and features of the smartphone. There were not large differences in the type of app categories used, but there were rather differences in the frequency of use of the categories. Regarding integrated apps, the older users were more concerned about using media apps, while the younger users preferred productivity apps. Older users also downloaded more traveling apps, while the younger users downloaded more apps regarding communication.

The users within both age groups did not differ in reasons for downloading apps, which were built on hedonic and utilitarian motives, but the older users were more concerned about

downloading apps for various areas of use, like private and work contexts. Although users within both age groups made use of apps through the entire day, some older users specified that most of the downloaded apps were used outside their working hours and some of the integrated apps within their working hours. It also emerged that there were different usage patterns across the age groups, regarding diurnal use of app categories. Some categories were preferred using in the morning, and some in the afternoon and evening.

Users within both age groups also claimed they used certain apps in periods which were related to certain hobbies and interests. When using the apps in that period, younger users were more likely to get tired of using the apps, while the older users were more likely to continue using the apps. This can have to do with development of new routines during that period, which demands more intensive or frequent use of the apps. The younger users also found themselves using apps for productivity more than intended, and the older users made use of more entertainment apps than intended.

The younger users also downloaded free apps and apps that cost money more often than the older users, but the older users were more likely to pay for apps. Younger users were often looking for a free option. This can again be related to the critical evaluation of apps in advance and the use of sources for finding and learning about apps, but also the economic situation of the users. The motives behind the downloading of the apps were quite similar across the groups, and were either hedonic or utilitarian. Being needed and would ease their everyday life, along with having entertainment value, were some of the emphasized reasons.

All of the users found access to the Internet via the smartphone very important, except from one of the older users. All of the users connected to the Internet via Wi-Fi or their cellular network, but that Wi-Fi was preferred due to economic reasons and network speed. The findings showed that all of the users appreciated the ability to use Internet on the go and the flexibility it provided.

The access to the Internet and a myriad of apps from anywhere did not always seem to provide positive effects, as more than half of the users claimed in the survey that it distracted them in their daily life. This seemed to have to do with notifications and reminder from several apps, but also the desire of checking their smartphone constantly. The older users seemed to have a more

relaxed relationship with their smartphone, which were discussed earlier in that they more easily separated private use and work-related use.

It seemed like the smartphone had a high frequency of use throughout the everyday life of the users, and especially for younger users. It though emerged from the studies that users within both age groups found areas where the phone was insufficient, or features the phone was missing. Regarding the areas of use, like writing situations or performing more complex actions, PC, Mac or tablets were preferred to use instead. This had to do with the limited screen size and the visual keyboard. Users within both age groups were concerned about these limitations.

Users within both groups also mentioned the quality of the smartphone camera, which was replaced with an external camera for use in important situations. The younger users also emphasized they stressed that the screen was a limitation to watch video and TV-series.

Regarding missing features, users within both age groups mentioned deficiencies with both the interface and design of the smartphone, and how improved features, additional features and extended features would make their daily life easier and more productive. Seamless integration with other tools was emphasized across the groups. The younger users did especially mention features related to study situations, and the older users mentioned features customized for people who were visually impaired or had disabilities.

7.5 Validity of the findings

This part will discuss the deliberated and unintended limitations of the study, which can have an effect on the validity and reliability of the findings. The reliability describes how trustworthy the material is, and validity is about the how valid the material is in relation to answering the research question (Lazar, Feng & Hochheiser, 2010).

There were early in the process provided restrictions and limitations to the area of research, regarding groups of users, amount of interviewees, survey and interview questions, smartphone platforms and research methods. These limitations were inserted mainly due to the time available. The area of research is however wide and provides interesting findings relevant for various actors and other research fields. Extensions of these limitations may provide a deeper understanding of

the appropriation of smartphone technology across several more users and age groups, and smartphone models.

By extending the survey questions, certain aspects within appropriation of smartphones could have gained more attention and resulted in a different direction in the thesis, which also would have affected the interview questions and clarification of the topic. By applying other methods for research, it could have led to different approaches to get deeper into the way of appropriating smartphones and maybe other findings.

Some unintentional limitations were also carried out, relative to the number of older smartphone users in the survey, and the selection of participants for the interviews. It was much easier to reach the younger users, which accounted for most of the survey respondents. Within the group of younger respondents it was, as previously mentioned, a few responses which were unserious and had misunderstood the questions in such a degree that their responses had no effect on the research and had to be discarded. This was luckily not the case for the group of older users, where all the responses could be used.

The number of interviewees landed on eight from each age group, because no more respondents wanted to participate in the interviews. Eight was however an appropriate number of interviewees, regarding the amount of questions created for the interviews and the time available.

The small amount of older users participating in the survey could affect the validity of the thesis, where it could contribute in not letting it respond properly to the research question. Based on the reliability of their responses to the survey, all the responses could be used for the further analysis. The small amount of users signing up for the interviews could also affect the validity of the thesis. One was dependent on that everyone who signed up was considered reliable in the analysis of their responses to the survey.

The background letter, the survey question and the interview guide are added as appendixes to this thesis to enhance the validity and reliability of the research. All the data from the survey is presented in frequency tables which are included in the text. Some of the additional details and information extracted from the survey are also included in the text, while the total overview of user quotations is added as appendix. This is also done to enhance the validity and reliability of the research. The responses from the interviews are presented in the text in a way that does not

make it necessary to include them as attachments, without impairing the validity and reliability of the research.

8.0 Conclusion

This thesis has aimed to understand how users in two age groups appropriate the smartphone and adapt it to their everyday life. In attempts to achieve this, three issues have been chosen for further examination. The first was the users' background and purpose for acquiring the smartphone. The second was the users' actual use of the smartphone and apps in their everyday life. The third was whether or not there were features that were insufficient or which the users felt the smartphone was missing. It was conducted quantitative and qualitative methods in terms of a survey with questionnaire, and single interviews. The survey was conducted to gain an overview and mapping of users within two age group's appropriation of the smartphone. The interview had the purpose to dig deeper into the users' appropriation of the smartphone, and was an expansion of the survey. This approach has made it possible for smartphone users to reflect on their attitudes toward smartphone adoption, and to evaluate their own use of the smartphone. It has also led to an opportunity to understand how new technology is integrated into users' everyday practices. Suggestions for new areas of research have also emerged through the review and analysis of the findings.

8.1 Main findings

The thesis emphasizes how the smartphone is integrated into the daily lives of users within various age groups and attempts to understand the appropriation of smartphone technology across the groups. There were found various levels and ways of appropriating the smartphone across the age groups, but not major or very surprising differences.

Users within both groups acquired the smartphone because they thought it would suit their needs. A greater proportion of the older users, compared to the younger ones, also got it in connection with work. Other people's reviews and media's recommendations affected both the choice of smartphone and apps for downloading within both age groups. Older users were however more concerned about using multiple sources which recommended and rated apps before downloading or purchasing them.

Except from using the smartphone's basic apps and features, younger users preferred using integrated productivity apps and downloaded apps for communication. Older users preferred using integrated media apps and downloaded traveling apps. Younger users download more apps than older users, and were more concerned about organizing them on their phone. The older users were however more likely to pay for apps, in contrast to younger users who needed very good reasons. Both younger and older users of smartphones had hedonic or utilitarian motives when downloading new apps.

Outside work, the majority of the younger users make use of their smartphone throughout the whole day, regardless of situation and activity. Older users, who were all employees, also used the smartphone throughout the whole day, but preferred to use most downloaded apps outside their working hours. Younger users are more likely to get distracted by the smartphone apps in their everyday life, in contrast to the older users who do not have such a large amount of apps on the phone, and to a greater extent separate between private and work-related smartphone use.

Access to the Internet via the smartphone was very important for all of the younger users in the interviews, and for most of the older users. Use of Wi-Fi and cellular network was also used interchangeably across the age groups. Users within both age groups found their smartphone insufficient in daily situations, and would rather prefer to use a computer or tablet. Both age groups found the smartphone screen and keyboard being too small and cumbersome when performing complex actions on apps or when writing large amounts of text.

Users within both age groups were not totally satisfied with the interface and design of the phone, and felt that the smartphones were lacking features for simplify their everyday life. Users within both groups also wanted more seamless integration with other tools, as well as features which were on par with the PC in technical features and capabilities.

8.2 Future work

There are several directions this thesis could have taken and themes that could have gained more focus, which have emerged through transcription of the survey and interview data. The thesis brought out many interesting topics and research areas which further research could dig deeper into. This research looked at how all these topics together amount the level of appropriation of the smartphone without going deeper into individual themes.

There are many aspects that must be considered to understand the appropriation of smartphones, which this thesis does not entirely cover. It could therefore be relevant with expanded research for better understanding of the topic. The analysis could have taken a different course, and for instance focusing on more concrete aspects of smartphone appropriation or other issues regarding technology's role in people's everyday life. It could also have been used different approaches for collecting data, which could have led to other angles, results or conclusions.

An important reason for further research in this area is due to users, developers, and other companies who affect and are affected by the use of the smartphone. This may include individuals and companies that create apps for smartphones and are interested in knowing how and why users are using apps.

From this research, it emerged that a great amount of the users found the access to Internet on their smartphone very important. In this context it may be important to examine the actual use of the Internet, to a greater extent than the thesis has done. Several of the smartphone apps are depended on access to the Internet. An issue to examine could be how the easily access to Internet has affected and possibly increased use of certain services, like for instance social networking.

Another topic which would be interesting performing further research on is the frequency of use of apps in relation to the web browser on the smartphone. This applies to the use of services where there exist both a website and an app. One can also examine whether the mobile version of a website is preferred over the regular website through the smartphone browser, and what makes people choose one over the other.

It would also be interesting to look deeper at the use of integrated and downloaded apps, which ones are mostly used during the daily life and what makes some downloaded apps preferred over the integrated apps and other downloaded apps.

Another topic is the use of apps in situations which the users in advance had not thought they were going to use them in. It would be interesting to know more about what situations this was, and not just the apps that were used. How have these apps been used, and how have they possibly simplified these situations?

Related research has revealed that situations and emotional states trigger the users to check their smartphone. This research also revealed that a great amount of the younger users felt the need to check the phone in various contexts. It could therefore be interesting to study what these situations and conditions that trigger this habit are, why they trigger this habit, and why the older users did not feel the same urge to check the phone at all hours.

The last proposal for further research is to include the socioeconomic status of the users, which would require more time and perhaps a narrowing of the topic. This could contribute in understanding the need for acquiring a smartphone, the choice of downloading and use of certain apps, as well as the expectations to the smartphone itself and in relation to other technological tools.

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10.0 Appendixes

10.1 Appendix 1 – Background letter

Bruk av smarttelefonar

Eg heiter Malin D. Øvrebø og studerer Informasjonsvitskap ved Universitetet i Bergen. I samband med masteroppgåva mi utfører eg ei spørjeundersøking for å kartleggje bruk av smarttelefoner og appar. Målet er å undersøke kva ulikheiter som finst innan bruk av smarttelefonen i kvardagen til brukarar i aldersgruppene 20-30 år og 46-56 år. Dersom DU er mellom 20-30 år eller 46-56 år og eig ein smarttelefon, er det fint om du vil ta deg litt tid til å svare på undersøkinga. Det er kun 17 spørsmål, og berekna tid ein bruker på spørsmåla er ca 6 minutt.

Du som deltakar på undersøkinga er anonym, og innhenta data frå undersøkinga vil berre bli brukt i samanheng med denne forskingsoppgåva.

Etter at undersøkinga er gjennomført vil eg intervjue 16 smarttelefonbrukarar for å gå djupare inn på bruken av smarttelefonar og appar. Dersom du kan vere interessert i å delta på dette, ver venleg og kryss av på dette nedst i undersøkinga og skriv namn og telefonnummer så eg kan kontakte deg om det skal bli nødvendig. Deltakarane i intervjua er også anonyme, og data som blir henta vil kun bli brukt i samanheng med denne forskingsoppgåva.

Dersom det skulle vere uklart for nokon kva som definerer ein smarttelefon:

«Ein smarttelefon er ein avansert mobiltelefon i grenselandet mellom mobiltelefon og datamaskin. Brukaren har sjølv moglegheit til å installere avanserte program og applikasjonar på telefonen. Smarttelefonen har berøringsskjerm eller eit QWERTY-tastatur, og ein kan bruke den til langt meir enn telefonsamtaler og SMS.» (Definisjon frå http://www.netcom.no)

Døme på smarttelefonar:

QWERTY-tastatur

10.2 Appendix 2 – Survey questions

1. Gender:
2. Age:
3. Type of smartphone:
4. How long have you owned a smartphone?
   - ☐ Less than 1 year
   - ☐ 1-2 years
   - ☐ 2-3 years
   - ☐ 3-4 years
   - ☐ 4-5 years
   - Other:

5. Why did you buy the smartphone? (You can choose several options)
   - ☐ It was a gift
   - ☐ It is trendy
   - ☐ In connection with work
   - ☐ To become more available
   - ☐ Was recommended
   - ☐ It is well suited to my needs
   - ☐ Other:

6. For what purpose(s) do you use your smartphone? (You can choose several options)
   - ☐ Games
   - ☐ Surfing
   - ☐ SMS/phone calls
   - ☐ Social networks
   - ☐ Listening to music/watching videos
   - ☐ Organizing daily life (email, notes…)
   - ☐ Using other downloaded apps
   - ☐ Other:

7. Do you utilize PC in lesser extent to conduct searches on the Internet when you have a smartphone?
   - ☐ Yes
   - ☐ No

8. How many downloaded apps do you have on your smartphone?

9. What are your five most used *integrated* apps (apps that came with your phone)?

10. What are your five most used *downloaded* apps?

11. To what extent do you use your smartphone to organize your daily life (notes, reminder, calendar, alarm etc.)?
   ☐ Daily
   ☐ Sometimes
   ☐ Never

12. What *integrated* apps do you use in connection with organizing your everyday life?

13. What *downloaded* apps do you use in connection with organizing of your everyday life?

14. What do you think the smartphone is missing, which you want it to have/contain in the future (functions, design, etc.)?

15. How many hours a day do you use your smartphone to activities other than making calls and sending SMS/IM (IM = instant messaging, like Skype, WhatsApp, MSN…)?
   ☐ 0-1
   ☐ 1-2
   ☐ 2-3
   ☐ 3-4
   ☐ Other:

16. Do you get distracted by the smartphone in your everyday life?
   ☐ Yes
   ☐ No
   If yes: In what way?

17. Do you think you use too much time on your smartphone in your everyday life?
   ☐ Yes
   ☐ No

10.3 Appendix 3 – Interview guide

1. How much experience have you had with your smartphone before you got your own?
    a. Much experience
    b. Have tried other's smartphone
    c. Barely touched one
    d. Other:

Use of apps
2. Approximately how many apps do you use in your everyday life?

3 How often do you download a new (free) app?

4 How often do you buy an app?
    a. What does it take for you to pay for an app?

5. How do you get to know about the apps, and how you find them?

6. How many of the apps you download do you keep, and how many are deleted within a short time?
    a. Why do you delete the apps?

7. You answered questionnaires that your five most frequently used downloaded apps were.....................
    a. Why did you download those apps? What lay behind?
    b. What time of the day do you use these apps?

8. You also said that the five most used integrated apps were ....
    c. What time of the day do you use these apps?

9. How did you get to know and learn about the integrated apps?

10. How do you get to know and learn about the apps you download?

11. Are there apps on your smartphone you use/have been using a lot in a given period?
    a. Did the use of this app/these apps decrease?
    b. If yes, why?

12. Are there apps you use only in certain contexts in everyday life (school, work, vacation)?
    a. If yes: What apps?

Organization
13. How do you organize/group the apps on your smartphone?
    a. Do you have a system?
    b. Why?

14. On iOS phones, one can attach apps at the bottom of the menu bar, which act as shortcuts on the phone. The phone comes with a fixed set of selected shortcuts. Have you chosen to change the setup and attach the other apps than those that came with the phone?
      a. Why/why not?

Usability
15. How simple did you think the smartphone was to get to know when you got it?
      a. Very simple
      b. Quite simple
      c. Not simple. Why?

16. Did you need help or guidance from others to get started with your smartphone?
      a. Yes
      b. No

17. How long do you think it took before you understood and learned how to use your smartphone?

18. What expectations did you have for your phone when you got it (In terms of user friendliness, design, to meet you requirements, etc.)?

19. To what extent did your smartphone meet your expectations?
      a. To a great extent
      b. To a proper degree
      c. To a small extent

20. How often do you ask for help from others to perform actions on your phone, when it has been a while since you performed these actions yourself (use of functions, apps etc.)?
      a. All the time
      b. Often
      c. Occasionally
      d. Seldom
      e. Never

21. When you download new apps, what determines how long time you spend learning them?

22. How easy do you think your smartphone is to learn, to use, to remember functions and to not make mistakes? And how user-friendly is the design?
      a. Very easy
      b. Quite easy
      c. Not easy

Internet
23. How important is it for you to have access to the Internet via your smartphone?
      a. Very important
      b Quite important
      c. Not important.

24. What do you use to connect to the Internet? (Wi-Fi, cellular network, other ..)

25. What do you use the Internet on your smartphone for?
    a. Surfing
    b. Social networks
    c. Reading news
    d. Other:

Smartphone vs. other tools
26. Are there functions/apps on you smartphone that are insufficient in your everyday life, where you have to use external tools/aids as a substitute?
    a. If yes: In what situations?
    b. What functions/apps are insufficient?
    c. What external tools do you use as a substitute?

Frequency of use and new areas of use

27. Are there situations where you use your smartphone as you had not believed you were going to use it, when you got it?

28. Are there functions or apps you would like to have, which you cannot find in the app store?
    a. If yes, what type of apps/functions?

29. Is your smartphone something you use when you are bored?
    a. If yes: What do you do/what apps do you use when you are bored?

10.4 Appendix 4 - "Other", and additional information from survey

Q5 - Why did you acquire the smartphone?

> *YF1:"The last phone was broken.*"
> *YF2: "I inherited my dad's old work phone."*

> *YM1: "Good price."*
> *YM2: "I'm a hobby app-creator."*
> *YM3: "Needed a new phone."*
> *YM4: "Internet is always available."*
> *YM5: "Because of functions that don't exist on traditional phones."*
> *YM6: "Borrowing it from HTC".*

> *OF1: "Inherited the phone from my 18years old daughter."*

> *OM1: "The old one was outdated, and I wanted access to new apps."*
> *OM2: "It was exciting to try new technology."*

Q6 - For what purpose(s) do you use your smartphone?

> YM1: *"Maps."*
> YM2: *"Taking pictures and videos. Flashlight."*
> YM3: *"Flashlight, alarm, camera, bus routes, calculator."*
> YM4: *"Ebook."*

Q10 - What are your most used downloaded apps?

> *YF1:"I have not downloaded any apps."*
> *YF2: "Games"*

> *YM1: "Other web browsers."*
> *YM2: "Various."*
> *YM3: "Games."*
> *YM4: "None."*

OF1: "Various games."

OM1: "I downloaded "Button Savior" because of broken buttons".

Q 14 - What do you think the smartphone is missing, which you want it to have/contain in the future (functions, design, etc.)?

YF1:"Lighter, stronger (not to be broken so fast)."

YF2: "Better music sound."

YF3: "Better battery-life."

YF4: "It should not be made of glass."

YF5: "Better battery."

YF6: "I wish one could change "My Words" that are being saved when I write SMS. If I type a word incorrectly, it gets stored and will come up as suggestions later. I also miss integrated weekly numbers in the calendar."

YM1: "Longer battery-life, but the lithium batteries can't get better. It's more the processors, screen and OS to use less power. The phones today are smarter, faster and easier to use than some computers - meaning that we have "peaked" over the evolution of technology."

YM2: "Larger screen, better resolution, more apps to download."

YM3: "Longer battery-life. Higher speed."

YM4: "Thinner, lighter, more shock proof and waterproof."

YM5: "More waterproof."

YM6: "Increased processing power and better video/audio integration."

YM7: "More intuitive OS."

YM8: "Improved safety. Less bullshit regards to ads, poor apps, apps that kill battery life, etc. Simply more content for less hassle."

YM9: "Physical keyboard (touch screen and gloves are not a great combo, and custom-made gloves are ugly and not very warm)."

YM10: "Appropriate camera, not the automated crap we have today."

YM11: "Better music player."

OF1: "Better camera zooms."

OF2: "Design; smaller but still easier to take notes etc. Color choice."

OM1: "A slightly larger screen."

OM2: "Improved memory, the phone is nearly exhausted because of little space (even though I have added as much as possible on the SD card)."

OM3: "Improved battery capacity, I have to charge it every day."

OM4: "Waterproof."

OM5: "Several dedicated keys (answer the phone, hang up, camera button)."

YF1: "My phone is missing a good way to write down notes or reminders (only got Calendar, and messages)."

YF2: "Better notes system, better reminder system."

YF3: "My phone has a physical keyboard, but it is getting old and worn out. There are no other phones on the market with a keyboard. NONE!"

YM1: "Mine cud need a 2-way camera for usage of Skype and video chat."

YM2: "Integrated mini projector."

YM3: "A built in mini projector, so if you wanted to show a video to say 5 friends you could just point the phone at the wall!"

YM4: "Maybe a small projector."

YM5: "Maybe a payment functions?"

YM6: ""To Do" integrated in iCal."

YM7: "Context sensitive information about bus schedules etc."

YM8: "Integrated file explorer, physical keyboard."

YM9: "Integrated notes solution, a couple of small games."

YM10: "Most of them should be equipped with some sort of a pen."

YM11: "Timer/stopwatch (was common before), a good alarm clock (after an hour of snooze, it shuts down - wtf ?)."

YM12: "Payment solution for bus, stores etc."

YM13: "Writing with pen which is then transformed into computer text."

YM14: "Solution for payment. Ticket managing."

YM15: "Integrated mini projector."

YM16: "Hologram projector (Yes, like in Star Wars)."

YM17: "Voice control that works properly. (Note, I don't have ICS on my phone)."

YM18: "Voice control that can work on multiple user-defined languages simultaneously. For me, it is Norwegian and English (without going into the settings and have to switch between languages)."

YM19: "Easy printer functionality."

YM20: "Use it as VISA card."

YM21: "Notebook."

YM22: "A payment function with NFC. I do not think it has in any case. But it comes. Yay!"

OF1: "I miss a feature that the old Nokia touch phone had, an overview of the tasks that constantly lie in the screensaver (sorted by date, chronologically)."

OM1: "Voice control."

OM2: "That the most used apps were automatically put on the front page."

YF1: "USB port for opening files on USB stick."

YF2: "My phone does not have the functionality for pairing with smart TVs. Like iPhone has...."

YF3: "More possibilities to change how things look on your phone."

YF4: "More correlated with each other (brands), minor differences from phone to phone, connect to the TV (on an easier way, bigger screen without having major phone)."

YF5: "Opportunity to use pen."

YF6: "Warning/flash/light on the phone if one has unread messages/missed calls."

YM1: "Potato peeler on the side."

YM2: "Seamless integration with all other units (computers, other gadgets)."

YM3: "4G."

YM4: "Integrated support for turning the phone into a Bluetooth mouse (I once had an old Sony Ericsson phone that had this integrated)."

YM5: "Better integration for tablets, PCs, TVs, etc., in addition to that everything already have more concurrent operating systems (e.g., both PCs and phones share the same OS, but mobile phones often have a "Lite" version instead)."

YM6: "Possibility of timing the duration of the mute function."

YM7: "Something that replaces the most useless communication technology ever: Bluetooth."

YM8: "Anything that prevents the creation of an annoying feedback if one plugs the phone into the car lighter and the aux input simultaneously."

YM9: "Interaction between other furniture, e.g. that the mobile phone is laid on a table and then one can use a touch table to see and manage content on your mobile phone."

YM10: "Java, Flash, to change exactly what you want to change on the phone."

YM11: "Flashlight."

OF1: "Voice telling visually impaired users what they are doing on their phone."

OF2: "How about a keyboard for blind users?"

OF3: "Voice function for disabled people if they have problem with typing."

OF4: "Whistle function to find where one has placed the phone."

OF5: "Beer opener."

OM1: "Lights on the phone (for example for finding key locks)."

OM2: "More seamless communication with other electronic equipment."

YF1:"I think it works very fine now, but when something new comes, I would probably want it."

YF2: "Nothing is missing for my use."

YF3: "I am satisfied with the way it is."

YM1: "They have the most now, so now it's more about making things faster and more reliable."

YM2: "Is quite satisfied."

OM1: "It is already a PC!"

OM2: "I feel that it has got what I need."

Q16 - Do you get distracted in your daily life by your smartphone? In what way?

YF1: "Every time I get a message, a Facebook message or notification, I stop my work."

YF2: "When the lecture is boring, I use Facebook, Twitter, and email."

YF3: "It is very easy to "just check" newspaper, when you really should be concentrating on schoolwork.."

YF4: "By getting updates from Facebook."

YF5: "I spend a lot of time on the phone in which I could spend on more useful things."

YF6: "I have easy access to the smartphone when I'm doing other things, like reading or watching movies. The phone is always there."

YF7: "Playing games!!"

YF8: "If I play Wordfeud and get notifications that it's my turn. I also feel I MUST check Instagram and Facebook if I do not have access to computers."

YF9: "I get very caught up in it and spend much time on it."

YF10: "Checking it much more often than necessary. I am sending a lot of messages that distracts me from school/work."

YF11: "There is always something you can check."

YF12: "Social media is readily available."

YF13: "I have to check if anything new has happened, if I have received any IM, mails etc. Since I am more connected to people with a smartphone."

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YF14: "Wanting to check news, write to people, etc. while studying."

YF15: "Facebook happenings, notifications, WhatsApp chat, 9GAG."

YF16: "I lose track of time when I'm playing a game."

YF17: "Checking social media and messages. Listening to music."

YF18: "Using it in class..."

YF19: "I am checking social apps all the time."

YM1: "Mainly when it reminds me that I have a Facebook update."

YM2: "Easier to use in situations one might find boring, such as in the reading room."

YM3: "One is too mobile."

YM4: "Feeling a need and an addiction to constantly check your phone for new emails, text messages, instant messages, etc.. It takes the focus away from both work and school, and probably affects the results both places, by being left behind and out of focus in work. However, it is awful to be without the mobile phone."

YM5: "It is an always available tool. If it distracts is thus a question of definition."

YM6: "Taking it out in all settings to check for new messages, updates on social services, email, surf."

YM7: "It is ringing, I get a message, something happens on Facebook. And then I have installed a game that suddenly asks if I want to play a bit. Which I don't. So maybe I should remove it.."

YM8: "Facebook, Twitter, IRC and Reddit, they are always available. And Jadders."

YM9: "Get a lot of mail/SMS/Facebook updates that need to be checked before the lights on the screen disappears. One does not have this constant expectation hanging over you that this must be checked when only using PC. (And yes, I know that the lights can be switched off)."

YM10: "In conjunction with the study, it is very easy to resort to the mobile phone when one is a bit stuck, and when I watch TV or is sitting on the bus and I'm bored it's easy to start pressing the buttons. The whole Internet is too available.."

YM11: "I am getting updates from time to time, and the phone is often just too

available for many channels."

YM12: "It is so much easier to keep in touch with people all around the world, as long as I'm online though. But it makes it easier to make an excuse for e.g. not studying, and I surf or chat instead if I have my smartphone around, or I just play games."

YM13: "Incoming messages, Facebook notifications."

YM14: "I use it all unnecessarily the time."

YM15: "Get distracted from social conversation/discussion to check my Facebook."

YM16: "From checking messages. I usually end up on social network pages, games, or the Internet browser."

YM17: "I play games in class."

YM18: "Facebook updates and other social apps."