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Mobile Apps and the ultimate addiction to the Smartphone

A comprehensive study on the consequences
of society's mobile needs.

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Abstract

The smartphone is omnipresent and is cherished and held close by people. It allows for constant connection within a digitally connected society, as well as for many other purposes such as leisure activity or informational purpose. Within the Information Systems studies deeper investigation is required as to what impact this “taken – for – granted” mobile access to information and mobile apps has for individuals and society and if a “technological addiction” can be developed when using the smartphone for everything during the day on such a constant basis.

The aim of this study was to understand the role of the smartphone in society and to shed light on this unclear relationship between the constant use of a smartphone and its development towards an addictive quality. To reach a conclusion, in depth – interviews were conducted with participants about their relationship to the smartphone and their smartphone use based on questions derived from literature on mobile communication technologies and the types of digital addictions existing.

The results are that the smartphone is a device that seamlessly integrates into our daily lives in that we unconsciously use it as a tool to make our daily tasks more manageable, and enjoyable. It also supports us in getting better organized, to be in constant touch with family and friends remotely, and to be more mobile which is a useful ability in today’s mobility driven society.

Smartphones have been found to inhabit a relatively low potential to addiction. Traits of voluntary behaviour, habitual behaviour, and mandatory behaviour of smartphone use have been found. All of these behaviours are not considered a true addiction. In the end, it seems that the increase of smartphone use is mainly due to the way we communicate nowadays digitally, and the shift in how we relate to our social peers using digital means.

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Writing this thesis was a challenge. Especially challenging was to frame my research since I started out too broad and needed a considerable amount of time to focus my research topic. Especially hard it became as I was working at the same time and needed to dedicate enough time towards this research. Countless evenings were spent on this work. In the end, however, it was a very rewarding experience and interesting journey and I do believe that I reached my goal in obtaining a good insight into what the smartphone as a daily companion means to me and to everyone else alike. I truly hope that this research does contribute in some way or another towards shedding a better light on smartphone use in daily life.

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1. Introduction

1.1 Background

In the information age, the borders between physical and digital are blurring.

The communication device that has attracted our attention and keeps a strong grip on us is the smartphone. It combines the benefits of a personal communicator and receiver for mass media. Where digital technology has pervaded almost every part of daily life, the smartphone has become our closest companion, being omnipresent as a communication device within the past decade. According to Cohen and Lemish (2002), smartphones used to be esoteric devices, whereas today they are certainly the most pervasive communicative device that people carry close and cherish. Smartphones mobile nature allows connection to people “anytime”, “anywhere” and with “anybody”. It is ubiquitous as being used almost anywhere and pervades our life’s as no other device before as being a multipurpose device that is able to complement anything you need or enjoy to do like watching movies, play video games, listen to music, pay for goods and services, look on the map, looking for bus times, pay for bills with your bank, arrange a meet up with friends or instant messenger them and so forth. Naturally, the use of a smartphone increases with every new activity we attach to a smartphone.

In 2006, the European Journal of Information Systems (EJIS) published a special issue on mobile user behaviour where scholars explored topics related to the rise of the mobile phenomenon at the time (Van der Heijden & Junglas, 2006). There are now almost as many mobile phone subscriptions as there are people on earth, with 7 billion subscriptions active in 2014 (International Telecommunication Union, 2014) in comparison with just 2.75 billion in 2006 (International Communication Union, 2013). Consumers and organisations started to have an insatiable appetite for the next feature – rich mobile devices and services, and as a response, mobile providers appear to launch devices and services with improved features on almost a daily basis. Mobile devices become the preferred method for individuals to interact with friends, family, and colleagues, as well as transaction of business, accessing the internet, using social media, or reading news or get engulfed in entertainment. Based on this trend in the direction of mobile phone systems and mobile phone apps, Middleton, Scheepers, and Tuunainen (2014), discuss Mobile Information Systems (MIS) in a paper in the European Journal of Information Systems (EJIS) and address questions of the definition of Mobile Information Systems and how mobile access can be defined as a key component of IS and, in addition, in what way mobility is becoming a key expectation of users regarding Information Systems.

Middleton, Scheepers, and Tuunainen (2014) suggest several key areas that require further research in the area of Mobile Information Systems (MIS). Among those, is the question as to what impact a: “taken – for – granted” mobile access to information and services has for individuals and society?”, (Middleton, Scheepers, and Tuunainen, 2014). Among several aspects, Middleton, Scheepers, and Tuunainen (2014), ask the question what negative aspects a possible wide spreading “technological addiction” and constant presence in front of a mobile phone screen has on our society.

In fact, the wide – spread acceptance of mobile phones around the world and its social and cultural impacts have attracted academic attention. While some research highlights positive effects on mobile phone regarding social, psychological and emotional study (Taylor and Harper, 2001; Carroll et al, 2002; Tjong et al, 2003; Matthews, 2004; Power and Horstmansh, 2004, Markett; 2006; Chen et al., 2007), other researchers address negative impacts on overuse of mobile phones for the social, psychological and emotional field of study (Bianchi and Philips, 2005; Paragras, 2003; Monk et al, 2004; Palen et al., 2001; Ling, 2005; Srivastava, 2005; Aoki and Downes, 2003; Warner, 2003; Ito, 2006; Thompson and Ray, 2007; Cheever, Rosen , Carrier , Chavez, 2014).

Niaz (2008), goes as far as claiming in a study that smartphone use has become a public health problem and that there is a need for awareness and dangers associated with excessive usage and addictive behaviours among common people. This aspect of addiction is most prevalent in younger generations as older people face the fear of getting familiar with new technology leading

them to a more reluctant use of new technology (Kurniawan, 2008). This correlates with a qualitative study from Walsh (2009) analyzing the behavioural patterns of young mobile users in Australia. He alarmingly concludes that young people are too much attached to their smartphones demonstrating the symptoms of behavioural addiction.

Whereas some studies indicate that technologic addictions are no different from substance addictions where users get some kind of reward from cell phone use, resulting in pleasure (Roberts & Pirog, 2012; Hope, 2013; Chongyang Chen, Kem Z.K. Zhang, and Sesia J. Zhao, 2015), other research questions the viability of the term “addiction” in that people tend to confuse habitual use of technology as addictive behaviour (Griffith, 2013).

Evidence of addictive use is shown for example through surveys from 2002 conducted with Korean college students where 73% of respondents reported that without access to mobile telephone, they feel uncomfortable and irritated (Lee, 2002) – indicating a sign of a withdrawal symptom of addiction. A similar study has been conducted in America where people have developed an “obsession” for carrying their mobile phone everywhere (Wikle, 2001), and show signs of heavy dependence on the use of mobile phones (Licoppe and Heurtin, 2001). In a recent US survey of 2013 with 2000 college students, it was reported that 85% of the students constantly checked their mobile phones for the time, and that 75% slept beside it, making the claim that one out of ten college students say they are “addicted” to their mobile phones (Hope, 2013). In a study in Spain of 1900 pupils and students by Griffith (2012), it was found that frequent problems with mobile phone use were reported by 2.8% of the pupils and students, whereas most problematic use was in the youngest age groups.

The mobile phone is considered to be multiplatform devices which offer an inexhaustible range of sources of reinforcement, which results in the large acceptance among young people (Walsh, White and Young, 2008).

1.2 Problem Discussion

It can be argued that the smartphone has become one of the most pervasive and flexible technology devices of our age. The smartphone constantly binds us to its immediate influence since it combines its multipurpose nature, and its ubiquity with our everyday activities successfully. It becomes our preferred method of interaction letting us spend countless hours in front of the screen to cope with our daily life in interaction with friends, family, colleagues, social media, entertainment, reading, etc.

Since the smartphone takes so much of our attention and seems to satisfy many of our needs, the question emerges if there is a tendency to become too attached to the smartphone.

Therefore, further study is required on the negative influences Mobile Information Systems (MIS) have on our social sphere. In this respect, the areas of “Smartphone Addiction” and “Social App Addiction” are analysed closely. Hence, what dangers can be attributed to the use of a smartphone and its corresponding Social Mobile Apps? How do mobile apps in particular attribute to a possible addiction to a smartphone? Is there a way to conceptualize a profile for addictive use of a smartphone?

1.3 Study Purpose

This study wants to analyse the widespread impact of the smartphone and Mobile Apps on society. It does so by analysing effects on a sample group of Millennials (between 18 – 33 years) in order to understand how the smartphone and social apps attribute to possible addiction traits among users.

Firstly, it is important to understand the general definition of an addiction versus an overuse of Information Technology and how this can be related to the use of a smartphone and social apps.

Secondly, it is vital to grasp the elemental causes of such a possibly addictive use of the smartphone and social apps.

Thirdly, the micro and macro effects of such an addiction need to be studied and outlined. This is performed by understanding what role the smartphone takes in our lives and how it affects us. Also it is important to understand if the increased use of the smartphone is a natural effect of our current societal expectations of being connected or if it truly is a cause to worry in regard to becoming a real “public health problem”.

1.4 Research Questions

Hence, the research questions based on the outlined study outcome are:

1. How can an addiction or overuse to a smartphone and social apps be defined?
2. What are the elemental causes leading to a smartphone or social app addiction or overuse?
3. What are the micro and macro effects of such a high reliance or an argued overuse on a smartphone?
4. What role does the smartphone take in our lives; does it affect us negatively in any way?
5. Can we talk about an overuse of the smartphone, possibly leading to addictive behavior, in response to today’s societal expectations of being connected?

RQ 1, RQ2 will be answered by literature found within the Research Framework (Chapter 3) and in the Profile of smartphone and Social App Use (Chapter 4) respectively.

RQ 3, RQ4, and RQ 5 are dealt with in the Analysis of the Findings (Chapter 6) as well as in the Interpretation of Findings and the Conclusion (Chapter 7 and 8).

1.5 Delimitations

A specific focus is set on the smartphone, which has become our predominant companion regarding digital communication, however, any device that has the same mobility qualities as the smartphone can be attributed to this study.

This study wants to analyse the areas that affect us as individuals. It does not take into account governmental or business change through digital technology.

This thesis will constitute of a collection of secondary literature of the time where smartphones became capable of being used as a multipurpose device hosting apps and the internet. Therefore, the timeframe chosen for this study on mobile phone use will be limited to the time of 2006 up to today.

The qualitative study comprising this research will be done in a multicultural context. The sample group will consist out of people from various background and cultures, hence, this thesis will not take into account a cultural dimension which might affect the habits of smartphone use.

This study will analyse the Millennial age group, as coined by William Strauss, and Neil Howe (2000), between 18 – 33 years as those age groups have been found to be the strongest impacted by smartphone use, thus, effects and implication can be studied thoroughly and are also visibly most strongly.

1.6 Definitions

Major definitions in this study are outlined here:

Addiction is defined as an unusually high dependence on a particular medium. As a general term, it denotes all types of extreme behaviour, including the unusual dependence on drugs (alcohol, narcotics), exercise, gambling, food, television viewing, gaming, and Internet use (Peele, 1985).

Technological Addiction is proposed as a concept by Griffith (1996) and is based on nonchemical behavioural nature involving excessive human – machine – interaction.

The concept of **Ubiquitous Computing** (also called pervasive computing) is the trend to embed microsystems in everyday objects in order to communicate with one another. Pervasive or ubiquitous means "existing everywhere". Pervasive computing devices are constantly connected and available anywhere at any time.

Mobile Information Systems (MIS) are systems that allow for mobility and access to information resources and services over many different distribution channels, anywhere, anytime, anyhow.

2. Research Methodology

The methodology has the task to provide the reader with the necessary information over the procedures, methods, and approaches taken to obtain a valid and credible research conclusion.

Firstly, the philosophical research approach is set, followed by the research design, which data collection methods have been chosen and what data analysis methods have been applied.

2.1 Research Approach

This chapter shall outline the research approach taken. In Social Sciences Research, two main research philosophies exist; Positivism and Interpretivism (Saunders et al, 2009). A research philosophy constitutes a personal view of what knowledge is acceptable and the process by which this is developed (Saunders & Tosey, 2013).

This study will focus on an interpretivist study. Interpretivist studies tend to encourage the researcher to recognize the distinction between “humans in our role as social actors” (Saunders et al., 2009). Interpretivism relates to the study of social phenomena in their natural environment: “It focuses on conducting research amongst people rather than upon objects, so as to understand their social world and the meaning they give to it from their point of view”, (Saunders & Tosey, 2013). This study will focus on social phenomena in their natural environment and wants to understand their social world and meaning they give from their point of view, therefore, this study will be incorporating an Interpretivism research philosophy.

Research is classified in terms of their purpose in exploratory, descriptive or explanatory (Saunders, Lewis & Thornhill 2007). This study has chosen an explanatory research purpose. A study following an explanatory research purpose has the task to study a certain situation or a problem and to explain a particular relationship between variables (Saunders, Lewis & Thornhill 2003). Explanatory studies shall explain whether one event is the cause of another (Hair, Babin, Money & Samouel 2003). This research can be termed as an explanatory one, since the goal of this study is to understand the situation of the “addiction” or “overuse” of mobile phones, the causes and effects of an overuse and its immediate effect on individuals on a macro and micro perspective.

The research method adopted is depending on the research philosophy (Rea and Parker, 2006). As data is collected first and a theory or model is developed afterwards, the research method itself can be termed as an inductive one (Saunders, Lewis & Thornhill 2009). For interpretivist studies, recent and past experiences are the focus (Davies, 2007). Since this research is built on an interpretivist research philosophy which focuses on recent and past experiences, an inductive research method will be used.

In a research study, either a qualitative or quantitative research approach can be taken. Whereas quantitative research emphasizes results through generating numerical data; qualitative data collection exists in the form of interviews and / or observational data, which is categorized in non – numerical form of data (Saunders et al., 2009). This thesis sets its focus on understanding the impact of smartphone overuse on the individual taking the individuals opinion into account.

This is done by leveraging upon secondary literature outlining the causes and effects on individuals of smartphone overuse. In the following, this information is used to prepare guided questions for in – depth interviews with a sample group of people within the given age range. Hence, this thesis will adopt a mono qualitative method by performing in – depth interviews based on results researched through literature using a model created as guidance. This study applies a cross – sectional time frame based on interviews conducted.

2.2 Data Collection

Data collection is the most crucial process in a research or study. Two data types can be collected: primary data and secondary data (Scheurich, 2007).

Data collection will be conducted in form of collecting secondary data to build a model to acquire primary data in form of interviews. This is applied because, firstly, secondary data is needed to build a reliable theory about macro and micro effects on individuals, and afterwards, primary data in the form of interviews help to understand the real impacts that smartphones had on individuals.

The sample group that will be targeted to collect this data and analyse these findings are individuals of the Millennial Generation from 18 – 33 years old. This sample group has been chosen because the relevance of impact through smartphones on a micro level is strongly visible among this generation. Hence, it offers itself to yield the most reliable results in terms of comparison. The sample size was set to a total of 12 interviews which allows for a fair representation of a sample group.

2.3 Sampling

An effective sampling strategy is vital to address research questions and objectives. It is not feasible to collect data from an undefined case or group as there commonly are restrictions of time, money, and often also access (Saunders et al, 2003).

In fact, sampling techniques provide methods to enable a researcher to minimize the amount of data a researcher needs to collect (Saunders et al, 2003). This is done, firstly, by considering only data from a specific subgroup, rather than all possible cases or elements, and secondly, by dividing into two broad groups; probability sampling and non – probability sampling. Probability samples are focus groups where each population element has a known, none zero chance of being selected, whereas a non – probability sample has no way of ensuring that the sample is representative of the population.

This research is based on probability sampling since close attention has to be paid to the age aspect of the focus group which has to fit into the “Millennial” age group. This ensures a reliable focus of this study.

2.4 Interviews

Three kinds of interview types exist; unstructured, structured, and semi – structured.

Saunders et al (2009) define a structured interview as one which uses questionnaires that are built of prearranged questions which are being asked, whereas semi – structured and unstructured interviews are un – standardized and in – depth interviews.

In order to yield a broad understanding of the researched topic, without losing focus on the research areas defined, a semi – structured interview approach has been applied. Literature researched, and the research areas defined in the theoretical framework section, have therefore been the basis of those leading questions in the interview and shall be following along the interview process. The structure of the interview and its questions can be found in the appendix.

Individuals in question were asked beforehand of their consent to be part of this study, its exact reasoning and content, and that a recording of the session might take place. The interviews have primarily been conducted face – to –face. Where this is was not possible, a digital interview has been conducted through communication technologies such as Skype.

2.5 Data Analysis

Based on the chosen qualitative research approach, two main approaches in analysing qualitative data can be defined; Content Analysis and Grounded Theory (Gray, 2004).

The former approach attempts to identify categories and criteria of selection before the analysis process starts. In the latter, no criteria are prepared in advance, measures and themes surface during the process of data collection and analysis. Grounded Theory can be seen as inductive approach and content analysis as a deductive one.

The analysis of data was conducted in 3 major steps based on the directed content analysis method.

The Directed Content Analysis is used when existing theory or prior research exists about a phenomenon that is incomplete and would benefit from further description. Potter and Levine – Donnerstein (1999) define this approach as a deductive use of theory based on distinctions on the role of theory. The goal of a directed approach is to validate or extend conceptually to a theoretical framework or theory. In a directed content analysis, existing theory or research can help to focus the research question. It is able to provide predictions about variables of interest and about relationships among variables, therefore, helping to determine initial coding schemes or relationships between codes, which has been termed as deductive category application (Mayring, 2000).

The analysis process of a directed content analysis approach is guided by a more structured process than a conventional approach (Hickey & Kipping, 1996). It is applied by using existing theory or prior research in order to identify key concepts or variables as initial coding categories (Potter & Levine – Donnerstein, 1999). The next step is to define operational definitions for each category using the theory.

When collecting data primarily through interviews, an open – ended question might be used, followed by targeted questions about predetermined categories. Commonly, it is helpful to identify the categories of a particular phenomenon that wants to be researched. Following, all instances of that particular phenomenon are highlighted in the interviews transcripts text using predetermined codes. Nevertheless, any text that could not be categorized with the initial coding scheme would be given a new code.

Findings of a directed content analysis can offer support for either a supporting or non – supporting evidence for a theory. In analysing the results, the researcher has two options. He could either describe his study findings by reporting the incidence of codes represented by the specified categories or he could report the percent of supporting versus non – supporting codes for each participant and for the total sample. In fact, theory earlier developed or prior research will guide the discussion of the findings. Newly identified categories will either provide a contradictory view of the studied phenomenon or they might extend, enrich, or refine the theory.

The analysis process, based on four steps, was conducted following the above mentioned approach:

It is started by identifying key concepts or variables as initial coding categories through previously researched literature.

As stated above, when collecting data primarily through interviews, an open – ended question might be used, followed by targeted questions about predetermined categories.

Hence, following this approach, categories through literature will be identified and will serve as a thread that steers the direction of the interview in order to yield the information which is relevant for the study.

Then, all instances of the phenomenon in study are highlighted using predetermined codes and categorized. Any text that cannot be categorized with the initial coding scheme is given a new code.

Finally, the findings are reported and compared against the specified categories that this research has defined in the theoretical framework. This follows the approach that theory or prior research is guiding the discussion of the findings. By doing this, either a contradictory or consistent view will emerge.

Patterns might evolve that give a clue of the future direction of a trend identified or completely new areas that could be affected through technology can be identified. Practical as well as theoretical implications can be learned from the outcome of this research.

2.6 Research Credibility

While conducting a research, the research credibility of its findings has to be taken into account. In order to mitigate the risk of an unreliable outcome of results, the reliability and validity of its findings have to be ensured.

2.6.1 Reliability and Validity

Reliability aims to indicate the consistency of findings based on the method of data collection and analysis (Saunders, Lewis & Thornhill, 2007). Hair et al. (1998) argue that reliability is an indicator to highlight the consistency between the different measurements of an individual's response. It is to ensure that the response is consistent and similar over a given period of time and across situations.

Validity focuses on the true nature of findings and addresses the question whether they are accurate from the view of the author or the contributor (Creswell & Miller, 2000; Creswell, 2014).

Zikmund and Babin (2010b, p.335) define validity as: "The accuracy of a measure or the extent to which a score truthfully represents a concept". Validity aims to test whether it is capable of testing what it was designed for (Hair, 2003).

To ensure reliability and validity of the study, several steps have been undertaken:

To define the theoretical framework and create a first understanding of the research topic, collection of secondary data was performed. During this process, it was paid attention to use academic sources only that adhere to a certain standard of quality, which are mainly academic journals, academic books and white papers that are dealing closely with the research topic. Statistical data used in this study has been collected from trustable research institutions such as for example PEW Research Centre.

The categories drawn out of the theoretical framework are directly tied to the research questions allowing for a clear direction of the desired outcome of research. These categories have been chosen to define questions that should guide along the qualitative interviews.

It has been assured that the interviews were conducted with the required focus group in a similar fashion and under similar circumstances. Interviews were recorded only with the consent of the interviewee. All of the questions used have been thoroughly reviewed through the author. The questions asked were based on the wished research outcome and on the theory model built by the literature researched. Respondents were asked the same questions with the same amount of time to respond to questions or fill out any additional information in the interviews.

Primary data collection and analysis was conducted following the directed content analysis approach.

2.7 Literature Review

This section presents the literature review for this thesis. It is based on literature needed to satisfyingly answer the research questions, in particular, the definition of a smartphone and social apps, its macro and micro effect on Society, and the definition of an overuse or addiction to a smartphone.

The literature review is conducted using the concept – centred approach propositioned by Webster and Watson (2002).

The literature review follows a concept based approach of previously defined key concepts. In total, three key concepts have been defined. Of these concepts, research papers have been drawn for analysis on various academic sources such as Science Direct, SAGE Journals, ProQuest, Wileys, SpringerLink, Emerald, and so on. These academic sources were all either of the type of academic journals, academic books, or white papers.

The three key concepts on which the collection of academic data has been executed are:

- Definition of Smartphone and Social Apps
- Impact on Social Life & Statistics on Smartphone use
- Smartphone Addiction & Social App Addiction

The various papers and keywords of interest derived from these concepts are outlined in the table below. The first column defines the category type of the article found, the second column defines the keywords for which each article stands of which each is relevant to the study at hand. The third column illustrates the corresponding reference and date of publication.

<i>Concept Categories / Title</i>	<i>Keywords</i>	<i>Reference</i>
Definition of Smartphone & Social Apps, impact of mobile systems on social life		
The Mobile and Mobility: Information, Organisations and Systems	Impact of mobility and connectedness, effects on information systems and development, information society, information systems development	Traxler, J. (2011)
The Impact of Mobile Computing on Individuals, Organizations, and Society – Synthesis of Existing Literature and Directions for Future Research	Ubiquitous computing, pervasive computing, mobile computing, impact on society	Fischer N. & Smolnik S. (2013)
When mobile is the norm: researching mobile information systems and mobility as post-adoption	Developments in mobile use and mobility, mobile artefact, services for mobile and ubiquitous computing, the mobile user, work / life balance and mobile technology use, future research on MIS	Middleton C., Scheepers R., Tuunainen K. V. (2014)

phenomena		
Statistics on Smartphone Use		
The Mobile Life European Report 2007		Carphone Warehouse, 2007
Mobile Consumer 2015 The UK cut, Game of Phones		Deloitte, 2015
Smartphone Addiction & Social App Addiction		
Mobile Phone Addiction	Addiction, Psychological Addiction, Media Addiction	Park K.W. 2005
Psychological Predictors of Problem Mobile Phone Use	Predictors of problematic Mobile Phone Use	Bianchi A. & Phillips G. J., 2005
Addictive, Dependent, Compulsive? A Study of Mobile Phone Usage	Mobile phone usage, addictive / compulsive / dependent / habitual / voluntary / mandatory behaviour, Motivational factors of mobile phone use	Hooper V. & Zhou Y., 2007
Mobile phone to youngsters: Necessity or addiction	Mobile phone, addiction, youngsters, youth	Ahmed I., Qazi F. T., Perji A. K., 2011
Online Social Networking and Addiction – A Review of the Psychological Literature	Social Network Addiction, Social Networking Sites, Motivations, Personality, Negative Consequences	Kuss J.D. & Griffiths D. M. 2011
Technological Addictions: Are These the New Addictions?	ICT, Society, Addiction, Technological Addiction,	Chóliz, M., Echeburúa E., Labrador J.F., 2012
Problematic Use of the Mobile Phone: A Literature Review and a Pathways Model	Addiction assessment, cellular phone, cyber addiction, mobile phone, pathways model	Billieux, J. 2012
Adolescents Mobile Phone Addiction: A cause for concern?	Adolescents, mobile phone addiction, indicators of addiction	Griffiths, D. M. 2013

Table 1 – Concept – centred Literature Review

Definition of a smartphone, social Apps, and impact of mobile systems on Social Life

Traxler (2011) provides an overview over the personal mobile devices and describes them as being pervasive and ubiquitous, as conspicuous and unobtrusive, and as noteworthy and taken – for – granted in today’s society. He describes the deep changes that the additional mobile characteristic of a smartphone caused, and describes smartphones as having created “simultaneity of place” such as in a physical space and a virtual space being able to communicate with one another due to mobile technologies being woven into all the times and places of users’ lives. Traxler (2011) argues that mobile technologies are personal technologies with people and that mobile devices do not tie particular activities to particular places or particular times and by doing that they reconfigure relationships of public and private spaces and change the way we

perceive reality and communicate with social peers. He also advances the fields of implications of mobiles at work and in organizations as well as the individual's identity towards smartphones in organizations.

Fischer & Smolnik (2013) review accumulated literature on the impact of mobile computing technology on individuals, organizations, and society in general. They offer a research agenda to enable IS researchers to account for the multi – level nature of mobile computing in everyday life, organizations, and society. They specify concepts such as ubiquitous computing, mobile computing and pervasive computing, and identify three key areas of research in IS; (1) organizational value – creation through mobile computing use (2) individual behavioural changes (3) social and cultural issues surrounding mobile information systems. According to the authors, a specific focus should be set on the diverse organizational and societal impact that mobile computing systems have.

Middleton, Scheepers, and Tuunainen (2014), discuss developments in mobility and mobile use. They discuss the concept of “Mobile Information Systems” (MIS) and the concept of a mobile artefact, its multipurpose nature and its implications for individuals and service providers who create an app for every need possible for a user. They argue that there is a daunting amount of free or paid apps available and that choice of an app by a user depends on whether the app allows for a control of a certain situation and on maximizing usability of a device for a user. They also discuss their ubiquitous and pervasive nature and how service providers seek to provide a seamless experience for users through many app services. They discuss concerns towards privacy of users since service providers might track user preferences, behaviours and identity and propose that smartphones can be seen as user empowering information technology that adds value to many people's lives.

Also concerns are raised in the paper that the constant availability due to the mobile phone can create clashes between private and work contexts. They also acknowledge the embedding of the mobile phone in people's day – to – day basis becoming a sort of routine and vanishing from their “field of vision”. However, they point to several negative outcomes with the spread of mobility which are cyber bullying, surveillance, invasion of privacy, and technology addiction. Finally, they give guidance towards further research in the areas of (1) the best system development approaches for designing mobile – friendly IS (2) what business models and value propositions for MIS (3) impacts of taken – for – granted mobile access to individuals and society (4) what are the challenges for organizations with employees bringing their mobile phones.

Statistics on smartphone use

The Mobile Life European Report 2007 offers statistical information on mobile behaviours in 5 countries: Sweden, Great Britain, France, Spain, and Germany. Especially interesting, for reference, is the chart on whether the mobile phone is an important asset to these countries.

The Mobile Consumer UK Report from Deloitte from the year 2015 provides data on the use of the smartphone and its occasions of use. Of particular interest for reference is the chart on unprompted use of the smartphone.

Definition of smartphone addiction & social app addiction

In one of the earlier works on smartphone overuse, Park (2005) acknowledges that the mobile phone blurs the distinction between personal communicator and mass media and that the mobile phone has become one of the most omnipresent communication devices to date. He illustrates studies from students especially on harmful mobile phone overuse and describes the definition of addiction as being something that can cause damage to the individual and society as addicted people are unable to work or study as their focus and need shifts entirely to physical or psychological dependence towards substance or media. Furthermore, he provides a definition of addiction in relationship to psychological addiction and media addiction.

In a paper from 2005, Bianchi & Phillips pinpoint psychological predictors of problem mobile phone use. They focus on predictors found by literature such as age, gender, and characteristics such as self – esteem, extraversion, and neuroticism.

Hooper & Zhou (2007), focus their study on the questions if mobile phone usage is addictive, and what main types of mobile phone behaviour exist. They argue based on current literature on motivational behaviour, that to date six degrees of behavioural motivations of mobile phone use exist. These motivations are addictive behaviour, compulsive behaviour, dependent behaviour, habitual behaviour, voluntary behaviour, and mandatory behaviour (for specifications please refer to section 3.7.4). Moreover, they identify seven types of motivations (reasons) towards use of a mobile phone. These are social interaction, dependency, image/identity, safety, job-related, freedom, and gossip (for specifications please refer to section 3.5).

In a paper of Ahmed et al. (2011), a broad review of literature from various authors can be found on positive and negative sides to mobile phone usage for young people, which are used throughout this study.

In a study of 2011, Kuss & Griffiths introduce a paper based on a literature review on online social networking and addiction. It is discussed what social networking sites (SNS) are and what motivates its excessive use. The paper aims to (1) outline SNS usage patterns, (2) examine motivations of SNS usage, (3) identify personalities of SNS users, (4) propose negative consequences of SNS usage, (5) explore potential SNS addiction, and (6) state SNS addiction specificity and comorbidity.

Chóliz et al. (2012) critically reflect upon the use of ICT in today's societies and its "technological" addictive qualities compared to substance addiction. They claim that ICT technologies are necessary and useful for proper functionality of our society / organizations and are used by the majority of the population. Factors among why ICT is so popular and widespread are accessibility, availability, intimacy, high simulation and anonymity. They argue in particular that adolescents are strongly vulnerable towards addictive qualities, mainly teenagers who have less impulse control, poorer long – term planning, and a potential of avoiding dangerous behaviours. Chóliz et al. (2012) argue that technological addiction has not been recognized as an addiction, however, a great deal of clinical, social, and scientific support speaks for an inclusion as an addictive disorder (Griffiths, 1995).

In a paper released by Billieux (2012), a literature review is given on all current scales applied and resulting factors that have been found which are in some way associated with an overuse of a mobile phone. Billieux defines problematic mobile phone use as the inability to regulate one's use of the mobile phone which will eventually result in negative consequences in daily life. He reviews certain risk factors from literature that can exhibit such negative behaviour and proposes the "pathways model" which integrates existing literature proposed into a cohesive framework which can be used to analyze dysfunctional use of a mobile phone. The four pathway models outlined are impulsive pathway, relationship maintenance pathway, extraversion pathway, and cyber addiction pathway (for specifications please refer to section 3.9).

Griffiths (2013) critically reflects in his paper on a story in "The Sun" newspaper based on a study of Hope (2013) claiming that one in ten college students say they are "addicted" to their mobile phones Hope claims that smartphone users feel they've got more control to communicate with whomever and whenever they want, however, this sense of control creates the anxiety as younger people become more reliant on maintaining those contacts and worrying about being bullied or being marginalised and excluded; People lose track of time, become socially isolated and before they know it, can't stop (Hope, 2013). Griffiths, however, argues that some people confuse habitual use of technology with addictive behaviour and that it is difficult to determine at what point mobile phone use becomes an addiction. He devise a few guiding questions that are indicators of problematic phone use (for specification please section 3.11).

3. Theoretical Framework

The theoretical framework has the task to outline the concepts, definitions, literature references, and existing theory used for a particular study. The theoretical framework must demonstrate a focused understanding of theories and concepts relevant to the study topic and relate to broader areas of knowledge considered.

The theoretical framework of this study comprises four key topics that have been identified based on the research questions which guide the desired research outcome. These four key areas are:

- How do you define a Smartphone; how did it change Society?
 - The Emergence of the Smartphone
 - The impact of the Smartphone on Society
 - Constant Digital Access through ubiquitous computing technologies
 - The 'mobile' user
- How do you define its widespread popularity and use?
 - The reason why people use mobile phones
 - Motivation of Mobile phone use
 - Statistics on Smartphone use
- How do you define an addiction versus an overuse?
 - Definition of Addiction
 - Technological and Mobile Addiction
 - Social Networking / Social Apps Addiction
- What elements lead to an addiction / overuse of a mobile phone?
 - Six categories of mobile phone addiction behaviour
 - Existing Measures of problematic Mobile Phone use
 - Pathway Model of problematic Mobile Phone use
 - Mobile phone Addiction assessment

In the following, the theory on these key areas is outlined.

3.1 The Emergence of the Smartphone

The use of mobile phones as we know it starts with the late 1980s, with the agreement on a GSM digital cellular standard in Europe (Collins, 2009). This standard allowed roaming across countries and made the use of a handset profitable for service providers. Since then, telephony was advanced from mere Mobile Phones to smartphones that offer a range of services that were to date only available to Personal Computers but adding the additional benefit of mobility. These devices bundled features of several products into a single integrated product (Bayus et al, 2000), allowing for many types of uses including communication, information search, document creation and management, entertainment, navigation etc.

Besides its functionality, mobile communication evolved from simple voice telephony and text messaging to email, instant messaging, and a range of social media services that allowed for connecting and communicating with many different social reference groups. Examples of such mobile phone operator's proprietary services and social app services are Facebook, Twitter, Whatsapp, and for Voice and Video communication; Skype, Google and Apple's Facetime, among others.

Nowadays, mobile devices are seamlessly combining organisational applications and services of pure utilitarian nature (made for being useful rather than comfortable) with services of hedonic

nature (games and other entertainment) (Gerow et al, 2013). Other uses are already on their way for example accelerometers, magnetometers, gyroscopes enabled through advanced sensor technologies (Saeedi et al, 2014). GPS – enabled systems create a range of new possibilities for businesses (Habjan et al, 2014) and also create new kinds of information privacy concerns by tracking user’s behaviour and identity (Xu et al, 2009). The Ubiquity of a mobile phone allows for access at anytime and anywhere (Balasubraman et al, 2002) and makes us available anywhere and at anytime in turn. In addition, the communication through missed calls or “beeping” or “shaking” of the phone using text messaging services allows taking advantage of connectivity without incurring costs when completing a telephone call (Donner, 2007). However, it also blurs the line between a work and a private context leading to context clashes. smartphones can be seen as user – empowering information technology as it adds value to many people’s lives (Jung, 2014; Scheepers & Middleton, 2013). The use of a mobile phone has become so routinely integrated that it has become a part of everyday life (Yoo, 2010; Bødker et al, 2014).

3.2 The impact of the Smartphone on Society

The smartphone had cultural, organisational and social impact resulting from the essential difference between desktop technologies and mobile technologies. Interacting with a personal computer takes place at one spot, at a dedicated time and place where a user is separated from the rest of the world (Traxler, 2011). Mobile phones created a sort of simultaneity of place, a physical space and a virtual space of interaction where conversations are no longer discrete entities but instead are multiple living threads (Traxler, 2011). This essentially changes the way people identify themselves in terms of time, space, place and location. It changes their relationship to organisations and communities, it changes the way they relate to other individuals, it changes their identity and ethics of what is right and wrong and what is approved and appropriate (Traxler, 2011). In conclusion, Traxler (2011) argues that desktop technologies operate in their own little world, whereas mobile technologies operate in reality itself.

This living in reality is termed ubiquitous computing which Weiser (1991), refers to as an environment where computers are: “embedded in the everyday world – both in a physical and social sense” (Weiser, 1991). Lyytinen and Yoo (2002) argue that due to substantial advances in wireless communication technologies, battery technology, and increases in processing power, combined with the reduction in physical size, the actual computer, in a general sense, vanishes from our mental picture and is woven into our daily life’s which lets us focus on the task at hand rather than on operating the computing device (Weiser, 1991). This “pervasive computing” means that computing becomes broadly accessible and is increasingly seamlessly embedded into the environment (Lyytinen, K., Y. Yoo, U. Varshney, M.S. Ackerman, G. Davis, M. Avital, D. Robey, S. Sawyer, and C. Sorensen, 2004).

Furthermore, mobile devices are reconfiguring the relationships between public and private spaces. Mobile technologies advance digital communities and digital discussins into physical public and private spaces, which forces deep changes and adjustments to time, place, and space aspects, forcing individuals, organisations and governments to cope with its aspects.

As Resmini (2013) submits, we have now “an unexpected, layered and uneven but very real version of what we believed “cyberspace” ought to be”. We are constantly connected, anytime, from anywhere, “from the privacy of the home, the quiet of a mountain top, and amidst the confusion of airports, bus stations, and crowded streets”. The smartphone is the primary enabler of this change.

According to Traxler (2011), mobility is nowadays seen increasingly as defining characteristics of our society and organisations alike and states five pervasive effects of mobility that form and re – form diverse networks:

- Corporeal travel of people for work, leisure, family life, pleasure, migration and escape

- Physical movement of objects delivered to producers, consumers and retailers
- Imaginative travel elsewhere through images of places and peoples upon TV
- Virtual travel often in real time on the internet so transcending geographical and social distance
- Communicative travel through person - to - person messages via letters, telephone, fax and mobile (Urry 2007)

3.3 Constant Digital Access through ubiquitous mobile technologies

As smartphone's become more pervasive in its use for everyday activity, providers respond with new services and solutions that leverage on the power of mobile and ubiquitous technologies. The main idea here is to make services available in different forms, on all interfaces, everywhere and at anytime, allowing for a seamless digital permanent online experience.

Mobile entertainment (games, videos, music, ebooks) may be consumed within the home, or on the move, or at work. The same applies for communications media with social networking sites such as Facebook or Twitter which can be offered on different interfaces such as computers, tables, or smartphones. An ideal design allows for the integration regardless of interface and a seamless experience also leveraging on the power of cloud storage to offer access to your personal content for viewing or sharing your content from multiple devices.

Smart technology devices increasingly built into homes, offices, and vehicles to leverage an even stronger constant digital user experience. Information Systems are no longer confined to the office. Even within the office, the mobile platform allows users to have access to many commercial IT services such as cloud – based services, storage services, analytics services, software as a service, etc. (Bhattacharjee & Park, 2014).

3.4 The mobile user

Most people engage with IS in a mobile context using a smartphone or a tablet. The typical mobile user in the developed world owns more than one device, sometimes at different locations (home, office) and might have multiple subscriptions to allow for the use of one single device in different contexts (Sutherland, 2009). In developing countries, the phone is often the very first purchase of technology after the rise of individual income (Barrantes & Galperin, 2008; Singh, 2008). Whereas phones may be shared, especially in developing regions (Rashid & Rahman, 2009), the mobile phone in developed countries and its use is primarily highly personal in nature.

A mobile user assumes also individual roles when interacting with a phone, as being a private (social) person, as being an employee (formal), as being an entertainment seeker (leisure), as being a professional, as being a citizen (society context), and as being an activist (political). Nevertheless, individuals tend to combine different roles when using mobile computing (Middleton & Cukier, 2006; Scheepers et al, 2006; Gregg, 2011, Duxbury et al, 2014).

Regardless of being in a private or professional context, mobile users use mobiles in terms of how well they can control a certain situation and how well they can maximize usability of the device and ensure benefits of its use. Interestingly, even while some systems are not designed for mobile access, an increasing number of users prefer mobile access to content (Loosemore, 2014).

3.5 Motivation of Mobile Phone Usage

Val Hooper and You Zhou (2007), define in general 7 types of motivation for mobile phone usage which are:

Social Interaction: mobile phones are used for purposes of social interaction making phones essential parts of their social life's to stay in contact with friends and family. (Aoki & Downes, 2003)

Dependency: meaning that it becomes part of their lives accompanying them everywhere (Aoki & Downes, 2003) and it is their main means to contact others (Davie, Panting & Charlton, 2004), and they feel disconnected if they do not have their mobile phone with them and leave it on all the time (Blendford, 2006).

Image / Identity: mobile phones bestow status or confirm group identity (Taylor & Harper, 2003). Optional additions to personalize the mobile phone allow for expression of identity and reaffirm their belonging to a particular group of friends (Leung & Wei, 2000).

Safety: some people can be labelled as “security & safety conscious” and having their mobile phone with them makes them feel safer (Wilska, 2003)

Job related: The mobile phone can be used as a compulsory tool to keep in touch in the business world (Ling, 2000)

Freedom: The mobile phone has reduced the possibility of parents control over children's communication; also it offers a direct line to the intended recipient without typical filtering by siblings or parents as with a landline.

Gossip: mobile phone use is used for gossiping with friends and family (Peters & Allouch, 2005). Peters & Allouch (2005) see gossip as essential to social, psychological and physical well – being, similar to a “social lifeline”.

3.6 Statistics on Smartphone use

A few statistics regarding the use and popularity of smartphones by the European population have been taken into account in this report. All statistics used have been attached in the appendix in chapter 14.1

3.7 Addiction

To better grasp the difference between addiction and non – addiction of mobile use, a clear definition of addiction, mobile addiction, and in particular social app addiction is reviewed and outlined in the following.

3.7.1 Definition of Addiction

Addiction is defined as an unusually high dependence on a particular medium. As a general term, it denotes all types of extreme behaviour, including the unusual dependence on drugs (alcohol, narcotics), exercise, gambling, food, television viewing, gaming, and Internet use (Peele, 1985).

Types that involve online addiction that have been recently studied are online sexual addiction (Bingham and Piotrowski, 1996; Young, 1998; Stein et al., 2001), and addictive consumer behaviour (Elliot et al., 1996; Faber et al., 1987).

Peele (1985) defines addiction as a psychological dependence that is life organizing and more important than other coping instruments. According to Peele (1985), any compulsive or overused activity should be considered as addiction. Reasons for addiction are various and different research proposed different models on different types of addiction. As an example, one theory of drug addiction illustrates that the drug itself causes the dependency, leading the individuals to be under its control (Haddock and Beto, 1988). Other research cites genetic predispositions or brain differences causing dependency (Schukit, 1987). Additional different research links theories of causes of addiction to the social sphere (e.g. demographic where an individual feels the need to compensate for perceived deficits); lifestyle (e.g. peer group pressure); and psychological (e.g. personality traits as for example depression or hyperactivity increase motives to indulge in addictive behaviour) (Haddock and Beto, 1988).

Peele (1985) describes the major motives for addictive behaviour to be relief of pain or anxiety, or other negative emotional states (i.e. escape); or enhanced control, power, and self –esteem (i.e. compensation); or simplifying and making life seem more manageable (i.e. ritual); and as a mood modifier or way of feeling good (i.e. instrumental).

3.7.2 Technological and Mobile Addiction

In a paper from 2012 termed “Technological Addictions: Are these the New Addictions?” Cholitz M., Echeburua E, and Labrador J. F., discuss the possibility of a technological addiction. They argue that Information and Communication Technologies (ICT) are a hallmark of today’s societies and those technological tools are necessary for the right functionality of organizations and the popularity at large. Major factors that benefit the adoption of ICT are accessibility, availability, intimacy, high stimulation and anonymity.

However, evidence of overuse among the populations showing signs of addictive disorder has been reported, particularly in adolescents. Reasons for this are for example that they have less impulse control (Robbins T.W., and Rogers R.D., 2001), are poorer at long – term planning, and tend to avoid risks that are connected to any dangerous behaviours.

Traditionally, the concept of “addiction” was a medical based model reserved for bodily and psychological dependence on physical substance. However, researchers started to question this constrained view and proposed to broaden the range of behaviours (Lemon 2002; Orford 2001; Shaffer 1996).

Griffith (1996) proposed the concept of “technological addiction”, based on nonchemical behavioural nature involving excessive human – machine – interaction. This concept comprises either passive aspects (TV watching) or active participation, such as gaming online, chatting online and anything that comprises inducing and reinforcing features that contribute to the promotion of addictive tendencies (Griffith, 1996). In this are additionally included all core components of addictions which are salience, mood modification, tolerance, withdrawal, conflict, and relapse (Griffiths, 1998).

In a paper of 2013, Griffiths, however, points out that the definition of addictive behaviour is quite blurry and that habitual use of technology is not equal to addiction towards a smartphone. As an example, Griffiths (2013) argues that people who don’t leave their house without the phone or doing many calls or do not turn off their phones at night are not directly predisposed

of addictive behaviour. Even if some studies claim that participants have replied to be “addicted” to their phones is not directly indicative towards problematic use. Griffiths proposes a test of 10 questions that can be asked to identify problematic or addictive use of a smartphone (Questions can be found in chapter 3.11).

Besides Griffiths studies, several other behaviours have been associated with excessive smartphone use, including the “nomophobia” disorder (the need to have a phone close to you) (King et al., 2010), text message overreliance (Igarashi et al., 2008), and phantom vibration syndrome (Rothberg et al., 2010).

Additional factors of Mobile Addiction found in research, are illustrated in chapter 3.8 “Existing Measures of Problematic Mobile Phone use”.

3.7.3 Social Networking/ Social Apps Addiction

The increasing use of Social Networking and social apps has been starting to show potentially addictive qualities (Webley, 2011; Hafner, 2009). The mass appeal of social networks on the internet is a concern especially as looking on the increasing amounts of time people spend online (The Nielsen Company, 2010). People, however, do not get addicted to the medium but to the activities they carry out online (Griffith, 2000). Young (1999) argues that social networking addiction falls into the category of cyber – relationship addiction (addiction to online relationships). This, Young (1999) argues is, because the main motivation to use SNSs is to establish and maintain both on – and offline relationships. Specifically, addiction criteria such as neglect of personal life, mental preoccupation, escapism, mood modifying experiences, tolerance, and concealing the addictive behaviour is present in some people who use social networking excessively (Young, 2009).

A survey from 2006 with 935 American youth participants about the usage of SNSs revealed that the main reasons to use SNSs were to stay in touch with friends and to make new friends. Additionally, half of the teenagers visited their SNSs at least once a day to update their profile showing a potential factor of excessive use (Lenhart, 2007). In an online survey of 131 students in the US, 57% used SNS on a daily basis mostly engaging were reading / responding to comments to their SNS page and or page / posts to one’s wall, sending / responding to messages and browsing friends profiles.

In terms of motivations to use SNSs, it was found that persons with higher social identity (solidarity with their own social group), higher altruism, and higher telepresence (feeling present in virtual environment) tend to use SNSs more because they perceive encouragement for participation from the social network (Kwon & Wen, 2010).

Several motivations are given for using SNSs

- Keeping in touch with friends they do not see often
- Using them because all their friends have an account
- Keep in touch with relatives and family
- Making plans with friends they see often
- Maintaining offline relationships
- Use it in favour of face – to – face interaction
- Using it to maintain social capital (in the sense of weak connections, meaning that SNSs fosters a networked individualism where no bonds exist except for connections that appear advantageous for users (Reich, 2010))

It is argued by Griffith & Kuss (2011), that users preferring communication via SNSs (compared to face – to – face communication) are more likely to develop an addiction to SNSs. A study of 387 students (Sledgianowsk. & Kulviwat, 2009) additionally found predictive factors that increase the intention to use SNS which are playfulness (enjoyment and pleasure), critical mass of users endorsed the technology, trust in the site, perceived ease of use, and perceived usefulness.

Personality traits decide upon the usage of SNSs (Correa, Hinsley, de Zuniga, 2010). Personality traits associated with extensive use of SNS is that people with large offline social networks, who are more extroverted, and who have higher self – esteem, use, in this case Facebook, for social enhancement. In contrast, people with few offline contacts compensate their introversion, low – self esteem, and low life – satisfaction by using Facebook for online popularity. Likewise, people with higher narcissistic personality traits tend to be more active on Facebook and other SNSs to present themselves favourably online as they feel it empowers their ideal selves (Mehdizadeh, 2010; Buffardi, 2008; Zhao, Grasmuck, Martin, 2008; Manago, Graham, Greenfield, Salimkhan,2008). It is also evident that narcissistic personality have been found to be associated with addictive traits (La Barbera; La Paglia.; Valsavoia, 2009).

People with high extraversion and openness to experience use SNSs more frequently. Furthermore, extroverts and people open to experiences are having more groups on Facebook, use socializing functions more and have more friends than introverts. It is also argued that shy people spend large amounts of time on Facebook and have a large amount of friends on SNS (Ross, Simmering, Arseneault, 2009). It appears as if SNSs are especially beneficial for those whose real – life networks are limited and easy access to peers without demands of real – life proximity and intimacy is sought after (Griffith, Kuss, 2011). Overall, it is argued that extroverts use SNSs for social enhancement, whereas introverts use it for social compensation, both is related to greater SNS usage. Hence, both groups could potentially develop addictive tendencies for different reasons, either social enhancement or social compensation.

Some other negative effects of extensive SNS use according to literature is that people who use SNS more extensively were perceived to be less involved with their real life communities (Nyland, Marvez, Beck, 2007). Additionally, the nature of feedback from peers online has a direct effect on the individual's wellbeing and self – esteem. Especially people with lower self – esteem who tend to use SNSs as compensation for real – life social networks can be influenced by negative feedback (Ellison, Steinfield, Lampe, 2011). Specifically for students, a survey of 219 university students of Facebook users reported that using SNSs had a negative impact, namely procrastination, distraction and poor time – management during their study, as they have been multitasking which is detrimental to academic performance (Kirschner, Karpinski, 2010).

3.7.4 Six categories of Smartphone addiction behaviour

In an article by Val and Zhou (2007), an attempt is undertaken to categorize mobile phone usage behaviour based on underlying motivation. According to Val and Zhou (2007), the categories of motivation that have been found most frequently referred to in literature are: habitual, addictive, mandatory, voluntary, dependent, and compulsive behaviour. In the following these types of motivation are described.

3.7.4.1 Addictive Behavior

Addictive behaviour is defined as any activity, object, substance, or behaviour which has become a major focus of a person's life by exclusion of other activities, or that has begun to harm the individual or others physically, mentally, or socially (Hanley & Wilhelm, 1992). In marketing

and consumer consumption research, O'Guinn and Faber (1989) developed a model of addictive behaviour, which was used as criteria to study addictive behaviour in other research, including four main elements:

- Sudden and spontaneous desire to act
- A state of psychological disequilibrium
- The onset of psychological conflict representing an inner battle of thoughts
- A lack of regard or denial of consequences of the behaviour

In general, addictive behaviour is based on characteristics such as low self – esteem and feelings of powerlessness (Maslow, 1943; O'Guinn & Faber 1989; Hanley and Wilhelm, 1992) and the need to relieve / improve the situation (O'Guinn& Faber, 1989).

3.7.4.2 Compulsive Behavior

Compulsive behaviour is primarily defined as an impulse disorder; the inability to restrain an impulse (Hanley & Wilhelm, 1992; O'Guinn & Faber, 1989; Faber & O'Guinn, 1992). O'Guinn and Faber (1989) state that compulsive behaviour is described as a chronic, repetitive behaviour that comes as a primary response to negative events or feelings which are difficult to stop and have harmful consequences. The difference between compulsive behaviour and addictive behaviour is that compulsive behaviour is a periodic characteristic (Rook, 1987) whereas addictive behaviour tends to be a continuing pattern (Rook, 1987).

3.7.4.3 Dependent Behavior

Dependent behaviour is defined as being on the same spectrum as physical and psychological attachments of addiction (Li & Chung, 2004). However, the difference between addiction and dependent behaviour is that dependent behaviour is often motivated by attached importance and social norm (Becker & Murphy, 1988). This means that the reason for dependency of something is rooted in the attached importance towards communication, or society norms.

3.7.4.4 Habitual Behavior

Habitual behaviour is based on tasks that are performed regularly and are performed with little mental awareness. Habits are initiated by a goal that someone wants to achieve, and by cues in the environment (Biel et al., 2005). Many daily activities are more or less performed automatically or unconsciously (Albanese, 1993). Habits are based on unconscious stimuli (Lester, 1990). Habitual behaviour could originally have been triggered by some sorts of voluntary behaviour based on attitudes and social norms. Lester (1990) states social norms as in fact being influencing human behaviour, especially routinized human activities. Hence, he says that any social activity which is a norm activity could be seen as habitual behaviour.

3.7.4.5 Voluntary Behavior

Voluntary behaviour is driven by specific motivations which are attached to positive impacts (Kang et al., 2007). It is mainly driven by information or social benefits for example interpersonal ties or belonging need (Kang et al., 2007). Ampt (2003) defines social and personal benefits to be the main factors for voluntary behaviour.

3.7.4.6 Mandatory Behavior

Mandatory is any behaviour that is compulsory of any type (Aoki &Downes, 2003). It is usually driven or prompted by environmental consequences (Aoki &Downes, 2003).

3.8 Existing Measures of Problematic Smartphone Use

During the last decade, many studies have tried to delimit risk factors that can be attributed to the problematic use of a smartphone. Existing literature found in a literature review of one of Billieux’s (2012) papers (table 1) outlines existing measures that researchers have identified to analyze problematic smartphone use. Findings of these scales were mostly associated with demographics and psychological factors which are outlined in the following.

Measure	Authors	Basis	Subjects	Items	Factor(s)	Validation Technique
Mobile Phone Problem Use Scale (MPPUS)	Bianchi and Phillips (2005) [12]	Substance abuse literature	University students and community participants	28-item Likert (10 points)	Unique factor of problem use ¹	Index of reliability, external and internal validity. Factorial structure not reported
Problematic Mobile Phone Use Questionnaire (PMPUQ)	Billieux <i>et al.</i> (2008) [6]	Existing studies on problem mobile phone use	Community participants	30-item Likert (4 points)	Prohibited use; dangerous use; dependence; financial problems	Index of reliability, external and internal validity. Exploratory and confirmatory factor analyses
Text-Message Dependency Scale (TMDS)	Igarashi <i>et al.</i> (2008) [22]	Existing studies on text-message use/Young’s criteria for Internet addiction	College students (15-18 years old)	15-item Likert (5 points)	Emotional reaction; excessive use; relationship maintenance	Index of reliability, external and internal validity. Exploratory and confirmatory factor analyses
Mobile Phone Dependence Questionnaire (MPDQ)	Toda <i>et al.</i> (2004) [11]	Evidence of excessive and prohibited use in students	Female university students	20-item Likert (4 points)	Unique factor of problem use	Index of reliability, external and internal validity. Exploratory factor analysis
SMS Problem Use Diagnostic Questionnaire (SMS-PUDQ)	Rutland <i>et al.</i> (2007) [23]	Young’s criteria for Internet addiction	University students	8-item dichotomous	Pathological use; excessive use	Index of reliability, external and internal validity. Exploratory factor analysis
Mobile Phone Involvement Questionnaire	Walsh <i>et al.</i> (2010) [18]	Substance abuse literature	Community participants	8-item Likert (7 points)	Unique factor of problem use	Index of reliability, external and internal validity. Principal component analysis
Problem Cellular Phone Use Questionnaire (PCPU-Q)	Yen <i>et al.</i> (2009) [19]	Substance abuse literature	Adolescents	12-item dichotomous	Symptoms of problematic use ² ; functional impairment	Index of external and internal validity, cut-off analysis

Table 2 – Existing Measures of Problematic Smartphone Use

3.8.1 Socio – Demographic Factors

Several studies highlighted gender differences. Most found that women have more intensive use of the mobile phone than men do, predominantly text message use (Billieux, Van der Linden,Rochat, 2008; Sánchez-Martínez, Otero, 2009; Geser, 2006). Also it was found that females have a higher tendency to become dependent on their mobile phone (Billieux, Van der Linden, Rochat 2008; Geser, 2006; Leung, 2008). Another demographic factor that could be identified was the age aspect which showed that the younger a person, the higher the symptoms of dependency on the mobile phone (Billieux, 2008; Leung, 2008).

3.8.2 Personality Traits and Related Psychological Mechanisms

Most investigations have dealt with psychological variables that lead to problematic mobile phone use. They focused their studies on differences of personality traits.

A particularly strong tendency of problematic use of the mobile phone has been shown in personalities with high neuroticism (the tendency to be emotionally unstable) as well as extraversion (the tendency to be sociable), less relationship could be found with other personality traits (for example agreeableness, consciousness) (Bianchi & Phillips, 2005; Ehrenberg, Juckes, White, Walsh, 2008; Igarashi, Motoyoshi, Takai, Yoshida 2008; Butt, Phillips, 2008).

Here, these two characteristic traits walk different ways towards excessive use. Igarashi et al. (2008), state that extroversion results in the strong desire to communicate with peers or to establish new potential relationships. This correlates with Bianchi and Phillips (2005) findings that state that extroverted people are fundamentally social in nature and use the phone to socialize and, additionally, seek more social contact because they are generally feel under aroused (Eysenck, H.J., & Eysenck, M.W., 1985). Furthermore, Igarashi et al. (2008) found that the dependency on mobile phones through neuroticism is explained by the constant need to seek reassurance and by the fear to be rejected.

Another psychological trait positively associated with problematic phone use is impulsivity (Billieux, 2008; Billieux, Van der Linden, d' Acremont, 2007; Billieux & Gay & Rochat, 2010). Studies addressing the trait of impulsivity made use of Whiteside and Lynam's UPPS model (Whiteside & Lynam, 2001).

This model is divided into four dimension and are defined as: urgency (tendency to act rashly when experiencing intense emotions either positive and / or negative); premeditation (the understanding of a consequence of an act before engaging into it); perseverance (capacity to remain focused on a boring and / or difficult task); sensation seeking (tendency to enjoy and pursue new and exciting activities). It was found that urgency strongly correlates with problematic phone use. High urgency is associated with all aspects of everyday use of the mobile phone (numbers of calls, duration of calls, number of SMSs sent) together with symptoms of dependence, financial problems and phoning while driving. Bianchi and Phillips (2005) compare urgency with the effects on substance – dependent persons and say that individuals who have a high level of urgency will have problems deferring their use of the cellular phone, especially in intense emotional contexts. High urgency people have difficulties exerting self – control in intense emotional contexts which exposes them for developing problematic use of the mobile phone (e.g. intense emotional moments of joy which has to be shared every time with friends and everyone via the phone, or of pain and despair). Dysfunctional use of the mobile phone therefore result from intense emotional context, implying loss of self – control and from the desire to communicate with someone to cope with either positive or negative affect states. In fact, many studies show that problematic and addictive behaviours arise as a short – term strategy to deal with depressive and unpleasant emotions or moods (Brandon, 1994; Jacobs, 1986).

Lack of perseverance mainly predicts the use of the mobile phone (number and duration of calls) and financial problems (Billieux, Van der Linden, Rochat, 2008; Billieux, Van der Linden, d' Acremont, 2007). Mobile phone use is also stronger with individuals who tend to want to rid themselves from unwanted thoughts or are mind – wandering (Gay, Rochat, Billieux, et al., 2008; Gay, Courvoisier, Billieux, 2010). Phoning helps them to rid themselves from irrelevant thoughts (e.g. quarrel or unpleasant meeting). Finally, high sensation seeking individuals result in more dangerous use of the mobile phone (e.g. while driving for example). Thus, it may be assumed that, for individuals with a high level of sensation seeking, phoning while driving may promote exciting hedonic sensations in certain demanding situations (e.g. situations in which the driver needs to concentrate).

3.8.3 Self – Esteem and Related Psychological Mechanisms

Some studies analyzed the link between use of the mobile phone and self – esteem. (Heatheron, Polivy, 1991). Evidence of such a link is found in that persons that have low self – esteem favour indirect communication (email, SMSs), compared to high self – esteem people who favour face – to – face communication (Joinson, 2004). It was found that low – esteem people demonstrated a strong predictor of dysfunctional use (Bianchi, Phillips, 2005; Ehrenberg, Juckes, White, Walsh, 2008; Ha, Chin, Park et al., 2008; Leung, 2008; Butt, Phillips, 2008).

This is because they experience the need to seek reassurance by contacting other people (friends, partners, family) making them susceptible to excessive use or dependence on the mobile phone.

Another relevant self – esteem – related factor for understanding problematic mobile phone use lies in attachment styles, conceptualized in mental working models playing a crucial role in affective relationships (Bowlby, 1988). Bowlby’s theory outlines three attachment styles which organize cognition, affect and behaviour together and shape self – image.

The secure style is sustained by confidence of the availability of attachment figures in times of need and by comfort with closeness and independence; the avoidant style is characterized by insecurity concerning other’s intentions and by preference for emotional distance; and the anxious ambivalent style is defined by insecurity concerning other’s responses, as well as the desire for intimacy and high fear of rejection (Hazan, Shaver, 1987).

3.9 Pathway Model of Problematic Mobile Phone Use

The Pathway Model of Problematic Mobile Phone Use from Billieux(2012) (figure 1), broadens the view of previous research of problematic mobile phone use as merely an addictive disorder. It takes into account many different manifestations as well as various psychological factors involved. Hence, it allows for a broader more holistic view of the model of mobile phone addiction. It integrates all of the above mentioned models (see table 2) and provides a theoretical framework for further studies. In particular, the model respects the many different ways of an addiction and relates factors together that can lead to an addiction.

Furthermore, Billieux (2012) shows in his model that the excessive or uncontrolled use of the mobile phone generates a vicious circle through perpetuation of negative effect. It also outlines that a person can have different factors that lead to an addiction (e.g. low self – esteem and strong urgency). To address the broader picture, Billieux’s model introduces four pathways leading to dysfunctional mobile phone use; the Impulsive Pathway, the Relationship Maintenance Pathway, the Extraversion Pathway, and the Cyber Addiction Pathway.

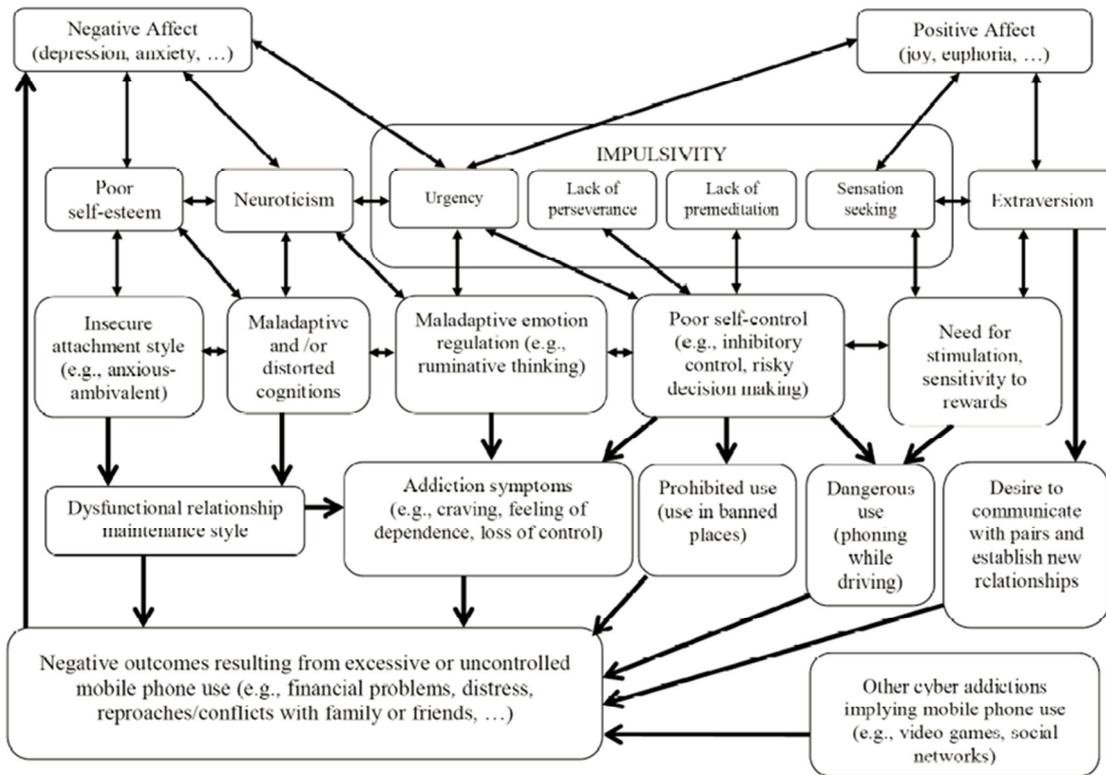


Figure 1 - Integrative model depicting four pathways to problematic mobile phone use: (1) the impulsive pathway, (2) the relationship maintenance pathway, (3) the extraversion pathway, and (4) the cyber addiction pathway

3.9.1 Impulsive Pathway

The first pathway called, impulsive pathway, describes individuals whose mobile phone use is mainly driven by poor self – control and / or maladaptive emotion regulation. It categorizes persons who can be identified by various impulsivity profiles. As outlined these impulsivity profiles are characterized by urgency, lack of perseverance, lack of premeditation, and sensation seeking.

3.9.2 Relationship Maintenance Pathway

The second pathway is called the relationship maintenance pathway. It describes individuals who use the mobile phone excessively to obtain reassurance in affective relationships (partner, family, and friends). These individuals are characterized by low level of self – esteem and a high level or neuroticism. Dysfunctional use is arising from a constant need of reassurance promoted by maladaptive cognitions and / or insecure attachment.

3.9.3 Extraversion Pathway

The third pathway is called Extraversion Pathway and describes individuals who are susceptible to excessive use of their mobile phone because they are sociable and outgoing and hold an elevated desire to communicate with peers and establish new potential relationships.

3.9.4 Cyber addiction Pathway

The fourth pathway is called cyber addiction pathway and is not directly connected to studies on dysfunctional mobile phone use, however, it is a realm that needs attention. The connection here lies within the ability of the mobile phone to use the internet to engage in all types of online activities such as video games or social networks. An example is role – playing games (MMORPGs), which allow a large number of players to interact in permanent virtual worlds, drawing many mobile phone users to a stronger use of mobile phones. As the mobile phone has access to the internet and people tend to use the mobile phone heavily for accessing the internet and perform internet related tasks, the mobile is subject to incorporates everything that currently is associated with internet addiction (Ishii, 2004). Billieux (2012) mentions the growing number of studies that have been found on internet – related disorders such as impulsivity facets (Billieux et al., 2011), maladaptive cognitions (Davis, 2001), or low levels of self – esteem (Armstrong, Phillips, Saling, 2000), allows mobile phone addiction to be defined in a broader spectrum of “cyber addictions” covering a range of behaviours relying on online activities and / or activities involving communication among individuals through technological devices.

As outlined by Billieux (2012) most frequent cyber addictions are online video – game addictions (Billieux et al., 2011), online gambling addictions (Griffiths, 2003), online sex addictions (Meerkerk, Van den Eijnden, Garretsen, 2006), and social network addictions (Wilson, Fornasier, White, 2010).

3.10 Smartphone Addiction Assessment

The use of mobile phones has started to be associated with harmful or potentially disturbing behaviours. Most important concerns associated with mobile phone use is that it may become uncontrolled or excessive having an impact upon daily living (Billieux, 2012). Among the most common negative outcomes of overuse of mobile phones are financial problems (Billieux, Van der Linden & Rochat, 2008; Funston & MacNeill, 1999), or sleep disturbance (Thomé, Harenstram & Hagberg, 2011).

Nowadays, excessive use of mobile phones is considered a behavioural addiction, similar to nonchemical addictions such as pathological gambling, compulsive shopping or video – game addictions (Chlóliz, 2010). In conclusion, mobile phone use has been associated with dangerous or “antisocial” behaviours, together with uncontrolled use and dependence symptoms.

According to Billieux (2012), the assessment of an individual’s mobile phone use should take into account three aspects:

1. The user’s profile (What type of person is it?)
2. The user’s actual use of the phone (How does this person use the mobile phone?)
3. The users problematic use (What activities can be called problematic use?)

Furthermore, Billieux (2012) proposes to realize this assessment using a semi – structured interview and validated questionnaires.

According to Billieux (2012), mobile phones are no longer instruments solely devoted to communication between two individuals but allow a wide range of activities including online activities like internet surfing, managing email, playing video games, gambling or involvement in social networks (Facebook and Twitter). This, Billieux states, differs entirely from its traditional predecessors which were constrained to calls and written messages. Hence, prior to the assessment of an individual’s potential problematic use, one should be aware of the various types of activities being practiced with the cellular phone. As an example, Billieux talks about

someone playing online video games. If someone uses the mobile phone for playing online video games, a potential overuse could mean an online video game addiction rather than a mobile phone addiction, where the mobile phone is only a device satisfying the desire or need to play online games. In order to avoid such faulty assumptions understanding a person's mobile phone user profile is a preliminary step.

After determination of a user's profile, the assessment should focus on the actual use made of the smartphone. Here, Billieux proposes a daily assessment rather than a weekly or monthly assessment (Billieux, 2008; Ehrenberg, Juckes, White & Walsh, 2008). The actual mobile phone assessment should comprise an evaluation of the number of calls emitted daily and their duration, and the estimation of the number of text messages sent daily (Billieux, 2012). The actual use can be segregated for example by determining the percentage related to social versus professional purposes. Additionally, if the person uses the mobile phone for other types of online activities, the daily time spent on these activities should be written down. From this point on, Billieux (2012) states that it is important to distinguish between heavy and problematic use of the mobile phone. This is because individuals may be heavy users of the mobile phone without being involved in any kind of problematic use; therefore a specific assessment of problematic use is required.

3.11 Ten Indicators of Smartphone Addiction

Griffiths (2013) provides ten indicator questions that can be used as indicators for a possible overuse of the mobile phone.

These questions are:

- Do you feel that the mobile phone is the most important thing in your life?
- Do you sometimes get in conflict between your family and friends about the amount of time you spend on the mobile phone?
- Does the mobile phone often get in the way of other important things that you should be doing? (work, education, etc.)
- Would you say that you spend more time on the mobile phone than on almost any other activity?
- Do you use your mobile phone as a way of changing your mood?
- Do you feel that you have increased over time the amount of time you spend on a mobile phone during the day?
- Do you feel moody or unhappy when not being able to use your phone?
- Do you sometimes feel like you need to use a phone?
- Did you ever try to stop using the phone and reuse it after a while? Did you feel that nothing has changed over the amount of time spend on the phone?
- Did you ever end up lying to others about the amount of time spend on the phone?

4. Profile of Smartphone and Social App Use

In the following, a summary is given of the findings based on literature and statistical evidence on the importance of the smartphone. It seeks to summarize the macro and micro effects of smartphone use in society to build a reliable Addiction Model that fits into today's context.

This model, in turn, is used to bundle suitable questions together for a reliable interview outcome to understand whether it can be talked about a smartphone addiction trend in society.

4.1 The impact of Smartphones on Society

The smartphone made our lives easier in many ways. It helps us in daily activities and gets us more easily connected; for example, you are able to use text messaging or SMS services at any time and you can wait for the answer instead of hoping that the other person is available when calling. It also allows for connectivity without incurring any phone costs using text messaging instead of calling. You are able to use social media to be connected to your social peers from far away or very close to you. You can use GPS to find your way from anywhere to anywhere else. You can access the internet at any time, giving you endless possibility. Not only you are aware of your phone consciously or unconsciously but the phone makes you aware of news from the online sphere through "beeping" or "shaking" of the phone. It blurs the line between places and times, especially in terms of working contexts, or private contexts; you are constantly available for anyone. The smartphone is an empowering technology for people, which makes them feel, connected and empowered to socialize. The mobile phone has become so routinely integrated that it becomes a part of everyday life.

This impact of the smartphone on Society was not being unseen by Service providers seeing the potential benefit of offering new apps for EVERY need imaginary, which means that every time you have a real life problem that can be solved through ICT (need), a service provider has created an app for it (solution).

In conclusion, this means that someone who relies a lot on the smartphone on daily activities will use it more heavily. The more he or she builds up real life needs into the capabilities of the smartphone by using another new app, the stronger the need for it gets. Additionally, the fact that you can use the same app on multiple devices can mean that you might use the same app on different devices. It can also be said that the combination of mobility of the smartphone (you can use it anywhere and it's easy to carry around) with communication media or apps that expect updates from you as soon as possible (e.g. instant messaging, social media feed) create a strong tendency to check your mobile phone whenever possible and wherever possible which can be seen according to statistics data (please see figure 3 and 5 in the appendix). The intent of service providers to create new apps for anything that can be done in Society has a reinforcing effect on the dependency on the smartphone to the point where it might be seen as vital to everyday activities. This effect is even more troubling looking at Service Providers who strive to offer a seamless experience for the user for anything the user wishes, including cloud based services, analytics services, software as a service etc.

Based on the literature, it can be said that two spaces have been created in Society (a digital sphere and a physical sphere) and that both spaces are being connected interchangeably through smartphones. Smartphones corroded the barrier between reality and digital which changed the way we see relationships and communities and the way we relate to others and what's approved and appropriate (Traxler, 2011). This means that individuals are able to project their real life in digital space and vice versa increasing their dependency on the smartphone, since they connect their reality with the digital sphere. This applies irrespective of time and space. However, this also means that you can have the same possibilities during socializing with others (family, friends, and work). This in turn can mean that you might be tending to repeat the convenience that you have when not being around anyone with when being around anyone interchangeably, which is evident in statistics data (please figure 4 about unprompted checks of the smartphone in appendix), creating the tendency of dependency of a smartphone or the perceived dependency on a phone ("I am using my smartphone all the time, also when being around friends"). Even worse, you might end up in a situation where you feel obliged to reply to other people's wishes of receiving updates from you as soon as possible forcing you into using your smartphone more than necessary during real life activities or during socializing with friends and family.

The question, however, remains if this is an effect that is strongly negative (as it can lead to a too strong dependency on the phone) or if it is a (needed) natural way of individuals of coping with today's fast moving world of which the strongest characteristics is its need for mobility (Traxler, 2011) and its structures of communication in society. Hence, the exact reasons of smartphone use and its immediate effects remain to be understood.

4.2 Characterizing the typical Smartphone user

Characterizing the typical "Mobile user" in the developed world, it can be said that he or she owns multiple digital devices that are connected, creating a constant flow of information on any device.

The smartphone is of highly personal nature to a mobile user. This might reflect into the fact that individuals project reality on the mobile phone, making it valuable to them as it is their convenience method to be connected to today's fast moving world, even though some apps are not created for mobile access, most users prefer mobile access to content (Loosemore, 2014). In addition, the mobile user takes different roles while interacting with a phone reflecting its multipurpose nature. He or she can take the role of using the phone for leisure activity as entertainment seeker, as a professional for work, calling people, or as an activist to plan the next political movement or event in the community. This also reflects into the variety of use of the mobile phone in every activity (please see figure 5 in the appendix about places of use of a smartphone).

According to literature, the typical mobile phone user uses the mobile phone for 7 types of activity. Social Interaction, Dependency on the phone as to being a part of their life and a solution to any obstacle, to bestow societal status upon them and to identify with them, to be connected for safety reasons (e.g. kids with parents), for professional use in the job, as a device for independence and freedom (e.g. teenagers and parents), and for gossiping with friends and family as a pacifier for social, psychological, and physical well - being (Peters & Allouch, 2005).

It can also be argued that mobile phones have been increasingly integrated into our daily life's at various different times and activities. This is shown in the occasions we use mobile phones such as on public transport, at work, while watching TV, during shopping, during walking, leisure time, even while meeting friends and talking to family / friends and eating. Interestingly, it even happens during business meetings and at very dangerous occasions such as crossing the road and driving (please see figure 5 in the appendix about places of use of a smartphone). A strong tendency to use the phone at any time is prevalent.

Finally, a strong tendency of attachment to the mobile phone is evident in Europe especially with Swedish citizens compared to other countries (except UK which is slightly higher). A total of 19% between 16 - 24 years argued that the mobile phone is their most important asset. This in turn indicates a high dependence on the mobile phone.

4.3 What are the traits that lead to a Smartphone / Social App Addiction and what are its effects?

In general, Addiction is a high dependence on a particular medium. Addiction is a psychological dependence whereas major motives are to relief pain or anxiety, or other negative emotional states (i.e. escape); or enhance control, power, and self - esteem (i.e. compensation) or simplifying and making life more manageable (i.e. ritual) and as a mood modifier or way of feeling good (i.e. instrumental). It can be argued that addiction must influence the individual in a strong emotional way either positively or negatively.

This is directly related to "Technological Addiction or Smartphone Addiction" as Griffith (1996) points out in his concept of technological addiction which involves excessive human - machine - interaction. In this are additionally included all core components of addictions which are

salience, mood modification, tolerance, withdrawal, conflict, and relapse (Griffith, 1998). Therefore, Mobile Addiction follows a similar pattern of the general concept of substance addiction. Several problematic behaviours that have been associated with Mobile Addiction are Nomophobia disorder, text message overreliance and phantom vibration syndrome.

In general, mobile phone overuse is associated with several socio demographic factors as well as personality traits and psychological factors according to literature. First of all, females have a higher tendency to become dependent on their mobile phone than males, and the age aspect showed that the younger a person, the higher the chance of symptoms of a dependence on the mobile phone.

Social App addiction is in the realm of cyber - relationships precisely because it is rooted in the idea of enhancing the inherent human trait of establishing, maintaining and communicating with social peers. It is this effect that makes social apps so appealing to a broad audience and on the other hand so vulnerable towards excessive use. Research has shown that SNSs are used mainly to stay in touch with friends, make new friends, and read status news and post status news and teenagers at least once a day update their profile which fosters excessive use of the smartphone (Lenhart, 2007). It seems that the more individuals are emerged in this new social space, the more they use it as they perceive encouragement for participation from the network (Kwon & Wen, 2010). social apps connect the digital space contacts with the physical space contacts. Therefore, it allows a real advantage as you are able to manage offline as well as online contacts with the smartphone. This in turn can lead to an overuse of it.

Five predominant characteristic traits of overuse of the phone have been found to be:

- People who are extroverted, with higher self - esteem to use social apps for social enhancement. Extroverted people have a strong desire to communicate with peers and establish new relationships (Bianchi and Phillips, 2005). The preference of using SNSs for communication instead of face - to -face communication can lead to an excessive use of social apps.
- People who are introverted, with low -self - esteem and low life - satisfaction using social apps for online popularity, and social compensation. These people favour indirect communication(email, SMSs), compared to high esteem people who favour face - to - face communication (Joinson, 2004)
- People with narcissist personality traits use Facebook actively to present themselves more favourably online to empower their ideal selves
- People who are neurotic seek constant reassurance and have an innate fear to be rejected by contacts reinforcing their need in resorting to constant use of the smartphone and social apps.
- People who are very impulsive showing traits of either urgency (tendency to act rashly when experiencing intense emotions, either positive or negative); or premeditation (understanding of a consequence of an act before engaging into it); or perseverance (capacity to remain focus on a boring or difficult task); or sensation seeking (tendency to enjoy and pursue new and exciting activities, or any combination. High urgency is associated with all aspects of everyday use of the mobile phone (numbers of calls, duration of calls, number of SMSs sent) together with symptoms of dependence towards the mobile phone

On a broader scale, a very strong correlation can be found with an excessive use of social networking and the effect of neglect of personal life, mental preoccupation, and escapism, mood modifying experiences, tolerance, and concealing addictive behaviour.

4.4 Summary of Findings

Impact on Society	Smartphone User and Use	Characteristic Traits and Effects of Addiction
<p>Access of internet at any time giving us unlimited possibility to a vast amount of information</p> <p>Be able to be connected to social peers from far and near (offline and online)</p> <p>Phone beeping or ringing (new instant messages, new post updates on social media) expects from you a constant call to action, and can make you feel obliged to sacrifice reality time with friends or family</p> <p>Helps in daily activities, replaces many tedious challenges we had with ease of access (finding a place using GPS, checking bus times using bus app)</p> <p>Smartphone blurs the line between places and times, therefore, between real and digital sphere</p> <p>Using text messaging instead</p>	<p>Owns multiple devices that are connected</p> <p>Smartphone is a highly personal device, by some it is the most important thing in their life's</p> <p>Mobile user takes on many roles as leisure seeker, professional, activist, or private individual</p> <p>Seven reasons exist to use a smartphone</p> <ul style="list-style-type: none"> • Social Interaction • Being part of life and the solution to everything • To bestow societal status and identify with them (image) • To be connected for safety reasons • For professional use in the job • As a device for independence and freedom <p>For gossiping with</p>	<p>Addiction is psychological dependence</p> <ul style="list-style-type: none"> • Relieving pain or anxiety • Relieving negative emotional states • Enhance control, power of self - esteem • Simplifying making life more manageable • Mood modifier or way of feeling good <p>Many of these traits are found in smartphone use</p> <ul style="list-style-type: none"> • Females and younger generations have higher chance of dependence on the phone • Social App addiction might be addictive because it builds on human trait of establishing, maintaining and communicating with social peers • The more individuals emerge in new social space, the more they use it as they get encouragement of participation from the network • Five dominant traits show overuse of smartphone <ul style="list-style-type: none"> ○ Extroverted people with high self-esteem to use social apps for social enhancement ○ Introverted low - self - esteem and low life - satisfaction use social apps for online popularity, and social compensation ○ People with narcissist

<p>of call in order to minimize phone cost</p> <p>Smartphone is an empowering device for people making them want to be more active socially (via digital sphere and real sphere)</p> <p>The Smartphone is a part of life</p> <p>Individuals project their real life into the digital Sphere using the Smartphone as the key</p> <p>The smartphone blurs the line between work and private context</p> <p>Service providers seek to satisfy customer needs with new apps, Customers in turn tend to use new apps for each problem increasing Smartphone use</p>	<p>friends or family as pacifier for social, psychological, and physical well – being</p> <p>Young people use Smartphones to comment on what others have published and post status updates themselves, resulting in many frequent looks on the phone</p> <p>Mobile phone is used almost everywhere (public transport, at work, while watching TV, during shopping, during walking, leisure time, even while meeting friends and talking to family / friends and eating)</p>	<p>personality traits use social apps actively to present their ideal selves</p> <ul style="list-style-type: none"> o Neurotic people seek constant reassurance on the network being afraid of being rejected by it o People who are impulsive show traits of urgency, premeditation, perseverance, or sensation seeking; high urgency is associated with all aspects of everyday use of the smartphone and symptoms of dependence towards it.
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Table 3 – Summary of main findings from literature

5. Model of Smartphone and Social App Use

5.1 Approach of Analysis

In order to get a broad understanding of addictive causes, it is made use of the addiction assessment approach of Billieux (please refer to chapter 3.10. Mobile Phone Addiction Assessment).

Since addiction is considered to be a very fuzzy definition (Griffiths, 2013) and can take on many forms, an approach of analysis is needed that takes a broad perspective and a more fine grained

approach towards the understanding of what can be termed an addiction or a mere excessive need for the phone out of other reasons.

Hence, the approach will be, firstly, to create a user profile of a person (what type of person is it?), secondly, to understand what the person is doing on the phone (how does this person use the mobile phone?). Especially, a focus is set here to Social App use and if social apps are used to maintain mainly online or offline contacts. Thirdly, determine the attachment to the phone, by asking on the time amount spent on certain activities and the amount of neglect towards real connections. This is to see if this activity can be seen as problematic (What activities can be called problematic use?).

To conduct this analysis, I will use a model that I have constipated drawn out of literature and statistical evidence called “Physical and Digital Sphere Addiction Model”.

5.2 Physical and Digital Sphere Addiction Model

The Physical and Digital Sphere Addiction Model assumes that information systems segregated the world into two realms, the digital sphere and the physical sphere. However, due to the traditional static nature of information systems by being bound to a certain location at a certain time, the digital sphere could not be used to its full potential.

The smartphone is the first technology that knows to successfully combine both realms interchangeably due to its mobile nature allowing for the digital sphere to be fully used to its full ability. However, now the question remains where an individual should dedicate its time to more.

Looking from this perspective, it can be said that the overuse of the smartphone can be a natural development of the connection between those two spaces and its consequences of simultaneous use. However, addiction is a different matter in that it has negative effects on our physical sphere in favour of the digital sphere. To analyse in how much a person is being endangered as to be too far into the digital sphere, the “Physical and digital Sphere addiction model has been created”.

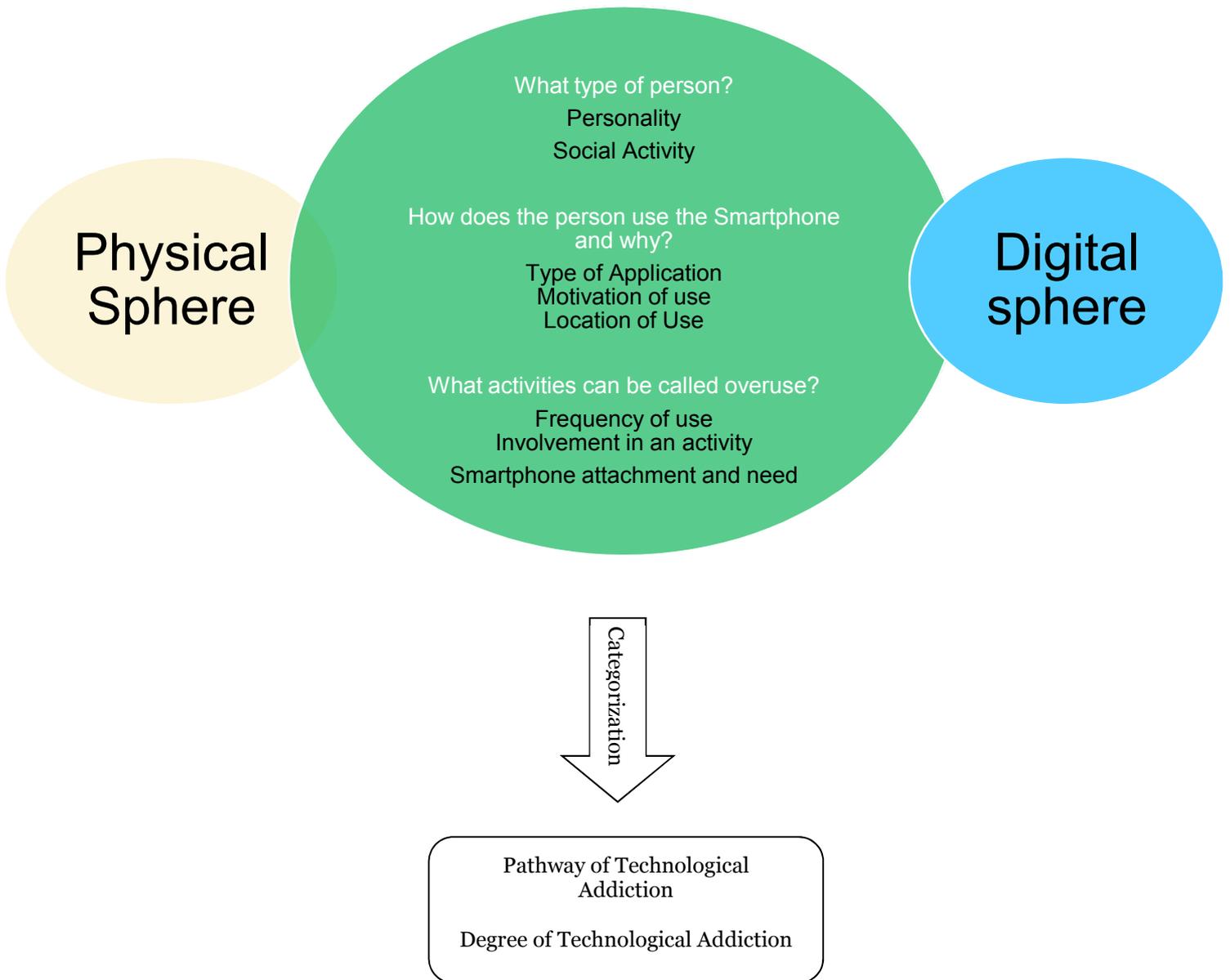


Figure 2 - Physical Sphere / Digital Sphere Addiction model

This model assumes in the two spheres' previously argued about that certain factors exist that draw an individual away from the physical sphere in favour of the digital sphere. It takes into account several factors that can favour such a transition.

For once, it looks at what type of person it is. It looks at an individual's personality based on values that have been connected to overuse of the phone (introvert, extrovert) and an individual's social activity (very active socially? Less active? Attached to friends and family? Need to express them? Is it used because of peer pressure, as all offline contacts use it to organize events etc?).

Secondly, it looks at how and where an individual is using the mobile phone and why. It clarifies the aspects of what type of application is mostly used (is it a social app? Is it an entertainment app? Is it a messaging app to stay in contact with friends and family?). Moreover, it looks at the motivation of use based on Val Hooper and You Zhou's (2007) approach. Is the smartphone

used for social interaction, as a companion of life, for image / identity, for safety reasons, for the job, for freedom or gossiping, or a combination of those?

Thirdly, it looks at what activities can be called an overuse by learning about how much time an individual spends on a certain activities, and in what frequency. Is it minutes, or many countless hours per day? Also it tries to grasp how much involved a person is in the activity, and whether it could end up in neglecting other tasks and if the individual has developed a strong attachment and need towards the smartphone. Billieux's 10 indication questions of addiction (please refer to chapter 3.11) is used as a guideline for questions regarding possible addictive qualities.

Finally, the model categorizes these findings by specifying whether the findings related to an individual are following a specific addictive pathway based on Billieux's (2012) pathway model of problematic mobile phone use (please refer to chapter 3.9). Thus, it categorizes whether the individual follows an impulsive pathway, a relationship maintenance pathway, an extraversion pathway or a cyber-addiction pathway or a combination of those. As a last step, it categorizes the degree of addiction, based on Val and Zhou's (2007) six definitions of addictions (please refer to chapter 3.7.4); does the person show addictive behaviour, compulsive behaviour, dependent behaviour, habitual behaviour, voluntary behaviour, or mandatory behaviour?

At the end, an evaluation is made whether the individual is more active in the physical sphere or in the digital sphere with an overuse of the smartphone. It is also evaluated if the individual overuses the phone as a natural consequence over changes in the way we communicate (socializing via internet, calling and text messaging) or if it truly roots in an addictive quality.

6. Analysis of Findings

In this section, the outcome of the findings are analysed and discussed. The analysis of findings was conducted based on the content analysis method and guided by criteria set by the Physical and Digital Sphere Addiction Model (please see chapter 5.2).

As a result, 12 participants between 18 and 33 years were asked about their relationship to the smartphone and their smartphone attachment based on the Questions derived from the model (please find question's asked in the appendix chapter 13.2) :

- Who is that person?
- How does this person live?
- What position does the smartphone take in this person's life?

It was aimed to keep a good ratio between men and women. Overall, 5 men and 7 women from various cultures and countries (France, Tunisia, Ireland / Sweden, Taiwan, Germany, Poland, Brazil, New Zealand / Korea, Romania, Macedonia) were interviewed using open ended guided questions. After defining the codes and marking the interviews based on these codes, the following results were identified.

Interview Results

Interview results have been codified, the occurrence of a certain code has been counted, and then results have been summarized in chart form. As the charts are various, all charts and figures used in this analysis have been moved and can be found in the attachment (chapter 13.3) of this document.

All participants with an age of an average 27 (female) and 30 (male) were asked a range of questions regarding their smartphone use and the smartphone's importance in their lives.

The participants scored the importance of the smartphone on average with a 7 out of 10 points, whereas the usefulness of the smartphone was scored on average with 6.5 out of 10 points.

From the people interviewed, 9 (77%) were very communicative, extroverted and outgoing, interactive, and eager to meet new people, whereas 3 (23%) were introverted and rather shy / uncommunicative.

According to the interviews, it was mentioned that the smartphone is used mostly in the evenings / and before going to bed and at any time when being free.

Besides that, on a typical day, the phone is used regularly for any type of activity that is quickly done (call, text, instant messaging); when waking up in the morning, during work, and when being in transport (bus / cab), and when being at new places for orientation purpose (e.g. Google Maps). Apart from this, other activities that participants mentioned were using the phone when doing grocery shopping, during sport activities, at special occasions (e.g. concerts), and while driving.

On the question about what is most commonly done with the phone, almost all participants were positive about using instant messaging apps on their phones such as Whatsapp, Skype, Line, aso. Besides instant messaging, most highly used on the phone is the Internet, Google (Google Search, Google Maps), Bus App (for Bus Schedule), Call or Text, Social Media, Youtube, Downloading / Listening to Music, Alarm Clock, and checking Email. A few other mentions were camera, news apps, buying tickets, using phone for groceries list, and the calendar.

According to the interviewees, time spent on smartphones lies between a max of 8 hours and a minimum of 30 minutes per day, except for one extreme case where the smartphone is used all the time. On average, most participants were having a 30 minutes per day time frame using the smartphone.

Time on the smartphone since their initial purchase increased for most participants.

The main reason mentioned herefore is the contact to family or friends as the smartphone is seen as the main medium for that. The second mentioned reason was the availability of apps as more apps on the phone increased overall use of the phone. Other reasons are that that internet use has increased.

Regarding the use of social apps, Whatsapp is the main reason for people to engage with social apps. This trend is followed by Facebook. Other types of social apps mentioned were Skype, LinkedIn, Twitter, Instagram, Viber, Line, Kakao (Korean Whatsapp).

Reasons for engaging in social apps were various, among the main activities are messaging and reading other people's timelines and posts. This is followed by messaging and posting or commenting on other people's posts. Besides this, other things being done is to be active in groups on platforms, using facebook for creating events, to be active on social groups in facebook, taking pictures of your life in instagram, using twitter for following and following back, and to follow the news on social media.

Over half of the respondents responded to use social apps between 30 minutes and one hour a day (55%). Slightly less people responded with 2 – 3 hours per day (18%) whereas few mentioned between not at all or between 1 – 10 minutes a day (9%).

As for the necessity in daily life, most interviewees responded with the smartphone as being a necessity in daily activity (83%). Reasons for this feeling of necessity exist most commonly because the smartphone is perceived to be convenient (also more mobile and faster to access than computer and mac as it takes less to start it up), it is also important for being socially connected, it is useful when being on the move or when travelling. Other reasons mentioned were to feel more secure by being connected, also to satisfy the feeling that you do not miss out on anything that might happen, and to inform yourself when needed. One participant mentioned that the attachment to the phone was equal to being addicted to it. Only few responded that the smartphone is not a necessity (17%), however, these respondents mentioned that they have gotten used to the phone as being part of their life.

Why do people have a smartphone? The main reason is to be connected to friends and family. Besides, a reason seems to be because of work and for emergency purpose. Other mentions were as it is cool image wise, to play games, out of personal interest, and for bus schedules.

Frequency of checking the smartphone is every 10 minutes for half of all respondents (50%) followed by regularly (33%), and every 5 minutes (17%).

The time people need to reply to a message is dependent on whether they know a person and if the message is easily answerable. Otherwise, it takes longer to respond, the average time to respond to messages lies within a range of 5 minutes.

What are the benefits of the smartphone? Among the top benefits mentioned were that you can be spontaneous and informed while being on the move (e.g. looking up information, and finding places). Besides these reasons, participants highlighted its multipurpose nature (you can do everything with the phone and you do not need to take anything else with you but the phone). Moreover, participants value the phones convenience of use, its feature to be available to others (also messaging wise), and the connection to the internet.

Negative impacts of the phone on a person mentioned were various. Interestingly, many of them were troubling and were grounded on social ties as they did indicate a sort of strong reliance on the phone of one sort or another at the expense of social activity. Most commonly, participants mentioned that the phone paradoxically hinders communication instead of enhancing it. People tend to lose their chance of proper communication in reality by being too hooked towards the activity on the phone. A participant mentioned that the phone is used to divert the attention to something else when being nervous to turn off the mind; also it helps to avoid talking to strangers by pretending to do something. Other claims in connection with the hindrance of proper communication in physical life were that the phone takes away time you could use for other social activities, that you lose touch with what is happening around you (using the phone on transport, at work, during meetup with friends, aso.), that it is highly addictive and you tend to get locked to your phone, and that you text more than calling or meeting up causing you to lose personal touch.

Interestingly though, regarding the preference of personal communication (meeting up) over using the phone, most people agree that personal communication is preferred over texting or calling. Few people prefer texting over calling or meeting up.

On the question whether friends or family ever mentioned that the phone behavior hinders communication, almost half (46%) of the participants were saying that this never happened to them, whereas one third replied (31%) that they use their phone too much. Some people said that it did not occur to them but to friends of theirs (15%), and very few mentioned that it rarely happens (8%).

On the question whether participants use smartphones without a particular reason most said that they do, however, reasons and occasions were various. Most commonly though, the indicator for browsing or checking the phone without a real reason is when being bored or when waiting for or on something (like breaks in between TV series, waiting for bus / plane, etc.). Things being done while checking the phone ranged from checking facebook timelines and people's posts or pictures, to randomly checking products on webshops online or watching

youtube videos, to randomly checking for a message even though you know you have not received one.

On the question whether smartphones distract a lot during important tasks, most participants said no or that if it happened they would have no issue with putting it away or turning it off.

On the question whether a phenomenon of phone vibration syndrome could be found with participants, most over half of them agreed with this (55%) whereas one third (36%) said it never occurred with them, and 9% responded with just sometimes.

7. Interpretation of Findings

This discussion describes the interpretation of the findings of chapter 6. It identifies certain trends that can be derived from the analysis and addresses the question in what way and to what extent the smartphone is part of our life, what effect this has on us on a macro and micro basis, and if there is a trend towards a possible overuse or addictive use of the smartphone based on the data. It also reflects on the possibility of a “natural” overuse through today’s societal expectations of being connected.

Firstly, it can be said that the smartphone is both, perceived to be important in participant’s lives, and perceived as a useful device in daily activity. Additionally, a perceived necessity in daily activity is indicated by all participants, or if they do not think it is necessary, that they have gotten used to have one around, because of the convenience and multi – purpose functionality it provides, and its mobility. This multi – purpose and mobility grounded necessity is confirmed through the reply of participants on the benefits of the smartphone. Among the top three reasons were the ability to be spontaneous (in terms of using the smartphone when needing information instead of planning ahead), furthermore, you would have all things you need in your phone (scheduler, google maps, bus planner, etc. etc.), lastly, it was said that it is very convenient to use. In addition, some participants even had two phones, one private one and one work phone which they both use dependent on the place they are, being constantly connected at work and at home.

Especially interesting is to note is that the extent of smartphone use depends on the person’s lifestyle on a typical day. The person chooses the apps which are most useful to them which can be attributed to the amount of time spent on the phone, e.g. using a sports app to measure daily performance of physical activity can be attributed to many frequent looks on the smartphone, whereas the use of an activity planner on the phone does lead us into a habit on using the phone during the whole day on a regular basis. Furthermore, both of these cases can be evidently found in the data set as one participant stated to use the smartphone (and SmartWatch together) for regular performance checks as well as two participants who use the phone especially for planning work related activities using the phone. None of these cases is especially troubling as they are both controlled activities. However, since they are tasks based on regular activity and performed with little mental awareness, the smartphone perfectly integrates in daily activities that: “are more or less performed automatically or unconsciously”, (Albanese, 1993), making the smartphone a device that fosters habitual behaviour. This habitual behaviour is evidently found, at several occasions. For once, it is found as participants unconsciously use their smartphone without a real intention during various activities, mainly including transits / breaks or when being bored. Additional evidence for habitual behaviour is found in that the smartphone triggers the urge to check the smartphone on a very frequent basis. New updates of any kind are checked for every 5 to 10 minutes, meaning that the mind constantly and subconsciously wavers towards the smartphone to check for anything that might become interesting, important, and / or arousing for the mind.

Various reasons were stated to own a smartphone and use one in the first place. Most commonly, it was mentioned to be connected with friends and family / or that family / friends expect to own one for communication. Moreover, it was mentioned that it was

mandatory for work, or in case of emergencies. All of these activities lie in the area of mandatory behaviour. Mandatory behaviour is a compulsory behaviour of any type which is rooted in environmental consequences and by society pressure (Aoki & Downes, 2003).

Most commonly, the smartphone is used between activities in the evenings for contacting friends or family as well as any time when being free (again mostly for social activity).

On one hand, the indication of using the smartphone anytime when being free sorts well with the very frequent looks on the smartphone. This encourages as stated earlier the claim that the mind is constantly aware of the smartphone and that the user is constantly being drawn to the smartphone even if there is no direct need for this, resulting in a habitual behaviour. It can also be assumed that the smartphone is carried around on a daily basis "to be available".

On the other hand, it can be said that the smartphone is mainly needed for social communication. Both most commonly activities involve the use of smartphones for social activity. This aspect of need of social activity is strongly supported by the reply on what is commonly done with the smartphone, which is using instant messaging by using any type of messenger to communicate with peers (WhatsApp, Facebook, Skype, Line, etc.). Furthermore, smartphone use increased for participants since first purchase, first and foremost, due to the need to be in contact with friends and family of which the main medium is the phone using any type of measure, mainly instant messaging, SMS, and Calling. From this, it can be derived that the preferred way of communication has shifted from calling towards a more text based communication between people as suggested by literature. Since most activity is done using Instant Messaging, the question could be raised whether people lose personal touch with their peers in "reality" since they use texting as main medium of communication. Indeed, some participants indicated that they prefer texting over calling or meeting up. However, it was commonly preferred to meet personally or to use the phone to meet up. When it was mentioned to use the phone, it was often said in order to stay in touch with friends remotely which makes the smartphone a natural choice to "keep in touch".

The constant drive towards social activity using the smartphone can lead to a tendency to overuse the phone to keep in contact with relationships or to have a constant desire to communicate and keep in touch with all peers, Billieux (2012) termed this as either a Relationship Maintenance Pathway or / and an Extraversion Pathway.

The constant drive towards the smartphone as a main device for connection to peers might evolve into a dependent behaviour, since dependent behaviour is rooted in the strong emotional attachment towards the phone to be available to social peers as for example feeling anxious not having it as he / she might miss messages or calls, or feeling incomplete when not having it around. This emotional dimension is the main difference between having a smartphone out of habit and having it out of dependent behaviour, which fosters an addictive tendency.

Indeed, few cases were evident where a smartphone overuse might be the case and had potential towards a dependent behaviour / addictive behaviour on the phone. For example it was mentioned: "I would not want to miss out on important messages, so I need my phone with me", or: "if I do not have my phone I might start to cry", or: "if I do not have my phone I feel I am missing something". Other cases were that a participant mentioned that the phone is used all around the clock to the maximum extent possible and that there would be no way to increase that amount spent towards the smartphone, mainly to stay in contact with his friends remotely, which certainly indicated an overuse of the smartphone.

Evidently this tendency towards "dependent behaviour" is enhanced by the use of social media, since the main motivation of Social Media Networking is to establish and maintain both on – and offline relationships (Young, 1999). According to literature, main motivations of using SNS are to keep in touch with friends they do not see often, and to keep in touch with family. It is also used to maintain offline relationships. Thus, people who extensively carry out activities online on SNS and spend much time on it could fall into the category of cyber – relationship addiction.

All in all, however, the time spent on the smartphone and social apps (per day) indicates that a real dependent behaviour or even addictive behaviour towards the smartphone and / or SNS is relatively unlikely. In the set of participants, using the smartphone, only one was in danger of being smartphone dependent / or even smartphone addicted with using the phone “to the maximum extent possible”. This person also spends a lot of time on social media forums and groups with friends. Another participant with 8 hours per day on the smartphone could be susceptible of overuse, all other participants lay within the 1 hour 30 minutes to 30 minutes timeframe. Regarding social apps, most participants lay in between 1 minute to 1 hour per day, whereas a few lay in the range of 2 – 3 hours per day. Interestingly, the amount of social apps use and the total amount of time spent on the Smartphone is equal in some cases. This either indicates that some participants use the Smartphone exclusively for social media, or that they are consciously or unconsciously uncertain about their time indication spent on the Smartphone.

In addition, the participants were certainly aware of the negative and possibly addictive qualities of the smartphone. Participants said that the smartphone could have a negative effect on relationships, it can be time consuming to use, and it could above all create addiction and take away time you could use for other activities. Also you become unaware of others or you do try to use it to avoid talking to others. In fact, one third of the participants mentioned that their friends or family told them to put their phone away as they use it too much which can in itself hamper family or friend relationships. So for this third it might be better to decrease their smartphone use. Almost half of the participants, however, mentioned that this never happens. Additionally, on the question whether the smartphone distracts from important tasks, meaning if participants need to divert attention because of the smartphone, the majority indicated that the smartphone does not do that or if it does that they put it away.

Interestingly though, a phone vibration syndrome which is an indicator of smartphone overuse was at least found with a bit more than half of the participants, whereas around one third said it never occurred. This in itself would indicate that with these participants an overuse of the smartphone is possible.

8. Conclusion

The aim of this study was to understand negative influences that Mobile Information Systems have on a macro and micro basis on smartphone users and to understand a possible overuse or addictive quality towards smartphone use. Close attention was put to the areas of “Smartphone Addiction” and “Social App Addiction”. In this chapter, a conclusion is given to stated topics, and an addiction profile is given.

Now coming to the question what role does a smartphone take in a user’s life and how much attachment does it create?

The data researched does reflect some of the main findings that were given in literature and in statistics.

You are indeed constantly aware of the smartphone, and it gives you endless possibility, it is perceived as multi – purpose and as convenient. You are mobile and can be more spontaneous in your daily decisions (during work, or when waiting for sth.), but also especially when travelling to find the right places, or to find the right information about anything you wish). You are tempted to prefer texting over calling or meeting up as this saves you the effort of meeting up in person. In what way this influences your communication with your peers depends on your personality whether you prefer to keep in touch via text or via call or meeting up. According to the data, the preferred way is still to meet up in person rather than using messaging for communication, hence, there is no direct evidence towards that the smartphone makes us less social.

Certainly, smartphone use increases when there is a need to stay in contact with family or friends remotely, which can be seen as a natural consequence of how the world is becoming interconnected and its citizens tend to travel more and stay in touch with friends or families from far. This habitual behaviour born out of the need for connection could have evolved out of a voluntary and mandatory behaviour that was created through social peer pressure or other means of environmental influences, coming from others or yourself (family wants you to buy a smartphone to keep in touch, you bought one to keep in touch with friends remotely, you need it for work related tasks, you wanted it for your image, etc.).

You integrate apps into your daily activity based on your lifestyle, which might or might not increase your daily amount spent on the smartphone. This is dependent on the time you need to invest in the activity you connect with the app you use on your smartphone. However, these activities are directly related towards your activity in real life and do directly relate to your real life connections, meaning that the smartphone by itself does not disconnect you from reality. This might or might not make you more dependent on the smartphone in building a voluntary or habitual behaviour. Just as literature states, you are unaware of the smartphones presence as it seamlessly integrates in anything that you do during the day, it is a true "invisible" life companion. Nevertheless, this is certainly a natural way of progression towards using the smartphone most effectively and making life easier and more manageable which is more of a benefit than a curse. The smartphone is used at various occasions during the day, for example to message and conveniently stay in touch, and read or post status updates on Social Media. Hence, the main reason for using the smartphone is to stay in contact with social peers and also to give updates about yourself using Social Media or read other people's updates on it. It is "to let others know about yourself". Constant checks towards the smartphone are performed in order to assure to be available to others and text them or contact them if needed. This happens to the point where you start to repeatedly and habitually take your smartphone to hand for various reasons, subconsciously, sometimes to the point where you do not know why. Surely, these tendency's do fit into the category of a Relationship Maintenance Pathway or an Extraversion Pathway, since the constant drive towards the smartphone to be available to contacts can evolve into a strong emotional attachment to the smartphone fostering a dependent behaviour. This is evident through a few cases where attachment was mentioned such as: "I would not want to miss out on important messages, so I need my phone with me", or: "if I do not have my phone I feel I am missing something". However, overall smartphone use and Social App use over the day remains low and it is likely that it is seen more as a convenience method to respond quickly to another person, rather than a true addictive quality.

Perhaps the amount of time spend is even higher than indicated by some. By looking at the chart indicating the time spent on social apps and the total time spent on the Smartphone, it can be concluded that either some participants use the Smartphone only for social interaction (as for 30 minutes per day using it only for social apps) or that they use the Smartphone unconsciously or consciously more than indicated.

To conclude, the result of this thesis is that smartphones do indeed have a potential to addiction, however, based on the data collected, it was found to be relatively low. Only a couple of participants showed signs of a dependent behaviour (however, even those were rather active socially), whereas most participants showed traits of a voluntary behaviour, habitual behaviour, and mandatory behaviour of using the smartphone. All of these behaviours cannot be considered a true addiction, because they are still controllable and do not harm the individual in any serious way. It lies more with the individual to give the smartphone less attention and put more focus on what is happening around the person (when being with friends, family, or anywhere else). Individuals, on average, do not overuse the smartphone in favour of a digital sphere and in disregard of their real social life and real social peers. They rather connect with their friends more conveniently using the smartphone. In the end, it seems that the increase of smartphone use is mainly due to the way we communicate nowadays digitally, and the shift in how we relate to our social peers using digital means.

9. Limitations of Findings

Several limitations have to be taken into account when looking at the findings of this research.

Firstly, most of the group of people chosen to be interviewed were on average at the middle to the maximum end of the Millennials age. Since their life is already relatively established and stabilized, this could mean a different outcome than interviewing exclusively younger years (e.g. 18 – 22) which are less stable in their social and emotional life. This could alter the results as it means that influences towards addictive behaviour are not as evident as they are within younger years. However, even then, most participants were using the phone quite extensively, which can indicate that the attractiveness and the attachment to the smartphone does not get less with age. Even the people who claimed to use their phone very little still used it quite regularly for different activities.

Secondly, the set of respondents was limited. A larger number of respondents would have improved the evidence foundation. In a few cases, replies were not given to all questions in the questionnaire, meaning that sometimes participants rather evaded a certain question or generalized it which made it harder to come to a clear conclusion. It was tried, however, to make the questions not too personal (leaving out personality questions and some social questions) to allow for a higher response rate.

Thirdly, a true in – depth addiction study would have involved to analyze each participant individually based on their emotional level and attachment towards the smartphone. This would have included questions regarding the persons personality and its social surroundings. However, this was not completely regarded as these questions are of relatively personal nature and they were kept on a broader basis to allow for a larger retrieval of replies on these questions. Another reason for not going to deep into this field was that the goal of this study was not too create an addiction profile which would have been a study fitting into the IT Health discipline. Thus, it was tried to make a trade – off between using questions regarding the importance of the smartphone to all participants of this study in daily life and seeking out a possible attachment of any kind towards the smartphone. Since this study is somewhat cross – discipline (IT and Health) it was not always easy to accomplish such a trade – off. Also, characteristics found in addiction literature that show certain addictive behavior and its immediate effects on smartphone users were not taken into account directly, but were used as a reference. These characteristics include personality, and demographic factors. Nevertheless, the outcome of this research shows that the trade – off was quite reasonable and provided a few interesting and useful results on a generic base.

10. Contribution to Theory and Practice

In this study, it was shown that there exists a relationship of the increased use of a smartphone and a possible development of addictive qualities, although this relationship was found to be relatively weak in form of a voluntary, habitual, or mandatory behavior.

From this study, it became evident that facts stated by literature and statistics hold true, in that the smartphone has become entrenched as part of society. It has become invisible to us and vital as it is perceived as a necessity to make life more manageable, to be more spontaneous and be more mobile which seems to become a necessity in today's fast moving society. People tend to primarily translate the convenience of mobile technologies into keeping contact remotely, in particular, via instant messaging or social media, to acquaintances, friends, and family.

This study is generalizable as it does not necessarily restrain its use towards the devices known as smartphones. Anything that comes up in the future that is able to connect to a network, allows for communication, and is mobile in nature can be attributed to this study.

Perhaps in the near future this study fits to an analysis of a chip in your skin that allows for such communication and mobility that creates the convenience that human beings need to satisfy being yet one of many nodes in an interconnected social network of peers.

11. Future research based on findings

This thesis covered but one of many topics regarding taken – for granted – mobile access to app services and information for individuals and society.

Potential other aspects that need to be further studied in regard to the position of the smartphone in daily life are for example:

- Implications of embedding computing into daily lives, how privacy of individuals is ensured or how unwanted surveillance through mobile technologies is prevented, etc.
- Implications on how the “digital divide” is handled for people who do not have convenient access to the internet or the smartphone, if many services start to be only offered via the smartphone and the Internet (banking, social services, etc.)
- The implications of using private smartphones as an employee or a customer in a company’s context

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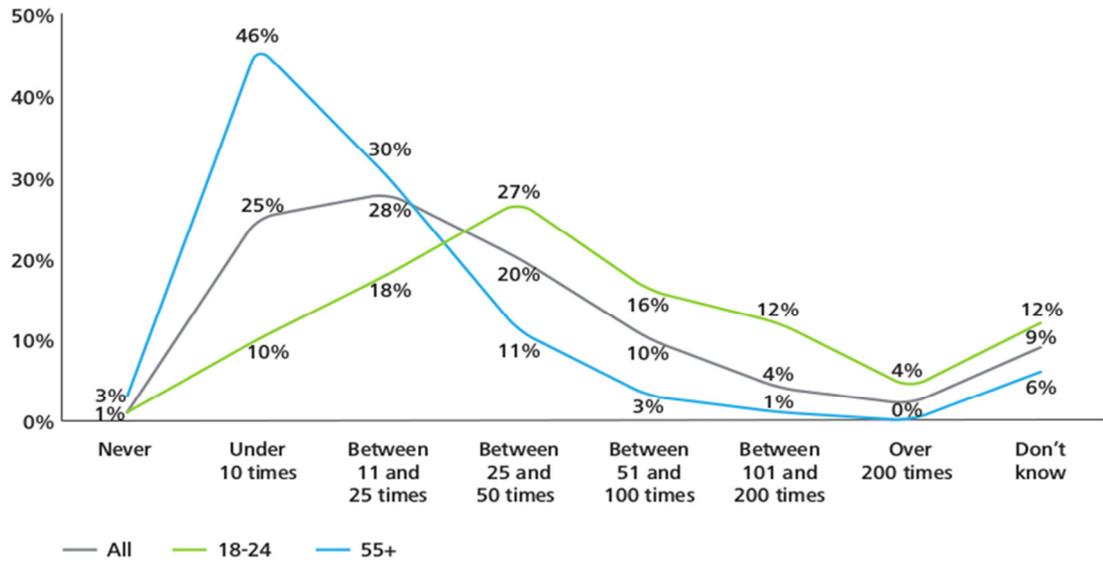
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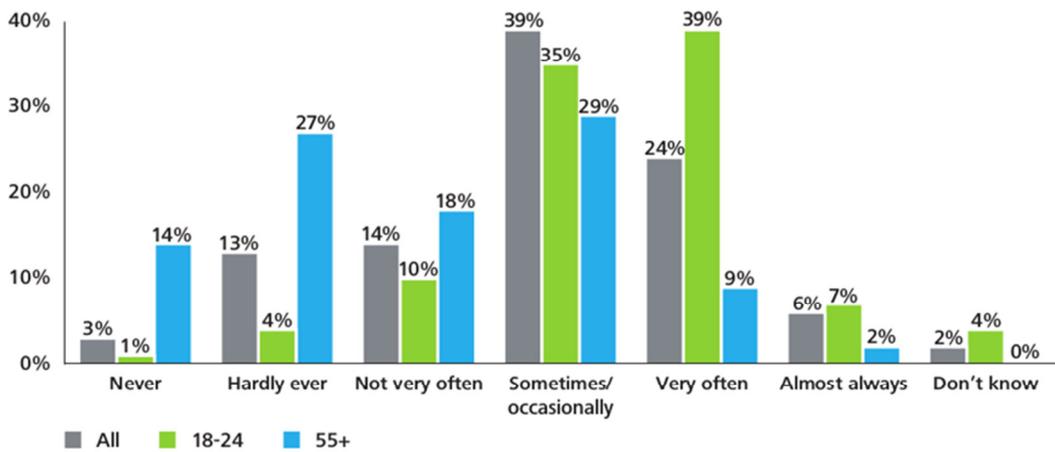
13. Appendix

13.1 Statistics of Smartphone use



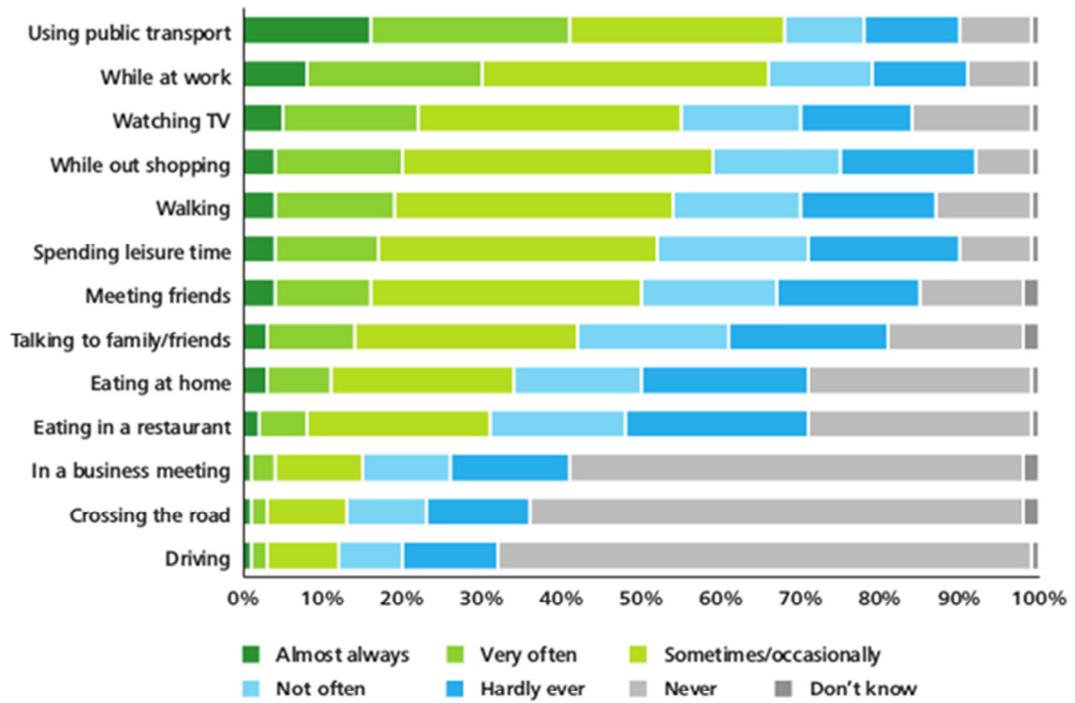
Weighted base: Respondents who own or have access to a smartphone (3,039)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2015

Figure 3 - Frequency of looking at smartphone on a daily basis



Weighted base: Respondents who own or have access to a smartphone (3,039)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2015

Figure 4 - Unprompted checking of smartphones



Note: Respondents for whom a particular activity does not apply have been excluded from this analysis (e.g. respondents who do not work have not been asked if they use their phone in a business meeting).
 Weighted base: Respondents who own or have access to a smartphone (3,039)
 Source: UK edition, Deloitte Global Mobile Consumer Survey, May-Jun 2015

Figure 5 - Usage of smartphone while doing other activities

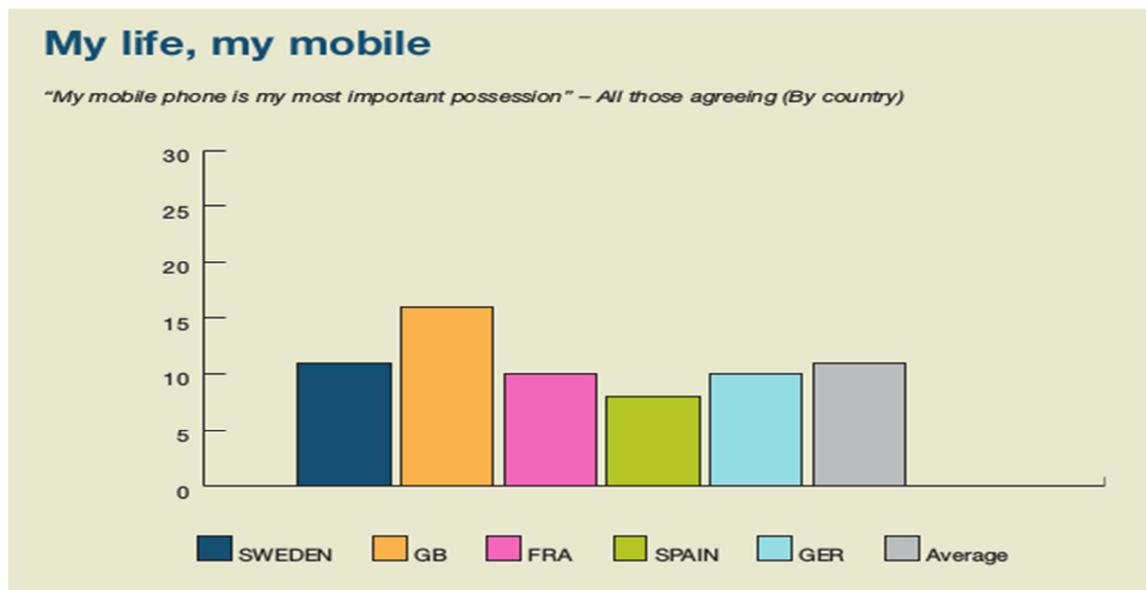


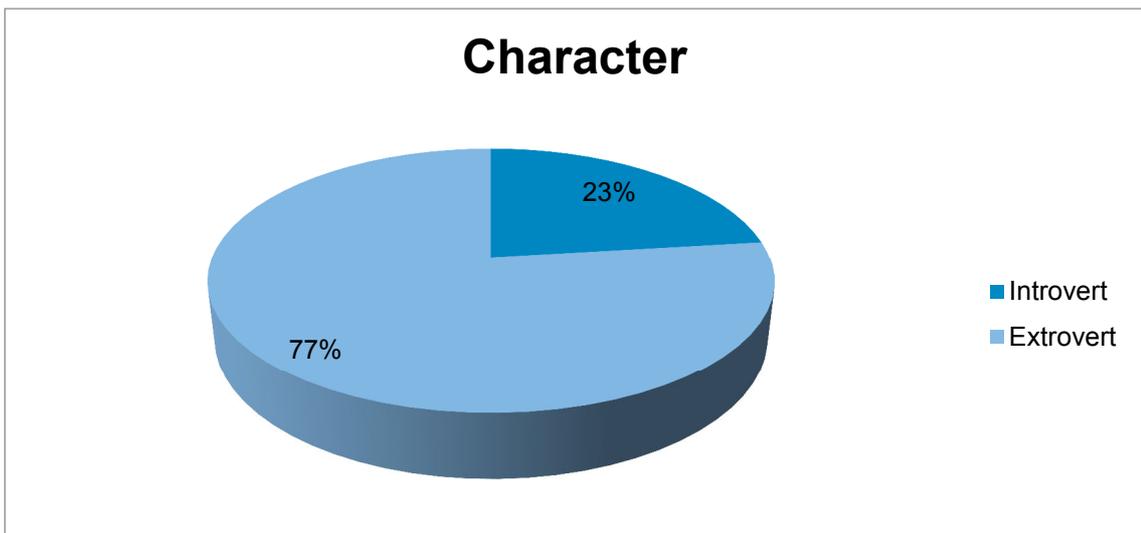
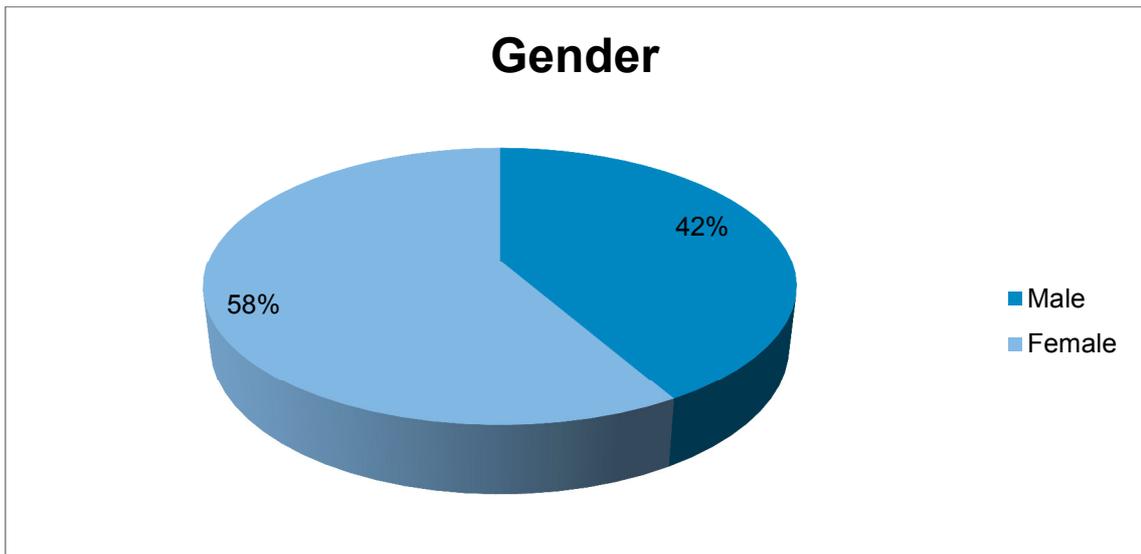
Figure 6 - The smartphone as most important asset

13.2 Interview Questions

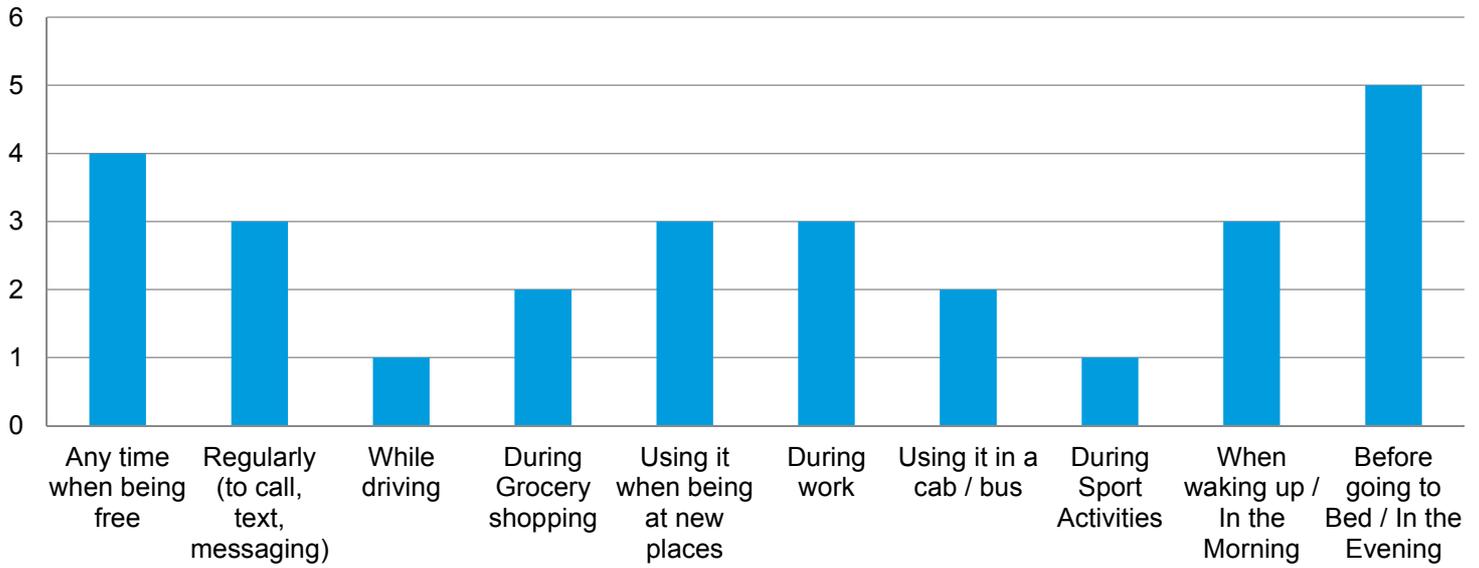
1. How old are you?
2. How would you describe your social character?
3. Can you describe me your typical daily activities?
4. When do you use your phone in these daily activities?
5. Why do you have a smartphone? What was the initial reason for you to have one, what is the reason now? Did it change?
6. What do you commonly use your smartphone for?
7. How long does it take you to reply to a message?
8. How often in an hour do you think about checking your phone?
9. Would you say that the time of use of the smartphone has increased over the years you own it? If yes, would you know what you have been using it for the most time in general?
10. Do you feel that the smartphone is a necessity to cope with daily activities? If yes, why do you think so?
11. How much time do you spend on the smartphone?
12. Do you use social apps? If yes, which ones and what do you use it for?
13. How much time do you spent on social apps?
(Twitter, Facebook, LinkedIn, Instant Messaging like Line, WhatsApp etc.)
14. Would you say that you actively seek to solve a problem in life (whatever that is like looking for bus times, checking cinema times, having a poll app, making it easier to define the next present of a birthday party with friends together) with your smartphone and a new app that you download from the store?
15. In what ways would you say does the smartphone benefit you?
16. Can you think of any ways where the smartphone impacts you negatively? If yes, how?
17. Do you sometimes use the phone in favour of more personal communication? In what occasions would that be and why?
18. Does it happen to you that you use your phone without any good reason? In what occasions does this occur? What do you do with the phone?

19. Did you ever get into the occasion where friends or family told you that you use your phone too often and neglect proper communication? Or do you sometimes feel like you use the phone too often?
20. Does the phone ever get into the way of other activities that you should be doing (like work,
21. Have you ever had the occurrence of a vibration of the phone or a ringtone of the phone and
22. How important would you say is the smartphone to you on a Scale of 1 - 10? (10 is best)
23. How useful do you perceive a phone on a Scale of 1 - 10? (10 is best)

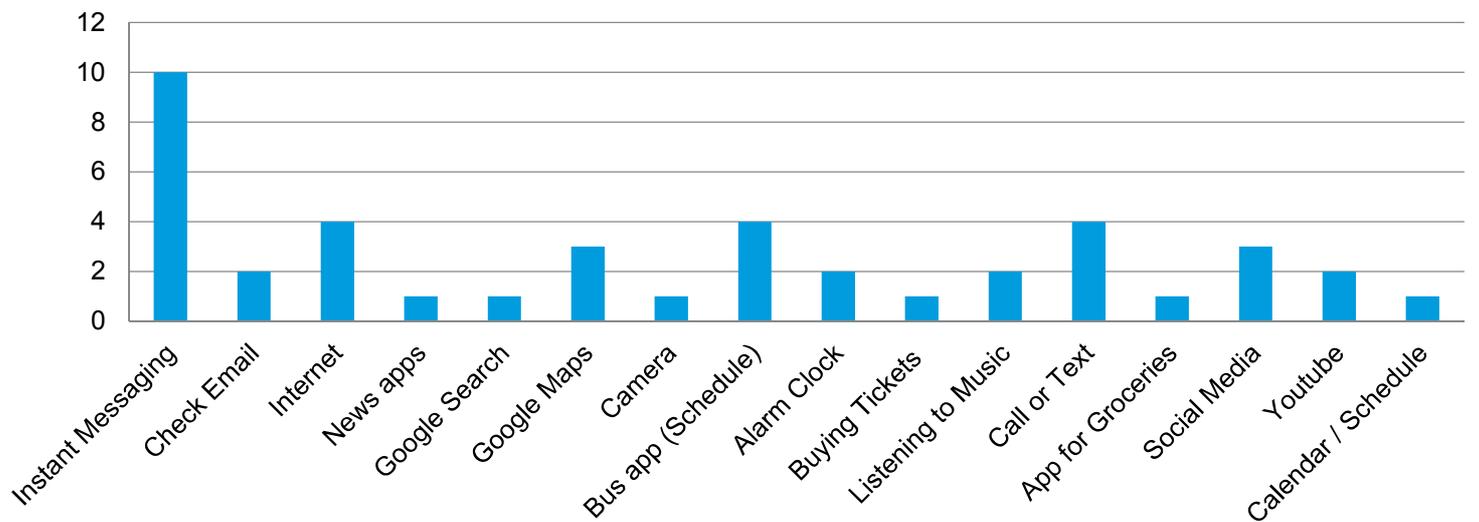
13.3 Interview Results (Charts)



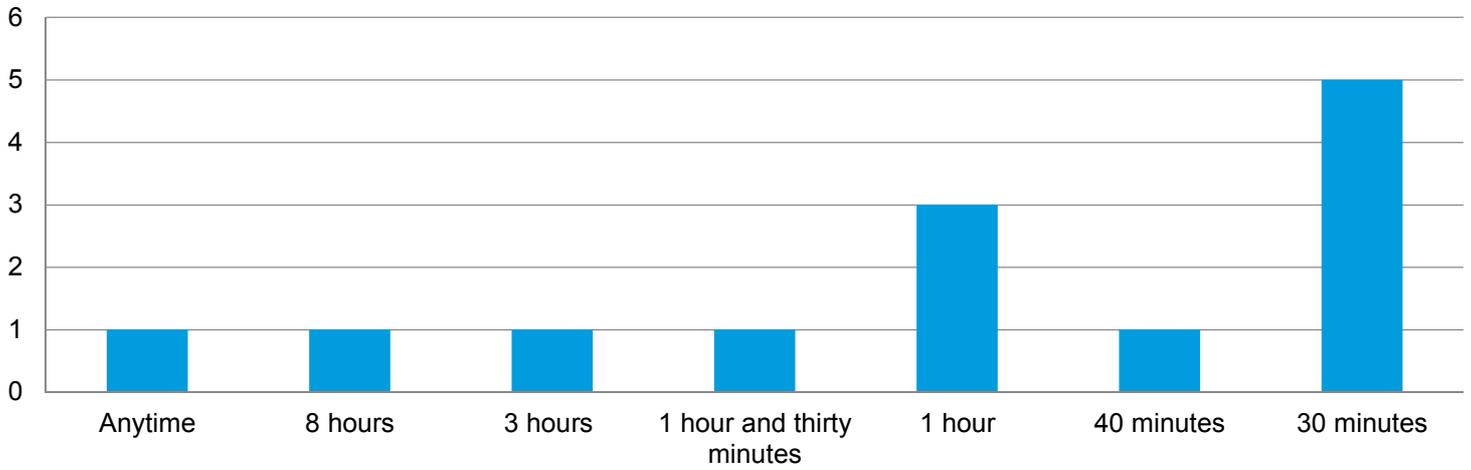
Occasions when Smartphone is used (daily)



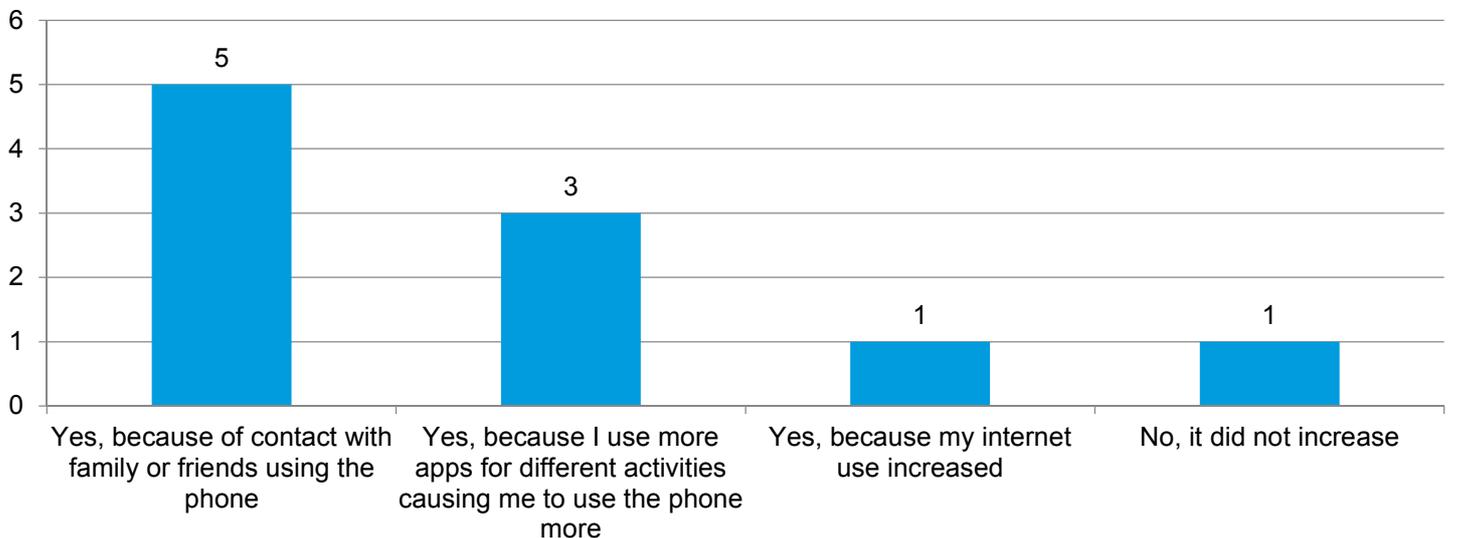
What is commonly done with the Smartphone



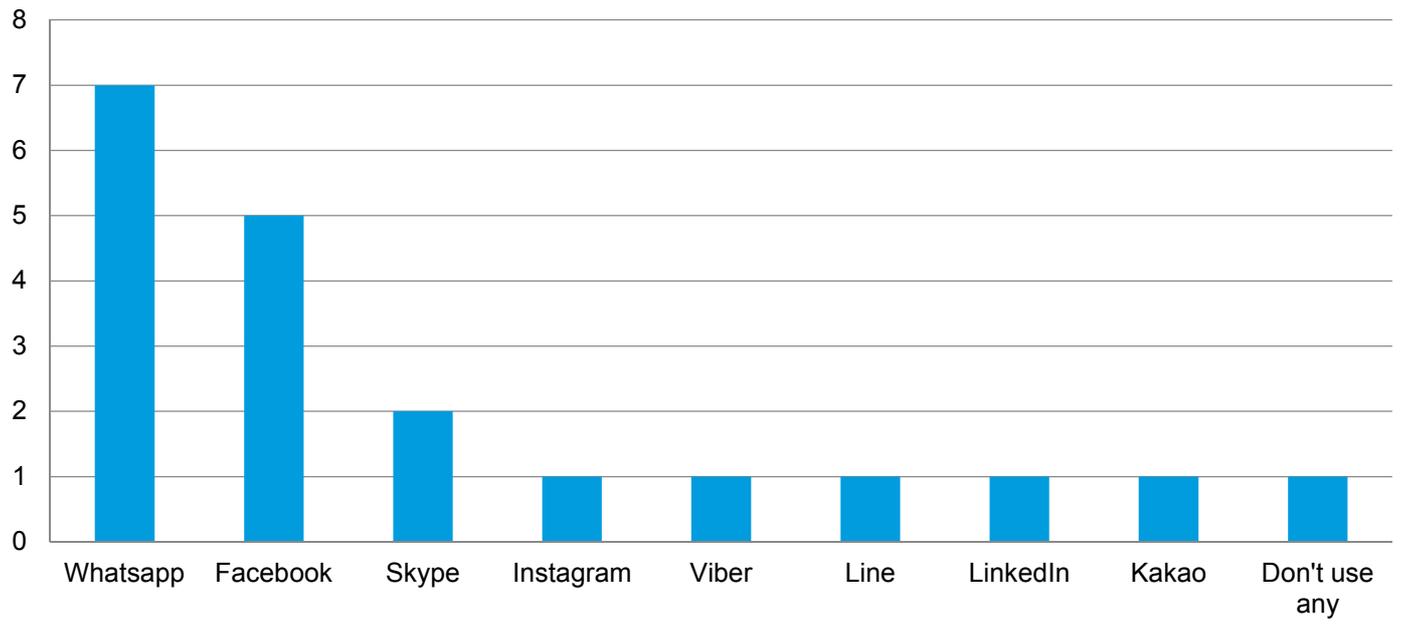
Time spent on Smartphone (per day)



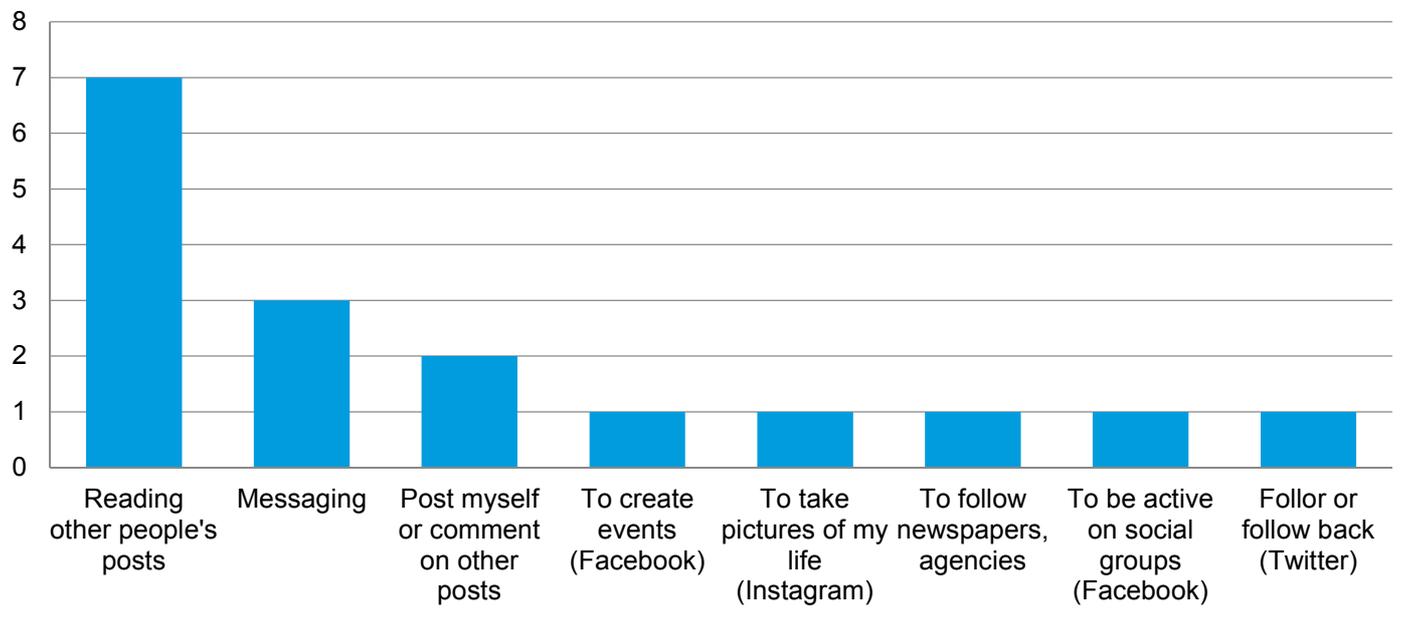
Time increased spent on Smartphone since first purchase



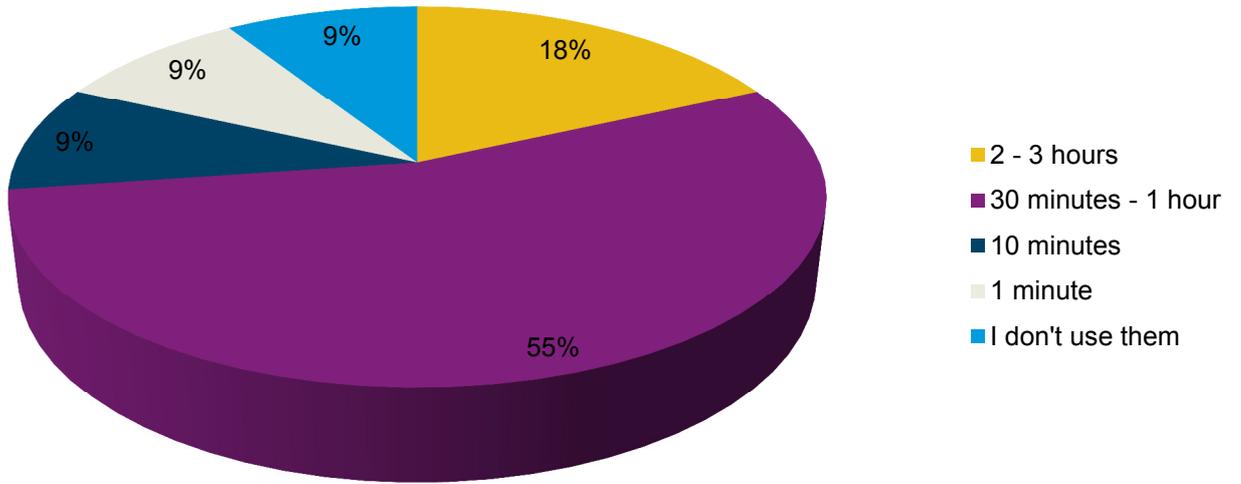
What Social Apps do you most commonly use



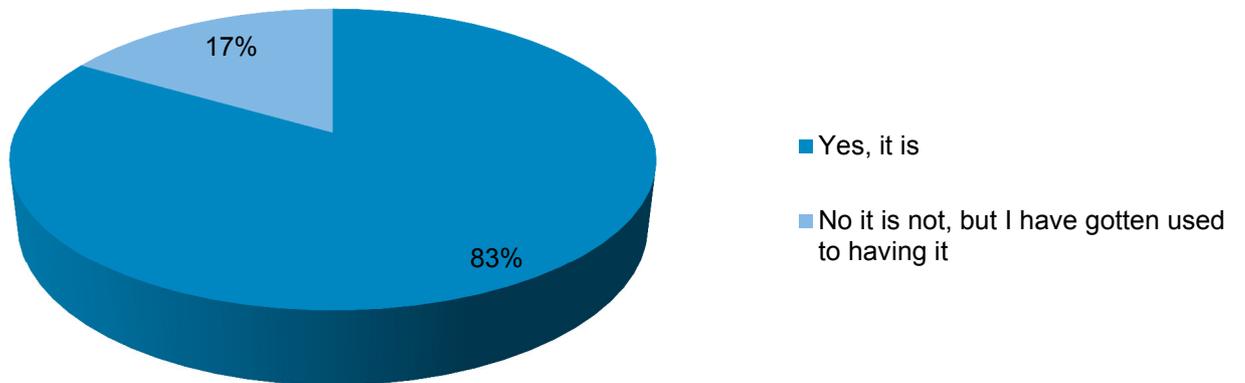
What do you most commonly do on Social Apps



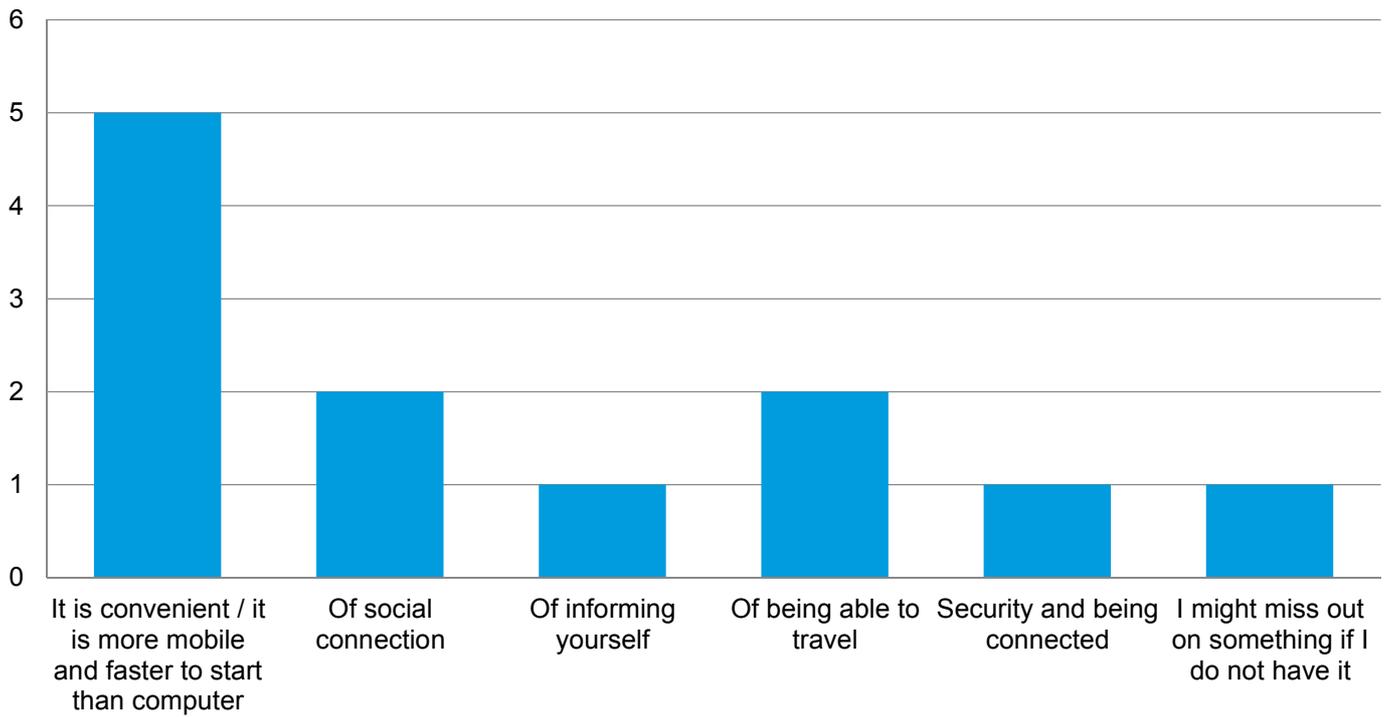
Time spent on Social Apps (per day)



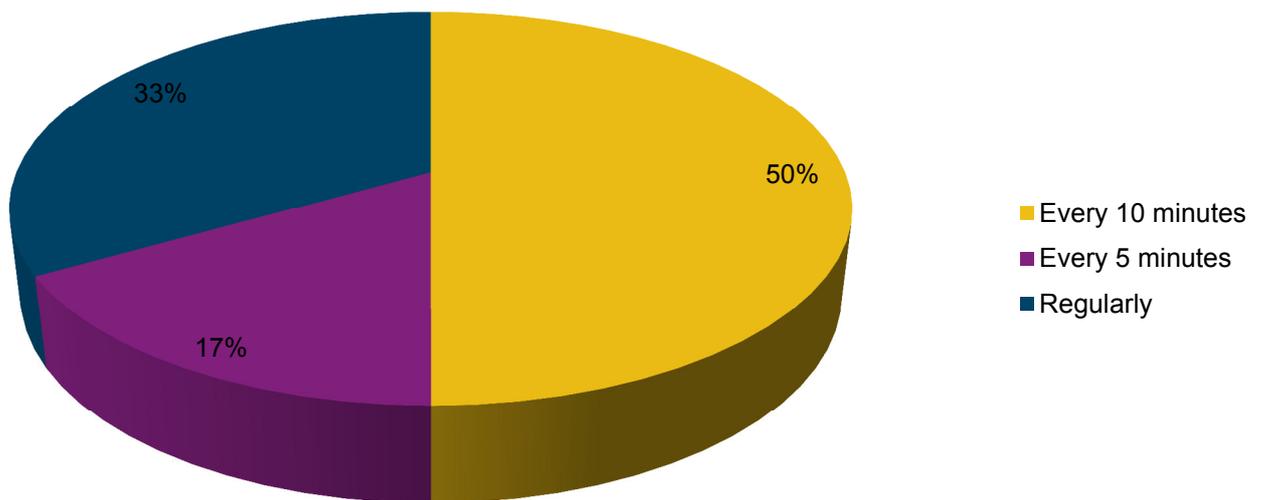
Smartphone is a necessity in daily activity



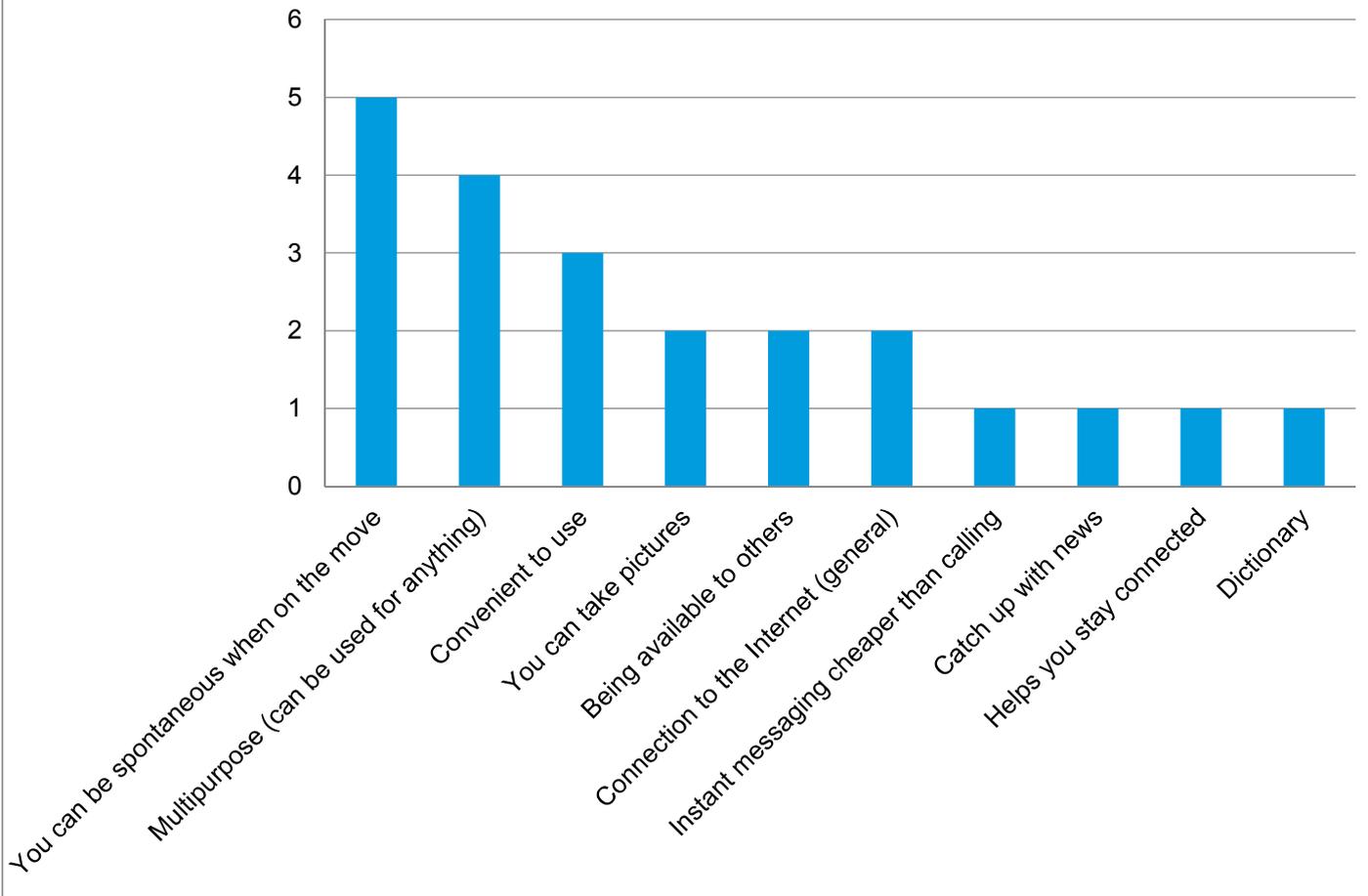
Yes, the Smartphone is a necessity, because



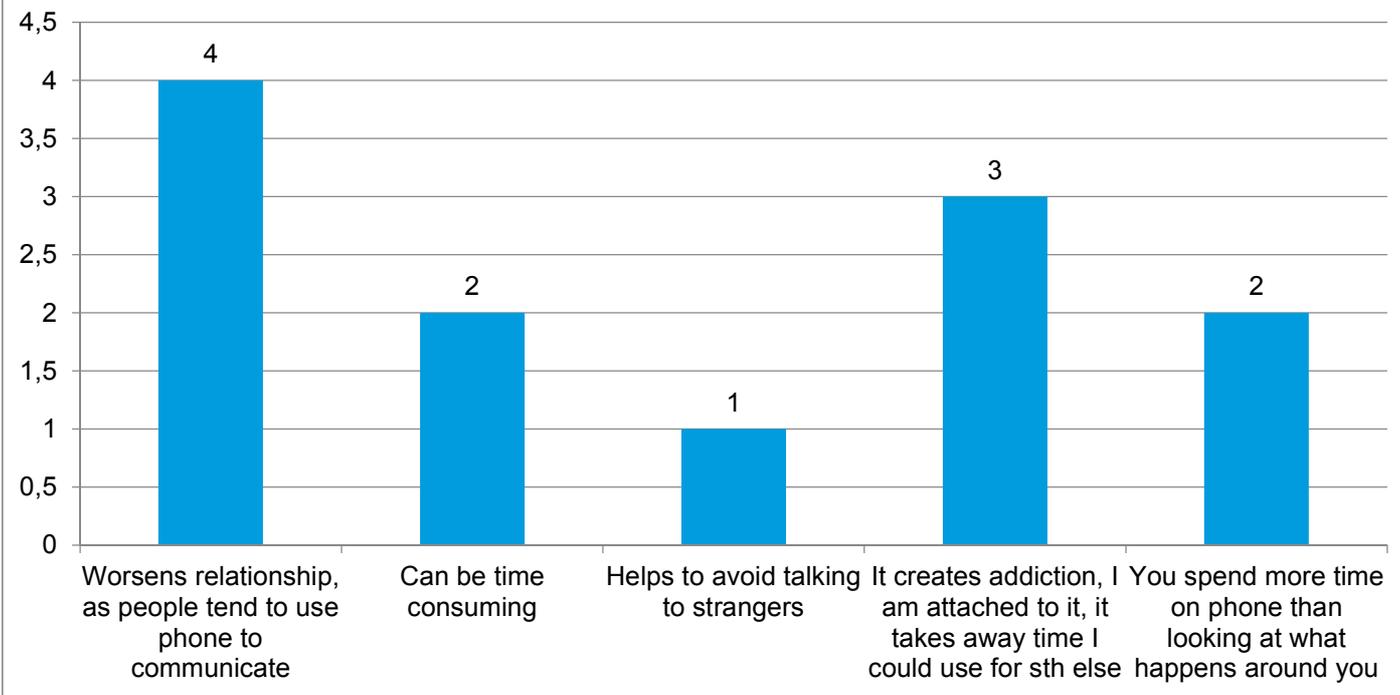
Frequency of checking the Smartphone



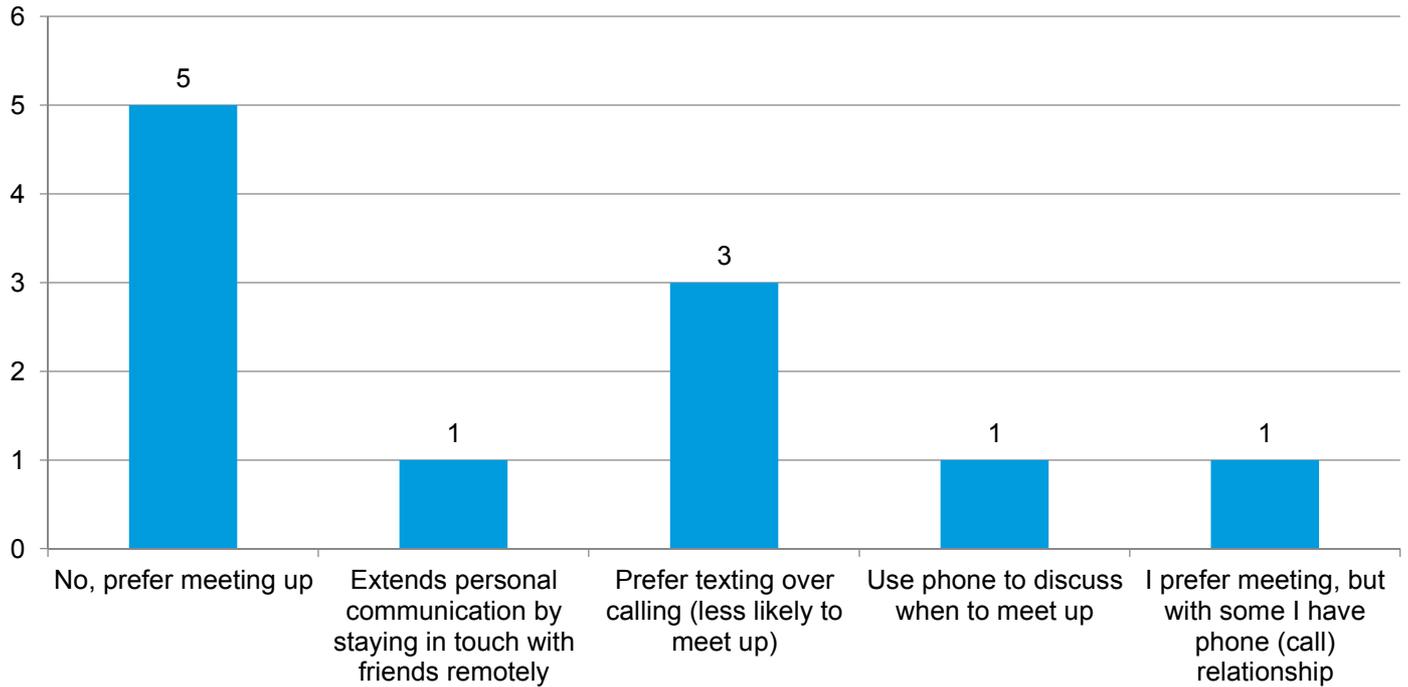
Benefits of the Smartphone



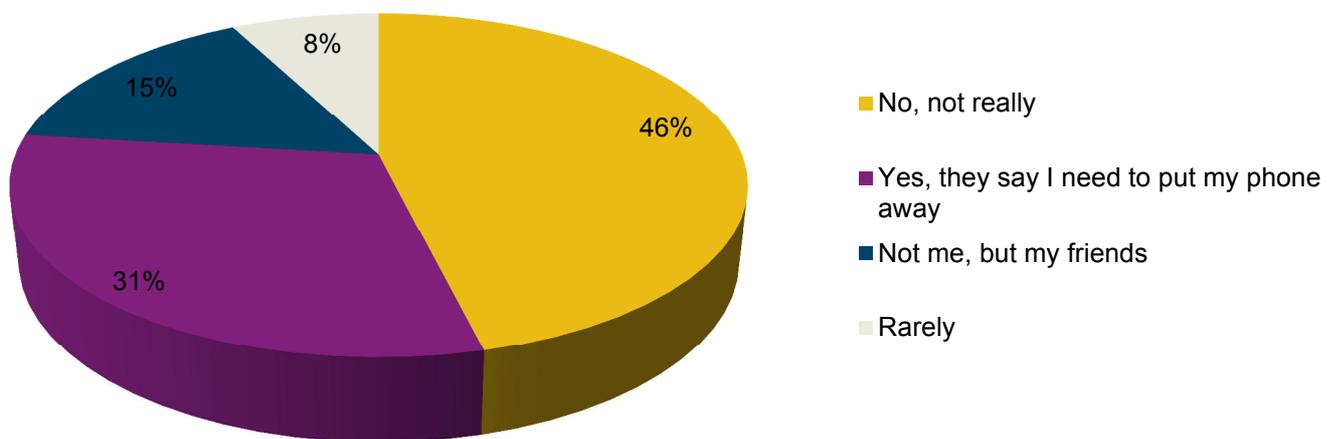
Negative aspects of the Smartphone



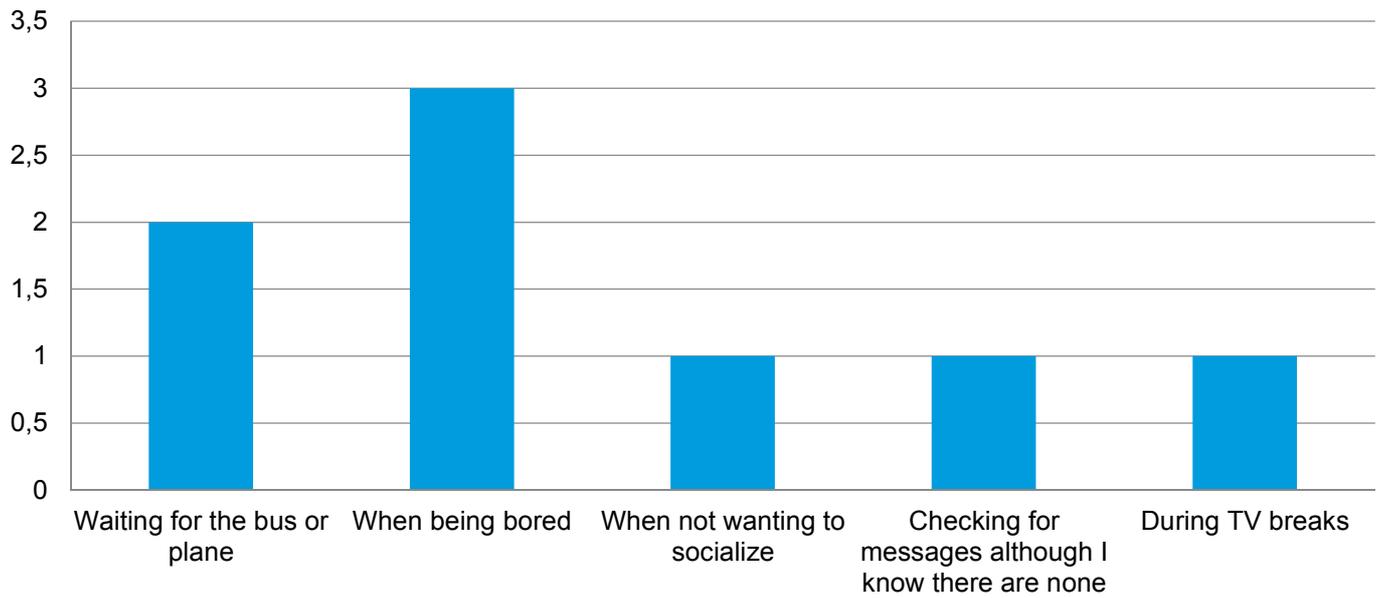
Prefer Communication via Smartphone than meeting up



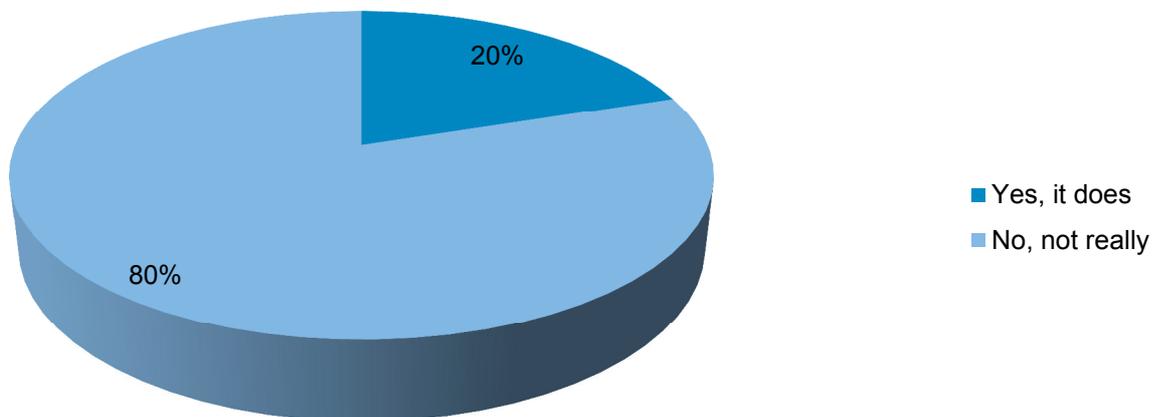
Friends and Family told me that I use the phone too much



I check my Smartphone without a reason, when



The Smartphone distracts a lot during important tasks



Phone Vibration Syndrome

