Marshall Plan
Research Paper

Refining the process combining design thinking and engineering for mobile gadgets development

Home university: University of Applied Sciences
Upper Austria

Host University: Clarkson University

August – December 2013

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Fall 2013

Affidavit

"I hereby declare on oath that this written assignment "Generating a process for mobile gadgets development that combines design thinking and engineering", which I am submitting as part of my research, is my own work. All sources have been properly acknowledged and the assignment contains no plagiarism."

Fazyl Ablanov
Potsdam, 20/02/2014

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1. Introduction

1.1. Overview

In modern world the competition between mobile gadgets producers gets fiercer every day – expectations are higher, time frame is shorter. It forces the designers as well as engineers focus on their particular problems, like functionality and appearance. However, many of them do not realize (or at least do not have time to do so) that a product produced has a bigger influence, rather than just being a solution for initial problems the product had been designed for. That is, all products have influences on direct problems/fields they are design for, as well as indirect areas. This idea is best described by a quote of famous architect, Eliel Saarinen "Always design a thing by considering it in its next larger context – a chair in the room, a room in a house, a house in an environment, an environment in a city plan" [1].

Giving a modern example, smart phone was initially designed for calling people. However, if you enter public transport you can witness many people using it as a book, messenger, music player, etc. As a result, the whole environment of public transport has been influenced. And this is only one of many environments that smart phones have changed. Not only that influences the way our lives go, but it also has a huge impact on businesses and even whole industries.

Continuing the example of smart phones, Photo Marketing Association (PMA)'s director of UK operations Nigel McNaught said that 'it's realistic to assume some of the loss in compact [unit sales] is down to smartphones. Smartphones are getting better' [2]. Even though smart phone producing companies are not direct competitors for camera producers and there was no intention to get the market share from them, it happened as a result of constant improvement of the smart phones' cameras. That influences the buying decisions of customers. As a result, they are able to buy more expensive cell phone with a good camera, by saving money on not buying a camera. Therefore, smart phone producers should take into account this factor when designing a new model. For example, if designers are having debates weather to choose more expensive materials or not and if customers can afford the expensive ones, they can regard to the fact that smart phones influence customer buying

decisions. Thereby, in order to reach the best outcome, both design and function-wise, the environments that are influenced should be regarded.

1.2 Motivation

Being in the middle of the process of getting a graduate degree with a major in product management and specialized in product concept design, the notion of design thinking has been always regarded as one of the key elements for a great designer or a product manager. Indeed, the greater a product or a service is, the bigger it changes the lives of people and the creators of these products and services have always been used as role models. That stresses the significance of incorporating design thinking into product development process.

The new technologies have been one of the key drives of humanity for the past few decades. The quality and innovation of it has been evolving each year. One of the major criteria for a good innovation has been its' reasonably compact dimensions. That being said, the gadgets are a group of products that are the smallest and with needful functions.
The term gadget implies a "small mechanical device or tool, especially an ingenious or novel one" [3]. These devices have developed a big industry in the modern world and being strongly associated with an intense breakthrough in a 21st century.
Gadgets are not only the hot topic among professionals, but they also are the subjects of big discussions among the users and even non-users. Belonging to a highly integrated user group, it is of a high interest and excitement to analyze specifically this type of products.

1.3 Significance and structure

Design thinking has always been a topic of big discussions among the greatest designers as the ability to see the products in a general scope. That ability was achieved by practical experience of professionals. Even though this concept has been under discussion for relatively long period, there was lack of attempts to structure this concept, especially for a

product category as gadgets. Taking into account that gadgets are increasingly becoming a big part of our lives, a deeper understanding of all indirect influences they have on people would help product managers making the product development process and the outcome more consistent and superior.

2. Problem statement

2.1. Overview

When designing a product, it is hard to oversee every aspect that it might influence. Moreover, the deadlines that engineers and designers are facing today are extremely short, which can make product managers overlook some of the essential product features, or modifications. However, there should be a generic process that leads every developed product affect lives in one-way or another. A framework that every product of a certain category (in this case, gadgets) can be checked through and adapted to the environment to fit best. The framework should consider two types of influences – the user perspective and the business perspective. If we find these processes, it can help engineers and designers to develop products more consciously, capturing most of the fields being influenced before the start of production.

2.2. Users' perspective

One of the environment types that are influenced is the user perspective type. That corresponds to how a certain product makes the life of a user different from the life before that product was released. Difference in the surroundings because of a curtain product can be considered as a change in an environment from users' perspective as well. As an example of change in surroundings could be the way people who hold cell phones behave during theater performance – some can forget to switch off the cell phone and disturb the experience of neighbors and even the actors. That kind of disturbance did not happen 30 years ago. That is because of a change in the surroundings due to an advancement and popularization of mobile gadgets.

2.3. Business perspective

Another type of an environment that is influenced is the business perspective type. That corresponds to how a certain product makes the situation in a certain business field/fields, or an industry/industries different from the ones before that product was released.

The business environments that are being changed and are taken into consideration are not necessarily direct competitors of the product. That also can be circumstantial business environment influences. As an example of such occasion, when a release of a certain product indirectly influences an industry that is not of a direct competition, can be the smartphones and compact digital cameras. Although the main purposes of compact digital cameras and smartphones differ, the latter have influenced the sales of the whole digital cameras industry.

3. Literature review

3.1. Impact of gadgets

"Technology has played a big role in human affairs including business for millennia" (] Elias G. Carayannis, Stephen C. Clark, 2011) [4]. Gadgets are a part of evolution in technology; that is a small technology with a particular function. The fact that gadgets have an immense impact on people's lives can be seen with a naked eye. Many areas have change drastically after introduction end evolution of key parts of the world of gadgets. A recent research has revealed both positive and negative impacts of smartphones on education, health, psychology and social life (Sarwar M., & Soomro T.R., 2013) [5]. Those are only few areas that have been under research, out of many more that have not been examined. In addition to the impacts gadgets have been making on a personal level, there is also a big influence on an organizational, business level. For example, smartphones are found to "incur opportunity costs in terms of effectiveness and efficiency of conducting business by causing distraction and disruption of the otherwise regular and natural flows of daily business and personal life" (] Elias G. Carayannis, Stephen C. Clark, 2011) [4].

3.2. Design thinking

Design thinking is a process, which is bigger than just giving a good look to a product. It is conscious and subconscious aspect of creating value to every element of the whole cycle affected by the product. "Thomas Edison understood that the bulb was little more than a parlor trick without a system of electric power generation and transmission to make it truly useful… He was able to envision how people would want to use what he made, and he engineered toward that insight" (Tim Brown, 2008) [6]. Design thinking is a process formed by the designers of all kinds. It enables designers to find solution to problems in the very refined and delicate manner. Both logical and subconscious conclusions and application of those are necessary for a successful process results.

The design thinking process has a general outline for any type of project. Though, every project has a unique outline in terms of how much effort should be involved in a certain

step. The general outline usually includes the following steps: "observe, brainstorm, synthesize, prototype, and implement" (Stanford University, 2010) [7]. This outline is "drawn on methods from engineering and design"[7]. The first step is the one the major focus of the research is made on. This step is concerned about the questions like – what is the problem? What are customers' needs and wants? Where is the opportunity? That is, the major necessity is in observing and analyzing the environment and surroundings. The scope is not just considered on the people, but the systems.

4. Research methodologies and identification of areas

The process of identification of areas has been developed by selection and observation of products grouped in three stages of product lifecycle: introductory, maturity and declining stages. That has been done through implementing secondary research methods like analysis of financial reports of the companies producing the products that are observed and also by using already existing researches made by statistical agencies. Each lifecycle group is then divided in subgroups – user's perspective and business perspective. That is done because there is a possibility that one environment can be influenced from two perspectives – user's and business. The scales of influence for these two perspectives differ.

To find an environment that is being influenced two kinds of research are conducted – the secondary and primary.

The secondary research involves analyzing existing researches as well as drawing conclusions from product features itself. The limitations of secondary research include not having a complete picture of different environments under influence.

The primary research type that is used for the research question is interpretivistic in nature. The research is done by conducting personal interviews with 15 people of age 18-35, who have been owners of one or more products included in the list of research. The main purpose of questions during the interview is to discover what parts of respondents' lives has changed after purchasing a certain product or products. Limitations of primary research include small number and limited scope of respondents.

Each product in the list contains highlighted information attached and the sales figures to justify the status of a current position in a product lifecycle.

Product list taken under observation sorted by position in a product lifecycle:

Introduction of product	Maturity	Decline
Samsung Galaxy Gear (Samsung Watches)	Android smartphones	iPods
iPad Air*	PlayStation Vita by Sony	Netbooks
iPad Mini with Retina display*	Tablet PCs	Nokia smartphones
iPhone 5S and iPhone 5C*	Ultrabooks	Portable CD-players
Google glasses**	iPads*	Portable Digital Cameras
Oculus**	iPad Mini*	
Portable 3D printer**	iPhones*	
Portable 3D scanner**		

* Both perspectives are under observation – Apple gadgets as a family of products, and Apple's newly released products from those families

** These products were included in the list, however they have not been released during the period of observation

4.1. Secondary research and analysis

4.1.1. Products on a decline stage of product lifecycle

The list of the products included for the observation is:

- Nokia smartphones

Nokia introduced its first smartphone Nokia 9000 in 1996, however it was not popular, because of unprepared market. The first successful project for Nokia was the model Nokia 9210, which is the third generation of 9000. The family of Nokia 9000 was running on Symbian OS, and was the first Nokia smartphone to allow third-party software developers to create new programs for the devices and let the users download them.

NOKIA SALES CHART

UNITS SOLD WORLDWIDE IN MILLIONS, PER FISCAL YEAR
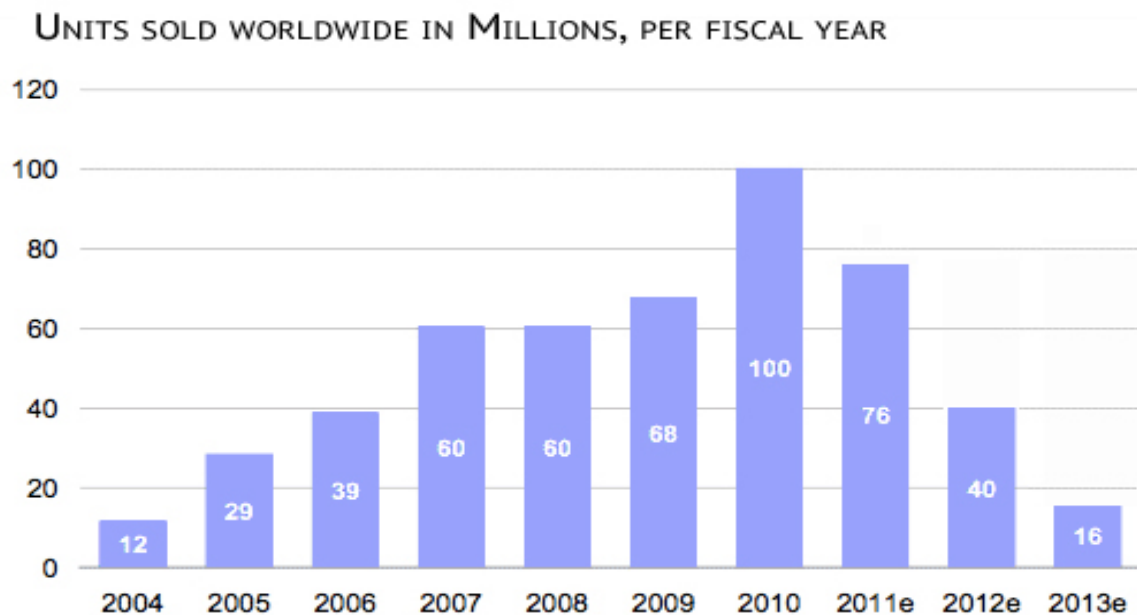
Source: Company data, Morgan Stanley Research

- iPod

Before iPod introduction, portable digital music players were of uncomfortable sizes and low storage capacities. Apple used that opportunity to occupy the niche.

The first IPod was released in 2001. The high price and no PC compatibility were obstructing the sales until 2004.

Development of iTunes – the software used to transfer media from computer to an iPod, changed the way music industry was marketing their products.

iPod Sales Chart

Units sold worldwide in Millions, per fiscal quarter

Units sold worldwide in Millions, per fiscal year
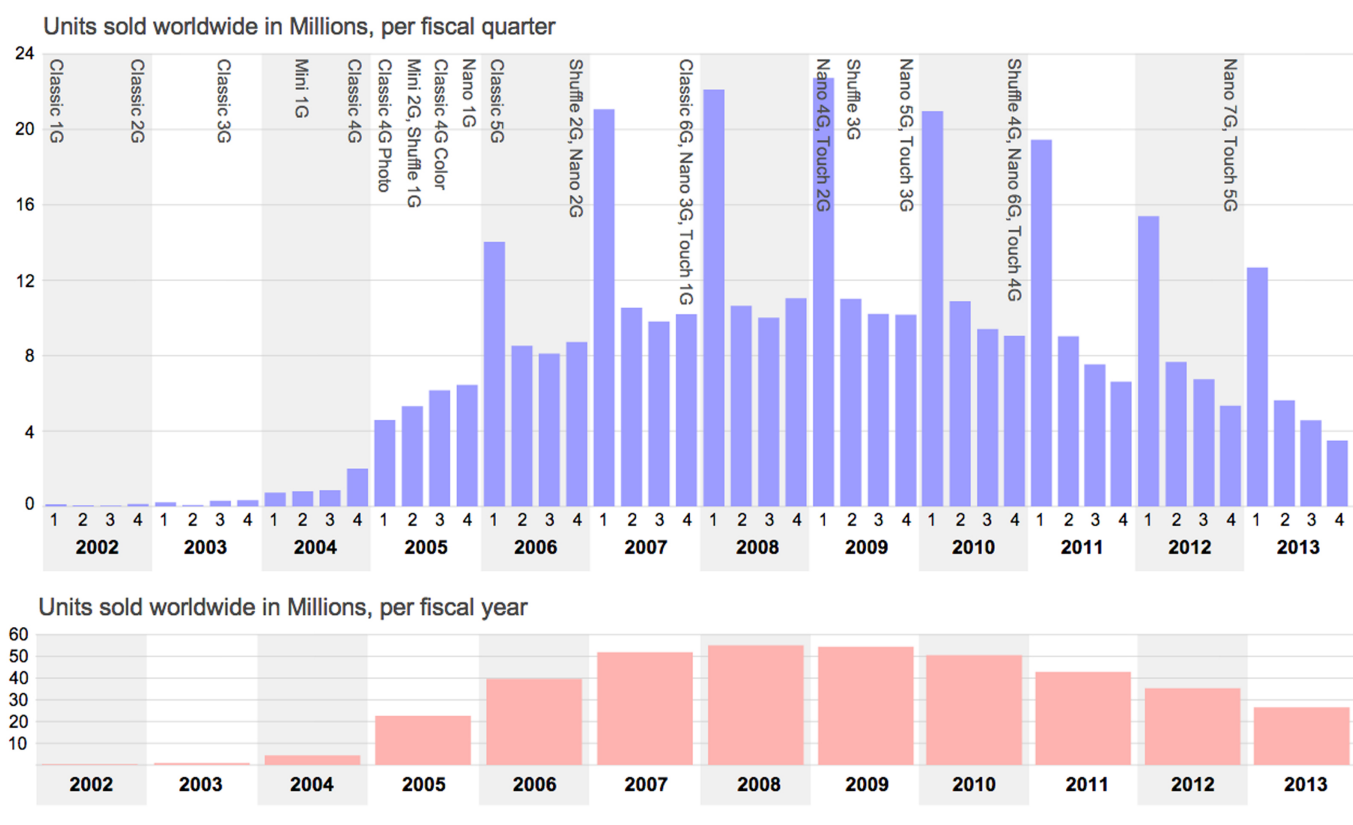
Source: Apple Inc.

- Portable CD-players

The first portable audio CD-player released was D-50 by Sony. It was released in November 1984. The commercialization of CDs started two years before introduction of D-50. With the release of D-50, the interest towards CDs and music industry as a whole raised significantly. It strengthened the industry of CD production and created a new branch in CD readers' industry.

ALBUMS SALES CHART

UNITS SOLD WORLDWIDE IN MILLIONS, PER FISCAL YEAR
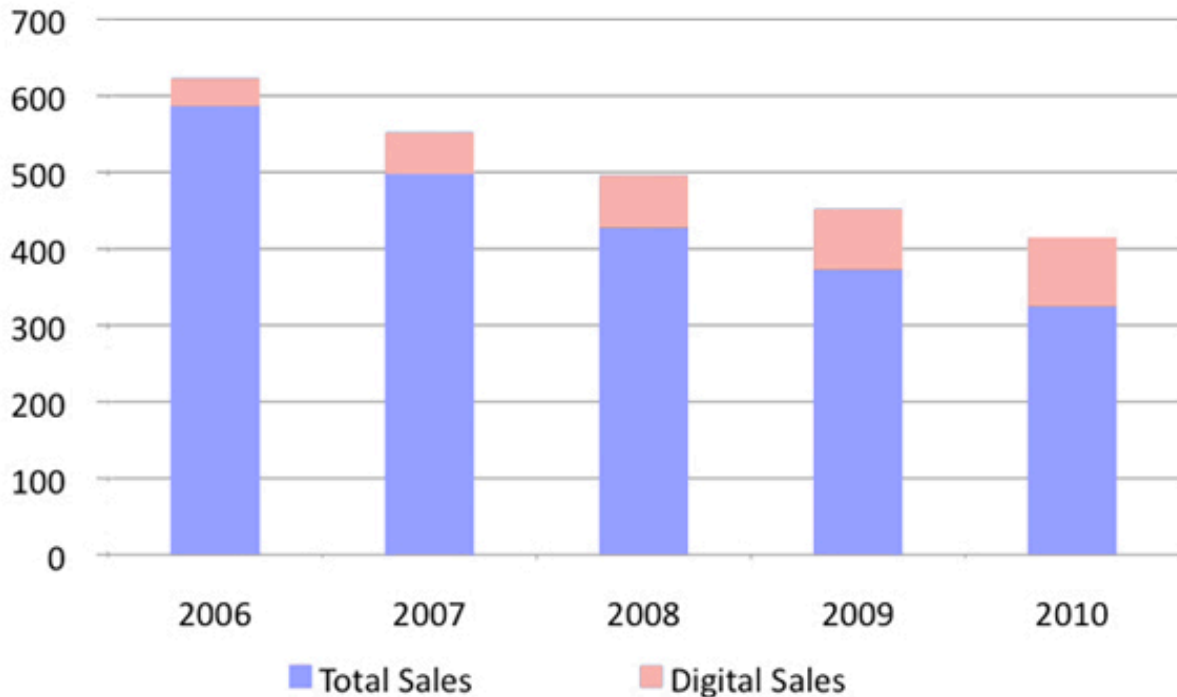
Source: Nielsen SoundScan

The albums sales figures are taken into account, since there are many portable CD player manufacturers and CD's are complement products for CD players. That is, if demand for CD's falls, the demand for complementary goods will fall as well. However, in this case, it could be stated that the reason of declining CD sales might be the rise of piracy. Although this statement is true, there is an obvious raise in digital album sales, which indicates an influence of digital music.

- Compact digital cameras

Compact digital cameras are handy devices best suitable for casual photography. The main features of the design of compact digital cameras are the easiness of use and portability.

The fact that compact digital cameras have been loosing their relevance is confirmed by Photo Marketing Association (PMA)'s director of UK operations Nigel McNaught,

who said that 'it's realistic to assume some of the loss in compact [unit sales] is down to smartphones. Smartphones are getting better' [2].

- Netbooks

The netbooks (smaller laptops) started gaining popularity in late 2007. Compared to a full-sized notebook, netbooks were of a smaller size, lower productivity and power, as the result offering the lower cost to final consumer. Usual weight for netbooks was around 1 kg, which made it popular for casual carriage and internet usage.
With the release of iPad and consequent popularization of tablet PCs, the sales of netbooks went down.

NETBOOK PC SALES CHART

UNITS SOLD WORLDWIDE IN MILLIONS, PER FISCAL YEAR
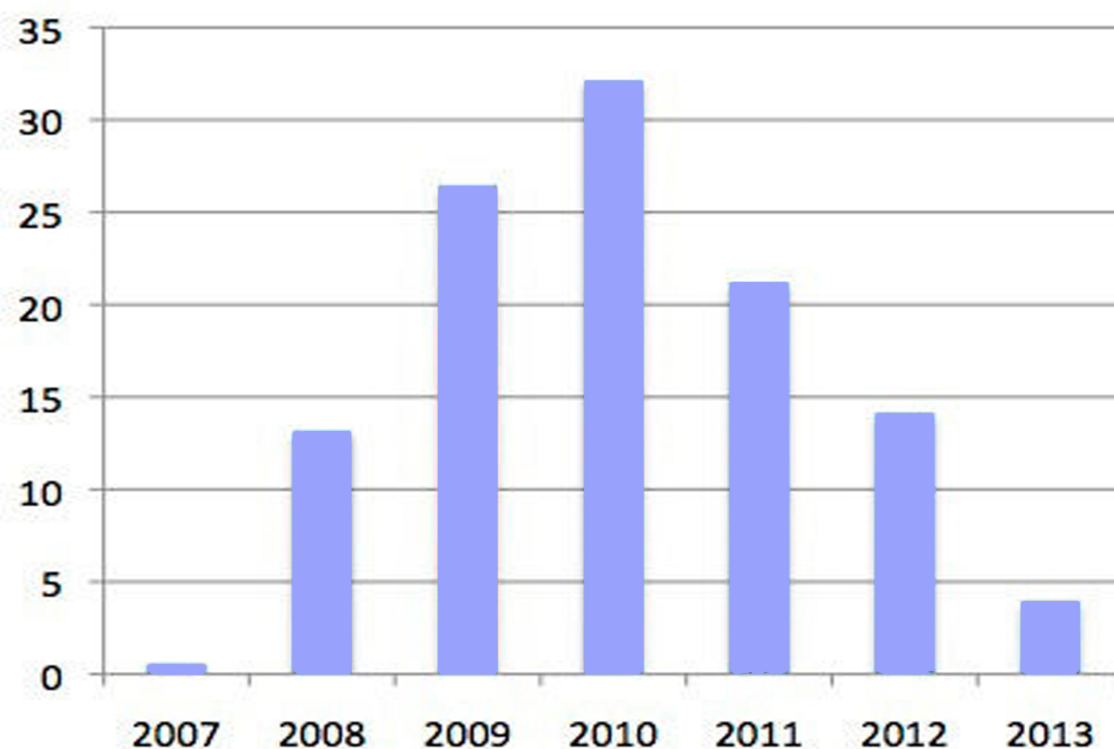
Source: Morgan Stanley

a. Users' perspective

From the users' perspective, the fact that Nokia was one of the first cell phones producers to have an operating system that allows third party software developers create and sell their products made a big contribution for aspiring young to start creating something themselves.

One of the main influences that portable CD players like Walkman have given to professional and recreational sports was the ability to choose and customize music to your own taste. The research about how music affects sports has shown "that music has helped elite tri-athletes increase their endurance by 15%" [8]. And not only the professional sport performance has improved, but also the recreational one.

b. Business perspective

From business perspective, all of the products on the decline stage of product lifecycle are having reduced sales. At the same time, related products, not necessarily with same product features, are having sales boosts. To look more closely, sales of netbooks began declining at 2011, which is right after introduction of iPad by Apple. Another case when a big industry is being affected by another one, which is not a direct competitor, was the case between portable CD players and iPod. At the album sales chart it is clearly seen, that hard copy albums' sales are going down, whereas digital sales are rising with the same correlation of iPod sales (see iPod sales chart).

The industry of programming had a big influence caused by release of Nokia smartphones on a Symbian OS. The family of Nokia 9000 was running on Symbian OS, and was the first Nokia smartphone to allow third-party software developers to create new programs for the devices and let the users download them. That created a new segment in mobile software business, writing the programs for mainly Nokia smartphones.

4.1.2. Products on a maturity stage of product lifecycle

In this stage Apple gadgets are observed from both perspectives - as a family of products, and Apple's newly released products from those families.

The list of the products included for the observation is:
- Ipad family of products

The first iPad was released on April 3, 2010. It was not the first tablet released, however it was the first tablet device that became popular. iPads overtaken the niche of netbooks. They were light, with functions of taking video and images, various entertainment features, GPS and capability of Internet browsing. Apple allows third-party software developers to create new programs for the devices and let the users download them.

IPAD SALES CHART

UNITS SOLD WORLDWIDE IN MILLIONS, PER FISCAL QUARTER
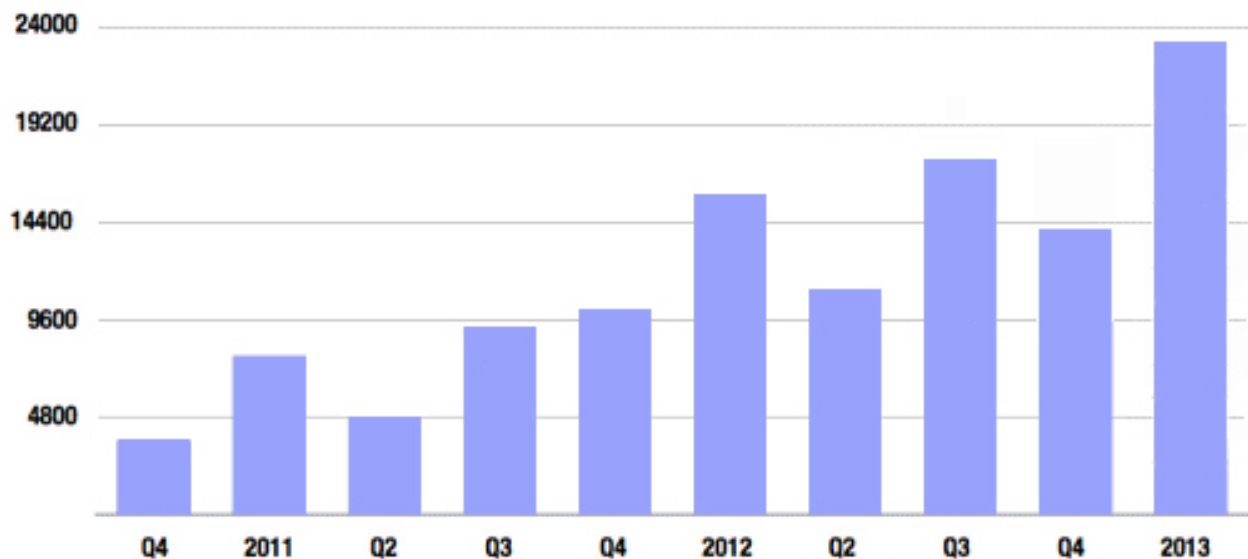
Source: Apple Inc.

- IPhone family of products

The first iPhone was introduced on June 29, 2007. At the moment of conducting the research, Apple released it's 7th and 8th models iPhone 5S and iPhone 5C on September 10, 2013.

Iphones functions are similar to iPad - taking video and images, various entertainment features, GPS and capability of Internet browsing. Apple allows third-party software developers to create new programs for the devices and let the users download them. Even though the first iPhone did not have the best camera at the time, it gave a start to the concept of having phone camera to replace a digital compact camera.

Iphone Sales Chart

Units sold worldwide in Millions, per fiscal quarter
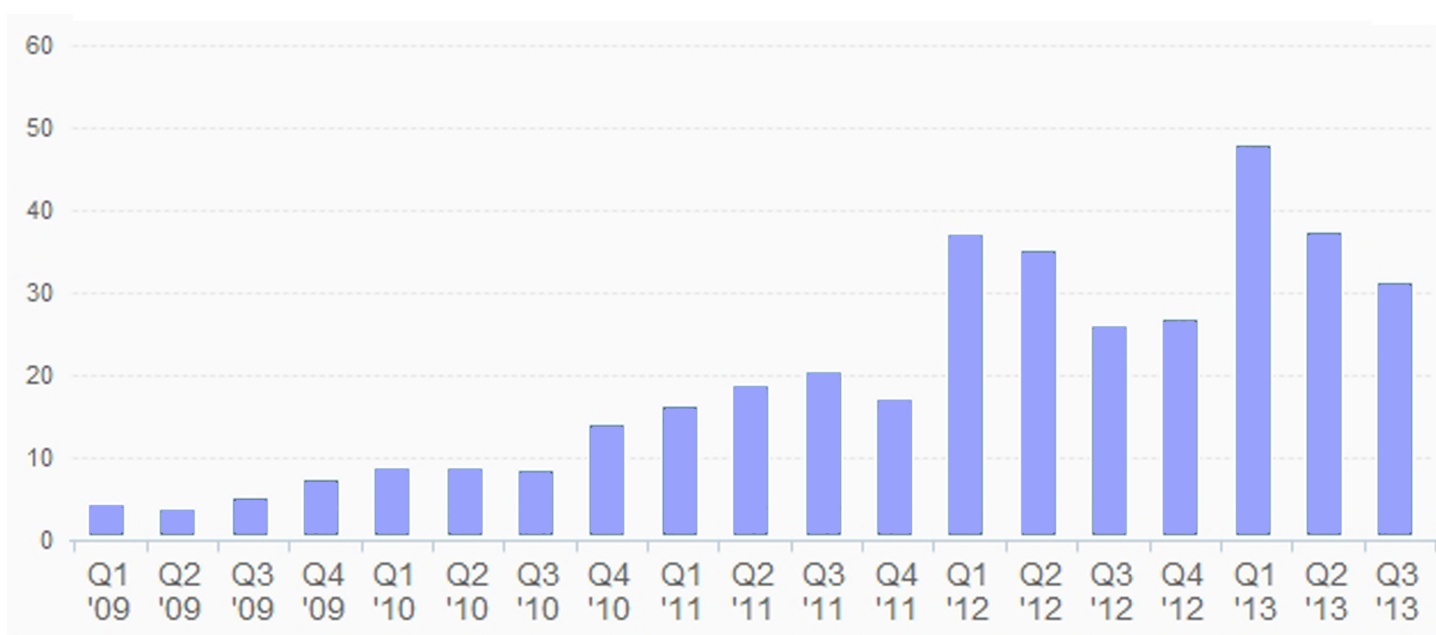
Source: Apple Inc.

- Tablets

Although the first tablets get their roots in the beginning of 90's, they did not gain high popularity until the introduction of the first iPad in 2010. The main functions of tablet included - taking video and images, various entertainment features, GPS and capability of Internet browsing. The tablet PCs support third-party software. As of May 2013, over 70% of mobile developers were targeting tablet (vs. 93% for smart phones and 18% for feature phones) [9].

PC Tablets Sales Chart

Units sold worldwide in millions, per fiscal year
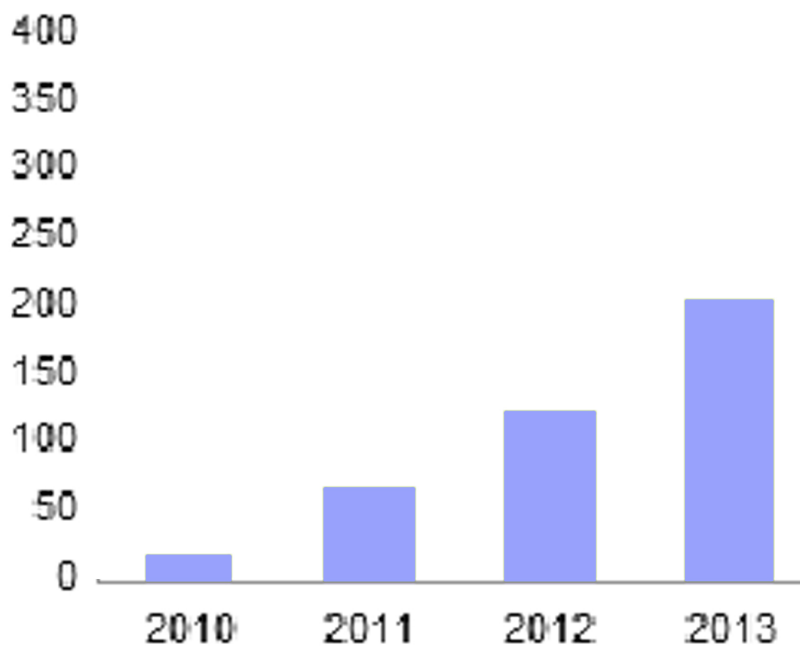
Source: IHS Research

- iPad mini

iPad mini was released on October 23, 2012 and became the fifth product from iPad family of products. It has the same functions as the iPad, however with smaller screen size and minor changes to the design.

The information about sales of Ipad mini only is not available in financial reports of Apple Inc. However, according to NASDAQ report, there were 12.5 million iPad Mini units sold during the second quarter, out of total 19.5 million iPads sold [10]. That means, that after introduction of iPad mini model, it has comprised the major portion of iPad sales, as a family of products. Since iPad as a family is at maturity stage as well, it is fair to assume that iPad mini is currently at the same stage.

- Android smartphones

Android is an operation system used primarily for smartphones and tablet PCs. The first smartphone that was using Android OS, was the HTC Dream introduced in October 22, 2008. Since Android is an open source operation system, it is possible to

SAMSUNG GALAXY SALES CHART

UNITS SOLD WORLDWIDE IN MILLIONS, PER FISCAL QUARTER
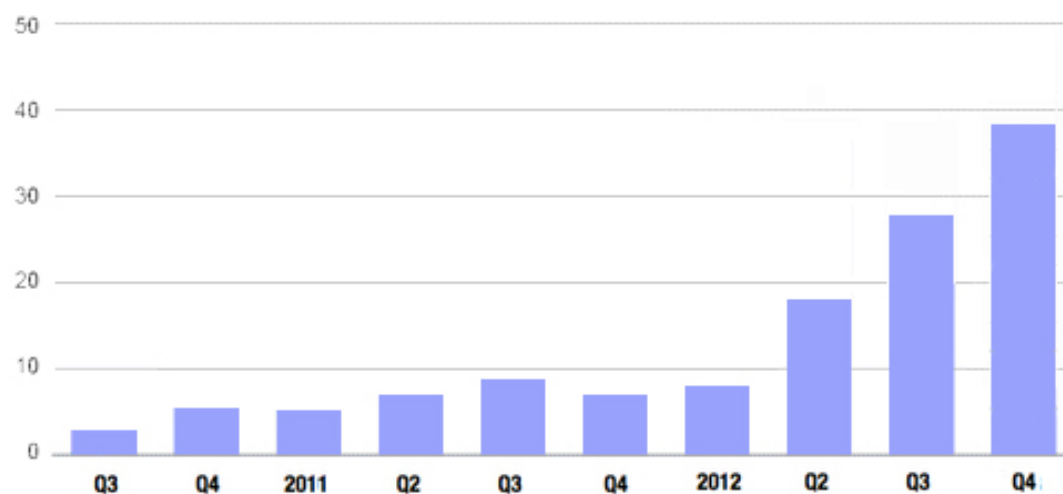
Source: Samsung

freely modify and distribute the software. That made Android the most used smartphone OS.

Basic functions of Android smartphones are similar to iPhone's: taking video and images, various entertainment features, GPS and capability of Internet browsing. As iPhones, android smartphones also became a substitute to digital compact cameras.

- PlayStation Vita

PlayStation Vita was first introduced on December 17, 2011. It is a portable game console by Sony. The device has a multi-touch supporting touch-screen, two cameras, stereo speakers and supports GPS, Wi-Fi and 3G. The functions look the same as of Android smartphones or iPhones, however it's shape and buttons' locations are design specifically for games.

- Ultra-books

Ultrabooks are the lighter versions of laptops that started gaining its' popularity after

ULTRABOOKS SALES CHART

UNITS SOLD WORLDWIDE IN THOUSANDSS, PER FISCAL QUARTER
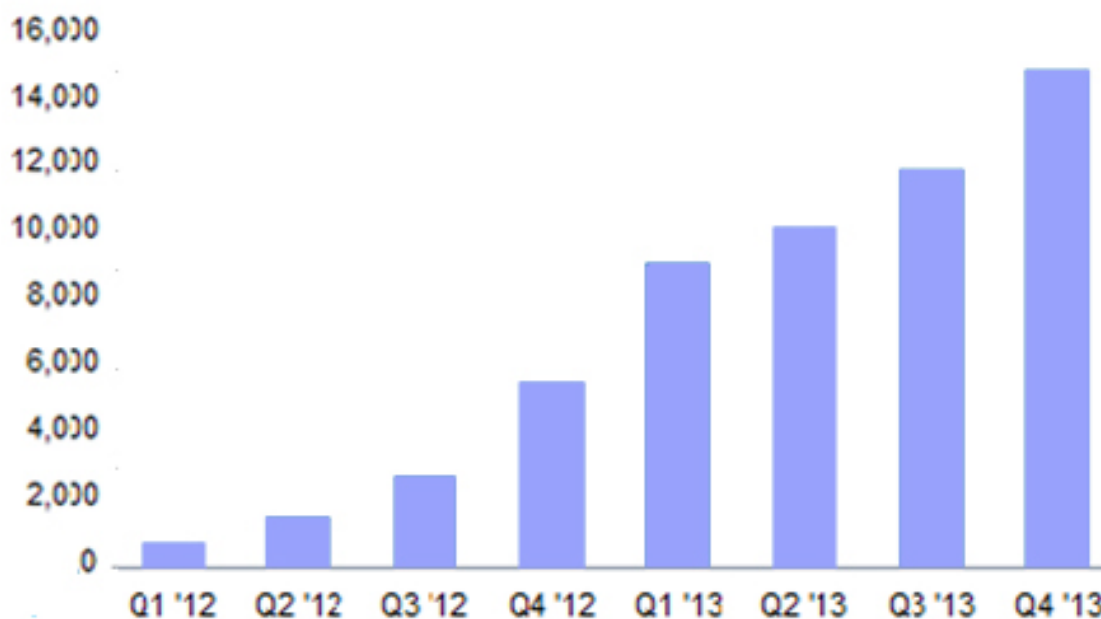
Source: IHC Resource

introduction of Apple's Macbook Air in 2008. The functions of Ultrabooks are the same as of a normal laptop. However the hardware capacity of an ultrabook is sacrificed to get a lighter and thinner device. That is done for the reasons of better comfort while using and carriage.

a. Users' perspective

From users' perspective, the devices of maturity stage, which allow third-party software developers to create new programs for their devices and let the users download them, like Apple and android products have a big impact on the education side of users, who are interested in programing. That is, users have an opportunity to write their own programs and distribute them online.

Another environment that has been influenced by devices of maturity stage was the photo community. Especially with the introduction and popularization of online media sharing software for mobile devices – Instagram, there has been a big community established with over 30 million users, among which there are many influential people, like heads of countries, famous artists and etc. As well as Instagram, Facebook became a more popular photo sharing service, after the development of Facebook software for mobile devices with convenient function of photo sharing. Whereas before the boom of photo sharing services, the photo community was less widespread.

With the advancement of camera technology the way distant communication has changed. The small gadgets of maturity stage, like smartphones and tablets, have two cameras available – the main camera and frontal one. Assuming, that both users have a good Internet connection, they can have a distant conversation and see each other. Before the advancement of cameras for gadgets, this feature was available only for computers and laptops. With this feature available for mobile gadgets, users can see each other at any place and the device that provides this service can be kept in a pocket.

The availability of GPS built in the portable smartphones makes it easier for travelers to find their ways, either by walk or by vehicles. In addition to the software with maps available, there are programs available that are more detailed about a particular city or town. That means, that any traveler can go to any place in the world and once he has a network coverage, he can make it anywhere.

A recent study of the effects of gadgets on our sleep has shown that there is a direct relationship between usage of smartphones at nighttime and a good sleep. "Using a smartphone, tablet or laptop at bedtime may be staving off sleep, according to Harvard Medical Schoolscientists, who have found specific wavelengths of light can suppress the slumber-inducing hormone melatonin in the brain" [11]. It means that, the human body reacts to the glow from smartphones or any other electronic device as to sunlight and keeps awake.

As the result there is a deficiency of sleep, hence less time for body to recover itself. All of that sums up into tiredness, stress and bad mood.

One more health issue has been under debate, that cell phones cause cancer. According to International Agency for Research on Cancer, a component of the World Health Organization, "has recently classified radiofrequency fields as "possibly carcinogenic to humans"…" [12]. Even though, scientists have not found a direct link between cell phones usage and brain cancer, they advise not to use, or at least limit the usage of cell phones for children, because their nervous system is still on a developing stage and more vulnerable for cell network exposures. In addition, the skull bones of kids are thinner, providing less protection against radiation.

b. Business perspective

Once again, from the charts it is clearly seen, that products of maturity stage can have an impact on a whole industry. Once again, if to look at the sales chart of iPad, it had an impact on sales of netbooks. The introduction stage for iPad was so small, that it went straight to the maturity stage after beginning of sales in USA – on April 14, 2010, Apple announced that due to an overwhelming demand, they had to postpone the launch of iPad outside of USA. That also accounts to the sales of tablet PCs. Alothough tablet PCs were introduced way before the introduction of iPad, it only had a boost in sales in 2011, after the success of iPad.

According to Photo Marketing Association (PMA)'s director of UK operations Nigel McNaught, due to improving quality of cameras in smartphones, like iPhone and Android smartphones, sales of digital compact cameras started dropping. Although compact cameras' producers are not the direct competitors of smartphone producers, companies like Apple and Samsung had a definite impact on other industries.

The fact that Apple, android smartphones, most of the tablet PCs allow third-party software developers to create new programs for their devices and let the users download them, significantly boosted the industry of software developers. Many aspiring entrepreneurs who entered the business of software programming for gadgets, became hugely successful. One of the most popular softwares for android and Apple devices Instagram, was launched in 2010 by two entrepreneurs Kevin Systrom and Michel Krieger. By April 2012, they had over

30 million accounts and sold it to Facebook for approximately 1 billion USD in cash and stock [13]. The total number of applications developed both for Apple App Store and Google Play exceeds 2 millions.

Not only privacy on personal level has been kept uncertain, but also on the business and even government levels. "US and British spy agencies routinely try to gain access to personal data from Angry Birds and other mobile applications" [14]. That is, the government and big corporations started giving out funding and paying more attention for security of their communication, by doing so, they create (or develop) a segment in an industry of communication, which is security communication.

Another area that was influenced by iPhones and android smartphones is music industry. After iPod completely changed the music distribution and promoted digital music as casual format of listening music, the functions of smartphones have improved. In some short period iPhones started cannibalizing iPod and other digital players' markets. The following after Steve Jobs CEO of Apple, Tim Cook stated, "…Our core philosophy is to never fear cannibalization. If we don't do it, someone else will. We know that iPhone has cannibalized some of our iPod business" [15]. Since android smartphones are having almost the same features as iPods, moreover, functional wise, there are more possibilities to have pirate music on android devices (i.e. free Bluetooth file transfer possible on android, but not on Apple), they have been making a big contribution in influencing music industry.

Gaming industry had a big shift after introduction of smartphones and tablets. Two new big platforms (iOS and Android OS) have created a new segment in a gaming industry. According to App Store, there are over 80 thousand games available for iPhone. Companies like Rovio Entertainment, who launched their best selling product – "Angry Birds, reached over 1 billion downloads today" [16]. Yet another platform for game developers was the Playstation Vita by Sony. Not only it became a big segment for software developers, but also for "gamers".

After the launch of iPad, tablet PCs, MacBook Air and other Ultrabooks, their main and special feature – light weight, allowed users to take these devices with them more frequently during their travels. This became so popular to an extent that big airlines, like British Airways, started allowing their passengers to keep their devices on during the whole flight, including taking-off and landing [17]. That was a big change in a flight security, which had been the same for years.

Another big industry that iPad, tablet PCs, macbook air and other ultrabooks have influenced was the film industry. The mix of easy availability of pirate content on internet and suitable features of these devices, like light weight, comfortable screen resolution made the film industry suffer losses.

According to the interviews conducted for the primary research part of the topic, all of the respondents confirmed the fact that iPhone and iPad devices could be perceived as a fashion statement. That is not only the case on a users' perspective, but on a business level as well. The futuristic design of Apple devices has popularized and asserted it as a style. An article in "Financial Times" magazine after Steve Jobs' passing away highlighted, "strangely, in all the thousands of pages devoted to Jobs … there has been surprisingly little attention paid to his influence on fashion. Design, yes; industrial design, yes. But fashion, no" [18]. Indeed, there was a big shift in fashion towards high-tech and futuristic design after iPhones gained its popularity.

An obvious industry that has been influenced by iPhones and Android smartphones was the industry of cell network – these devises gave an impulse to advance the network speed and quality. The networks like 3G and 4G, which is third and fourth "generation of mobile telecommunications technology" [19] are one of the examples of it.

At one of the interviews it was stated by an android smartphone holder, that he does not usually print the boarding passes when flying, and the bus tickets as well, because it is enough to just download the "PDF" version of the ticket and check it in. From this perspective, there is a positive tendency towards environmental side. That is, using less paper means saving trees. There are obvious negatives sides of it though. All of the leading smartphone producers update their lines of products each year. Many of the followers tend to update their device to a newest one, even though their current one works completely fine. Since motherboard circuits are made of raw materials that are difficult to mine and manufacture, that causes recycling issues with the old models.

Another big industry that has been influenced by the devices on a maturity stage of the lifecycle is journalism. The devices of this stage promoted an online access to information, including daily news. That made the classic business of newspaper to shrink and/or move to online platform. From the chart bellow it is clearly seen, that the first notable drop in revenue of newspapers was in 2001, due to popularization of Internet. The second

notable drop started in the period 2006 - 2008, when mobile Internet became widely used, because of suitable features of iPad, tablet PCs, macbook air and other ultrabooks for gaining information and reading purposes.

US Newspapers' revenue from advertisements

Source: naa.org; TheLadders (March 2011)
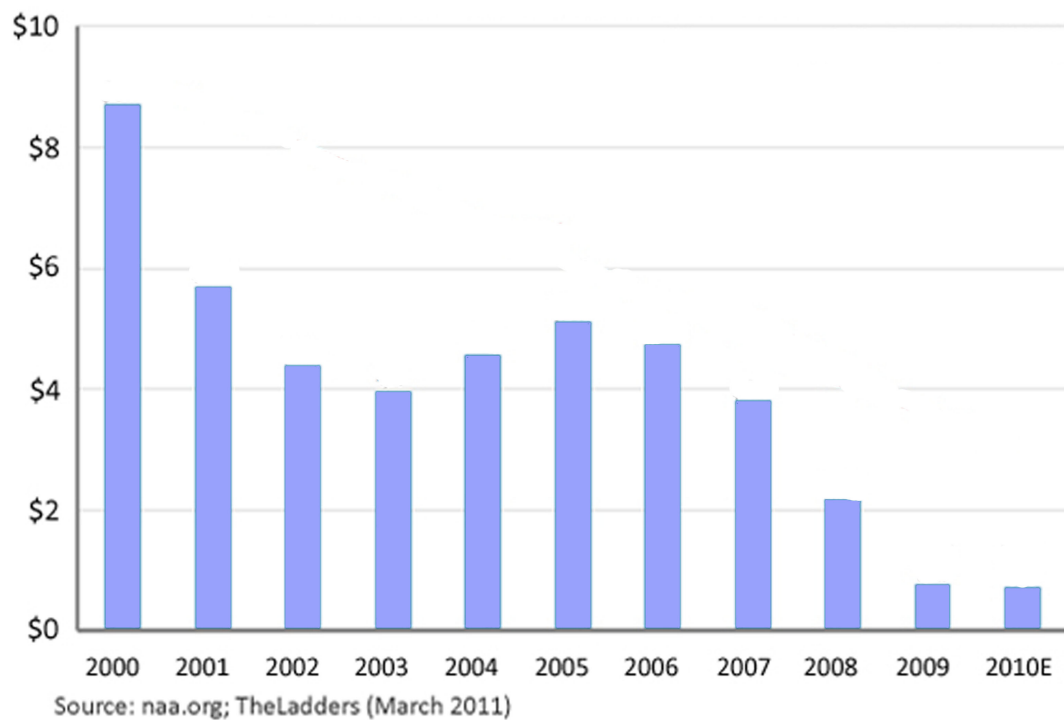
4.1.3. Products on an introductory stage of product lifecycle

At this stage the products like google glasses, 3d printer, 3d scanner and oculus were included in the list for observation. However, they have not been released during the period of observation, hence they are not being analyzed.

The list of the products included for the observation is:

- Samsung watches (galaxy gear)

Galaxy Gear was introduced on September 4, 2013. It is a complementary device for Samsung Galaxy Android smartphones and tablets. It does some of the functions Samsung Galaxy smartphones do, however Galaxy Gear cannot be used without the parenting device like a Galaxy smartphone or a tablet. Samsung watches have a touch-screen display, camera, speakers, accelerometer and a gyroscope.

In general, it had a poor reception. The most critics were toward design of interface, poor battery life and the dependence on Samsung Galaxy smartphones and tablets.

- iPad Air and iPad Mini with Retina Display

Ipad Air was released on November 1, 2013. The device is similar to the previous iPad models, except thinner body and enhanced performance. IPad Air was the 5th generation model in the iPad family of products.

iPad Mini with Retina Display is the second generation in the family of iPad Minis. There are only few differences with the first iPad Mini model, which are increased quality of display, slightly thinner body, different color and enhanced performance.

- iPhone 5S and 5C

The iPhone models 5S and 5C are the 7th and 8th models released under the iPhone line of products and were introduced on September 20, 2013.

iPhone 5S has a similar design to the previous model iPhone 5. Some of the main new features of iPhone 5S included the new home button with finger print recognition system built in, upgraded software and hardware, and more color choices.

iPhone 5C was the first device in the iPhone family, not to position itself as a high end device. Unlike the iPhone 5S, the 5C does not have metal materials in it. Instead, Apple used polycarbonate casing with different colors available. Hardware wise the 5C has less capacity than the 5S and does not include the finger print recognition button. Software wise it has completely the same capabilities as 5S.

a. Users' perspective

The newly introduced iPhone 5S had the same features as the old models, except one true novelty, that found a big resonance among people. That novelty was the home button with possibility of fingerprints scanning to access the cell-phone. Although it does not guarantee 100% proof for user's content, however it does give some level of privacy security.

In general, the enhanced performance and quality (as in iPad Mini with Retina display), brings up a better user experience to the holders of newly introduced products. Improvements in design (thinner body of iPad Air) suggest more comfortable usage and carriage of the devices.

In regards to Samsung Galaxy Gear, it is the first product of that kind. The fact that it is possible to receive calls without bringing a cell phone to the ear makes it less dangerous to health. According to International Agency for Research on Cancer, a component of the World Health Organization, "has recently classified radiofrequency fields as "possibly carcinogenic to humans"…" [12]. Even though it has not been proved that there is a direct relationship between cell phone usage rate and cancer, it is still less risky to use Samsung Galaxy Gear, especially for children.

b. Business perspective

From the business perspective for newly introduced (by the time of the research) Apple devices – iPhone 5S, iPhone 5C and iPad Air, the research showed that these gadgets did not affect any other environment, which Apple products of maturity stage have not affected. However, it is fair to conclude that Apple has a big influence on financial stock markets. In order to provide an insight how big is the Apple Inc. – "Apple has more than US$76.2 billion in cash as of the June quarter, and *The Wall Street Journal* reported on Wednesday that this was more than the gross domestic product (GDP) of 128 countries, according to data from the World Bank" [20]. And according to CNBS, it was expected, that Apple's "iPhone 5 could add have a point to USA GDP" [21]. Hence, there is no doubt that iPhone 5S and 5C had big influence on financial markets.

The new additional device by Samsung for Galaxy series smartphones – Galaxy Gear (Samsung watches) was released during the research process and has been observed. The research showed that there was not any other environment, which android products of maturity stage have not affected. However, the same as with Apple products, there was a definite influence to the financial markets with the introduction of Galaxy Gear.

4.2. Primary research and analysis

The primary research has been done to find out how was the life of gadget users before and after they started using a particular device. The research has been made via conducting **personal face-to-face interviews (qualitative research method)** with 15 people – 8 males and 7 females, scheduled for 15 minutes each, who have been using particular gadgets. All of the respondents are well familiar users with a device or devices that are observed and that gives more accurate research results and analysis. It is important to determine each change for users, because once a change is recorded, it can be inserted into the design thinking framework. Since all of the interviews are done with non-business representatives, the primary research considers only the users' perspective.

The research is exploratory by nature of its research question. There are chosen the most effective particular methods to be used during the research. Personal interviews - is the best method to determine a specific question deeply, identify users' experiences and to clarify psychological motivations and perceptions. The disadvantage of personal interviews is that the sample of respondents that are chosen cannot be representatives of the whole population being studied.

Unlike questionnaires, the nature of personal interviews is less structured, that is the research is interpretivistic and there are no pre-conclusions drawn (a hypothesis). However, to make the interviews more organized and in order to keep a common path for the interviews, there is a general structure designed:

The first part of the interview is started with the discussion of gadgets in general. It is important to get an idea, what is the background of the respondent towards gadgets and it is good way to initiate a conversation in the topic of interest.

Then in the second part the topic narrows down to a gadget or gadgets that are under observation and a respondent have been using it/them at the same time. It is important to find out what were the initial reasons for the respondent to purchase a particular device, why the product stood out from the competitors' products. That might give an insight to what kind of environment a respondent wanted to change consciously with purchase of the device.

In the third part it is important to find whether respondent notices changes that are connected to a certain device, however these changes were not the results of conscious interaction. Various segments of daily life can be taken into conversation for discussion.

4.2.1. Products on a decline stage of product lifecycle

- Nokia smartphones

With Nokia smartphones, all of the respondents remember as their first smartphones. There were several reasons of why they purchased the Nokia smartphones:

- general trend
- new features
- mobile internet

Under general trends the evidence in the interviews was the saying that it was considered classy to "…have a smartphone among your friends and classmates". From this it is fair to conclude, that Nokia smartphones were one of the first smartphones to indicate social status. In addition to social status, it was influencing the way people got along with each other – "…I can admit that I was interacting more with classmates who was having smartphones, because we played games with each other through Bluetooth during classes".

The new features that attracted respondents to purchase a Nokia smartphone was the ability to install applications in it. Previous cell phones they had were having preinstalled software that could not be expanded or changed. Nokia smartphones included the functions of installing some of the existing brands for computers into a cell phone - "…it was something new and great to have applications you knew from computer usage to be in your phone". These new features brought up an idea of having a computer in your pocket. "Some of the games I had long ago on my computer, could be installed in a Nokia". Not only it created a new market for programmers, but also raised a new platform to learn programming from.

With development of smartphones, the usage of mobile Internet started rising. Marcus mentioned about Nokia, "it was when I started sing mobile Internet". As the result, mobile Internet has changed how the whole day goes for people. All of the respondents admitted, that they have been checking emails, social networks' messaging many times a day.

Findings from primary research:

The environments that Nokia smartphones influenced included:

Cinema experience, distant communication, fashion, Internet experience, live communication, photo experience, programmers, social interaction, theater experience, traveling experience

- iPod

The obvious environment that iPods have change is the way people were getting and listening music. It is true, that music listeners had already had an experience of listening to music with headphones/earphones with portable CD and mp3 players. However, iPod was different from CD and mp3 player by its capacity and dimensions. With the storage capacity of the same as for hard disks, iPods could hold the whole music library of the user in his pocket. That opportunity eliminated the hassle to periodical updates of the playlists for the users. Indeed, that was one of the main reasons for the respondents to purchase an iPod. Alexandra mentioned about the iPod, "I like the idea of carrying all my music with me". For Alexandra it replaced the portable CD-players.

She also mentioned the battery life as one of the reasons of having iPod, "I like the idea of having a device for one task, like Kindle is made to store all of the books, iPod store all the music… when you have a device that does everything, your battery dies very fast". Although she has other device, an android smartphone, that could support playing and storing music, she still prefers to have an iPod because of the battery life and its' special function.

In addition, the design of iPod and the fact that this product was designed by Apple made it some sort of a fashion statement. By the time of purchasing an iPod, it was trendy to have one. When purchasing an iPod, the respondents admitted that the decision making process went by very quick, that is, they did not make any research of competitive products; they went to the store directly.

One more important reason for Alexandra when getting an iPod was that she liked listening to music while doing sport activities. However, the portable CD-player she had was failing to consistently playing the music, while she was running and as the result, shaking the player. That is, the way doing sports looks and interaction during trainings has become different.

Findings from primary research:

The environments that iPod influenced included:

Fashion, live communication, leisure, music experience, public transport experience, sport

- Portable CD-players

All of the respondents who had a portable CD-player either do not have it anymore, or completely stopped the usage of it. Indeed, with the advancement of technology and popularization of digital music, we witness portable CD-players being on a decline stage of product life cycle. Interviewees recalled that portable CD-players had shifted portable cassette players to a decline stage as well. They connected the reason of them purchasing the device as a better solution to listen to music, than portable tape players. They no longer needed to rewind all over the cassette to switch to another song. As the result, they started listening to music more often. All of the respondents admit music as big part of their lives and portable CD players became a fulfilling element.

With popularization of MP3 format, some of the interviewees mentioned updating their portable CD-player to a MP3 supporting one. That allowed them to have much more songs on one CD. They could purchase MP3 CD collections of songs, as well as write a CD themselves. That was the start for music piracy and when the music industry gained losses.

Portable CD-player users mentioned in the interviews that they loved exchanging CDs with their friends. Anna told, "I remember my friends and I were making a list of albums we wanted to buy and then evenly splitting the list. Later we would buy assigned albums, listen them and then we could take turns with others". Indeed, CD players, specifically their complementary product – music CDs became part of social interaction.

Findings from primary research:

The environments that Portable CD-players influenced included:

Live communication, leisure, music experience, public transport experience, sport, social interaction, social life.

- Portable digital cameras

Among the compact dimensions and lightweight, the main reasons for purchasing a portable digital camera for the respondents were:

- affordable price
- ease of use
- relatively good quality of pictures

All of the portable digital camera users interviewed, were not the professional photographers. However, they liked to snapshot some of the moments they considered as memorable, like traveling, leisure, concerts etc. Not only the respondents wanted to keep the memorable moments just for themselves, but also to share and show to other people – some of the quotes from the interviews point out this statement "I show my pictures to my parents after I travel", "…I don't really use the digital camera these days because the camera on my phone is enough for me, but if I did, I would upload it to the web, definitely". As the result, the compact digital cameras have impacted the social interaction.

The compact dimensions of the digital camera allow the users to bring it with themselves easily. It is very comfortable to take it when traveling. Timur mentioned, "Before I had my android smartphone, I was always carrying the camera with me when I traveled", "…if I don't show pictures to my parents, for them it seems like I haven't traveled anywhere". From this, it could be concluded that compact digital cameras had an impact on the way people are behaving when traveling.

Findings from primary research:

The environments that Portable Digital Cameras influenced included:

Leisure, photo community, social interaction, traveling experience, video recording experience.

- Netbooks

The unique selling propositions of netbooks are – low weight and low cost. These two propositions were the reasons for the interviewees to purchase netbooks. The respondents mentioned that the cost factor was more important for them, because as students, they could not afford a high performance laptop. As the result of their affordability, netbooks have a positive impact on education.

Another feature of netbooks - the low weight could allow the users to take them when traveling. Most of the models have a built-in camera, which allows users to have videoconferences and chat. These tools are especially useful during traveling.

The respondents admitted that they did not spend much time on netbooks, unless they had to do some work.

Findings from primary research:

The environments that Netbooks influenced included:

Distant communication, Internet experience, traveling experience

4.2.2. Products on a maturity stage of product lifecycle

- Ipad family of products

According to some of the interviews, one of the biggest changes iPad caused to respondents' life was the way they used their free time. For example, on the way to work or studies, or on a train, during the flights they used iPad to entertain themselves with movies, music or chatting with friends. From the following, several conclusions can be derived:

- the way people behave in urban public transport (buses, trains, subways), subsequently the needs of public transport users changes
- how passengers behave in an aircrafts during the flights, as a result the airline clients' needs (sockets, wi-fi, etc.)
- preferences in means of communication

In addition to the above, iPad gives useful tools to work. Its' lightweight, convenient screen dimensions and the idea of touchscreen is more native by itself, makes it an attractive yet useful device for relatively simple work and tasks i.e. typing, calculating, using spreadsheet tools and etc.

However, it was also mentioned in the interviews, that not only iPad was helping to "fill-in" spare time and give helpful tools for working, but it was also the cause of distraction during school assignments or any other jobs, so the work becomes inefficient.

One of the other environments mentioned above was that iPads were used in public transport for entertainment. The interviewees mentioned that the way people act in public transport today differs than it had been looking before all of the recent gadgets were out. Before passengers interacted with each other more, or read books during the journey. Nowadays people talk less, even if they know each other. That is, iPad has influenced they way people interact. Users have also admitted that their online conversations became more frequent and full than offline/live ones. All of the respondents who have held an iPad and used it in a frequent base admitted that their live conversations became less attractive than online conversation in a way that, they

would prefer to chat online, than make new acquaintanceships for example in a subway. However, infrequent iPad users denied latter and stated the opposite. Alexander from Sweden stated "It is hard to travel with bass amplifier, so I just take the iRig and practice wherever I want". That was about the Apple software and additional tool he used for that, named iRig designed for electric musical instruments like guitars and bass guitars. It gave him more mobility to practice his music instrument. Alexander added, "…also I use the headphones not to disturb my parents", which also gave him more freedom to practice.

iPad is being discussed by respondents as a well-designed device by its' looks, and also by the native design of the way it works and controlled. Indeed, there is a positive evidence of the intuitiveness of iPad – Alexander who happens to be traveling frequently, always keeps in touch with his parents and grandparents. For Alexander's grandparents it is easier to understand how to use iPad rather than a computer. He says about his grandparents "For them it is hard to use smartphones and computers. The smartphone is too small for their eyesight and computer is too complicated. It is much more simple to just push couple icons like Skype and call me".

Another fact all of the respondents have admitted was the computer usage. After the purchase of iPad, respondents started using computers less frequently than before. They almost fully cut off the usage of computer for entertainment or communication purposes. For the interviewees, the purpose of a computer narrowed down to specific work assignments that require special software iPads do not support, or it is not convenient to implement them using it (e.g. Photoshop, Excel).

One of the respondents, Anna mentioned, that her nephew who was 8 years old is an iPad holder as well. Anna noticed that the way her nephew behaves is different to the way Anna behaved when she was the same age. "…the best toy for him is iPad", "he never goes out and plays in a yard… with friends", Anna states about the subject. Not only it changes the way children behave after having and constant interaction with iPads, but also it impacts the vocabulary they use – "…he uses the words that I didn't when I was 8 – "apps", "skype" and so on".

That is, iPads have an influence on children's upbringing, and hence, as the result, the way they are going to behave when grow up. There are well known terminologies for

different generations – baby boomers, generation X, generation Y, generation Z. Generation Z relates to people who was born in the mid or late 1990s to the present day. Generation Z sometimes also referred as "digital natives". This is the generation that has not experienced the world before Internet. iPad is definitely one of the biggest impacts on the whole generation.

The other experience respondents showed that has been changed were the books – some of the interviewees were using iPad for reading books on a frequent basis. Thomas is a frequent user of iPad for reading purposes; he says "it is cheaper for me to keep my books in digital format, rather than buying a paper book. Also, it is more comfortable to bring an iPad with you to a coffee-shop, rather than having lots of heavy books".

Not only the way iPad users read books has become different, but also the way they read the news. Thomas mentioned that "the first thing I do every morning is I get my iPad and start browsing the news web sites or twitter. That became a habit, I would say so". Indeed, the way information is being gathered after the advancement of technology has changed. From business perspective, the newspaper companies started gaining losses after mobile Internet usage became widespread.

Findings from primary research:

The environments that iPad family of products influenced included:

Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, work experience.

- iPad Mini

The functions of one of the representatives of iPad family, iPad mini are completely the same as for its' big brother. That is, the influences of environments on a personal level are the same as it is for the whole family of products. However, the small size and low cost of it gave a positive influence to personal budgeting of its' users – Lisa stated that "…I could not afford iPad, so I got myself an iPad mini".

Apart from its' low cost, the other reason interviewees preferred an iPad Mini to an iPad was its compact size. These users did not want to completely switch from computer to a tablet, they wanted to switch only some casual tasks like browsing, email texting, typing.

Findings from primary research:

The environments that iPad Mini influenced included:

Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, user experience, work experience.

- IPhone family of products

Gaining information about iPhone was easier than with any other device in the list, because even non-users of iPhones had defined opinions and conclusions very similar to holders of the device. That is why, the research results about iPhone family of products is the most accurate.

All of the respondents who have ever held an iPhone and even non-holders asserted that iPhone was a fashion symbol. However, most of the opinions were regarded from iPhones holders' side to minimize personal biases. The holders of the device stated that they like it for the design where every detail was thought of for them, like materials iPhones are made of, the shape, packaging and even the smell when opening a new device from the box. It was mentioned that the design of iPhones suited to any type of clothing they were wearing and it was "as iconic in fashion as Louis Vuitton bags".

In addition, to considering it as a fashion symbol, iPhones were regarded as a status symbol, like good cars, jewelry, watches, expensive clothing brands and etc. Some of the respondents stated that they acquired an iPhone because of the status it provides, despite the fact that it is not always having the best hardware specifications. One of the interviewees, Sarah who is 22 years old, has been using iPhones since its' first generation introduction, and updates her device with the new one, when new generation is out, does not even use the most important functions and features smartphones like iPhone are made for, and uses it only for calls, messages and taking pictures. Sarah stated that there were two main reasons for getting such an expensive device: good looks and status it brings. And to keep that status, she always keeps her iPhone up to date.

Another environment that was mentioned by all of the users of gadgets was the theater, cinema theater experiences. It was stated that the devices have gotten so deep in hour habits, that people continue using it in the places where they can distract everyone around. As the result, the atmosphere of going to an art place, such as theater is changed for the ones who use gadgets during an act, as well as for the ones who are next to.

During the research period there has been a big issue under discussions – the leakages of secret US National Security Agencies' documents, proving spying on Apple (and not only) users (including iPhones) through some of the most popular applications, like Facebook, Angry Birds and etc. That fact has opened many doors for argues, like whether "Should people be spied on?", "How to protect own privacy?" and so on. It is a huge topic for argues, however, one definite conclusion can be derived: iPhones have been a big part of an immense impact on personal privacy.

As in the case with iPad family of products, users of iPhones had the same opinion on the impact of them on live communication, i.e. "…there is more to say online, than offline" was told by a student from Sweden, Alexander.

With an advancement of technology, like 3G and 4G, which is third and fourth "generation of mobile telecommunications technology" [19], the traditional way of cell phone connection also has been influenced. All of the respondents stated that after increased Internet connection speed and quality, they have been using Internet messengers like Whats App, Viber and Skype to communicate on a daily basis. The reason for that were the lowered costs. Some of the interviewees were international students and in their case the ability to use all of the Internet messengers was exceptionally useful, since it bore no costs to contact their home countries.

The majority of respondents stated, that in many cases iPhones are saving their time in some of the daily tasks, like payment of the bills. A student from USA Ryan told: "I do all of my bank transactions through my iPhone. It is even faster than doing it online with a computer… I like paying my bills while I am walking to a class".

Findings from primary research:

The environments that iPhone family of products influenced included:

Cinema experience, distant communication, fashion, flight security, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, sport, traveling experience, video recording experience, work experience.

- Tablet PCs

Tablet PCs have very similar functions to iPads, which makes its' influences to environments very similar too. However, it is fair to mention that for the most part, the reason why most of customers tend to choose tablet PCs, is the lower cost compared to iPads. Another reason is the openness of its' operating system. Indeed, during the interviews, tablet PCs' holders mentioned these reasons as the main ones in their decision to purchase a tablet PC. That is, Tablet PCs have a bigger influence on education, since its' lower price is more relevant for students and pupil.

The openness of tablet PCs' operating system gives bigger opportunities for professional programmers to experiment.

The lowered cost was mentioned in Christopher's interview "it did not hit my budget too bad", which is a signal for actual positive influence to a personal budgeting.

Since its' higher openness, tablet PCs offer the users more opportunity for entertainment, because it is much easier to get any media in to a tablet PC than to an iPad. There are certain restrictions with iTunes made by Apple, that tablet PCs do not have. It makes tablet PC more favorable for watching movies – Christopher mentioned "I frequently watch Big Bang Theory on my tablet".

As in the case with iPad users, Tablet PC users admitted the lowered frequency of computer usage after the purchase of Tablet PC.

Findings from primary research:

The environments that Tablet PCs influenced included:

Cinema experience, computer usage, distant communication, education, internet experience, leisure, live communication, personal budgeting, photo experience, public transport experience, traveling experience, work experience.

- Android smartphones

During the interviews with the users of android smartphones, they have been mentioning similar environments of influence, as for iPhones: Transport, programmers, live communication, distant communication, photo community, video community, traveling, leisure, Internet, cinema experience, theater experience, sport, privacy, ways of having payment transactions. In addition to that, the environment of personal budgeting has also been influenced, since it has similar functions, but for a lower price.

In one of the interviews with android smartphone user, it was mentioned that the device was a good tool to be used for planning. Alexandra mentioned: "I use Google calendars for planning my days ahead… and then synchronize it with my phone". The function of android smartphones supports a comfortable way of appearing the calendar as a widget on the desktop, which gives an easy way for accessing the calendar with all of the notes on it.

Another use for android smartphones, mentioned in the interviews was the ease and convenience of gaining information - Alexandra mentioned "every day I read the news on my phone". Not only the news, but also the opportunity of gaining information about the weather, currency rates, stocks and etc., makes it different. Public transportation is the other environment that was noted by one of the respondents, Michael – "…nowadays everyone is texting, calling, playing, listening or just staring at their smartphones when you step in to the bus". Indeed, you could even experience people falling in the subways, because they are busy holding their devices.

There is another side of how smartphones' applications gave a change to public transportation – the public transport scheduling applications. Today it is very convenient to download applications to view schedules and even book the tickets. Not only that saves time and brings convenience, but it also gives positive trends towards environmental issues. At one of the interviews it was stated by an android smartphone holder, that he does not usually print the boarding passes when flying, and the bus tickets as well, because it is enough to just download the "PDF" version of the ticket and check it in.

The way people drive cars also has been influenced with the advancement of smartphones. Several respondents mentioned that they frequently use GPS when driving. However, there are safety issues concerned with using cell phones while driving a car – "28 percent of accidents involve talking, texting on cellphones" in 2009 [22].

Although android smartphones were not the first ones to have multi-touch touchscreen displays, it was noted in one of the interviews, that it saved time when having day-to-day tasks. Kristine's previous cell phone was without a touchscreen feature. She mentioned, "…on my previous phone I had to click all the time. For example, when I was trying to browse something, I had to click to locate the mouse on the screen… With touchscreen display, you just have to point with your finger and it saves so much time".

Findings from primary research:

The environments that Android smartphones influenced included:

Cinema experience, distant communication, fashion, flight security, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, sport, traveling experience, video recording experience, work experience.

- PlayStation Vita

One of the obvious environments that PlayStation Vita has an influence on is the way people spend their free time or time for leisure. That is what this device was made for. However, there are also not so obvious environments that were found in the interviews. Garrison, who is not only a PlayStation Vita holder, but also other gaming devices, talks about gaming devices in general as the "tools to have fun with your friends". He also added "I have close friends who happen to be gamers too… its just easier to get along with them for me". That is, for the respondent it is a topic that affects the things he is talking about in his social life.

Findings from primary research:

The environments that PlayStation Vita influenced included:

Leisure, transport, traveling, social life.

- Ultra-books

Ultra-books have been changing the environments the same as the normal laptops have. That is – they way we work, Programmers, distant communication, photo community, video community, fashion, traveling, leisure, internet usage and etc. However, one of the main features of ultra-books is in its' thinness and lightness. All of the respondents that held ultra-books were students and they highlighted in the interviews that mainly they were bringing their ultra-books to classes and using instead of notes and pens.

Another main feature of ultra-books is considering it as a more fashionable laptop. One of the respondents, Alexandra is a female student, stated, "I chose my Mac Book Air, because it is much nicer to carry a light computer, than a big heavy one. It even looks nicer". That is, for females it is more suitable type of laptops to carry with, rather than having a heavy one. In other words, it is not feminine to carry heavy things.

Findings from primary research:

The environments that Ultra-books influenced included:

Cinema experience, distant communication, fashion, internet experience, leisure, traveling experience.

4.2.3. Products on an introductory stage of product lifecycle

- Samsung watches (galaxy gear)

Samsung Galaxy Gear was one of the most anticipated products at the time of the research. However, not that many respondents have purchased it due to controversial arguments whether it is needed or not. Although there was only one respondent who happened to have a Samsung Galaxy Gear, he could give some useful insights on new environments that it could influence.

One of the main influences is the opportunity for users do better in sports. There are few reasons for that:

- the new way to answer a call
- convenient location of the device
- built in software

In regards to the new way of answering calls, Michael who happens to be the user of Galaxy Gear told "…when someone calls you, you just have to bring your palm to your ear and it answers the call". That is much more comfortable than holding a phone next to your ear when jogging.

In addition to that, Michael said "you do not have to interrupt your training and try to take out the cell phone from your the pocket".

The other feature of Galaxy Gear is the built in program to count the steps. It is a good tool to calculate and control the training process.

The other interesting topic regarding environments Galaxy Gear influences was the privacy of other people or private areas. It was brought up by Michael that the camera on Samsung Watches is hidden and it is very easy to take pictures without other people noticing it. He added, "…you could easily go to public toilet and take pictures, no one will find it out".

Findings from primary research:

The environments that Samsung Galaxy Gear influenced included:

Cinema experience, distant communication, fashion, health, live communication, photo experience, privacy, public transport experience, sport, theater experience, traveling experience

- iPad Air and iPad Mini with Retina Display

The reasons for the respondents to buy iPad Air and iPad Mini with retina display (later in this subsection used as just iPad Mini) were the same for both of the users. Those included:

- better usage experience
- desire to pursue the novelties
- lower weight

With better user experience respondents associated an improved performance of both iPad Air and iPad Mini. An iPad Air user Marcus did not have a tablet before and decided to purchase the latest generation of iPad mainly because of better performance.

For Claire it was the first tablet device. She preferred iPad Mini with retina display to iPad Air because of the compact size. And it was a dominant choice in comparison to the first generation iPad Mini because of higher quality display, which brings better user experience.

As it was with iPhones, Sarah is trying to keep up with the latest models of iPads as well. She is the owner of iPad Air and even though she owned previous generations of iPads, as the reason for purchasing the last model Sarah stated, "…just because it is the latest model".

iPad Air had a considerable reduction of weight (200 gram reduction) which became one of the reasons to purchase the device instead of getting previous models.

Findings from primary research:

The environments that iPad Air and iPad Mini with Retina Display influenced included:

Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, user experience, work experience.

- iPhone 5S

Respondents who own an iPhone 5S highlighted the main reasons of purchasing this model as:

- desire to pursue the novelties
- better performance

As it was mentioned earlier, Sarah was the follower of the latest Apple products and her reason of iPhone 5S purchase was that she wanted to stay up-to-date.

As another reason to purchase an iPhone 5S Marcus mentioned an improved performance.

During discussions about the new features of iPhone 5S, Marcus noted about the novelty in the "world of gadgets" – fingerprint scanner. He has been using it as his security lock. Marcus admitted this type of security as a better one than the other, which is the passcode lock. He stated, "I have a lot of my passwords like for my email accounts and etc. on my phone, so it is good that it has some kind of security". So Apple bringing fingerprints scanner to iPhone 5S has influenced the security environment for the gadgets.

- iPhone 5C

Both iPhone models 5S and 5C were released at a same date. Although main features of both were almost the same and the price for 5C was slightly lower, the 5C version did not sell as Apple anticipated it. There was only one respondent for iPhone 5C.

As the main reason for purchasing iPhone 5C, Samantha stated that she likes the design of it better than of 5S. She did not need the latest features of iPhone 5S, including fingerprints scanner. In addition, there was a slight price difference between the two, which was definitely a push for Samantha to purchase the 5C.

Findings from primary research:

The environments that iPhones 5S and 5C influenced included:

Cinema experience, distant communication, fashion, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, security of information, sport, traveling experience, video recording experience, work experience

5. Summary and conclusion

All of the gadgets' development processes are unique. However, there are general steps and a common process that most of the projects of gadgets' development follow. That is "observe, brainstorm, synthesize, prototype, and implement" [7]. This outline is "drawn on methods from engineering and design"[7]. This research has been focused on refining of the first step in the gadgets development process, which is concerned about observing and analyzing the environment and surroundings. The environments and surroundings of one group of products (in this case gadgets) have mutual environments. These environments are divided in two subgroups – the Users' perspective and the Business perspective.

An overview to the general refined gadgets' development process:
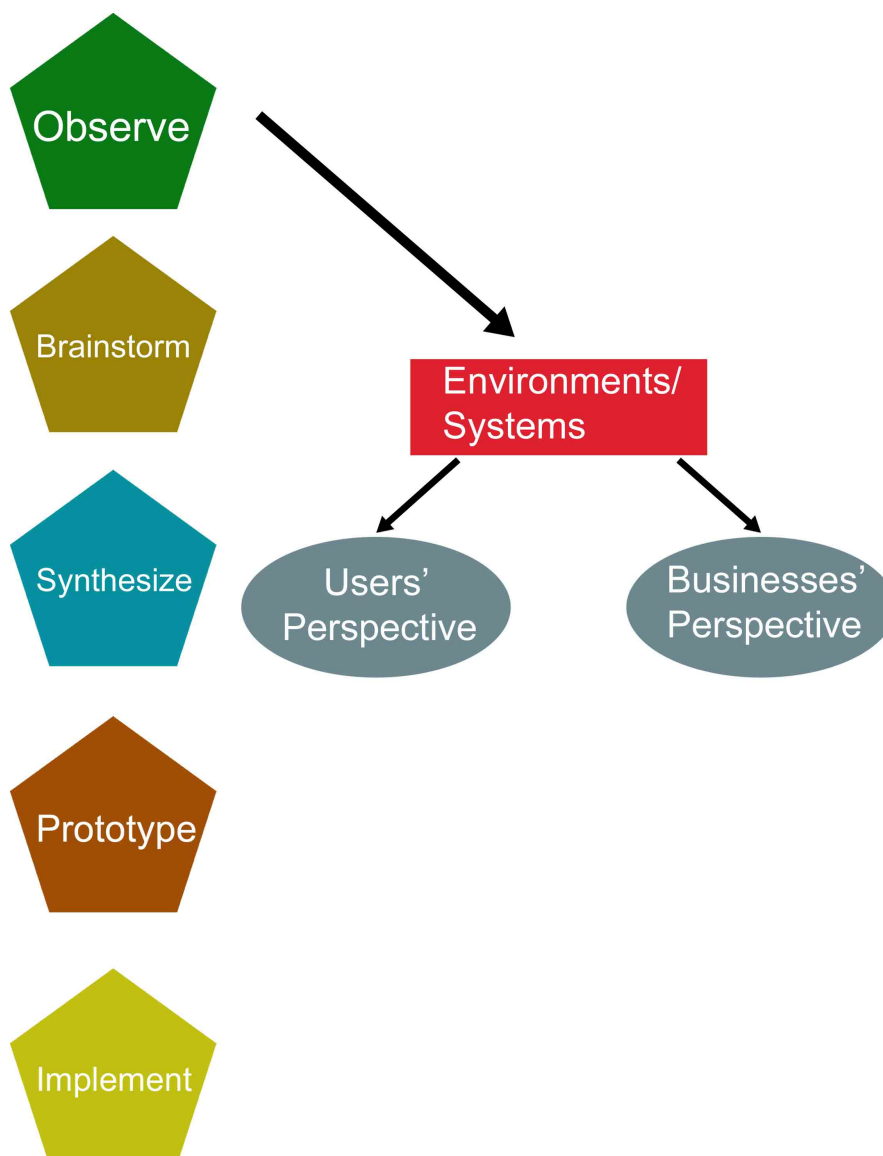
Indeed, from the research results it can be seen that the further gadgets develop, the more environments they comprise. That is, the gadgets from introductory and maturity stage in product lifecycle commonly cover the environments of products that are on a decline stage. That is the design thinking framework can not a stable or fixed tool. It is a floating entity and can be modified with either the advancement of gadgets or further research via interviews.

The Users' perspective framework:

Accessibility of technology for elder people	How the accessibility of a device influences the elder people's usage rate
Children's upbringing	Influence on children's upbringing
Cinema experience	How a device changes the way user or user's surrounding people perceive cinema
Computer usage	How a gadget changes the usage rate or purposes of a computer
Distant communication	How a gadget changes distant communication
Education	The influence of a gadget on education
Fashion	The influence of a gadget on fashion
Flight security	The way a gadget can influences flight security
Generation	How a gadget influences a generation(s)
Health	Effect of a gadget on health
Internet experience	The way a gadget changes Internet browsing experience
Leisure	Changes in the ways of leisure caused by a gadget
Live communication	Whether a gadget influences live communication
Music experience	The way music listening experience is changed by a gadget
Musicians	An influence a gadget makes on the musicians' community
Payment methods	An influence a gadget makes on payment methods
Personal budgeting	The way a gadget helps with personal budget planning activities
Photo community	An influence a gadget makes on the community of photographers
Photo experience	An influence that a gadget makes on experience of taking pictures

Privacy	Impact of a gadget on personal and others' privacy
Programmers' education	Contribution of a gadget on education of programmers' community
Public transport experience	How public transport experience changes because of a gadget
Security of information	Influence of a gadget on security of personal information
Social interaction	How a gadget changes social interaction
Social life	How a gadget changes social life
Sport	Influence or supplement of a gadget on the way of doing sports
Theater experience	The way a gadget changes the experience of going to theater
Traveling experience	How gadget influences traveling experience
User experience	How gadget can improve or change the user experience
Video recording experience	How gadget can improve or change the video recording experience
Work experience	How gadget can changes the work behavior

The Business perspective framework:

Advertisement industry	How a gadget influences the advertisement industry
Airline industry	How a gadget influences the airline industry
Camera producers	How a gadget influences the industry of camera producers
Cell network industry	How a gadget influences the cell network industry
Environment industry	How a gadget influences the environment saving industry
Fashion industry	How a gadget influences the fashion industry
Film industry	How a gadget influences the film industry
Financial markets	How a gadget influences the financial markets
Game development industry	How a gadget influences the industry of game development
Music industry	How a gadget influences the music industry
Software development industry	How a gadget influences the software development industry

Appendix I

Transcripts of interviews

Nokia

Marcus is a 20 years old bachelor student from Sweden, who came for an exchange semester to USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes, I would consider myself as a frequent gadget user for sure. I have an iPhone that I use every day and recently I bought the new iPad. I would say. I couldn't spend a day without a phone. I mean I could have, but it would be miserable.

- Do you currently use a Nokia smartphone?

  No I don't, but I used to have one. I think it was a Nokia 7610.

- What was the reason for you to purchase the Nokia?

  Well, it was a cool phone back in that time. It had a lot of new functions. I mean the phone I had before this, was Siemens S45 and you could only give calls and messages with it. With Nokia I had more games and apps.

- How did it differ from competitive products?

  I would say it looked better than other phones. And the functions of the phone were better than others' that time.

- Did you find anything that has changed in your day-to-day life after purchasing the Nokia?

  It was the first phone when I started using mobile Internet with. Also it had a good camera. I mean at that time we thought it was a great camera. So at my school we started exchanging all the videos and photos through Bluetooth, which was new too.

- Did you find anything that has changed in your day-to-day life because others use the Nokia?

  Yes, as I said before, at school we started using Bluetooth to exchange media. It was a fun thing to do during classes.

Michael is a 24 years old Master student from UK:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I am keen on gadgets. I think everybody is today. It is hard to find someone without a phone now.

- Do you currently use a Nokia smartphone?

  No, at the moment I use Samsung Galaxy S4.

- What was the reason for you to purchase the Nokia?

  I guess, I loved the idea of having a small computer in your pocket. As you can see, I still do. Some of the games and programs I had long ago on my computer could be installed in a Nokia. Well, also it was classy to have a smartphone among your friends and classmates.

- How did it differ from competitive products?

  I liked the Symbian OS on Nokia's phones. You could choose and install software you wanted, like on a computer.

- Did you find anything that has changed in your day-to-day life after purchasing the Nokia?

  I took pictures more frequently. Also I remember texting all the time. There was an online messenger called ICQ, which I think does not exist anymore. You could use Internet on your phone and text, which was much cheaper than regular texting.
  Yeah, and it was something new and great to have applications you knew from computer usage to be in your phone.

- Did you find anything that has changed in your day-to-day life because others use the Nokia?

  I can admit that I was interacting more with classmates who were having smartphones, because we played games with each other through Bluetooth during classes.

iPod

Alexandra is a 23 years old Nissan employee from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

    I think yes, because I use my phone daily for Internet and every time I go to work or gym, I listen to music.

- Do you currently use an iPod?

    Yes.

- What was the reason for you to choose the iPod?

    It was a present from my brother. But I always liked listening to music.

- How did it differ from competitive products?

    I think iPod looks and functions are the best among competitors. It has a lot of memory on it and I like the idea of carrying all my music with me.

- Did you find anything that has changed in your day-to-day life after getting the iPod?

    It is more comfortable to use an iPod than a smartphone for listening music. I like the idea of having one device for one task, like Kindle is made to store all of the books, iPod stores all the music. I have a Samsung Galaxy S3 and sometimes I can use it for listening music too. But when you have a device that does everything, your battery dies very fast. And Samsungs don't last long.
    And yes, it is definitely more comfortable than CD-players. Actually before the iPod I had a CD-player. It was comfortable to use it in like a bus but it was impossible to use it in the gym. It was too big and you can't run with it, because it always pauses the music.

- Did you find anything that has changed in your day-to-day life because others use the iPod?

    Yes, maybe. When I am in a subway, everyone has the earphones in the ears. Sometimes even people talk to you with their earphones in and that is so vulgar. I hate it.
    Can't think of something other than that.

Garrison is a 20 years old bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I would say yes. I like gaming, so I guess it counts.

- Do you currently use an iPod?

  I do.

- What was the reason for you to purchase the iPod?

  Well it was trendy and Apple was cool to have. Although I don't like Apple anymore.

- How did it differ from competitive products?

  It is the first device that came out with such a big memory. Generally speaking, it is a hard drive only for music.

- Did you find anything that has changed in your day-to-day life after purchasing the iPod?

  I listen more music since then. I always take it with me on a bus trip to work or school. I like doing my home assignments with music.

- Did you find anything that has changed in your day-to-day life because others use the iPod?

  I would say not really.

Portable CD-players

Alexandra is a 23 years old Nissan employee from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

    I think yes, because I use my phone daily for Internet and every time I go to work or gym, I listen to music.

- Do you currently use a CD-player?

    No, because I have an iPod now.

- What was the reason for you to purchase a CD-player?

    It was just the best option.

- How did it differ from competitive products?

    I am not sure. I don't know other models of CD-players. Otherwise, I think there were no competitive products for my CD-player except maybe the cassette players.

- Did you find anything that has changed in your day-to-day life after purchasing the CD-player?

    For sure. I love music and CD-players were much better than cassette players because you need only push one button to go to the next song. That doesn't work with cassette players. I remember when I first got my CD-player, I always took it with me literally everywhere.

- Did you find anything that has changed in your day-to-day life because others use the ___?

    It seems that music was a bigger thing back in that time. People were listening and buying the music. Now you can have everything online.

Anna is a 24 years old Master student from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I don't think I am an addicted gadget user, but I have an iPad.

- Do you currently use your CD-player?

  Not anymore.

- What was the initial reason for you to purchase the CD-player?

  I wanted to listen music and CD-player was the best solution, so I bought one. I mean, my parents bought me one.

- How did it differ from competitive products?

  I am not sure, because my parents chose it for me.

- Did you find anything that has changed in your day-to-day life after purchasing the CD-player?

  Yes, I spent a lot of money on CDs. It was a big thing to have a CD-player in those days. I remember my friends and I were making a list of albums we wanted to buy and then evenly splitting the list. Later we would buy assigned albums, listen them and then we could take turns with others.

- Did you find anything that has changed in your day-to-day life because others use the CD-player?

  I think people started listening to music more.

Portable Digital Cameras

Timur is a 24 years old Master Student from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I think yes. I use my cell phone all the time.

- Do you currently use your portable digital camera?

  Not as often as I used to. I usually use my phone for that now.

- What was the reason for you to purchase the camera?

  I wanted to take good photos and that was a good deal.

- How did it differ from competitive products?

  My camera was cheaper than other. That was my main criteria. I didn't need a professional camera.

- Did you find anything that has changed in your day-to-day life after purchasing the camera?

  I was always carrying the camera with me when I traveled. Before I had my smartphone, if I didn't show pictures to my parents after I traveled somewhere, for them it seemed like I haven't traveled anywhere. Obviously, now I don't carry the camera with me anymore, because I have a phone with a good camera. But sometimes I take it for fishing.

- Did you find anything that has changed in your day-to-day life because others use the ___?

  No, I didn't.

Kristine is a 21 years old Bachelor student from Denmark:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I wouldn't. I use gadgets moderately.

- Do you currently use a portable digital camera?

  I do, sometimes.

- What was the reason for you to purchase the camera?

  I like taking pictures. But it is not professional, just for keeping pictures for good memories.

- How did it differ from competitive products?

  It was cheap but had a good quality outcome.

- Did you find anything that has changed in your day-to-day life after purchasing the __?

  I usually take the camera when I travel and I like showing my pictures to my parents after I travel. Also I used to have a blog where I uploaded my photos. But I don't really use the digital camera these days because the camera on my phone is enough for me, but if I did, I would continue uploading it to the web, definitely.

- Did you find anything that has changed in your day-to-day life because others use the camera?

  I like watching others' photos on blogs. Usually these blogs belong to professionals.

Netbooks

Kristine is a 21 years old Bachelor student from Denmark:

- Would you consider yourself as a frequent gadget user? Why/why not?

    I wouldn't. I use gadgets moderately.

- Do you currently use your Netbook?

    Yes, I do.

- What was the reason for you to purchase the Netbook?

    It was very cheap and portable.

- How did it differ from competitive products?

    It was not as massive as the usual laptops. I don't like carrying it, it's to heavy.

- Did you find anything that has changed in your day-to-day life after purchasing the Netbook?

    I use it for doing some of my work and web browsing. When I travel I always take it with me to Skype with my parents and friends.

- Did you find anything that has changed in your day-to-day life because others use the ___?

    Not really.

Timur is a 24 years old Master Student from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I think yes. I use my cell phone all the time.

- Do you currently use your Netbook?

  I do. I usually use it if I have to do some small work or when I travel.

- What was the reason for you to purchase the Netbook?

  It was cheap and small. I didn't need a high-performance laptop, because I have a desktop PC for complicated tasks.

- How did it differ from competitive products?

  It was the best performing laptop for lowest price.

- Did you find anything that has changed in your day-to-day life after purchasing the Netbook?

  It is useful for traveling, because it is so small. Basically, that is it.

- Did you find anything that has changed in your day-to-day life because others use the Netbook?

  No

- Ipad family of products

Thomas is a 21 years old bachelor student from Sweden, who came for an exchange semester to USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes. Because I use it all the time.

- Do you currently use an iPad?

  Yes I do.

- What was the reason for you to purchase of the iPad?

  I think it is a cool device. You can do almost anything on it

- How did it differ from competitive products?

  It has a high battery life and much nicer interface than other tablets.

- Did you find anything that has changed in your day-to-day life after purchasing the iPad?

  Yes, I started using it too often. I would say, the first thing I do every morning is I get my iPad and start browsing the news web sites or twitter. That became a habit, I would say so. Also it is cheaper for me to keep my books in digital format, rather than buying a paper book. And it is more comfortable to bring an iPad with you to a coffee-shop, rather than having lots of heavy books.When I go to classes, I don't bring notebooks anymore. Actually, I almost stopped using my PC, iPad almost fully replaced it.

- Did you find anything that has changed in your day-to-day life because others use the iPad?

  I am spending more time online now, than before. That is a bit sad, because before I used to do spend that time on something else. But everyone is online now, so I have to keep the connection with them somehow.

Anna is a 24 years old Master student from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I don't think I am an addicted gadget user, but I have an iPad.

- Do you currently use the iPad?

  Yes, I do

- What was the reason for you to purchase the iPad?

  It was a present from my parents, but I think I would get it anyways.

- How did it differ from competitive products?

  iPad has a good design. It is also more intuitive than the competitive products.

- Did you find anything that has changed in your day-to-day life after purchasing the iPad?

  Yes, before my parents gave me one, I never carried a computer with me. But iPad is like a computer. So sometimes I find myself overusing it. I occasionally try to consciously keep away from it.

- Did you find anything that has changed in your day-to-day life because others use the ___?

  Yes, I did. It is crazy, but my 8 years old nephew already has an iPad. In my opinion, because of that, he doesn't have a normal childhood. When we were kids, we used to play in a yard with toys, but the best toy for him is iPad. He never goes out and plays in a yard or play with friends. The kids today are very different even in the way they talk. He uses the words that I didn't know when I was 8 – "apps", "skype" and so on.

Alexander is a 25 years old Master student from Sweden:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes, I am a frequent user. I use it daily.

- Do you currently use an iPad?

  Yes.

- What was the reason for you to purchase the iPad?

  It is a pretty innovative product. It has a lot of great features like iRig.

- How did it differ from competitive products?

  It looks better and it is a higher-class product in general. Also I love iRig, which is a complementary device, through which you can plug-in an electric guitar to an iPad or iPhone.

- Did you find anything that has changed in your day-to-day life after purchasing the __?

  I like to play bass guitar and it is hard to travel with a bass amplifier, so I just take the iRig and practice wherever I want. Also a good thing about iRig is that I can use the headphones not to disturb my parents or anyone around.

- Did you find anything that has changed in your day-to-day life because others use the ___?

  Yes, my grandparents got an iPad recently. For them it is hard to use smartphones and computers. The smartphone is too small for their eyesight and computer is too complicated. It is much more simple and intuitive to just push couple icons like Skype and call me using iPad.

- iPad Mini

Lisa is a 20 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

    Yes, I do use my iPad Mini everyday.

- What was the reason for you to purchase the iPad Mini?

    I always wanted an iPad but I could not afford it, so once iPad Mini was out, I got myself one.

- How did it differ from competitive products?

    It was cheap and really nice looking.

- Did you find anything that has changed in your day-to-day life after purchasing the iPad Mini?

    Yes, I use it everyday for browsing, chatting, taking pictures, reading. It changed a lot.

- Did you find anything that has changed in your day-to-day life because others use the iPad Mini?

    Can't think of any.

- IPhone family of products

Sarah is a 22 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes. I love all of the new technologies.

- Do you currently use an iPhone?

  Yes, I've had all of the models of iPhone since the very first one. I try to keep my phones up to date.

- What was the reason for you to purchase an iPhone?

  I love Apple products. I think they are perfect from package to the shape and colors.

- How did it differ from competitive products?

  I think iPhones look better than any other phone. iPhones are as iconic in fashion as Louis Vuitton bags. It just suits anything.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone?

  Yes, it is a great feeling when you are one of the first ones to have the latest model.

- Did you find anything that has changed in your day-to-day life because others use the iPhone?

  I think stylistically iPhones changed the design world. I mean, the minimalistic design became very popular after iPhone first release.

Alexander is a 25 years old Master student from Sweden:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes, I am a frequent user. I use it daily.

- Do you currently use an iPhone?

  I do.

- What was the reason for you to purchase an iPhone?

  I like Apple products in general. I also have an iPad. I would say one of the best features I like is the iRig.

- How did it differ from competitive products?

  Also I love iRig, which is a complementary device, through which you can plug-in an electric guitar to an iPad or iPhone.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone?

  I like to play bass guitar and it is hard to travel with a bass amplifier, so I just take the iRig and practice wherever I want. Also a good thing about iRig is that I can use the headphones not to disturb my parents or anyone around.
  Also I like the applications like Whats App and Viber. They are especially useful, when you are abroad and don't want to get high bills for roaming.
  When I travel, GPS is always helping me out to find my way.

- Did you find anything that has changed in your day-to-day life because others use the iPhone?

  Yes, I think people have lack of live communication now. Because of the messengers, there is more to say online, than offline today.
  I think generally speaking, smartphones are being overused – when you go to a concert, people are filming the concert, instead of watching it. Or when you meet up with people, you will find everyone with cellphones, typing.

Ryan is a 20 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes, I am a frequent gadget user. I use it daily.

- Do you currently use an iPhone?

  Yes, I do.

- What was the reason for you to purchase the iPhone?

  I prefer the iPhone design to any of the Android smartphones. The sizes of Androids are too massive and not comfy.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone?

  I check all my emails, facebook chats, news and all of that stuff on the iPhone. iPhones have a lot of useful apps. For example, I do all of my bank transactions through my iPhone. It is even faster than doing it online with a computer. You don't have to turn it on and wait until it loads. You just take your phone and that's it. I like paying my bills while I am walking to a class from home.

- Did you find anything that has changed in your day-to-day life because others use the ___?

  Yes, I think people are spending too much time on their phones and missing what is happening around them.

- Tablet PCs

Christopher is 18 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  For sure. I use gadgets all the time.

- Do you currently use a Tablet PC?

  Yes, I do. I have a Samsung Galaxy Tab 7.

- What was the reason for you to purchase the Tablet PC?

  I think it is a good tool to make some easy tasks like typing, browsing.

- How did it differ from competitive products?

  The price of my Tab is much lower than iPad's so, it did not hit my budget too bad. Although it is cheaper than iPads, it still has a competitive hardware.
  One more thing I don't like about iPads is the closed OS – you can't do anything with that.

- Did you find anything that has changed in your day-to-day life after purchasing the Galaxy Tab?

  I usually spend time reading or browsing on my Tab. But I also like to watch some videos on it, like I frequently watch Big Bang Theory.
  Also I noticed that I sit less at computer after I got the Tablet.

- Did you find anything that has changed in your day-to-day life because others use the Galaxy Tab?

  I would say the whole Tablets family became a new niche for computer makers – we didn't think we would need one before. Now we can't live without it.

- Android smartphones

Kristine is a 21 years old Bachelor student from Denmark:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I wouldn't. I use gadgets moderately.

- Do you currently use an Android Smartphone?

  Yes, I have a Samsung Galaxy S4.

- What was the reason for you to purchase the Android smartphone?

  I wanted to change my phone to a more convenient one. My previous phone was without a touchscreen display, so I had to click all the time whenever I needed to get the pointer to. With touchscreen display, you just have to point with your finger and it saves so much time

- How did it differ from competitive products?

  I liked the screen of it. I was really impressed when I first saw it.

- Did you find anything that has changed in your day-to-day life after purchasing the Android smartphone?

  I started using my cell phone camera all the time and upload it on the web. Before that I used a digital camera and uploaded pictures to a blog through computer. Now it is much easier and you have all the various effects available for the camera.

- Did you find anything that has changed in your day-to-day life because others use the Android smartphone?

  Yes, I think people are using their smartphones everywhere for everything today. You can even video-chat using your phone. I think that's really great.

Alexandra is a 23 years old Nissan employee from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I think yes, because I use my phone daily for Internet and every time I go to work or gym, I listen to music.

- Do you currently use your Android smartphone?

  Yes

- What was the reason for you to purchase your Android smartphone?

  Its is more flexible, it is cheaper than iPhones and you have a phone with same functions.

- Did you find anything that has changed in your day-to-day life after purchasing the Android smartphone?

  I became more socially active. I am more available to any kind of messaging. For example, if I receive an email, I have an alert on my phone.
  I read the news on my phone all the time.
  Also the phone is very convenient for traveling, you don't have to print boarding passes or tickets, you can get away with downloading PDFs on your phone. And I use GPS a lot for traveling.
  Another function I like to use is Google calendars. I use it for planning my days ahead. Great thing is that I can have it set up on my desktop computer and then synchronize it with my phone.

- Did you find anything that has changed in your day-to-day life because others use the Android smartphones?

  I find a lot of people who are too much involved in their smartphones. For example, you walk into a restaurant and people are sitting with their phones. Sometimes I find myself doing that too, but I am trying hard not to.

Michael is a 24 years old Master student from UK:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I am keen on gadgets. I think everybody is today. It is hard to find someone without a phone today.

- Do you currently use an Android smartphone?

  Yes, I do.

- What was the reason for you to purchase an Android smartphone?

  I love having a small pocket computer.

- How did it differ from competitive products?

  It has some prevailing features, like better OS, eye sensor, nice screen.

- Did you find anything that has changed in your day-to-day life after purchasing the Android smartphone?

  Yes, I use it every day for anything from browsing, making calls and texting to online shopping and playing games.

- Did you find anything that has changed in your day-to-day life because others use the ___?

  Nowadays everyone is texting, calling, playing, listening or just staring at their smartphones when you step in to the bus or underground. I think everyone is already too attached to their devices, that it is impossible to imagine life without them.

- PlayStation Vita

Garrison is a 20 years old bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I would say yes. I like gaming, so I guess it counts.

- Do you currently use PlayStation Vita?

  I do. Not too often though. I usually take it with me when I go to the camping or barbeque.

- What was the reason for you to purchase PlayStation Vita?

  I've always wanted to have a pocket console, so I bought the latest version of PS Vita.

- How did it differ from competitive products?

  It has a better quality screen and more comfortable controls. The controls are much better than any other pocket console.

- Did you find anything that has changed in your day-to-day life after purchasing the PlayStation Vita?

  It's just a great fun to have good games wherever you want. You can entertain your friends with it. In fact, I have close friends who happen to be gamers too. We like to meet up and make competitions. It's just makes it easier to get along with them for me.

- Did you find anything that has changed in your day-to-day life because others use the PlayStation Vita?

  Not really.

- Ultra-books

Alexandra is a 23 years old Nissan employee from Kazakhstan:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I think yes, because I use my phone daily for Internet and every time I go to work or gym, I listen to music.

- Do you currently use your Ultra-book?

  Yes, I do.

- What was the reason for you to purchase the Ultra-book?

  I chose my Mac Book Air, because it is much nicer to carry a light computer, than a big heavy one. It even looks nicer.

- How did it differ from competitive products?

  The lightweight and Mac OS.

- Did you find anything that has changed in your day-to-day life after purchasing the Ultra-book?

  Yes, I carried it more often to classes and work.

- Did you find anything that has changed in your day-to-day life because others use the Ultra-books?

  Yes, more and more often students prefer to bring laptops and iPads, to bringing notes and pens.

- Samsung watches (galaxy gear)

Michael is a 24 years old Master student from UK:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I am keen on gadgets. I think everybody is today. It is hard to find someone without a phone today.

- Do you currently use Galaxy Gear?

  Yes

- What was the reason for you to purchase?

  I liked the idea. It is pretty innovational.

- How did it differ from competitive products?

  I think there are currently no competitors for Galaxy Gear.

- Did you find anything that has changed in your day-to-day life after purchasing the Galaxy Gear?

  Yes, the fact that it has new ways of control, it makes some difference if you do sports. What I mean is, when someone calls you, you just have to bring your palm to your ear and it answers the call. You don't have to interrupt your training and try to take out the cell phone from your the pocket.
  There is also one tricky thing I noticed. You can easily take pictures without others noticing it. You could easily go to public toilet and take pictures, no one will find it out.

- Did you find anything that has changed in your day-to-day life because others use the Galaxy Gear?

  Not yet, I haven't seen that many people using it.

- iPad Air and iPad Mini with Retina Display

Claire is a 21 years old Bachelor student from France:

- Would you consider yourself as a frequent gadget user? Why/why not?

  I would say so. Because I use it pretty much every day.

- Do you currently use an iPad Mini with Retina Display?

  Yes

- What was the reason for you to purchase the iPad Mini with Retina Display?

  I did not have a tablet before, so I wanted to buy one. I preferred the one with Retina Display, because it had a better display quality than the previous model.

- How did it differ from competitive products?

  It looks much better than other tablets, I think.

- Did you find anything that has changed in your day-to-day life after purchasing the iPad Mini with Retina Display?

  Yes, I use it every day for classes and browsing. It has a comfortable size and it is not heavy to carry around.

- Did you find anything that has changed in your day-to-day life because others use the iPad Mini?

  I wouldn't say so.

Sarah is a 22 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes. I love all of the new technologies.

- Do you currently use the iPad Air?

- What was the reason for you to purchase the iPad Air?

  It the first tablet I got. I wanted to try it out.

- How did it differ from competitive products?

  The design and intuitive interface makes it an outstanding product.

- Did you find anything that has changed in your day-to-day life after purchasing the iPad Air?

  Yes, since I have an iPad, I am using my computer much less than I used to. I use iPad most of the time.

- Did you find anything that has changed in your day-to-day life because others use the iPad Air?

  Not so much

iPhone 5S

Marcus is a 20 years old bachelor student from Sweden, who came for an exchange semester to USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

    Yes, I would consider myself as a frequent gadget user for sure. I have an iPhone that I use every day and recently I bought the new iPad. I would say. I couldn't spend a day without a phone. I mean I could have, but it would be miserable.

- Do you currently use an iPhone 5S?

    Yes, I do.

- What was the reason for you to purchase the iPhone 5S?

    My old iPhone became to slow, so I wanted to update it.

- How did it differ from competitive products?

    I like the size of it. It is not too big. It just feels right when it is in your hand.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone 5S?

    Yes, I like the new finger scanner. I usually don't remember my passwords, so I have a lot of them, like for my email accounts and etc. on my phone, so it is good that it has some kind of security.

- Did you find anything that has changed in your day-to-day life because others use the iPhone 5S?

    I think people spend too much time with their phones today. The new iPhone just keeps this trend going.

Sarah is a 22 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes. I love all of the new technologies.

- Do you currently use iPhone 5S?

  Yes, I've had all of the models of iPhone since the very first one. I try to keep my phones up to date.

- What was the reason for you to purchase iPhone 5S?

  I like to have the latest version of iPhones.

- How did it differ from competitive products?

  I love Apple products. I think they are perfect from package to the shape and colors.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone 5S?

  I started using the fingerprint scanner. I think it is a great way to protect your phone.

- Did you find anything that has changed in your day-to-day life because others use the iPhone 5S?

  I think iPhones in general have influenced the world from various ways – it is innovative, great designed product.

- iPhone 5C

Samantha is a 21 years old Bachelor student from USA:

- Would you consider yourself as a frequent gadget user? Why/why not?

  Yes, because I use gadgets every day.

- Do you currently use an iPhone 5C?

  I do.

- What was the reason for you to purchase the iPhone 5C?

  I had to change my old iPhone, so I chose the 5C

- How did it differ from competitive products?

  I liked 5C because I liked its design. I even preferred it to 5S. It was cheaper than 5S as well.

- Did you find anything that has changed in your day-to-day life after purchasing the iPhone 5C?

  Yes, my cellphone became faster. I became less nervous because of that.

- Did you find anything that has changed in your day-to-day life because others use the iPhone 5C?

  I didn't.

Appendix II

The list of products that were observed with corresponding environments found out from the secondary and primary research methods for the Users' perspective:

Nokia smartphones	Cinema experience, distant communication, fashion, internet, live communication, photo experience, privacy, programmers, theater experience, traveling experience
iPods	Fashion, live communication, leisure, music experience, public transport experience, sport
Portable CD-players	Live communication, leisure, music experience, public transport experience, sport, social life
Portable digital cameras	Leisure, photo community, privacy, social interaction, traveling experience, video recording experience
Netbooks	Distant communication, internet experience, traveling experience
iPads	Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, work experience
iPhones	Cinema experience, distant communication, fashion, flight security, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, sport, traveling experience, video recording experience, work experience
Tablet PCs	Cinema experience, computer usage, distant communication, education, internet experience, leisure, live communication, personal budgeting, photo experience, public transport experience, traveling experience, work experience
iPad Mini	Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, user experience, work experience
Android smartphones	Cinema experience, distant communication, fashion, flight security, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, sport, traveling experience, video recording experience, work experience
PlayStation Vita	Leisure, transport, traveling, social life
Ultrabooks	Cinema experience, distant communication, fashion, internet experience, leisure, traveling experience

Samsung Galaxy Gear	Cinema experience, distant communication, fashion, health, live communication, photo experience, privacy, public transport experience, sport, theater experience, traveling experience
iPhone 5S, 5C	Cinema experience, distant communication, fashion, generation Z, health, internet experience, leisure, live communication, musicians, photo experience, privacy, programmers' education, payment methods, public transport experience, security of information, sport, traveling experience, video recording experience, work experience
iPad Air	Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, user experience, work experience
iPad Mini with retina display	Accessibility of technology for elder people, children's upbringing, cinema experience, computer usage, distant communication, education, fashion, generation Z, internet experience, leisure, live communication, musicians, photo experience, public transport experience, traveling experience, user experience, work experience

The list of products that were observed with corresponding environments found out from the secondary research method for the Businesses' perspective:

Nokia smartphones	Camera producers, financial markets, music industry, software development industry
iPods	Fashion industry, financial markets, music industry
Portable CD-players	Financial markets, music industry
Portable digital cameras	Camera producers, fashion industry
Netbooks	Financial markets, software development industry
iPads	Airline industry, camera producers, fashion industry, film industry, financial markets, game development industry, music industry, software development industry
iPhones	Advertisement industry, airline industry, camera producers, cell network industry, fashion industry, financial markets, game development industry, music industry, software development industry
Tablet PCs	Airline industry, camera producers, fashion industry, film industry, financial markets, game development industry, music industry, software development industry
iPad Mini	Airline industry, camera producers, fashion industry, film industry, financial markets, game development industry, music industry, software development industry
Android smartphones	Airline industry, camera producers, cell network industry, financial markets, game development industry, music industry, software development industry
PlayStation Vita	Financial markets, game development industry
Ultrabooks	Airline industry, financial markets, game development industry, music industry, software development industry
Samsung Galaxy Gear	Fashion industry, financial markets, software development industry
iPhone 5S, 5C	Advertisement industry, airline industry, camera producers, cell network industry, fashion industry, financial markets, game development industry, music industry, software development industry
iPad Air	Airline industry, camera producers, fashion industry, film industry, financial markets, game development industry, music industry, software development industry
iPad Mini with retina display	Airline industry, camera producers, fashion industry, film industry, financial markets, game development industry, music industry, software development industry

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