Impact of Smartphone’s on Society

Muhammad Sarwar  
Department of Information Technology, SZABIST  
Dubai, United Arab Emirates  
E-mail: sarwar.baloch@gmail.com  
Tel: +971-50-5055285; Fax: +971-2-4045110

Tariq Rahim Soomro  
Corresponding Author, College of Engineering & Information Technology  
Al Ain University of Science & Technology, Al Ain, United Arab Emirates  
E-mail: tariq.soomro@aau.ac.ae  
Tel: +971-3-7024883; Fax: +971-3-7024777

Abstract

The intention of this study is to investigate how Smartphone’s are impacting the society and also how Smartphone’s are going to transform the culture, social life, technology landscape and other diverse aspects of modern society. The intention of this study is to understand all the positive and negative aspects of Smartphone on the society. The study will primarily focus on impact of Smartphone on business, education, health sectors, human psychology and social life. At the end, the study will summarize the impact and conclude based on wide range of impacts that Smartphone’s have on society. The paper will also recommend solutions, in order to reduce the negative impacts of Smartphone’s and realizes more benefits of this exiting technology.

Keywords: Smartphone, Mobile Applications, Social Impact, Addiction, Health.

1. Introduction

The convergence of communication and computing for mobile consumer devices is on the evolutionary course to bring interoperability and leverage the services and functions from each and every industry. In this process of convergence the Smartphone’s are the leading devices taking the front end and playing the role of universal mobile terminal. As a marketing strategy the Smartphone term was introduced in the market, referring a new class of mobile phones that provides integrated services from communication, computing and mobile sectors including voice communication, messaging, personal information management (PIM) applications and wireless communication capability [1]. In real sense Smartphone is a mobile phone with advanced features and functionality beyond traditional functionalities like making phone calls and sending text messages. The Smartphone are equipped with the capabilities to display photos, play games, play videos, navigation, built-in camera, audio/video playback and recording, send/receive e-mail, built in apps for social web sites and surf the Web, wireless Internet and much more. Due to same reasons the Smartphone’s now become a common choice for consumers along with the use in business as it was initially intended for business users only [2]. The latest surveys show that the popularity of Smartphone’s is increasing in general public with the more paces then it is increasing in Corporations. Initially the Smartphone’s were only perceived for business use due to their cost and application, but not today, today we are in a frenetic Smartphone
society populated with the Smartphone’s from many vendors providing a range of advanced functionalities and services on a piece of hardware [3]. Today Smartphone’s enable consumers, advertisers and publishers how to better engage, socialize using the ubiquitous experience this advanced platform by leveraging it’s of the firm. The focus of income statement is on the operating revenues and expenses. User groups of financial reports for decision–making require data related to all easy to use and availability characteristic [4]. Due to its ubiquitous nature and social acceptance we can find Smartphone in educational institutes, hospitals, public places and shopping malls etc. [3]. This paper is organized as follows: next section 2 will review history of Smartphone’s; section 3 will review Smartphone growth and usage; section 4 will explore the impacts of Smartphone’s on diverse sectors of society; and finally this study summarized the impacts of Smartphone’s and concludes.

2. History of Smartphone’s

Today’s Smartphone’s has been around since last six years when Apple introduced the Smartphone in mass consumer market, but in reality the Smartphone has been in market since 1993. The different between today’s Smartphone and early Smartphone’s is that early Smartphone’s were predominantly meant for corporate users and used as enterprise devices and also those phone were too expensive for the general consumers [5]. The Smartphone era is divided into three main phases. First phase was purely meant for enterprises. During this phase all the Smartphone’s were targeting the corporations and the features and functions were as per corporate requirements. This era began with the advent of the very first Smartphone ‘The Simon’ from IBM in 1993. Blackberry is considered as the revolutionary device of this era, it introduced many features including Email, Internet, Fax, Web browsing, Camera. This phase was totally based on Smartphone targeting enterprises [5] [6] [7]. The second phase of Smartphone era started with the advent of iPhone, the major breakthrough Smartphone market in 2007. Apple revealed its first smart phone in 2007. This was the time when first time ever industry introduced the Smartphone for general consumers market [8]. End of 2007 Google unveiled its Android Operating System with the intention to approach the consumer Smartphone market. The emphasis during this time period was to introduce features that the general consumer requires and at the same time keep the cost at lower side to attract more and more customers. Feature like, email, social website integration, audio/video, internet access, chatting along with general features of the phone were part of these entire phone [8] [9] [10] [11]. Third phase of Smartphone was mainly closing the gap between enterprise centric and general consumer centric Smartphone and improvement the display quality, display technology and on top of that also aiming to stabile the mobile operating system, introduce more powerful batteries and enhance the user interface and many more features within these smart devices. This phase logical started in 2008 with the upgrades in the mobile operating system and within last five year there have been several upgrades in Apple iOS, Android and Blackberry OS. The most popular mobile Operating systems (iOS, Android, Blackberry OS, Windows Mobile) and key Smartphone vendors (Apple, Samsung, HTC, Motorola, Nokia, LG, Sony etc.) are concentrating to bring features both in operating systems and devices which will provide exciting feature to enterprise and general consumers. The role of Android has been tremendous during this time period as it provided a great opportunity to all vendors to build devices using the great open source Android technology [8] [9] [10].

3. Smartphone Growth / Usage

The adoption of Smartphone’s has been tremendous in mainstream consumer markets all over the world. Surveys show that around 42% of mobile subscribers in US use Smartphone’s, along with 44% of mobile users in 5 major countries of European Union (France, Germany, Italy, Spain, and UK). Media usage on mobile– including browsing the mobile web, accessing application and downloading content saw a major increase and surpassed 50 % in many markets; this introduced the high-speed networks and increased public WiFi availability in those areas [4]. With the ability to connect on-the-
Muhammad Sarwar and Tariq Rahim Soomro

go and use internet and mobile services, mobile users have not only adopted real-time social networking on their Smartphone at a growing rate but frequency of access has been also increasing day by day [12]. A UK telecommunications regulator Ofcom, released the following statistics as part of their study on Smartphone usage in the United Kingdom only [3]:

- 37% of adults and 60% of teens admit they are highly addicted to their Smartphone.
- 51% of adults and 65% of teens say they have used their Smartphone while socializing with others.
- 23% of adults and 34% of teens have used their Smartphone during mealtimes.
- 22% of adults and 47% of teens admitted using or answering their Smartphone while in the bathroom.

4. Impacts of Smartphone’s

Smartphone has impacted almost all walk of human life. The prominent areas, where impacts of Smartphone are obvious include business, education, health and social life. Mobile technology has drastically changed the cultural norms and behavior of individuals. The impacts are both at the positive side and also at the negative side. At one end Smartphone are enabling people to create their own micro-cultures and engage into activities considered dangerous of society and on the other end Smartphone enabling people to remain connected all the time [3]. The subsequent sub-sections of this study provide detailed account on positive and negative impacts of Smartphone on society.

4.1. Business

Smartphone has created new dimensions for business. It is not only the Smartphone vendors enjoying the business but it also created a new domain for mobile application developing companies, Internet services provider and other sectors of life to utilize the Smartphone to gain competitive advantages [13].

4.1.1. Positive Impacts

There has been a drastic growth in broadband and Internet service providers business in past few years and one of the main reasons for this drastic increase in their business is the ever increasing use of Smartphone’s and growth of Smartphone and mobile applications. In a very small duration a huge number of Smartphone have been sold that provided an opportunity to businesses to invest in mobile application development and allowed to introduce new business dimensions in market space. As it is easy to change settings and make customizations on Smartphone, therefore there are several programs for Smartphone’s from different vendors including Blackberry, Android, iPhone and Microsoft etc. Mobile Application Market is another business sector introduced by Smartphone’s. Different mobile operating system vendors have their own mobile application technology hence having a different market for Mobile Applications. The most common one are iPhone application market, BlackBerry application market, Android market, Microsoft mobile Application market. These online market places enable users to download useful mobile applications on need basis. Furthermore these market places also provide some free of cost application and some applications have associated with reasonable cost. Smartphone’s also impacted advertising business sector as well. Advertising is an old concept but the features of Smartphone have made it more effective and no doubt it is an additional positive impact of mobile application for business. Mobile application publisher, distributor and service provider are getting large revenue by providing ads as a part of mobile application [13]. Unlike the other computing advancement in the past, where most of those advancements came directly from security agencies, armed forces and large research centers and the initial purpose was defense or enterprise use, the advent of Smartphone and related technology innovations started directly in consumer market space in its own right. The polarity has reversed in the technology industry and now many exciting
developments in the field of information technology (IT) are appearing in consumer market space first and only then making their way into other fields [14].

**4.1.2. Negative Impacts**

The major impact of Smartphone is on PC market. According to a survey by Compete, a web analytics firm, a large number of people almost up to 65% are using their smart phones to read news feeds, post status updates, read & reply to messages and post photos. This shows that now people are leaving PCs and moving towards Smartphone’s. According to market results in 2011 Smartphone shipments beat those of PCs, with 73 million more units being sold. Today the Smartphone users having are more powerful than the most of the desktops we have 10 year back. Smartphone have outsold PCs in 2011 and soon they could replace our wallets as well [15]. Furthermore in last few years PC upgrades have become less important because developer activity has stagnated on the PC platform [16]. According to analysts, the long dominated Microsoft and Intel alliance is experiencing bad times due to the rise of Smartphone’s and tablets, and the pressure to gain market share in the mobile device market is causing fractures in long partnership. It is true that still millions of PCs will continue to be sold every year, but the Smartphone’s and tablets will see more considerable growth in the future. All companies are taking forceful steps to power their way into Smartphone market, but still find themselves behind the curve [17], following figure-1, shows these growth compared to PCs.

**Figure 1: Growth of the Gadgets**

![Growth of the gadget](image)

**4.2. Education**

The notion and value of education has been exceptional and noble since day one in human history and the efforts to improve the quality of education has been appreciated throughout [18]. Smartphone’s introduced another means for the knowledge lovers to fulfil their thrust and dreams.

**4.2.1. Positive Impacts**

Use of the Internet has become a part of life of every student and a mean to search for the information as and when it is needed. These days, use of mobile phones for internet purposes has become a routine and number of mobile consumer accessing the Internet is surpassing fixed line internet users [18]. The growing demand of Smartphone, availability of the Internet and high speed mobile browsing is ready to provide an alternative channel to deliver education services. This will provide an opportunity to the users to utilize their Smartphone to get educational benefits within their available time irrespective to their location [19]. Distance education is a learning mechanism that focuses to liberate students from limitations of time and location, while offering flexible opportunities for education. Distance learning enables students to utilize their time such that they can continue their education without impacting their work and family life. The Smartphone with the capability of always connected makes it much easier
for the students to avail this type of education facility and makes the Smartphone a perfect fit device for distance learning [18]. Smartphone within and without the classroom make it easier for students and teachers to collaborate. Students on sick leave or with health issues, or miss school for other reasons would be able to attend class through their Smartphone and keep up with their work, rather than falling behind due to unanticipated circumstances [20]. The education system of developing countries might unarguably be the most prevalent beneficiary of the mobile technologies. Smartphone’s are not just supplementary devices for developing countries, but these devices can play integral part of in their education systems. The Smartphone provide access to modern society a massive amount of educational and learning resources. In developing countries Smartphone can easily compensates the limited access of internet and data access, which in turn help their infrastructure and education development [19].

4.2.2. Negative Impacts
Along with their fantastic facilities, Smartphone’s enables students to text, cooperate on social networking sites, check e-mails, play online games, and even watch TV channels. This is one of the sources of distraction. This is not only distracting for the student, but it can also become distracting for other students around them and even sometimes for whole class. In addition, it wouldn’t be easy for students to make calls during exams to cheat but it may be easy for pupils in a crowded classroom or examination hall to use their Smartphone’s to access information online to cheat in exams. In fact some surprising statistics are there about the use of Smartphone’s for cheating in the classroom. The misuse of Smartphone could be through the use of text message exchange with other students, find answers on the Internet, using advanced calculator and phone applications, reading notes saved on their phones to help on the test. Smartphone’s can encourage bullying and hazing also. Bullying and hazing are very serious problems in schools across many countries including United States of America (USA). Smartphone’s come equipped with camera and video technology, which can be used to record and photograph bullying and hazing in schools and colleges [21].

4.3. Health
According to a survey almost half of Smartphone users use their phone for access health related services, figure-2 below shows the in health sector [22].

![Figure 2: Use of Smart phone in Health Sector](image)

4.3.1. Positive Impacts
Today Smartphone are the most commonly used devices for communication and almost 27% of the consumers’ use Smartphone’s for online activities. Accordingly surveys more than 10 million users in USA use Smartphone to search for health information and facilities. There are a huge number of
mobile applications to facilitate the users to manage prescriptions, promote alternative treatment options, provide price comparisons and validate prescriptions. In near future we see a breed of mobile applications, which enables doctors and parents to monitor a patient/child blood glucose levels at any point during the day. Even today several apps are available to track exercise, diet and blood pressure. This in turn enables the Smartphone’s to play a key role in health sector [23]. At the moment more than 40,000 mobile health apps available for tablets and Smartphone’s, and more than 500 health projects underway worldwide with the emphasis to use Smartphone apps in health sector. The online health care education portal survey results show that apps such as Runkeeper, access health records electronically or participate in wellness programs have been taking benefit of mobile’s health even without realizing it. Analysis show that the number of people using health related apps is growing drastically and 2012 surpassed 247 million [24]. There is huge number of Medical and healthcare apps for Smartphone are, including drug references, medical calculators, reference guides and personal health and lifestyle applications. A survey was conducted on a small number of US healthcare students, administrators, providers, and nurses by a software company and the reports shows that almost 83% use Smartphone’s to access, 72% use Smartphone’s to write notes and memos, 50% use it for drug references, 28% use Smartphone to access clinical decision support tool and 13% to view medical images. Healthcare is no doubt complex and often requires area of expertise and knowledge and locating its resources to assist with complex medical issues is somehow challenging. Smartphone apps are very useful as these apps assist healthcare workers to access specific information in areas of radiology, neurology, neonatology, pediatrics, and continuing education activities easily [25].

4.3.2. Negative Impacts
The convenience that Smartphone bring in daily life is tremendous, users with a click or simple touch of finger can access the health and related services anytime and anywhere, but along with the convenience it also poses several dangers as well. According to a recent article from CNN [26] this convenience of Smartphone access to health resources can be dangerous if patients start avoiding personal interactions with doctors for mandatory tasks. According to the article, on average, the targeted users use to check their phones 34 times a day, but not necessarily that it was really needed to check emails instead it is habitually checking, which may result, in relying on phone more than doing things themselves. Another aspect that has been noticed is that lots of parents let their kids carry and use Smartphone’s even in their very young age. The convenience offered by these modern devices is indeed great, but on the other side also there are major issues associated [4]:

- Disconnect kids from the true essence of social interaction. For example, games and other entertainment applications designed for kids may discourage them from interacting with other kids and people around them.
- Excessive exposure of these devices in early age can cause poor eye sight for kids.
- The use of Smartphone’s exposes children to the habit of jumping from one option to another that trains them to gather small portions of information instead of concentrating and getting complete information. This habit is harmful for development of brain.
- Online and video games are addicting and kids may easily get addicted and spend hours playing games and this may be awful when they have Smartphone with them everywhere they go.

4.4. Psychological Impacts
Impacts of Smartphone on human Psychology are tremendous; there are several ways that Smartphone is impacting human Psychology.

4.4.1. Positive Impacts
According to a survey on use of Smartphone [27], the Smartphone provides a mean to reduce stress in busy work life. In today’s busy schedule Smartphone enables users to interact with their friends and
family as and when they get time. Interacting with friends and families, while traveling, waiting on bus stop enables users to utilize such time to promote their social life. It enables the users to interact and stay up-to-date with the latest news and development in the political and social circles resulting in reducing work stress. The concept of "use it or lose it" principle in Psychology is very old and according to this concept the key to keep your brain functioning in its peak condition throughout your life lies in its smart use. The smart use of Smartphone will increase your brain function instead of using the Smartphone only for entertainment it could be used to access useful information, for example, access the news headlines, latest technology updates, and real time featured stories from respected news outlets around the world. This knowledge will build mental warehouse of information, and make the user a better communicator as well. It is also known that some videogames can have positive impact on people by strengthening their empathic tendencies. Social networking may build social bonds. Staying connected is easier than ever, and keeping the social bonds active allows reducing stress and promises social support [28].

4.4.2. Negative Impacts
Addiction to Smartphone (also known as communication addiction disorder), is a serious problem. According to recent research, the addiction to Smartphone is increasing rapidly. The Ministry of Public Administration and Security of Korea reported that around 8.4% of Smartphone users in Korea are addicted to Smartphone and around 10.1% of Koreans overuse social networking sites including Facebook, Twitter and YouTube. The addiction to Smartphone can be described as wanting to be in constant communication with people even though when there is no real need for communication [29]. According to an article, Smartphone addiction is not just a buzzword but researchers have recognized habitual and compulsive communicating as a serious psychic problem. It is also established that obsession with our Smartphone is also responsible for significantly altering our brain’s perception for the device. While several research across the world have been reasserting how Smartphone dependency is going to be a real danger in future, some other studies in UK also discovered another aspect to it, showing that anxiety and withdrawal symptoms in Smartphone users increase when they do not receive any messages or updates [30] [31]. Most of the time the problem is not with the use of the Smartphone, but it comes when the device takes over a function that human brain is capable to perform perfectly. It's like multiplying 5 by 7, resulting the opening calculator in your Smartphone instead quickly calculating in your mind and getting result 35 or waiting for an elevator to take you to first floor of building instead of the stairs; the ride may be quicker but your muscles won't get a workout. Smartphone’s can be considered as mental elevators, taking the basic and useful functions off the brain [28]. Another psychological impact is that users check their mobiles almost all the times, while at work time, with family or even when with friends. Lookout, a mobile security company conducted a study on Smartphone users in USA and found that 58% of Smartphone users check their phones at least once in an hour and another 54% of respondents said that they check their phone even while going to bed to sleep[28].

4.5. Social Impacts
The social life has been drastically changed with the introduction of Smartphone’s and this domain has encountered most of the impacts from use of Smartphone.

4.5.1. Positive Impacts
Accordingly to research [32], around 15% of the current world population has some sort of disabilities and also the number of elderly persons increasing day by day. Furthermore, this research shows that, by year 2020 more than 1000 million people over 60 years age will be living on this planet [33]. Keeping this in mind and looking into the capabilities of Smartphone, it is apparent that in such a situation Smartphone will play an important role in the integration process of people with special needs and elderly age. Smartphone’s are capable to give this group of people the opportunity to live more independently. The more they can do by themselves, the better they will feel and enjoy the life.
Smartphone features like, text to speech, GPS and social Websites are some examples, which can help this group of people to easily remain integrated with society. Using these services and many more features, the target group of people can easily communicate their needs, seek assistance from others and remain connected to society [32]. Even in today’s busy world Smartphone had also made possible for us to remain connected with our friends and family all the time. Always connected to the Internet through a Smartphone provides a great instrument for individuals for constant communication resulting in great safety for children attending schools or going outside. The classic mobile phones provided this facility for long time but the Smartphone’s utilizing the same and providing additional convenient capabilities to communicate with children and know their whereabouts anytime [19]. The Smartphone has given an opportunity to individuals to act as a journalist at any point in time and real-time information to society. Smartphone features like the camera, video capture, access to social Websites and nature of always connected to the Internet enable individuals to capture any video at any time and share it with friends and family using social Websites and other Internet based options. Even though the quality of video/image can’t be that good but the features on social Websites and opinions and comments make it more absorbing and useful [34].

4.5.2. Negative Impacts
Addiction to Smartphone is major impact on social life. Surveys show that Smartphone addiction is interfering with our night’s sleep. According to the survey, 33% of mobile workers admitted that they check their phones for email and message throughout the night. Nearly 50% of those surveyed said, they wouldn’t even think of going to bed without have their Smartphone’s tucked under their pillows. This addiction to Smartphone is impacting the social and family life and creating frictions in our lives [34]. Another aspect is that applications installed on Smartphone enabling image and video editing, allowing individuals to manipulate the actual content and provide their version of the content. This shows that most of the time there will be issues with the authenticity of information received through these channels and it requires further research to ensure its validity and authenticity [34]. According to another research [35], the organizations expect their employees to respond to the emails immediately even after working hours, due to that employee feel compelled to respond to official emails. Many Smartphone users engage in continuous monitoring of their work related emails, which creates compulsive routines of chronic checking and in the long run it is responsible for increased stress. There are evidences that Smartphone usage is responsible to blur the distinctions between the work and family life. The Smartphone causes the employees to take the work into the home domain. As a consequence, the blurring work and family life might lead to a worsened work–family balance. In short, the higher integration of the work and home facilitated by Smartphone result in work–home interference (WHI), which is considered as a potential source of stress that having negative effect on employee social and family life. Cyber bullying is another major issue the society is facing today. The advent of Smartphone and the nature of being connected to internet anytime and anywhere is adding to this issue and making it much severe. It enables student to access irrelevant content while at schools, enables working community to access social Websites and other irrelevant content while at work, and enables youth to access the Internet for inappropriate contents. This highlights minimum control from parents and administration to prevent the users’ access certain content on the Internet [19]. According to another report by security industries [36], Smartphone’s and social networking site are likely to become the next target for criminal attacks. Security holes on several Smartphone’s were exploited and malicious software was found on several Smartphone’s from different vendors.

5. Conclusion & Future Direction
It is true that Smartphone has a sizeable impact on society and other aspects of life. Clearly the enormous usage of these devices by consumers demonstrates the volume of this impact. Consumers are in process of traversing away from the use of conventional cell phone as the Smartphone’s are beginning the norm of the society. Manufacturers and marketing can be blamed for this hype, but there
is no doubt that Smartphone’s are bringing great features and capabilities to consumers. The key impacts like enable to be always-connected, addiction to phone, single device with all required features, business edge, convenient educational features, apps as new technology, entertainment, best utilization of time, disrespectful behaviour, privacy issues, impact on culture, distraction at work & at education Institutes and many more provide us both positive and negative sides of the Smartphone’s. These positive and negative impacts are secondary, when we look at this existing technology from a different perspective and that perspective is interpretation and perception of Smartphone. There are several ways that we can control and minimize the negative impacts of Smartphone in society. “Education and Guidance”: In order to understand the positive and negative impact of Smartphone it is very important to educate the users on how to use Smartphone’s smartly. The education should emphasis to enhance the positive impacts and highlight the negative impacts clearly so that the users can take advantages of this exciting technology. “Security and Access Control”: There are several initiatives from different vendors to combat the misuse of Smartphone at workplace and at Universities. SAP, Airwatch, MacAfee and many other vendors provide solutions to control the access of Smartphone within the workplace and Universities. Such measures are very useful in environments, where security of information is the top priority. These can also be useful in controlling the access of Smartphone’s in Universities to minimize the use of social Websites, minimize the misuse of Smartphone’s for cyber bullying, cheating in examinations and tests. These mobile management devices will also enable the administrators to remotely control the access of these devices check what services are running on a specific device. “Polices and Procedure”: Policies and strict compliance procedure should be in place at workplace and at Universities to ensure the proper use of Smartphone’s. This will enable users to use their phones if it is really required and when the use is really important. In summary, Smartphone can certainly be smart if the vendors, society and technologists understand their responsibility towards usage of these devices smartly in order to get more benefit in business, education, health and social life. It is apparent from above facts that the benefits of Smartphone are tremendous and negative impacts are minor. So it is important to concentrate on how to stop and avoid smartly the misuse of Smartphone rather trying to stop or avoid use to Smartphone’s.

References


[34] Douglas Idugboe, 2011, “1 in 3 Are Addicted to Smartphones”, http://smedio.com/2011/06/03/1-in-3-are-addicted-to-smartphones/
