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# Convergence of media devices: trends of consumption in the USA/UK and Italy

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# Contents

Acknowledgements .....	1
Executive summary.....	9
1. The diffusion of technology: global data about different devices diffusion. ....	14
1.1. TV.....	14
1.1.1. Definition .....	14
1.1.2. History .....	15
1.1.3. Transmission of the signal .....	17
1.1.4. Global data about quantity of the devices .....	18
1.2. Radio.....	20
1.2.1. Definition .....	20
1.2.2. History .....	20
1.2.3. Transmission of the signal .....	22
1.2.4. Global data about quantity of the devices .....	24
1.3. Computer.....	26
1.3.1. Definition .....	26
1.3.2. History .....	27
1.3.3. Internet.....	30
1.3.4. Global data about quantity of the devices .....	34
1.4. Tablet.....	35
1.4.1. Definition .....	35
1.4.2. History .....	36
1.4.3. Network.....	38
1.4.4. Global data about quantity of the devices .....	41
1.5. Mobile phone .....	42
1.5.1. Definition .....	42
1.5.2. History .....	43
1.5.3. Network.....	47
1.5.4. Mobile Internet.....	49
1.5.5. Smartphone operating systems.....	50
1.5.6. Global data about quantity of smartphones .....	53
1.6. Game console .....	59

1.6.1. Definition .....	59
1.6.2. History of the fixed console.....	60
1.6.3. History of the handheld.....	62
1.6.4. Global data about quantity of the devices .....	66
2. Media consumption.....	71
2.1. TV.....	73
2.1.1. Overall time spent .....	75
2.1.2. Usage habits .....	79
2.2. Radio.....	85
2.2.1. Overall time spent .....	89
2.2.2. Usage habits .....	91
2.3. Computer.....	96
2.3.1. Overall time spent .....	97
2.3.2. Usage habits .....	100
2.4. Tablet.....	109
2.4.1. Overall time spent .....	114
2.4.2. Usage habits .....	116
2.5. Mobile phone .....	123
2.5.1. Overall time spent .....	127
2.5.2. Usage habits .....	129
2.5.3. Countries comparison by mobile phone usage at different times of the day.....	146
2.6. Game console .....	150
2.6.1. Overall time spent .....	151
2.6.2. Usage habits .....	152
2.7. Multitasking.....	156
2.7.1. The most popular combinations of devices .....	156
2.7.2. Demographics.....	160
2.7.3. Behaviour.....	162
2.8. Hybridization .....	163
3. Focus groups.....	166
3.1. Theory.....	166

3.1.1.	Introduction .....	166
3.1.2.	The process of focus group.....	167
3.2.	Practical participation and analysis .....	169
3.2.1.	Comparison between the theoretical conditions for the focus groups and practical implementation .....	169
3.2.2.	Group 1 - Students.....	171
3.2.3.	Group 2 - Adults of 30-35 years old.....	174
3.2.4.	Group 3 - Adults of 40-45 years old.....	176
3.2.5.	Comparison between three groups in terms of perception of technology.....	178
3.2.6.	Comparison between all followers vs. all technology-friendly. ....	179
3.3.	Comparison of the theory and the practice in terms of technology consumption.....	181
3.3.1.	TV.....	181
3.3.2.	Radio .....	182
3.3.2.	Computer.....	184
3.3.3.	Tablet.....	186
3.3.4.	Mobile phone .....	188
3.3.5.	Game console .....	190
3.3.6.	Multitasking.....	190
3.3.7.	Hybridization .....	192
4.	Conclusions.....	194
	Bibliography.....	204

**Figures :**

Figure 1. Research methodology.....	10
Figure 2. TV introduction of TV in the world, by years.....	17
Figure 3. Global 3-D and IETV shipments forecast by iSuppli.....	18
Figure 4. DVR Penetration in the USA, trend January 2006 – September 2010.....	19
Figure 5. Country Information for Digital Audio Broadcasting services, Sept. 2010.....	23
Figure 6. Ownership of DAB sets, UK, Q1 2011.....	25
Figure 7. Number of analogue and digital radio sets sold in UK, 2006-2011.....	26
Figure 8. Percentage of US population with broadband or dial-up Internet access at home, 2002-2011. ....	31
Figure 9. Internet users Growth in the World, 1995-2011.....	33
Figure 10. Internet Users in the World by Geographic Regions, 2011.....	33
Figure 11. Importance of Internet in US population’s life, 2002-2011. ....	34
Figure 12. Worldwide Internet-Enabled device shipment vs. PC shipment, 2010-2014. ....	35
Figure 13. iPad share of the traffic by country, May 2011.....	41
Figure 14. Global shipments of tablets forecast, 2009-2015. ....	42
Figure 15. Cell towers at the corners. ....	43
Figure 16. Smartphone shipments by manufacturer, Q3 2009-Q1 2011.....	53
Figure 17. Smartphone shipments surpass PC shipments, 2009-2010. ....	55
Figure 18. Active handsets by device type and smartphones’ share of total handsets, Western Europe, 2010–2016.....	56
Figure 19. Android and iOS smartphones production forecast, 2008-2014. ....	57
Figure 20. Smartphones market share by operating systems in the US, June 2011.....	58
Figure 21. Share of worldwide 2011 Q2 smartphone sales to end users by operating system, according to Gartner .....	59
Figure 22. Revenue and shipments of handheld consoles forecast, 2008-2013.....	67
Figure 23. Shipments of game consoles.....	67
Figure 24. Handheld consoles, game consoles and game-capable cellphones shipments comparison, 2009-2014.....	68
Figure 25. Age profile of those who have a games console at home in the UK, 2011.....	69
Figure 26. Age profile of those who personally use a games console in UK, 2011.....	70
Figure 27. Media consumption trends, 1900-2020.....	71
Figure 28. A ‘Western’ consumer’s average daily telecoms and media time, by device type, 2011 and 2016....	72
Figure 29. Gadget ownership in the USA, 2010-2011.....	73
Figure 30. Media sources reached a percentage of population, US, 2010.....	74
Figure 31. American digital platform landscape .....	74
Figure 32. Percentage of Europeans using each media in a typical week.....	75
Figure 33. Monthly time spent on TV in the USA, Q1 2011.....	76
Figure 34. Comparative Estimates: Average time spent per day watching TV among US consumers, 2008-2010.....	77
Figure 35. Time spent per day watching TV in the USA, trend 1988-2009.....	78
Figure 36. Percentage of users watching a DVR at different time of the day, 2010.....	80

Figure 37. European TV channels by geographical coverage (2009).....	81
Figure 38. European TV channels by genre in 2009. ....	82
Figure 39. Digital TV penetration in UK, 2001-2011.....	83
Figure 40. News watching time in UK, 2011.....	84
Figure 41. Which media activity consumers would miss the most, UK, 2010.....	85
Figure 42. The Popularity of the US Media Platforms.....	86
Figure 43. Media devices popularity in Europe.....	87
Figure 44. Percentages of Europeans using each media in a typical week, years 2006-2010. ....	87
Figure 45. Digital radio’s share of radio listening, UK, Q1 2011. ....	88
Figure 46. Hours spent on different media in the USA in 2005-2010. ....	89
Figure 47. Time spent with the online radio in the USA.....	90
Figure 48. Digital radio monthly listening, by age group, UK, 2011. ....	90
Figure 49. Average weekly listening by demographic in UK, year ending Q1 2011. ....	91
Figure 50. Percentage of minutes by audio sources by location in the USA, 2009.....	92
Figure 51. Growth of online radio US listeners 2001-2011. ....	93
Figure 52. Top reasons to listen to the online radio in the USA, 2010.....	94
Figure 53. Growth of users listening online radio from their cellphones in the car. ....	94
Figure 54. Location of listening radio in UK, year to Q1 2011.....	96
Figure 55. Ownership of desktop vs laptop in the USA over time, 2006-2011. ....	97
Figure 56. Time spent with different media in the USA, 2005-2010.....	98
Figure 57. Time spent on Internet for personal and professional purposes across generations, US, 2009. ....	99
Figure 58. Average time spent on the fixed-line Internet, by age and gender, UK, 2011.....	100
Figure 59. Top 10 ranked activities by share of the Internet time in the US, 2010. ....	101
Figure 60. Social networking site use by online adults, US, 2005-2011.....	102
Figure 61. Online activities by popularity of usage at least monthly, US, 2007-2010. ....	103
Figure 62. Percentage of Internet users and the activities they do online, US, 2002-2011.....	104
Figure 63. Reasons for using the Internet, by age and gender, 2010. ....	105
Figure 64. Comparative use of Internet by PC and mobile user, UK, 2011. ....	106
Figure 65. Engagement with online media content, by age, UK, 2011. ....	108
Figure 66. Concerns about the Internet among users, by age, UK, 2010.....	109
Figure 67. Demographics of tablet owners, US, Q3 2010. ....	111
Figure 68. Demographics of e-reader owners, US, Q3 2010. ....	111
Figure 69. Comparison of demographics of Tablet and E-reader owners, US, 2010-2011. ....	112
Figure 70. Percentage of female owners of smartphones, e-readers and tablets, US, 2010-2011. ....	113
Figure 71. Devices used to visit Internet websites by age, UK, 2010. ....	114
Figure 72. Percentage of tablet owners and time spend with a tablet, US, 2011. ....	115
Figure 73. Percentage of tablet owners who prefer spend time with tablet than doing other activities, US, 2011. ....	115
Figure 74. Tablet versus Netbook, 2010.....	116
Figure 75. Tablet versus Laptop, 2010.....	117
Figure 76. Preference of using tablets vs. computers, US, 2011.....	118

Figure 77. Tablet versus Smartphone, 2010.....	119
Figure 78. Situations when the connected devices are used, US, 2011.....	120
Figure 79. Percentage of tablet owners and situations stayed with tablet, US, 2011. ....	121
Figure 80. Percentage of tablet owners and the ways the tablets used, US, 2011.....	121
Figure 81. Activities done regularly on a tablet, 2011.....	122
Figure 82. Penetration of mobile devices in different countries.....	124
Figure 83. Fig. Cellphone ownership by generations, US, 2010. ....	125
Figure 84. Smartphone ownership by generations, US, 2011. ....	126
Figure 85. Smartphone penetration and OS share in US, 2011. ....	126
Figure 86. Mobile phones and smartpnones penetration in UK, 2011. ....	127
Figure 87. Mobile Internet most famous activities, US, 2010. ....	128
Figure 88. Most used daily activities on the mobile phone, globally, 2011. ....	129
Figure 89. Wi-Fi usage globally, 2011.....	130
Figure 90. Social networks popularity, globally, 2011.....	131
Figure 91. Playing mobile games on a cellphone, globally, 2011. ....	132
Figure 92. Watching online videos on a cellphone, globally, 2011. ....	134
Figure 93. Most missed features on the mobile phone, globally, 2011.....	135
Figure 94. Activities people do on the cellphone and smartphone, 2011. ....	136
Figure 95. Mobile social network by age, 2009.....	137
Figure 96. US mobile apps vs. web consumption, minutes per day, 2010-2011. ....	138
Figure 97. US mobile app consumption time spent per category, 2011.....	139
Figure 98. Portion of time spent on web vs. apps by the average Android smartphone user, US, 2011. ....	139
Figure 99. Distribution of time spent on apps by the US Android smartphone user, 2011.....	140
Figure 100. Smartphone owners involvement in car purchase stages, US, 2011. ....	141
Figure 101. “Smartphone mom” age evolution, US, 2009-2011.....	141
Figure 102. Smartphone role in the purchase process of a “smartphone mom”, 2011. ....	142
Figure 103. Frequency of making calls and sending SMSfrom feature phone in UK. ....	144
Figure 104. Activities conducted on a smartphone: UK adult, 2011.....	145
Figure 105. Mobile Internet usage by age in UK, 2011. ....	146
Figure 106. Mobile phone usage throughout a day, USA vs. UK.....	147
Figure 107. Mobile phone usage throughout a day, India and South Korea. ....	148
Figure 108. Mobile phone usage throughout a day, China and Japan.....	149
Figure 109. Mobile phone usage throughout a day, Russia and Italy .....	150
Figure 110. Console owner statistics by generations. ....	151
Figure 111. Weekly hours spent with a game console by gender, US, 2010. ....	152
Figure 112. Percentage of users who do different activities on a fixed game console, US, 2010. ....	153
Figure 113. Share of consoles by location, US, 2011.....	154
Figure 114. What the UK consumers use games consoles for, 2011. ....	155
Figure 115. Activities done less since having smartphone: adults vs. teen, UK, 2011.....	156
Figure 116. Media devices usage in parallel with the Internet by US youth, 2009.....	157
Figure 117. Time distribution of the device usage by location, US, 2011.....	158



Figure 118. Meshing of media sources, Europe, Dec.2010. ....	159
Figure 119. Age profile of European TV and Internet multitaskers vs. non-multitaskers. ....	160
Figure 120. Daily media consumption in the UK, based on research carried out for Ofcom in April/May 2010. ....	161
Figure 121. Top web activities popularity among multitaskers vs. non-multitaskers. ....	163
Figure 122. Hybridization. ....	165
Figure 123. Stages in conducting a focus group. ....	166
Figure 124. News watching time in UK, 2011. ....	182
Figure 125. Digital radio monthly listening, by age group, UK, 2011. ....	183
Figure 126. Engagement with online media content, by age, UK, 2011. ....	185
Figure 127. Facebook users by age, 1 March 2011. ....	186
Figure 128. Comparison of demographics of Tablet and E-reader owners, US, 2010-2011. ....	187
Figure 129. Devices that US passengers travel with, 2011. ....	188
Figure 130. Smartphone penetration in the UK. 2011. ....	190
Figure 131. Hybridization in Italy. ....	193

**Tables:**

Table 1. Digital radio platforms quick comparison. ....	24
Table 2. Internet World Stats, evolution of Internet. ....	32
Table 3. Share of Tablet Traffic for Selected Countries, May 2011. ....	40
Table 4. Smartphones. WiFi/LAN vs. Mobile Network Access, US, May 2011. ....	49
Table 5. Top Five Worldwide Smartphone Vendors, Shipment Volumes, Market Share, and Year-Over-Year Growth, 2Q11. ....	54
Table 6. Time spent watching TV in different regions of the world, 2009. ....	79
Table 7. Time of the day the TV is used. ....	82
Table 8. Media use by time of the day in Europe, 2010. ....	95
Table 9. Tablet owner profile, 2011. ....	110
Table 10. Tablet owner profile prediction for 2012. ....	110
Table 11. Comparison of percentage of Europeans consuming Social Media. ....	143
Table 12. Media use by day part across Europe, 2010. ....	159

## **Executive summary**

For the last years the consumers have experienced the enormous impact of the media technology on the everyday life. Media has become ubiquitous in the modern society and it has deeply integrated in the activities we do throughout the typical day. We wake up in the morning by the alarm set on a mobile phone, we turn on TV to listen to the latest news during the breakfast, we rush to work listening music on the iPad, we spend our working day in front of a computer, we practice sports listening an mp3 player, we watch videos on Internet and share latest pictures on Facebook in the transport, we play games before going to bed, etc. But we do not only consume different media technologies at different parts of the day, we often consume them simultaneously. Media devices themselves evolve and converge, transferring features historically created for one device to another, and giving the consumer opportunity to get more diversified content on a single device.

This thesis provides the insight to the evolution of media devices; analysis of daily media habits, emerging trends and phenomena of the UK/US and Italian consumer; their comparison; and finally, sums up with the ideas or opportunities for the service provider and media producer companies.

The work performed here is a part of a collaboration project of MIP of Politecnico di Milano and private media companies. The aim of the whole project was to identify the guidelines for the firms that are interested in launching effective advertising campaigns on the multichannel media. This implies selecting the right time of the day and delivering the best appropriate advertisement content and the right media channel/device aimed to target the right audience with optimal efficiency.

### **Objectives of the thesis**

Within the project discussed above, objectives of my work were as following:

1. To obtain a global view on the diffusion of the modern media devices.

This means to understand which media devices people actually use. To see how these devices have evolved since the time they appeared, on the basis of which technology they operate. Which technology has become extinct, and what are the latest trends of the evolution of these devices. And finally, to gather data about the quantity of devices produced globally as for 2011.

2. To understand and compare the trends of the international (US/UK) and Italian market of the consumption of media technologies, preferences, habits, contexts of usage and phenomena.

The latter implies that so that to deepen the contexts of consumption that are characterized by the convergence of the modern media devices, it became important to discuss two media consuming phenomena of our days that are vastly spreading in the society – multitasking and hybridization. Multitasking it is a human activity that can be described as a simultaneously consumption of the content from different media. Hybridization is a consumption of the content from a device that historically was not designed for this content, like watching TV from a mobile phone.

- Based on the examined trends of the modern media consumption, to discover opportunities or ideas for the media production or service provider companies (direction they should move so that to fulfill the consumer's media needs).

### Methodology

I performed two types of research with respect to the objectives of the thesis (see Figure 1). The first objective "To obtain a global view on the diffusion of the modern media devices" implied numerical format of the gathered data aimed at quantifying and describing characteristics of the media devices. Hence I worked on this part according to quantitative methodology on macro level doing my desk research of "as-is" situation of primary and secondary data. The second objective was "To understand and compare the trends of the international (US/UK) and Italian market of the consumption of media technologies, preferences, habits, contexts of usage and phenomena". It inferred studying people's behaviors and needs, therefore made me using qualitative methodology on the micro level. The US/UK market I studies as a desk research again, but Italian customer, instead, I considered in practice during "Focus group" interview method.

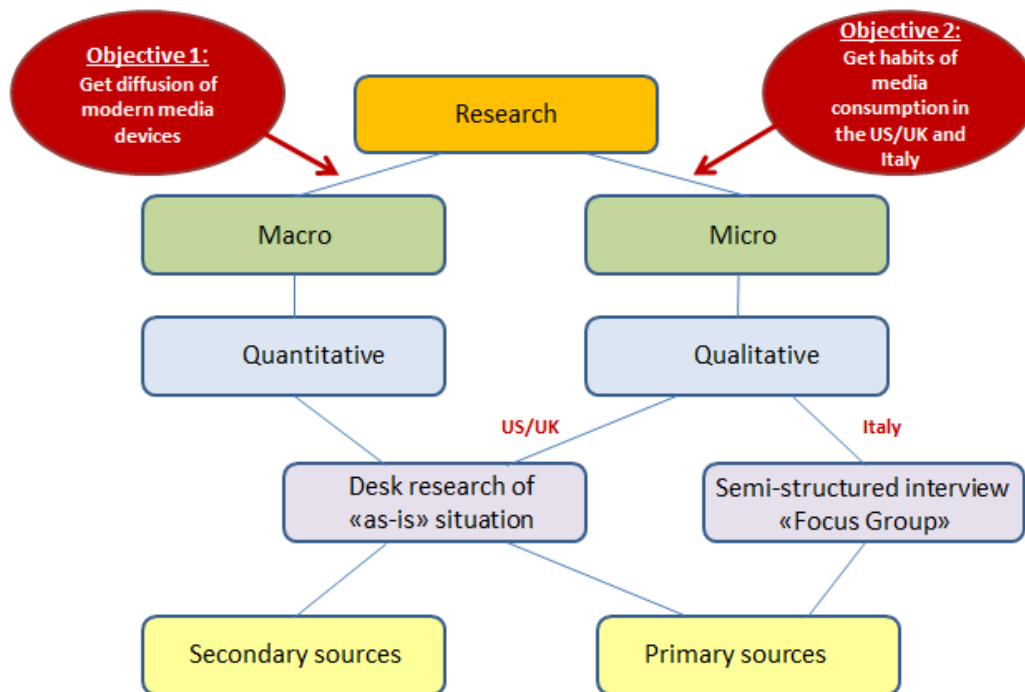


Figure 1. Research methodology.

At the beginning of my desk research the sources that I had found on Internet with Google search were articles and publications, which are secondary data sources. They included articles from Wikipedia, online newspapers, journals and blogs. Having read these articles, I found out that they refer to the studies of different organizations, companies, institutions and Universities, which are the primary sources. My special attention caught institutions that perform research upon measurements and statistics, because I needed the numerical data about global diffusion of the technology. Very helpful material was available on the websites of World Statistics, techno-magazines, Wikipedia and others.

According to the second objective, the international market I studied as a desk research at the example of at minimum two countries: the United States of America and the United Kingdom. The selection of these two countries is not accidental and picked up due to several reasons. First of all, these countries are generally considered as the leaders in adoption of the new technologies and they set up the “media consumption standards” for the rest of the world, especially United States, where the most important technology giants’ headquarters are concentrated. Secondly, I searched information in English which is native language for these countries. Thirdly, because the majority of the studies available were dedicated to the USA, Great Britain and Europe. Certainly I would be glad to include data about other technologically advanced countries and in some perspective even more advanced, like Japan, but the language limits access to local studies. Though for the mobile consumption, I have found a very helpful tool providing the data comparison of any two given countries, including Japan and South Korea.

The findings of my desk research about the media habits, trends, context and phenomena of the US/UK consumer, are based on both primary and secondary sources available on Internet. The primary sources are studies of the market research companies and institutions that investigate the habits, tendencies and contexts of a modern media consumer, and provide measurements and statistics. Among them are the European Interactive Advertising Association, The Nielson Company, Arbitron/Edison’s Research, World Statistics, Ofcom, Forrester, Morpace Omnibus and others. Sometimes they publish the results of the studies on their websites, and in some cases these studies are cited in articles on marketing oriented websites, social and digital media news, portals dedicated to technology and web culture. The latter are the secondary sources of my data. I paid special attention to the Mashable website, because they publish new tendencies in the field of digital marketing.

Studying the Italian market, instead, was not theoretical but practical participation in marketing research conducted in Milan. It was based on the qualitative method called “Focus Groups” - widely used in the scientific research nowadays. The method is qualitative and based on interviews with semi-structured questions. It is semi-structured, because the list of questions to discuss with participants is prepared in advance, but during the interview the moderator can change this list according to the answers and behavior of the group. This method helps to understand about how consumers feel and think and can discover more about consumer habits, product usage and consumer’s attitudes toward a product or service, because participants are encouraged to talk about their problems and unfulfilled needs in the research field. In this case ideas about possible new products and services can be generated. With respect to the scope of this project it means that the method provides deeper understanding of experiences, feelings and motivations why people select a particular media device and content in a specific context, as well as their technological wishes and ideas about future devices.

The main objective of the focus groups was to explore and deepen the actual scenario of relations of a single individual with technology, situations in which he uses technological devices, and connection between the situations and media content. The actual scenario was based on the hypothesized contexts, including home, public places, transport, etc.

The discussion guide contained these points:

- To know and study the present scenario of individuals in terms of consumption of technology (relevance, values, etc.) and related technology.
- Consumer’s spontaneous talking about of their media experiences to verify the hypothesized contexts, and to find out contexts non-predicted.
- To deepen into particular contexts:
  - People were invited to tell their **experience** in media practice: the location, people present in the context, what are the devices available, such as those used, what content they enjoyed, and so on.
  - People were asked to describe the **usage** of the device: degrees of interaction, perception, usability, level of focus, the limits and constraints perceived, etc.
  - People were asked to tell their **motivations and desires** about media experiences.
- To detect needs **unfulfilled** by the current producers of devices and content.

The Italians involved in group discussions were selected in such way so that they provide: the relationship with technology and the stage of life. This made it possible to highlight any differences in perceptions and behaviors among the different sub-targets. Three focus groups were made 6 of 8 people each:

1. Students of age 20-25 years.
2. Younger adults of 30-35 years old, laboring, was engaged or married but without children.
3. Mature adults of 40-45 years old, laboring, having family with children.

Each group was composed by two types of individuals depending on their relationship with the technology. The first half of the group were so called “technology-friendly” people – those who feel interest into technology, early adopt and use modern media devices. The second half are so called “followers” who are less aware about technology, devices and trends, or late adopt the technology.

With to compare trends of media consumption in the USA, UK and Italy, I performed qualitative analysis on a micro level. I selected qualitative analysis because the nature of the data about the Italian consumer was qualitative. The results of the focus groups are formed by trends, and this method is not designed to create generalizations the whole population and consequently it is inappropriate to report in percentage the data gathered by the method. Thus, I made comparison between the numerical results about the US/UK consumer and the trends of Italian consumer with respect to each device (TV, radio, tablet, mobile phone, game console) and two phenomena (multitasking and hybridization).

## Results

Having seen the media consumption trends of a modern individual, both Italian and international, I realized that the context, which includes time, location and current activity, plays the central role for selection of the technology or media content for the user. Therefore, as a result, I suggest context based opportunities for the companies that are fully presented in the Conclusions paragraph.

The opportunities include the services that are transferred “on the fly” between different devices of the consumer (that implies hybridization concept); automatically recognition of content delivered on one device by

another device and suggestion of related content (implies multitasking phenomenon); location-based services; mobile payment services; applications based on the information that Quick Response or Near Field Communication code of a product can provide.

### **Structure of the chapters**

This thesis consists of four chapters. The devices people use in everyday life are described in Chapter 1. Here the reader will get information about the device itself – the definition, history, and particularities of its functionality. Main categories of the devices include television, radio, computer, tablet, mobile phone, fixed game console and handheld. The particular features of TV and radio will be the transmission of the signal; whereas for computer - the Internet; and for mobile phone the peculiarities are the network and mobile Internet. Each subchapter dedicated to the device will be concluded with the global data about quantity of the devices shipped in the recent years and the prognosis of shipments for the next year.

The international consumption trends, preferences, habits, contexts of usage and phenomena are described in Chapter 2. These include total time spent with the device, media habits, trends and contexts according to the time of the day. The media devices are those given in Chapter 1. Two additional paragraphs present the numerical data about the importance of multitasking and hybridization.

The habits of the Italian consumer are given in Chapter 3. First part of the chapter describes the theoretical base the focus group method, contents of the interviews and the comparison between the theoretical implications for the focus groups and the practical implementation. In the second half of the chapter I present three levels of comparisons. First, between the three age groups regardless of subdivision into technology-friendly and followers; second, between all technology-friendly and all followers; and the last between the international and Italian media consumer.

Finally, Chapter 4 presents the conclusions of the thesis, which include the results with respect to three objectives that had been set up.

# **1. The diffusion of technology: global data about different devices diffusion.**

In this chapter I will write about different media devices, the history of their evolution, global data about the quantity, and some particular features that depend on a device. The devices I will write about in this chapter include television, radio, computer, table, mobile phone, and game consoles. The particular features of TV and radio will be the transmission of the signal; whereas for computer it is the Internet, and for mobile phone the peculiarities are the network and mobile Internet.

## **1.1. TV**

### **1.1.1. Definition**

TV of today is represented by a huge variety of devices of old and new generation that differ in the components, transmission of the signal, available features, etc. As a general definition, I have selected the one from Wikipedia. “A television set (usually called a television, TV set, or simply TV) is a device that contains a wireless tuner (television) and used to view broadcast television. Television is a telecommunication medium for transmitting and receiving moving images that can be black-and-white or monochromatic (shades of grey) or multicolored. Images are usually accompanied by sound.” In this document I will call “traditional TV” the one that broadcasts television signals but doesn’t contain features to record TV programs or program the preferred list of channels or content.

Instead, Time-Shifted television (TS TV) is the TV that allows “the recording of programming to a storage medium to be viewed or listened to at a time more convenient to the consumer” (Wikipedia).

Digital Videos Recorder (DVR) is “a consumer electronics device or application software that records video in a digital format to a disk drive, USB flash drive, SD memory card or other local or networked mass storage device... which enables video capture and playback to and from a hard disk” (Wikipedia). The first television set with built-in digital video-recording facilities was introduced in 2007.

TS TV and DVR both allow users to record the programs and watch them later on. But there are some differences in term of cost and flexibility for the user’s choice. DVR TV has the potential for a high degree of personalization and integration with mixed media applications including Video on Demand (VoD), Internet TV, and others. On the other hand, TS TV lets a user watch only content from the pre-determined list by the service provider. This list usually includes a top rated content. But the advantage is that the cost of subscription to a program is shared between all the subscribers of the network, and it is cheaper than in DVR case (Mahony, 2008).

3D television (3DTV) is “a television set that employs techniques of 3D presentation, such as stereoscopic capture, multi-view capture, or 2D-plus-depth, and a 3D display – a special viewing device to project a television program into a realistic three-dimensional field”, Wikipedia defines. The first 3DTV was introduced in 2008.

## **1.1.2. History**

### **19<sup>th</sup> century**

In its early stages of development, television employed a combination of optical, mechanical and electronic technologies to capture, transmit and display a visual image. The first images transmitted electrically were sent by early mechanical fax machines, including the pantelegraph, developed in the late 19<sup>th</sup> century. The idea of using scanning to transmit images was put to actual practical use in 1881 in the pantelegraph, through the use of the concept of "rasterization", the process of converting a visual image into a stream of electrical pulses. Scientists experiment with selenium and light, this reveals the possibility for inventors to transform images into electronic signals.

In 1884 Paul Nipkow, sends images over wires using a rotating metal disk technology with 18 lines of resolution. Nipkow's design would not be practical until advances in amplifier tube technology became available. Later designs would use a rotating mirror-drum scanner to capture the image and a cathode ray tube (CRT) as a display device, but moving images were still not possible, due to the poor sensitivity of the selenium sensors.

### **1901-1927**

In 1900 At the World's Fair in Paris, the first International Congress of Electricity was held. That is where Russian Constantin Perskyi made the first known use of the word "television." Soon after 1900, the momentum shifted from ideas and discussions to physical development of television systems (Bellis).

In 1907 Russian scientist Boris Rosing became the first inventor to use a CRT in the receiver of an experimental television system.

Scottish inventor John Logie Baird demonstrated the transmission of moving, monochromatic images in 1926. In 1926, Hungarian engineer Kálmán Tihanyi designed a television system utilizing fully electronic scanning and display elements, and employing the principle of "charge storage" within the scanning tube.

By 1927, Russian inventor Léon Theremin developed a mirror-drum-based television system which used interlacing to achieve an image resolution of 100 lines. Also in 1927, Herbert E. Ives of Bell Labs transmitted moving images over a cable from Washington, DC to New York City, and via radio from Whippany, New Jersey. In 1927, Philo Farnsworth made the world's first working television system with electronic scanning of both the pickup and display devices.

### **1928-1950**

In 1929 Vladimir Zworkin demonstrates the first practical electronic system for both the transmission and reception of images using his new kinescope tube. John Baird opens the first TV studio, however, the image quality was poor.

In 1936 the Olympic Games in Berlin were broadcast to television stations in Berlin and Leipzig where the public could view the games live. On 2 November 1936 the BBC began transmitting the world's first public regular high-definition service. It therefore claims to be the birthplace of television broadcasting. In 1936,



Kálmán Tihanyi described the principle of plasma display, the first flat panel display system. About 200 hundred television sets are in use world-wide in that year.

1939 – V. Zworin and RCA conduct experimentally broadcasts from the Empire State Building. Although television was demonstrated at the New York World's Fair and the San Francisco Golden Gate International Exposition, the outbreak of World War II prevented it from being manufactured on a large scale until after the end of the war. True regular commercial television network programming did not begin in the US until 1948.

Mexican inventor Guillermo González Camarena also played an important role in early television. His experiments with television began in 1931 and led to a patent for the "trichromatic field sequential system" color television in 1940, and a remote control.

In 1940 Peter Goldmark invents a 343 lines of resolution mechanical color television system, later on replaced by the electronical one.

1948 was the year when Cable television is introduced in Pennsylvania as a means of bringing television to rural areas. One million homes in the United States have television sets.

### **1951-2011**

In 1956 Robert Adler invents the first practical remote control called the Zenith Space Commander.

In 1962 AT&T launches Telstar, the first satellite to carry international TV broadcasts. Starting from 1967 most TV broadcasts were in colour. By 1972 half of TV sets at home were colour.

Dolby surround sound for home sets is introduced in 1982.

1996 - A billion TV sets world-wide. At the same time WebTV was by Diba Inc and Zenith Electronics, who produced and marketed the first WebTV sets.

Digital broadcasts began in 1998.

World's first 3D TV sets went on sale in Japan in 2008 (Lytle, 2008), and in 2010 in the UK (Daily Mail, 2010). By now, two strategies have been used to accomplish this: have the viewer wear eyeglasses to filter the separate offset images to each eye, or have the light source split the images directionally into the viewer's eyes (no glasses required).

Analog broadcast television in the United States ended on June 12, 2009 in favor of Digital terrestrial television (DTV) or digital-only broadcasting.

2010 - Google Company with collaboration with Sony and Logitech has launched Google TV or Sony Internet TV. A user can search as in Google search what he wants to watch, enjoy TV channels, browse the Internet, or watch A TV channel and navigate the Internet sites simultaneously. Furthermore, he can now arrange a homepage on the TV, select the widgets he wants to enjoy, use his cellphone as a remote control or use the qwerty-based remote. DVR features as recording the content so that to access to it later is also available.

Introduction of TV happened in different countries at different time. Figure 2 shows the map of the world and time when TV appeared in a particular region. It is clearly seen that TV was firstly introduced in the countries where the research in television was active. Among the pioneers are the USSR, United States, Great Britain, some European countries and Japan where TV started in 1930-1939. In the rest of North America, Australia, China, India, in some Asian and African countries, and in the majority of Latin America television arrived in 1950-1959. Among the followers are the major African territory, South-East Asia and other countries where TV was introduced in the period between 1960 and 1999.

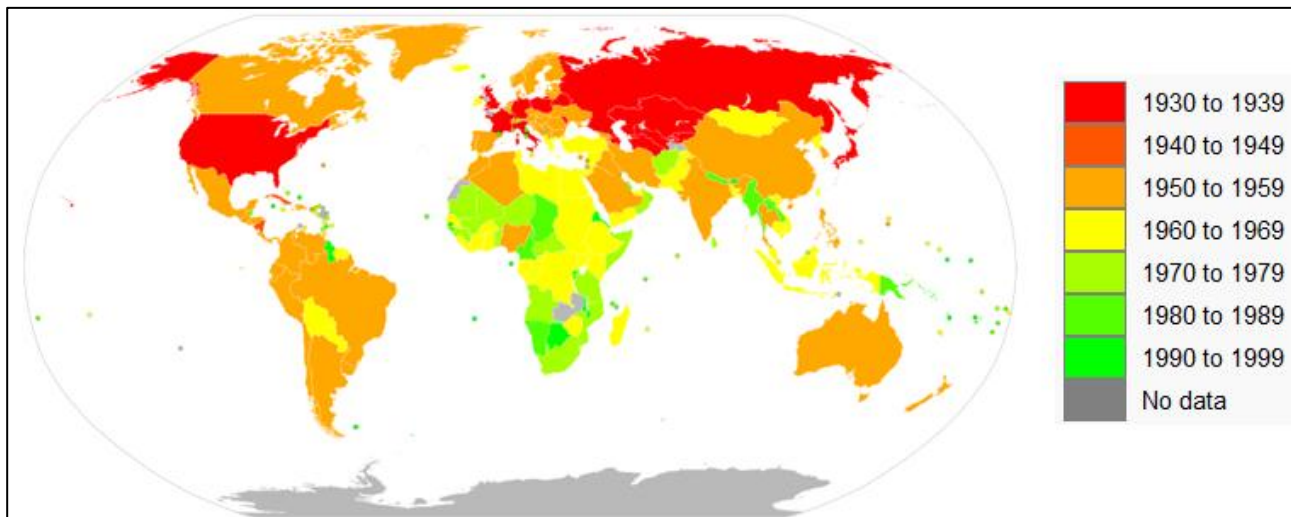


Figure 2. TV introduction of TV in the world, by years<sup>1</sup>.

### 1.1.3. Transmission of the signal

The signal transmitted in the television can be whether analog or digital. Historically analog signal appeared first, and later on digital signal showed on the TV scene.

**Analog** (or analogue) television is the analog transmission that involves the broadcasting of encoded analog audio and analog video signal. An analog signal is any continuous signal for which the time varying feature (variable) of the signal is a representation of some other time varying quantity, i.e., analogous to another time varying signal. All broadcast television systems preceding digital transmission of digital television (DTV) were systems utilizing analog signals. Analog television may be wireless or can require copper wire used by cable converters.

**Digital** television (DTV) is the transmission of digital audio and digital video by digital signals. A digital signal is a physical signal that is a representation of a sequence of discrete values. It consists of a series of "1" and "0" bits, encoded according to some particular standard, and delivered as a series of rapid transitions in voltage.

In fact, there are several good reasons to go digital, including: how much data it can transmit, how consistent the data stays over distance, and what type of data the signal can carry. For the same amount of bandwidth, one can stuff a lot more information into a digital signal than an analog signal. A digital signal doesn't produce the same problems with the picture we see on a distant analog television, either. And television in the digital

<sup>1</sup> Wikipedia, <http://en.wikipedia.org/wiki/File:TV-introduction-world-map.svg>

age won't be limited to video and audio; it will become truly interactive. Combined with HDTV and digital sound, this means a better picture, better sound, and digital data (PBS, 2005).

In some countries the governments regulate the milestones in the switch off from analog TV signal. For example, analog broadcast television in the United States ended on June 12, 2009 in favor of Digital terrestrial television or digital-only broadcasting.

#### 1.1.4. Global data about quantity of the devices

According to iSuppli Corp., global shipments of IETVs—i.e., TV sets with built-in Internet capability—overpass 3D TV shipments. The Figure 3 figure presents iSuppli's forecasts for 2010-2014. It shows that both 3-D and IETV shipments have a growing trend. But whereas 3D TV will amount around 15 million units in 2011, IETV set shipments will total 3 times more – about 50 million.

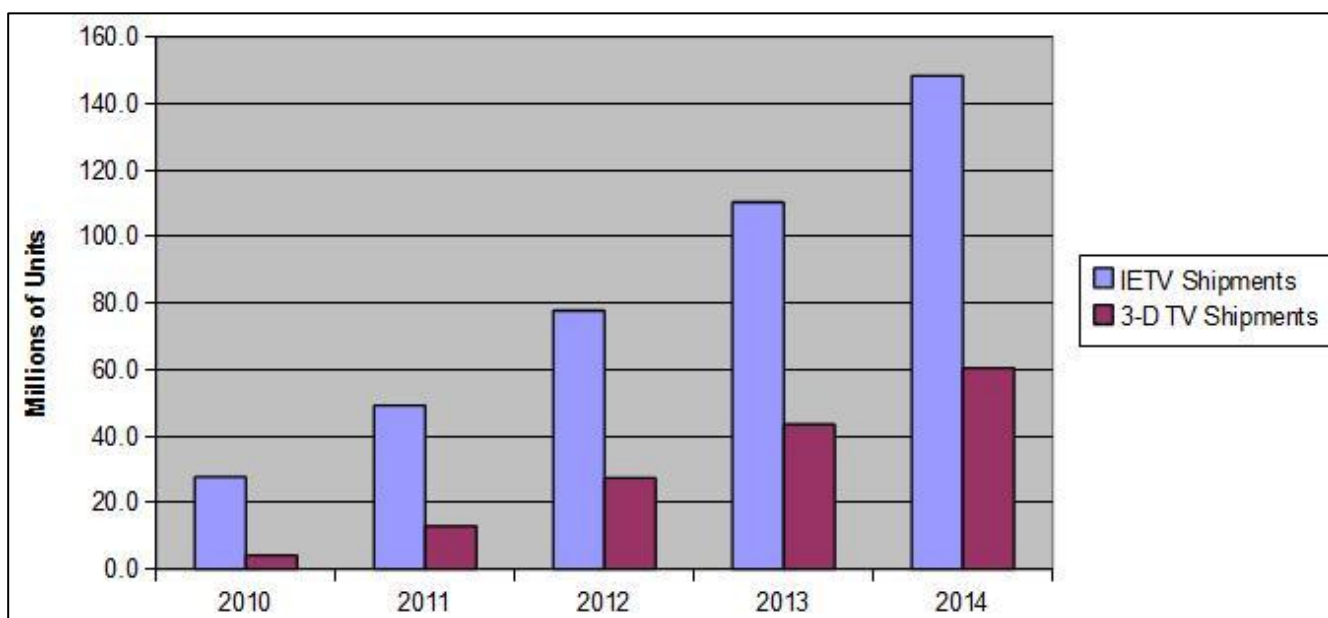


Figure 3. Global 3-D and IETV shipments forecast by iSuppli<sup>1</sup>.

DVR TV technology is getting popularity. As seen on the Figure 4, introduced roughly in 2005, its penetration in the US reached 38% in 2010, according to the Nielsen Company (The Nielsen Company, 2010). Furthermore, Deloitte estimates that “the growth trajectory in DVR ownership suggests that the penetration among television owners in the United States and United Kingdom should cross 50 percent in 2011-2012” (Deloitte, 2010).

<sup>1</sup> PC's Electronic Blog, 2010, <http://pcconsumerelectronics.blogspot.com/2010/08/Internet-enabled-tv-trumps-3-d-tv-in.html>

## DVR Penetration –through Sept 2010

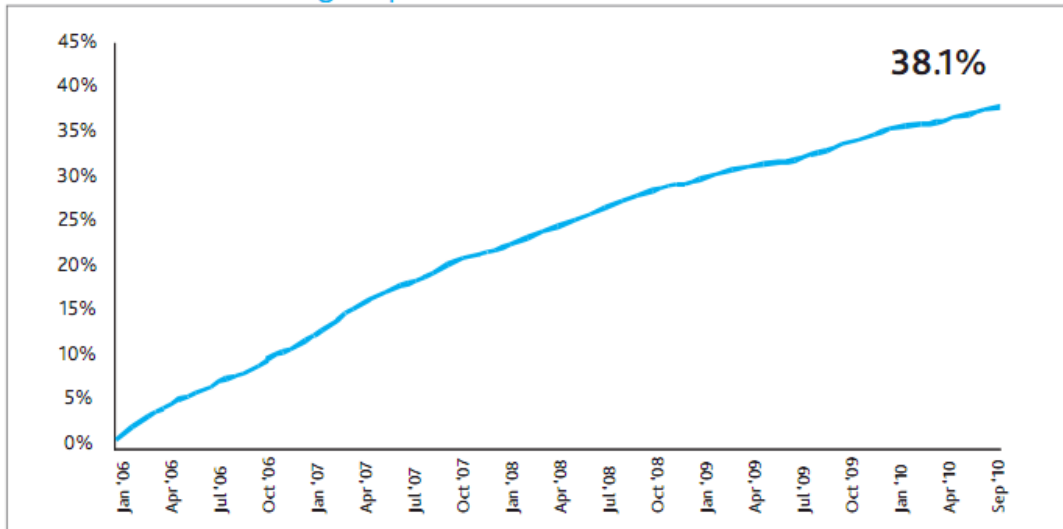


Figure 4. DVR Penetration in the USA, trend January 2006 – September 2010<sup>1</sup>

Deloitte also expects television to grow its share of audience attention, despite competition from many other existing and emerging distractions – both online and offline. In 2011, aggregate television viewing will likely reach 4.49 trillion hours. The global television audience is expected to grow by 40 million to 3.7 billion viewers (Deloitte, 2010).

### UK

At the device level, a range of television screens now incorporate an **Internet connection**, and during 2010, **10%** (1 million) of television set sales incorporated a connection to the Internet, according to the latest statistics (Ofcom, 2011). This means, the total TV sales are about 10 million sets.

At the beginning of 2012 **Google TV** sets will come to the UK, according to Mashable (Schroeder, 2011). Google TV in the UK will let users search the Internet (voice search will be enabled too), easily switch between TV and Internet content, use smartphones as remotes and access a special YouTube channel in high definition. It will also let users watch content from two UK online video on-demand services, BBC's iPlayer and ITV Player.

**3D TV** set sales accounted for around only **1%** of sets sold in 2010 which is approximately 100 000 units.

In comparison to the US with 38.1% of **DVR** penetration among the population, in the UK the research suggests the higher penetration – 46% of the UK population (or 9.6 million homes) in first quarter (Q1) of 2011. This number is up to 3 million since 2005.

<sup>1</sup> The Nielsen Company, 2010, <http://blog.nielsen.com/nielsenwire/wp-content/uploads/2010/12/DVR-State-of-the-Media-Report.pdf>

## 1.2. Radio

### 1.2.1. Definition

Radio is “a standalone device that transmits signals through free space by modulation of electromagnetic waves with frequencies below those of visible light”, as from Dictionary of Electronics by Rudolf F. Graf (1974). As for this chapter, this definition is for the **traditional radio** device, where traditional means ‘not from Internet’ (Wikipedia).

In addition to the traditional radio, an **online radio** (also **Internet radio**, **streaming radio**, **e-radio**, **net radio**, **web radio**) can be defined as “an audio service transmitted via the Internet” (Wikipedia).

**Digital Audio Broadcasting (DAB)** is a digital radio technology for broadcasting radio stations, used in several countries, particularly in Europe (Wikipedia).

**Satellite radio** is “an analogue or digital radio signal that is relayed through one or more satellites and thus can be received in a much wider geographical area than terrestrial FM radio stations” (Wikipedia). There is one particular difference between satellite radio in the USA and Europe. In Europe, FM radio is used by many suppliers that use a network of several local FM repeaters to broadcast a single programme to a large area, usually a whole nation. Many of those have an additional satellite signal that can be heard in many parts of the continent. In contrast, US terrestrial stations are always local and each of them has a unique programme, albeit they are sometimes interconnected for syndicated contents; but each local station still carries its own commercial and news breaks even then. This means that a national distribution of the contents of original terrestrial stations via satellite makes no real sense in the US, wherefore satellite radio is used in a different way there.

### 1.2.2. History

#### 19<sup>th</sup> century

The meaning and usage of the word ‘radio’ has developed in parallel with developments within the field of communications and can be seen to have three distinct phases: electromagnetic waves and experimentation; wireless communication and technical development; and radio broadcasting and commercialization. Many individuals—inventors, engineers, developers, businessmen - contributed to produce the modern idea of radio and thus the origins and 'invention' are multiple and controversial.

In 1893, in St. Louis, Missouri, Nikola Tesla made devices for his experiments with electricity. Addressing the Franklin Institute in Philadelphia and the National Electric Light Association, he described and demonstrated the principles of his wireless work.

In 1895 the Russian scientist A. Popov built his first radio receiver. In the same year, G. Marconi built a wireless system capable of transmitting signals at long distances (2.4 km).

In 1897, Marconi established a radio station on the Isle of Wight, England. Marconi opened his "wireless" factory in Hall Street, Chelmsford, England. Shortly after the 1900s, Marconi held the patent rights for radio.

#### 1900-1950

On Christmas Eve, 1906, Reginald Fessenden made the first radio program broadcast, from Ocean Bluff-Brant Rock, Massachusetts.

One of the first developments in the early 20th century was that aircraft used commercial amplitude modulation (AM) radio stations for navigation.

1920- The first radio news program was broadcast Detroit. In the same year the first broadcast of a sporting event was aired, as well as the first college radio station began broadcasting from New York. Also Sociedad Radio Argentina aired a live performance of Parsifal opera from the Coliseo Theater in downtown Buenos Aires, and only about 20 homes had receivers at that time and could listen to this concert.

In the early 1930s, single sideband and frequency modulation (FM) were invented by amateur radio operators. By the end of the decade, they were established commercial modes. Radio was used to transmit pictures visible as television as early as the 1920s.

1943 - The United States Supreme Court decided to awarded priority of the invention of radio to Tesla and his 1893 presentation in St. Louis. The Supreme Court justified that Marconi's related patent (1904), contained nothing new not having been published earlier and registered by Tesla, Lodge, and others. However, what made Marconi more successful than any other was his ability to commercialize radio and its associated equipment into a global business.

### **1951-2011**

In 1954, the Regency company introduced a pocket transistor radio, the TR-1, powered by a "standard 22.5 V Battery". In 1955, the newly formed Sony company introduced its first transistorized radio. It was small enough to fit in a vest pocket, and able to be powered by a small battery. It was durable, because it had no vacuum tubes to burn out.

By 1963, the first (radio) communication satellite, Telstar, was launched. In the late 1960s, the US long-distance telephone network began to convert to a digital network, employing digital radios for many of its links.

In the 1970s, the US Navy experimented with satellite navigation, culminating in the invention and launch of the GPS constellation in 1987.

The **DAB** (Digital Audio Broadcasting) standard was initiated as a European research project in the 1980s.

In the early 1990s, amateur radio experimenters began to use personal computers with audio cards to process radio signals.

Digital transmissions began to be applied to broadcasting in the late 1990s. The first live Internet only broadcast of a live band was Seattle based space rock group Sky Cries Mary in 1994. A bit later, in November 1994, Rolling Stones concert was the "first major cyberspace multicast concert."

On November 7, 1994, WXYC (USA) became the first traditional radio station to announce **broadcasting on the Internet**. In 1995, Progressive Networks released RealAudio as a free download. Time magazine said RealAudio took "advantage of the latest advances in digital compression" and delivered "AM radio-quality sound in so-

called real time." Eventually, companies started to release streaming audio players as free downloads. As the software audio players became available, "many Web-based radio stations began springing up."

In March 1996, Virgin Radio - London, became the first European radio station to broadcast its full program live on the Internet. In 1998, the Internet radio show "The Vinyl Lounge", commenced netcasting from Sydney, Australia, from Australia's first Internet Radio Station, NetFM.

From 2000 onwards, most Internet Radio Stations increased their stream quality as bandwidth became more economical. Today, most stations stream between 64 kbit/s and 128 kbit/s providing near CD quality audio.

Digital Audio Radio Service (DARS) was approved by the US Federal Communications Commission (FCC) in 1992 by establishing certain segments of radio frequency for **satellite broadcast on radio**. An auction was subsequently held and two companies were awarded the license to use these frequencies: American Mobile Radio (later to become XM Radio) and CD Radio (later to become Sirius Satellite Radio). In 2001 XM they launched nationwide. (Satellite Radio USA, 2009). In 2007 two companies merged into "Sirius XM Radio" to create a single radio network in the USA. In August 2011, Sirius XM Radio reports over 21 million subscribers (SiriusXM Radio, 2011).

DAB+, an upgraded version of the DAB system was released in February 2007. It is approximately twice as efficient as DAB.

### 1.2.3. Transmission of the signal

Radio waves are a type of electromagnetic radiation with wavelengths in the electromagnetic spectrum longer than infrared light. They travel at the speed of light. In order to transfer the radio signal it must be modulated. The modulation methods can be analog or digital. The **analog modulation** methods for radio are the following:

1. **Amplitude Modulation (AM)**, when the amplitude of the carrier signal is varied in accordance to the instantaneous amplitude of the modulating signal.
2. **Frequency Modulation (FM)**, when the frequency of the carrier signal is varied in accordance to the instantaneous amplitude of the modulating signal.

Traditionally radio programmes were broadcast on different frequencies via FM and AM, and the radio had to be tuned into each frequency, as needed. This used up a comparatively large amount of spectrum for a relatively small number of stations. Instead, **digital modulation** thanks to multiplexing and compression combines multiple audio streams onto a relatively narrow band. Digital radio systems include (Digital Radio Tech, 2009):

#### 1. DAB (Digital Audio Broadcasting) Digital Radio

On the figure below (Figure 5) there is a picture of the world, showing in which region DAB radio is launched, which countries are interested in introducing it, and where the DAB technology is in a trial mode. We see that as by September 2010 this technology is already fully used in some European countries (UK, Spain, Norway, Germany, Malta), in few Asian nations (China, South Korea) and Australia. UK is the biggest consumer of digital radio in the world (World DMB, 2010). Countries with trials and/or regulation include in Europe (Croatia, Czech Republic, France, Italy, and others), Africa (Ghana, South Africa), Asia (Hong Kong, Indonesia, Israel, Kuwait,

Malaysia) and New Zealand. Finally, Russia, Canada, India, Mexico and Turkey are the countries paying interest in this technology.

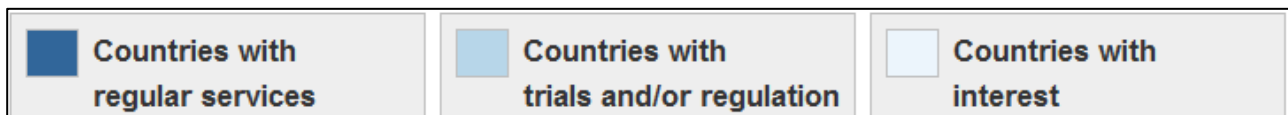
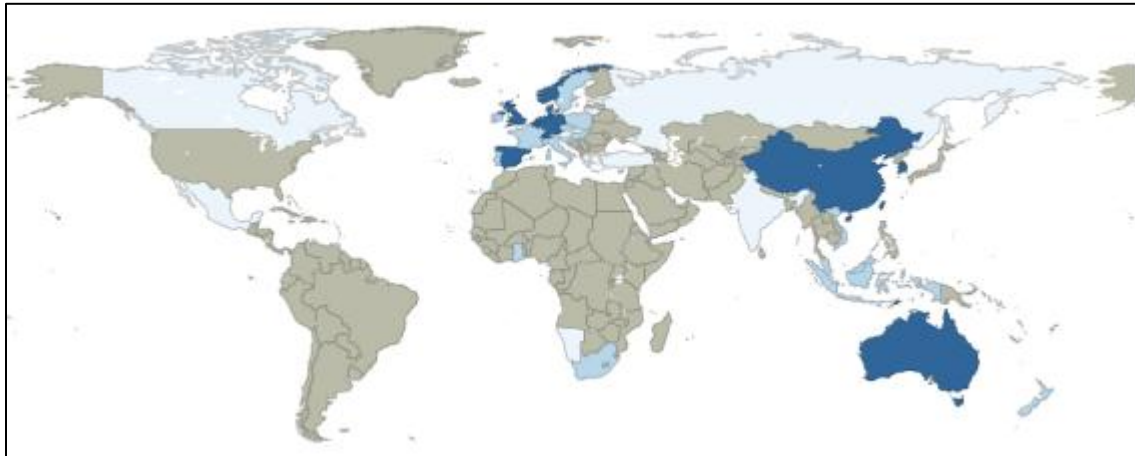


Figure 5. Country Information for Digital Audio Broadcasting services, Sept. 2010<sup>1</sup>.

2. **Radio transmitted via Digital Satellite** – as the name suggests, the signal of this kind of radio is transmitted wireless in a digital form via satellites.
3. **Radio via Digital TV** - digital radio signal is transmitted via the same cables (or wireless) used for the digital television. The digital signal, arriving through the TV, allows the listener to enjoy superior sound quality over car or portable analog radios, particularly when the television is connected to an entertainment center with surround sound capability (WiseGeek, 2009).
4. **Internet Radio (or online, net, streaming, e-radio)** – radio signal in the digital form is transmitted via Internet.

On Table 1 there is a comparison of parameters of DAB radio, Internet radio and radio via digital TV. We see that Internet radio is a champion in number of stations available: more than 10000, in comparison to approximately 35 of DAB and 30-120 of the radio via digital TV. Internet radio also provides better quality, on-demand content, personalization and interactivity, unlimitedly accompanied by video, pictures, text. Moreover, specialists forecast that in the future the quality of DAB will remain the same or decrease, for radio via digital TV it will stay on the same level, and only for the Internet radio the quality will increase.

<sup>1</sup> World DMB, 2010, [http://www.worlddab.org/country\\_information](http://www.worlddab.org/country_information)



Parameters	DAB	Internet radio	Radio via digital TV
Number of stations	35 (on average)	10,000+	30 (Freeview) - 120 (satellite)
Range of choice	Very poor	Excellent	Poor
Audio quality now	Poor	Very good	Average / good
Audio quality in future	Same or lower	Higher	Same
On-demand content available	No	Yes	No
Age of technology	1980s	State-of-the-art	1990s
Interactivity/personalisation	No	Yes	No
Video/pictures/text	Limited	Unlimited	Limited / no

Table 1. Digital radio platforms quick comparison<sup>1</sup>

#### 1.2.4. Global data about quantity of the devices

##### The USA.

##### Internet Radio devices in the car

Global sales of automobiles with Internet radio capability are set to rise by a factor of more than 30 during the next eight years, leading a wave of in-vehicle apps that will be integrated into car electronics systems in the coming years, according to the IHS iSuppli Automotive Research Service.

Sales of cars with Internet radio integrated into their head unit will soar to 24 million units in 2018, up from 168,000 in 2010. The United States will lead the Internet radio market, with sales growing to more than 10.9 million units in 2018, from 149,000 in 2010 (Chakraborty, Automotive Internet radio market set to boom, 2011).

About 50 car models in the United States already have Internet radio app integration or will have it in their model-year 2012 versions. BMW, Ford, Lincoln, Mercedes-Benz, Scion, Buick, Chevrolet and Hyundai integrate Internet radio apps in the United States. In Europe, only BMW and Mini offer Internet radio so far. In China, there are four Chinese luxury models that are in the process of adding Internet radio integration.

Beyond Internet radio there are a variety of other cloud-based sources of content. Cloud music locker services, such as Apple's iCloud, Google Music or Amazon's Cloud Drive will likely see implementation in the car due to the potential popularity of the approach in the mobile industry. However, at this point in time automotive

<sup>1</sup> Digital Radio Tech, 2009, <http://www.digitalradiotech.co.uk/index.htm>

OEMs have shown little interest in implementing this type of cloud service in the car. Instead, the trend is toward popular entertainment apps such as Pandora, iHeartRadio, Slacker and more.

## UK

According to the recent study (Ofcom, 2011), UK adults claiming to have access to a **DAB radio set** in the home rose by 3.7% in the 12 months to Q1 2011; to **38.2%**, see Figure 6. Take-up has tripled over five years, from 13.6% of homes in 2005; up by 24.6 percentage points over the period.

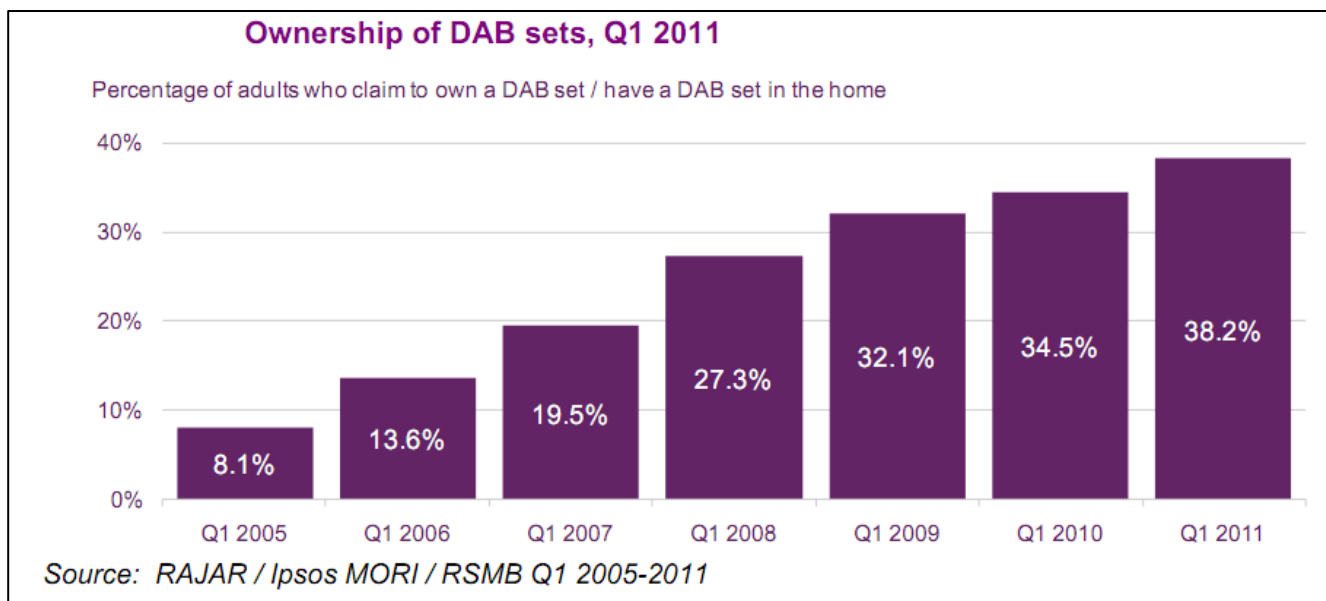


Figure 6. Ownership of DAB sets, UK, Q1 2011<sup>1</sup>.

DAB sales have remained stable at 1.9 million in the year to Q1 2011, as presented on the diagram below (Figure 7). While analogue sales still account for the majority of radio sets sold (77.7%), DAB increased its proportion of sales by 1.4pp to 22.3%.

The portable market accounted for nearly half (49.8%) of total DAB sales in the year to Q1 2011, representing 64.5% of the overall portable radio market. Total radio set sales (analogue and digital) were down by 677,000 to 8.5 million in the year, mostly due to a decline of 655,000 in analogue sales.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

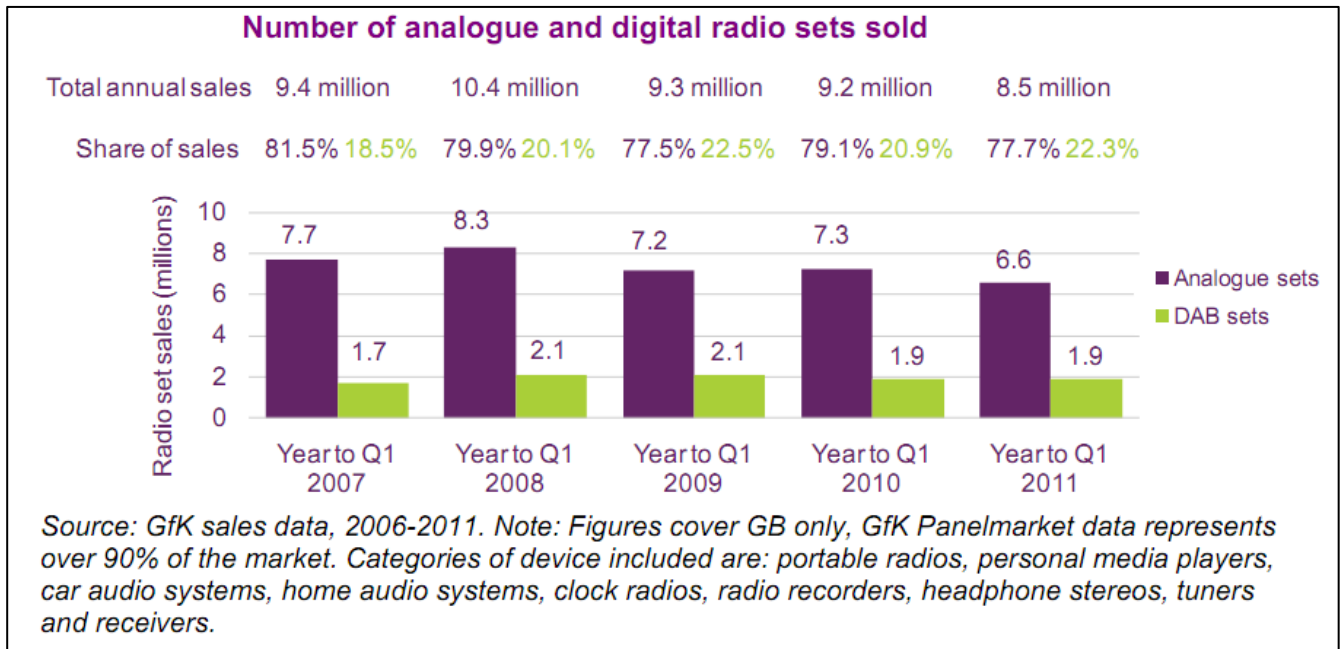


Figure 7. Number of analogue and digital radio sets sold in UK, 2006-2011.<sup>1</sup>

## 1.3. Computer

### 1.3.1. Definition

There are many definitions of computer. As of Oxford Dictionaries, **computer** is “an electronic device which is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals.”

In the same way, Wikipedia defines it as “a programmable machine designed to sequentially and automatically carry out a sequence of arithmetic or logical operations.”

Webster's Dictionary defines computer as “any programmable electronic device that can store, retrieve, and process data”.

According to the mode of use, computers can be classified as (Kishore, 2007):

- **Workstation** is a computer “designed for technical or scientific applications. Historically, workstations had offered higher performance than desktop computers, especially with respect to CPU and graphics, memory capacity and multitasking capability”.
- **Desktop computer** is “a personal computer (PC) in a form intended for regular use at a single location, as opposed to a mobile laptop or portable computer” (defined by Wikipedia).

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

- **Laptop** (or **notebook**) is a portable computer. “A laptop, also called a notebook, is a personal computer for mobile use. It is powered by mains electricity via an AC adapter, and can be used away from an outlet using a rechargeable battery” (Wikipedia).
- **Netbooks** are “laptops that are light-weight, economical, energy-efficient and especially suited for wireless communication and Internet access” (Wikipedia).
- **Tablet personal computer** (or **tablet PC**) “is tablet-sized computer that also has the key features of a full-size personal computer” (Wikipedia).
- **Palm PC** a hand-size computer that “accept handwritten inputs using an electronic pen which can be used to write on a Palm’s screen (besides a tiny keyboard), have small disk storage and can be connected to a wireless network” (Kishore, 2007).

### 1.3.2. History

#### Until 20<sup>th</sup> century

The history of the modern computer begins with two separate technologies—automated calculation and programmability—but no single device can be identified as the earliest computer, partly because of the inconsistent application of that term.

A few devices are worth mentioning though, like the Sumerian abacus, designed around 2500 BC, the astrolabe and the Antikythera mechanism, an ancient astronomical computer built by the Greeks around 80 BC. Around the end of the 10<sup>th</sup> century, the drawings of a machine invented by the Moors that answered Yes or No to the questions it was asked (binary arithmetic) were brought from Spain. The basic idea of computing develops in the 1200's when a Moslem cleric proposes solving problems with a series of written procedures.

As early as the 1640's mechanical calculators are manufactured for sale. Blaise Pascal invents the first commercial calculator, a hand powered adding machine.

In 1801 Joseph-Marie Jacquard builds a textile loom that weaves by reading punched holes stored on small sheets of hardwood. These plates are then inserted into the loom which reads (retrieves) the pattern and creates (process) the weave.

Shortly after the first mass-produced calculator (1820), Charles Babbage begins his lifelong quest for a programmable machine. Although Babbage was a poor communicator and record-keeper, his difference engine is sufficiently developed by 1842. Ada Lovelace, the first programmer, uses it to mechanically translate a short written work. Charles Babbage’s son, Henry, continued the work of his father and completed a simplified version of the analytical engine's computing unit in 1888.

George Boole, while professor of Mathematics, writes *An Investigation of the Laws of Thought* (1854), and is generally recognized as the father of computer science.

The 1890 census is tabulated on punch cards similar to the ones used 90 years earlier to create weaves. Developed by Herman Hollerith, the system uses electric power (non-mechanical). The Hollerith Tabulating Company is a forerunner of today's IBM.

By the end of the 19th century a number of ideas and technologies, that would later prove useful in the realization of practical computers, had begun to appear: Boolean algebra, the vacuum tube (thermionic valve), punched cards and tape, and the teleprinter.

### **1901-1950**

During the first half of the 20th century, many scientific computing needs were met by increasingly sophisticated analog computers, which used a direct mechanical or electrical model of the problem as a basis for computation.

In 1936 Alan Turing, the father of modern computer science, provided an influential formalization of the concept of the algorithm and computation with the Turing machine.

The Atanasoff–Berry Computer (ABC) was among the first electronic digital binary computing devices. Conceived in 1937 the machine was not programmable, designed only to solve systems of linear equations.

The inventor of the program-controlled computer was Konrad Zuse, who built the first working computer in 1941 and later in 1955 the first computer based on magnetic storage.

George Stibitz is internationally recognized as a father of the modern digital computer. While working at Bell Labs in 1937, Stibitz invented and built a relay-based calculator the "Model K", which was the first to use binary circuits to perform an arithmetic operation. That same year The Enigma, a complex mechanical encoder is used by the Germans and they believe it to be unbreakable. However, first in Poland and later in other countries, Enigma code was broken. Information gained by this shortens the war. To break the code, the British, led by Turing, build the Colossus Mark I and kept it in secret.

A succession of more powerful and flexible computing devices constructed in the 1930s and 1940s, gradually adding the key features that are seen in modern computers. The use of digital electronics (largely invented by Claude Shannon in 1937) and more flexible programmability were vitally important steps, but defining one point along this road as "the first digital electronic computer" is difficult.

In 1944 the Harvard Mark I, a large-scale electromechanical computer with limited programmability, was introduced. Based on a series of proposals from Howard Aiken, the Mark I computed complex tables for the US Navy.

In 1943 three year development begins on the Electronic Numerical Integrator And Computer (ENIAC). Designed by John Mauchly and J. Presper Eckert, they get help from John von Neumann. ENIAC used decimal arithmetic and had an inflexible architecture which essentially required rewiring to change its programming. Several developers of ENIAC came up with a far more flexible and elegant design, which came to be known as the "stored program architecture" or von Neumann architecture. This design was first formally described by John von Neumann distributed in 1945.

1947 - scientists of Bell Labs complete work on the transistor and by 1948 teams around the world work on a "stored program" machine.

## **1951-2011**

In 1953 IBM introduces the 701 - the first commercially successful computer.

In 1956 FORTRAN programming language is introduced. Other early languages include LISP, COBOL, ALGOL and BASIC. Although never widely used, ALGOL is the basis for many of today's languages.

A new age dawns in 1958 with the introduction of CDC1604 - the first transistor powered computer developed under supervision of Seymour Cray. Over the next three years computers begin affecting the day-to-day lives of most Americans.

In 1961 the integrated circuit was introduced. Within ten years all computers use them instead of the transistor. Formally building sized computers became room-sized, and considerably more powerful.

In 1964 IBM introduces the System/360. The main feature of this machine is business orientation. IBM guarantees the "upward compatibility" of the system, reducing the risk that a business would invest in outdated technology. Another achievement of this year was done by Dartmouth College – the first Wide Area Network.

In 1969 Bell Labs develops its own operating system, UNIX.

In the same year one of the many precursors to today's Internet, ARPANet, is launched. Alan Keys, who will later become a designer for Apple, proposes the "personal computer." Also in 1969 a group of technicians formed Intel company.

1973 - Xerox introduces the mouse. Proposals are made for the first Local Area Networks.

In 1975 the first personal computer is marketed in kit form - the Altair featured 256 bytes of memory. Bill Gates, with others, writes a BASIC compiler for this machine. Soon after, Apple begins to market PC's, also in kit form (the Apple II was launched in 1977). It includes a monitor and keyboard. The earliest RISC platforms become stable.

During the next few years the personal computer explodes on the American scene. By 1977 stores begin to sell PC's. Continuing today, companies strive to reduce the size and price of PC's while increasing capacity .

In 1981 Microsoft released MS DOS operating system. IBM introduces its PC in 1981 as well (Golden Ink). While IBM was not the first or only company with a personal computer (PC) on the market, it started the home computing revolution (Elliott, 2011). IBM PC was made of the third-party hardware and software. This decision waded the company time and money, versus building the machine from ground. They took the processor from Intel, operating system from Microsoft (MS-DOS). This solution helped IBM to succeed in the industry.

The 1980s witnessed home computers and the now ubiquitous personal computer. With the evolution of the Internet, personal computers are becoming as common as the television and the telephone in the household.

In 1990s the PC market experienced a dramatic change when the companies that helped to establish it in 1980s disappeared (among them are Atari, Commodore, Amiga, and others). Meanwhile Compaq and Dell became

the biggest Windows-based PC producers. At the same time the name Microsoft became synonymous with the name of the computer, as it released its successful operating systems Windows 3.0 in 1990, Windows 95 in 1995 and finally Windows 98. In the 1990s decade Apple struggled for the dominance over Microsoft. And in 1997 it revealed with iMac and iBook. While the most computers were laptops these years, portability became important. So in 1992 the first laptop ThinkPad was introduced by IBM. Soon other manufacturers followed the same path.

Tim Berners-Lee introduces Internet to the public in 1991. But the rapid raise happened in 2000s.

1996 - more e-mail is sent than postal mail in USA. Next year IEEE institute releases WiFi standard.

Computers continue to work and the world doesn't come to an end on January 1, 2000 as some feared might happen because of the year 2000 bug. This year the domain twitter.com comes online. Next year the domain wikipedia.org comes online too.

In 2001 Dell computers becomes the largest PC maker; whereas Apple achieved popularity with the launch of a music player iPod in 2002. Its other successful products were MacBook, iMac, iBook, iPhone, iPad and others.

During 2000 decade Microsoft released its operating systems: Windows XP, Windows Vista and finally Windows 7 on 2009. The 1<sup>st</sup> two operating systems were not very successful, and Windows 7 “returned consumers to the Windows fold” (Elliott, 2011).

The general trend for 2000s was the following: desktops shrunk, laptops rose dramatically, prices dropped whereas the features improved. Netbook, tablet, smartphone were innovations and are fully programmable computers in their own right.

### 1.3.3. Internet

“The **Internet** is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies” (Wikipedia).

Common methods of Internet **access** in homes include dial-up, landline broadband (over coaxial cable, fiber optic or copper wires), Wi-Fi, satellite and 3G/4G technology cellphones.

- **Dial-up** Internet access uses the facilities of the public switched telephone network (PSTN) to establish a dialled connection to an Internet service provider (ISP) via telephone lines. The user's computer or router uses an attached 56kbit/s modem to encode and decode Internet Protocol packets and control information into and from analogue audio frequency signals, respectively.
- **Broadband Internet access**, often shortened to just "broadband", is a high data rate connection to the Internet, generally without disrupting telephone cable.
- **Wi-Fi** is a standard for wirelessly connecting electronic devices to the Internet via a wireless network access point. An access point (or hotspot) has a range of about 20 meters indoors and a greater range outdoors.

- **Satellite Internet access** is Internet access provided through satellites. The service can be provided to users world-wide through Low Earth Orbit satellites.
- **3G** is a generation of standards for mobile phones that include application services like wide-area wireless voice telephone, mobile Internet access (with the peak rates at least 200kbit/s), video calls and mobile TV, all in a mobile environment. **4G** is a successor of 3G with the speed peak requirements for 4G service from 100Mbit/s to 1Gbit/s.

Let us compare the dial-up and broadband Internet access trends. Arbitron and Edison’s have studied which kind of Internet connection do the Americans use at home (Arbitron/Edison’s Research, 2011). Figure 8 describes the results of the research. It shows that as of 2011 the majority of US home have broadband connection (86% vs. 8% of dial-up). Whereas the percentage of Americans preferring the broadband has always been growing since 2002, number of people favoring the dial-up have decreased from 78% in 2002 to just 8% in 2011. Instead, the growth of the broadband was registered 21% in 2002 up to 86% in 2011. An only in 2005 number of people using both types of access was equal (see the figure below).

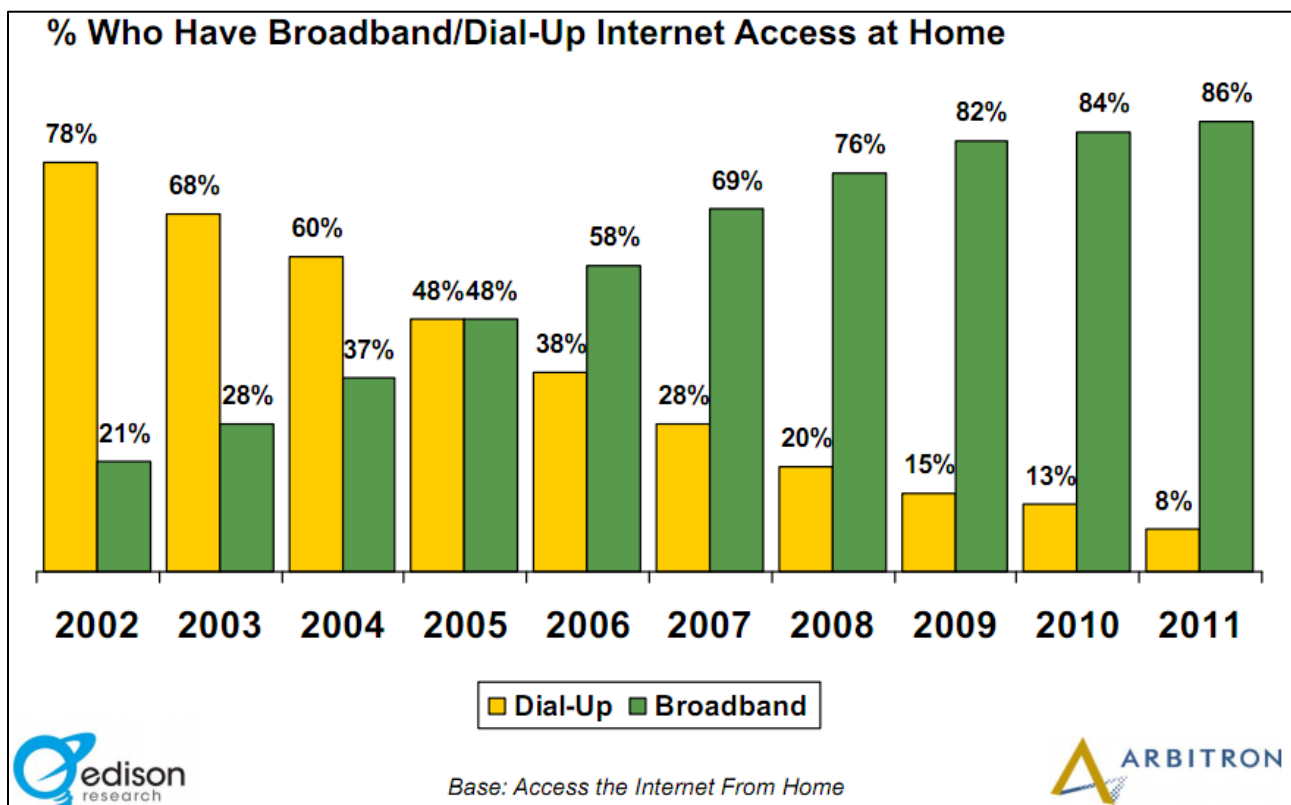


Figure 8. Percentage of US population with broadband or dial-up Internet access at home, 2002-2011<sup>1</sup>.

Talking about history of Internet, it is worthwhile to mention that its origins go back to the 1960s research, commissioned by the United States government in collaboration with private commercial interests to build robust, fault-tolerant, and distributed computer networks. The commercialization of what was by the 1990s an international network resulted in its popularization and incorporation into virtually every aspect of modern

<sup>1</sup> Arbitron/Edison’s Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf).



human life. Internet has been spreading all over the world more and more, and this process will continue to evolve.

Indeed, according to Internet Growth Statistics (Internet World Stats, 2011), Internet is a “universal source of information for millions of people, at home, at school, and at work. With a very low investment, anyone can have a web page in Internet... almost anybody that can read and write can have access to the World Wide Web.” The evolution of Internet is presented in the table below (Table 2). The data say that in 1995 number of Internet users was 16 million people, which was 0.4% of world population. In 2000 there were already 5% of population using Internet, and it doubled in 2003 reaching more than 10%. After 4 years, in 2007 it doubled again (and achieved 20%) and tripled in 2011. As of March 2011 the statistics counts more than 2 billion of Internet users, which is 30% of global inhabitants.

DATE	NUMBER OF USERS, millions	% WORLD POPULATION	INFORMATION SOURCE
<b>Dec, 1995</b>	16	0.4 %	IDC
March, 2000	304	5.0 %	Nua Ltd.
Sept, 2003	677	10.6 %	Internet World Stats
Dec, 2007	1,319	20.0 %	Internet World Stats
Sept, 2009	1,734	25.6 %	Internet World Stats
Sept, 2010	1,971	28.8 %	Internet World Stats
<b>Mar, 2011</b>	2,072	30.0 %	Internet World Stats

Table 2. Internet World Stats, evolution of Internet<sup>1</sup>.

Internet evolution trend of 1995-2011, shortly given in Table 2, can be better seen in the graph below (see Figure 9). The growth is more or less linear. The first billion of global users was registered at the end of 2005; the second at the beginning of 2011.

<sup>1</sup> Internet World Stats <http://www.Internetworldstats.com/emarketing.htm>

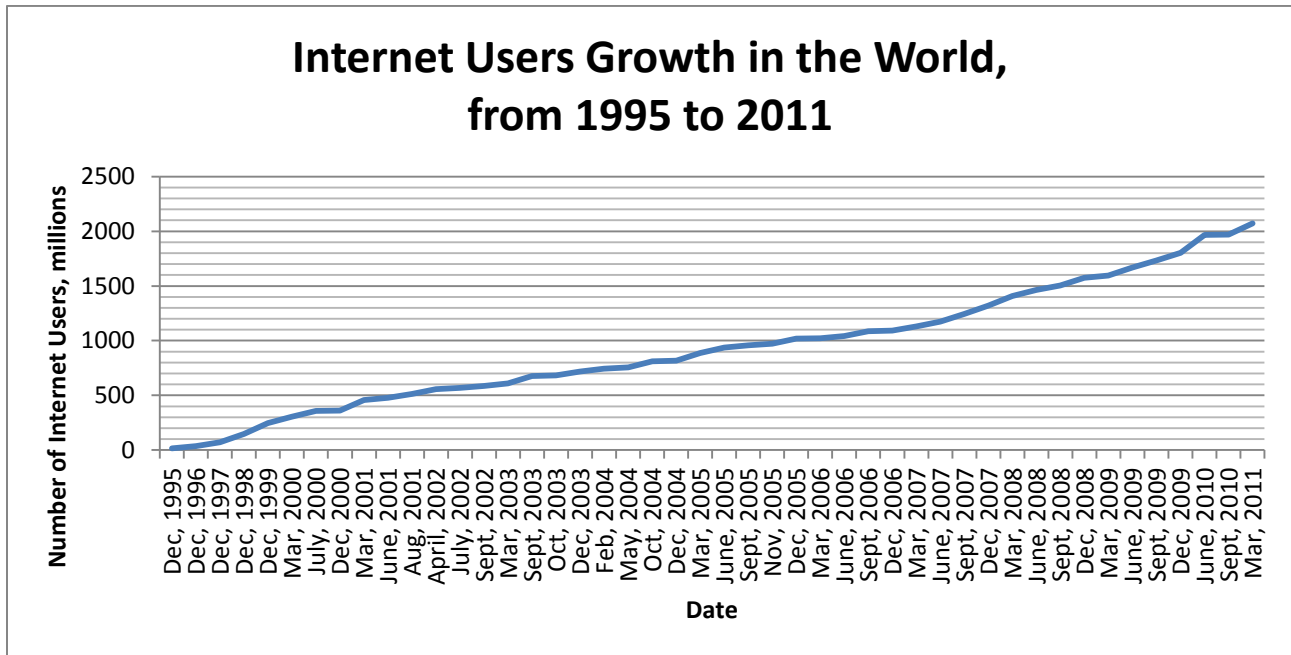


Figure 9. Internet users Growth in the World, 1995-2011

As for the distribution of Internet users by geographic regions Figure 10 displays the global statistics. The leader is Asia with approximately 922.3 millions of users, about twice less users are from Europe (476.2 millions) and even less are in North America and Latina America/Caribbean (272.1 and 215 millions respectively). Oceania and Australia are at the bottom of the list with only 21.3 millions of Internet users.

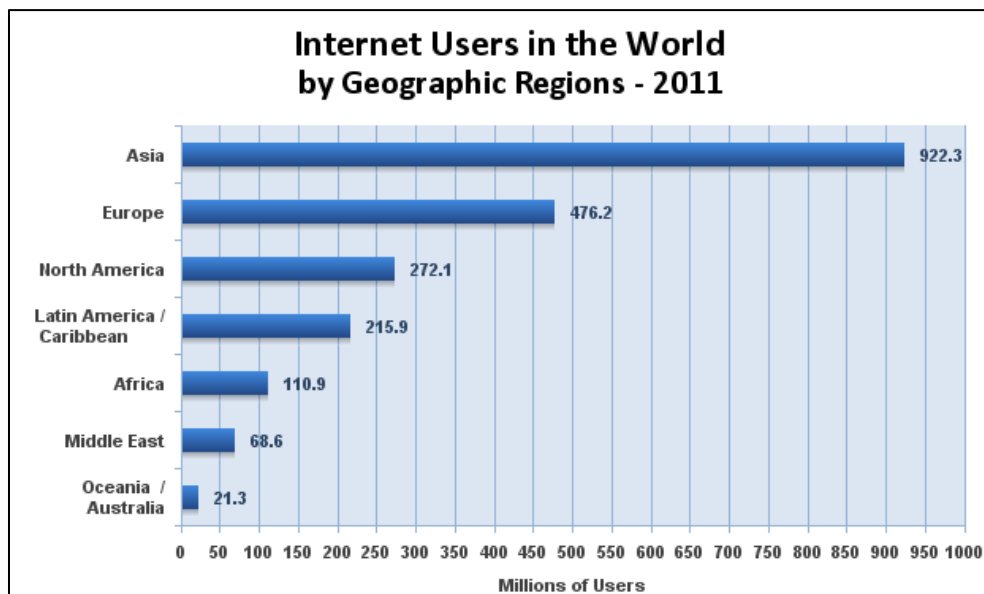


Figure 10. Internet Users in the World by Geographic Regions, 2011<sup>1</sup>.

<sup>1</sup> Internet World Stats, 2011, <http://www.Internetworldstats.com/stats.htm>

Not only number of Internet users is increasing, but also the importance of Internet is growing, according to the recent survey conducted over 2020 US people aged 12 and older (Arbitron/Edison's Research, 2011). As seen on Figure 11, in 2011 almost half of Americans older than 12, say the Internet is the most essential medium in their lives; compared with one third of US population in 2007 and only one fifth in 2002 (see the figure below).

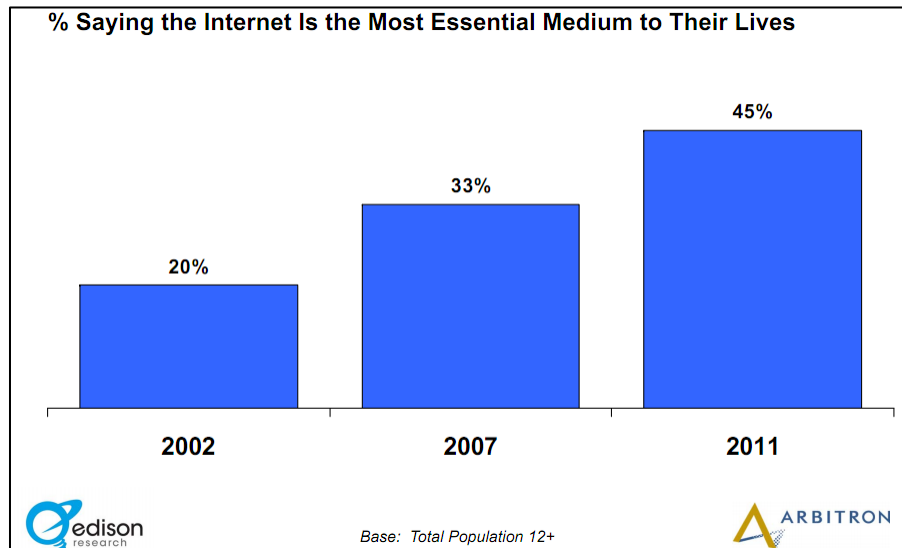


Figure 11. Importance of Internet in US population's life, 2002-2011<sup>1</sup>.

#### 1.3.4. Global data about quantity of the devices

Internet's transformative impact on the electronics industry can be seen if we look at the shipments of Internet-enabled consumer electronics devices. They will exceed those of the traditional platform used for accessing the Internet—the PC—for the first time in 2013, according to a IHS iSuppli Consumer Platforms Report (Selburn, 2011).

Shipments of Internet-enabled consumer electronics devices will surge to 503.6 million units in 2013, up from 161 million in 2010. In comparison, PC shipments during the same period will amount to 433.7 million, up from 345.4 million, as presented in a graph below (Figure 12).

In 2015, shipments of Internet-enabled consumer devices will breach three-quarters of a billion units, at 780.8 million units, massively exceeding PC shipments of 479.1 million.

“The Internet now is revolutionizing the consumer electronics business by delivering a range of products that can bring web-based content to homes. Increasingly, each Internet-enabled consumer electronics device is aggregating content throughout the home and serving up movies, television programs, videos and music. In the future, consumers will be more likely to access the Internet through their televisions than via their PCs,” said Jordan Selburn, principal analyst for consumer platforms at IHS.

<sup>1</sup> Arbitron/Edison's Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf).

Examples of Internet-enabled consumer electronics devices are televisions, Blu-ray players, game consoles, set-top boxes, digital media adapters and media tablets. Excluded from this category are other devices that can connect to the Internet like PCs and smartphones, which are tracked separately as data processing and wireless communications equipment, respectively.

Although IHS officially designates tablets as wireless devices, they are being included in the Internet-enabled consumer electronics category because of the key role they are playing in the market for the connected home.

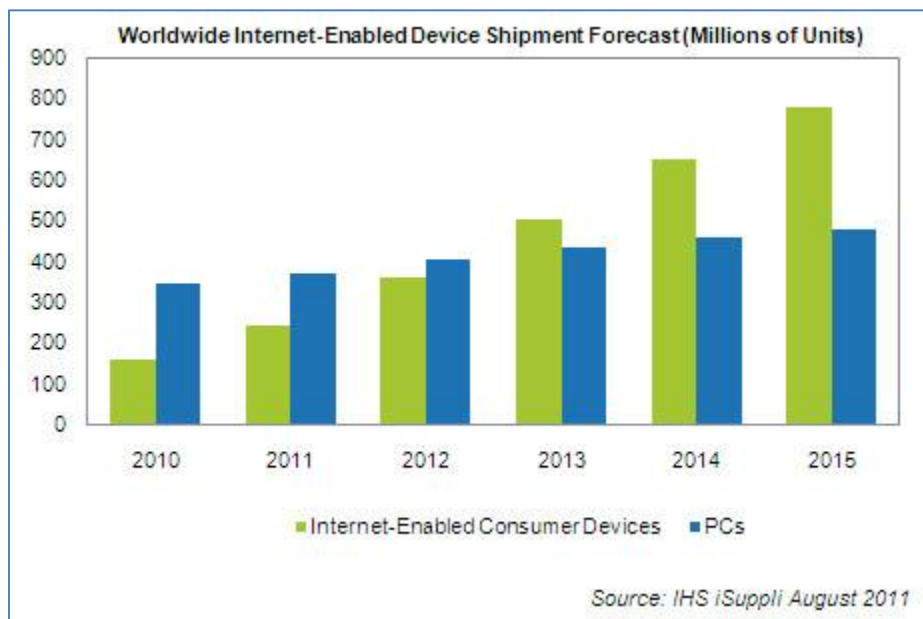


Figure 12. Worldwide Internet-Enabled device shipment vs. PC shipment, 2010-2014<sup>1</sup>.

## 1.4. Tablet

### 1.4.1. Definition

As defined by Search Mobile Computing, “A tablet PC is a wireless, portable personal computer with a touch screen interface”. Another definition of PCMag is “A general-purpose computer contained in a single panel. Its distinguishing characteristic is the use of a touch screen as the input device.” “Tablet computer” is also known as “tablet”, according to (Bucki, 2011). Therefore, in my thesis I will refer this device simply as “**tablet**”.

Tablets can be two types:

1. **Media Tablets** – “such as the iPad, Xoom from Motorola Inc. and Galaxy Tab from Samsung Electronics Co.—typically are slate-style, utilize a mobile operating system and ARM-based or mobile CPU, and employ a touch screen as the primary interface. Media tablet usage is largely concentrated on Web browsing, social networking, email and consumption of a range of media content such as video, music,

<sup>1</sup> iSuppli, 2011, <http://www.isuppli.com/Home-and-Consumer-Electronics/News/Pages/Shipments-of-Internet-Enabled-Consumer-Devices-to-Exceed-PCs-in-2013.aspx>

e-books/magazines and games. The applications are touch friendly, evolving from a smartphone environment, with touch as the primary interface”, according to iSuppli (Rhoda, iPad-Style Media Tablets to Outship PC Tablets by Factor of 10 from 2010 to 2015, 2011)

2. **PC Tablets** “can use slate or convertible/hybrid form factors based on Atom or x86 architecture, and incorporate a full PC operating system such as Windows 7, Linux, or Mac OS. PC-based tablets have incorporated touch but made poor use of it in the past, burdened by legacy applications heavy with pull-down menus and a dizzying array of choices.” (Rhoda, iPad-Style Media Tablets to Outship PC Tablets by Factor of 10 from 2010 to 2015, 2011)

Another device visually similar to tablet is **e-reader**, also called e-book reader or e-book device, is a portable electronic device that is designed primarily for the purpose of reading digital books and periodicals, according to Wikipedia. An e-book reader is similar in form to a tablet computer. The main advantages of e-book readers are better readability of their screens especially in bright sunlight and longer battery life.

### 1.4.2. History

“The history of tablet computing is littered with white elephants and false starts. As the old PDA market proved, it's not enough to simply get the hardware built. You've got to have intuitive software and an effortless user experience to go with it” (Evans, 2011).

#### 1968

The idea for a tablet computer was born back in the 1960s. In 1968, when Alan Kay and the Xerox Palo Alto Research Center dreamt up the 'Dynabook', they envisaged a portable device that would give children easy access to digital media. Alan Kay conceived requirements for **the Dynabook** - a pad-like computer no larger than a notebook that weighs less than 4 pounds, works via a touchscreen with a floating keyboard, connects to the Internet. It was the perfect name for a new and dynamic device that would act as a paper and pencil, artist's easel, typewriter and musical instrument. The Dynabook was never built, but Kay laid out all its details in 1972 in a paper "A Personal Computer for Children of All Ages."

#### 1983

Apple made a prototype of its tablet called **Bashful**, but it never got released. The prototype and add-ons, like a keyboard, stylus, floppy drive, phone, and handheld carry-case was all in grey and implemented in a very far similar to Apple style. Hartmut Esslinger created the idea of the Snow White design scheme for Apple, a minimalist off-white look that started with the Apple IIc and defined the brand until 1990.

#### 1988

If the **Gridpad** looks like a prototype for the Palm. They share the same progenitor: Jeff Hawkins, a chief propagator of pen-based computing who went on to found Palm Computing and then Handspring. The touchscreen-based Gridpad worked on a handwriting-recognition system developed by Hawkins that he refined into the Graffiti that was later used in Apple's Newton and in Palm devices. The Gridpad may have been portable, but it was priced too much to reach many, and its popularity was largely limited to healthcare and law enforcement institutions.

## 1989

Wang Laboratories joined the tablet market with a stylus-based system that let users write on any file or annotate it with voice notes via a phone handset and then send the document off by email. **The Freestyle** was a welcome addition for offices for collaboration on documents. The Freestyle was sold component by component—tablet, stylus, interface card, software, cable, phone, fax, and scanner—or as a package.

## 1993

The **AT&T EO** Personal Communicator is the tablet that for its time, it did seem like a bit of science fiction, outfitted as it was with a cellphone, modem, fax, microphone, calendar, database program, and word processor. Two technologies met their beginning and their end in the EO: GO Corp.'s operating system and AT&T Hobbit microprocessors. The device failed to take off.

In the same year Apple's second appearance in the table timeline showed up. **The Apple Newton** was a Personal Digital Assistant (PDA), but it was meant to be a tablet computer. Originally, the Newton team was working on what was called Figaro. The requirements for Figaro were a touch-sensitive active-matrix display, IR port, spread-spectrum capabilities. Due to some reasons instead of a tablet, Apple refocused the project to create Newton - a device that was lighter in features but more portable and less expensive.

The PDA is an important part of the tablet story. While the GRiDPad had been a failure, GRiD engineer Jeff Hawkins hit on the idea of taking the tablet and shrinking it down to a more portable size. Hawkins founded Palm Computing to pursue the project and, together with Tandy and Casio, they produced a touchscreen device called the Zoomer.

“Most people agree that Apple's Newton platform was ahead of its time. Three years to be exact, which is how long it took Jeff Hawkins and Palm Computing to come out with the Palm Pilot 1000 (1996). It marked the beginning of the PDA era and a temporary end to any tablet ambitions” (Evans, 2011).

## 2002

In 2000 Bill Gates presented at Comdex, computer expo, **Microsoft Tablet PC** prototype. It was outfitted with handwriting recognition that fit all the functions of a PC into a tablet format with a 500- to 600-MHz CPU, 128MB of RAM, 10GB hard disk, and USB ports. Tablets running Windows XP Tablet PC edition from the likes of Compaq and ViewSonic started shipping in 2002, but they never gained much market share.

## 2007

While gadget fans waited for somebody to launch a usable tablet that wasn't trying to be a PC, Amazon went off on a technology tangent with the **Kindle**. While the first model was underwhelming, it proved beyond doubt that the time was right for ebooks and e-readers to make their move. For Amazon, the Kindle was the perfect way to nudge customers beyond ordering physical books. And by making the Kindle software available on the iPhone, Android, Blackberry, Windows Phone 7, Mac and PC, customers could buy an ebook once and read it on any device they wanted to.

## 2010

The **Apple iPad** launched in April 2010 with a 9.7-inch display, 10-hour battery life, powerful 1GHz A4 processor and access to the biggest app library. Like most Apple products, it wasn't just early adopters and gadget-obsessed fans who slapped down their money. A recent comScore report that focused on tablet traffic in 13 countries showed that the iPad's reach was the lowest in India but still at 89 percent. Its traffic share in all other measured countries was above 95 percent. Despite increased competition from other operating systems and hardware on a near-constant basis, Apple has retained its leadership role in the current tablet trend.

“**Samsung Galaxy Tab** was arguably the first credible alternative to the iPad” (Evans, 2011).

## 2011

The **Motorola Xoom** has the potential to take your breath away. It beats down Apple's device in almost every area. Note the 10-inch (1280 x 800 pixel) display, 1GHz dual-core Tegra 2 processor, front and rear-facing cameras and additional SD card storage. It also runs Android 3.0, which is designed specifically for tablets and provides the wind in this perfect technology storm.

## 2012

The One Laptop Per Child program is getting an upgrade with the **XO-3**, an under-\$100 tablet that will incorporate solar charging and satellite connectivity to maximize its usability in the developing nations that it will call home. The XO-3 comes close to the ideals of Alan Kay's Dynabook. Aside from the functional requirements of serving as a computer, e-reader, and camera, the tablet must be durable, which is reflected in the rubber and plastic design. One Laptop Per Child founder Nicholas Negroponte put a delivery date of 2012 on the XO-3 (Steele, 2011).

### 1.4.3. Network

“Tablet computers are great media devices but much of their usage is going to require some form of network connectivity. This is vital for functions such as browsing the web, checking email or streaming audio or video. As a result, network connectivity is built into every tablet PC that is available on the market” (Kyrnin, 2011).

According to Guide To Tablet PC Networking Features (Kyrnin, 2011), tablets support the following network technologies:

#### 1. Wi-Fi

Wi-Fi is the most ubiquitous form of wireless networking technology. Pretty much every tablet comes with some form of Wi-Fi built into the device. The technology is designed for local area networking so it alone will not connect to the Internet. Instead, it allows connection into a home wireless network that shares a network broadband connection or a public hotspot with Internet access.

Wi-Fi is comprised of multiple standards that are fairly compatible with one another. Here is a breakdown of the various Wi-Fi standards along with their features:

- 1) 802.11a - 54Mbps, 5GHz Band, Used Mainly By Corporations

- 2) 802.11b - 11Mbps, 2.4GHz Band, Most Widely Used Wi-Fi
- 3) 802.11g - 54Mbps, 2.4GHz Band, Most Common High-Speed Wi-Fi
- 4) 802.11n - Up To 300Mbps Standard, 2.4 or 5GHz Band, Fastest Wi-Fi Standard

## **2. 3G/4G Wireless**

First of all, any tablet that offers 3G or 4G wireless connectivity has extra costs to it. Then the owner must sign up for a wireless service plan with a carrier that the tablet is compatible with.

3G is currently the most widespread of the wireless data networks within the US. 3G is based upon with a variety of different technologies but are not cross compatible with GSM or CDMA networks. These run over different frequency and signal technologies. Typically, a 3G compatible tablet will be locked into one service provider due to exclusivity contracts within the US that allow the hardware to be locked to a specific provider.

4G is a bit more complex as there are three major technologies right now on the market, none of which are widely deployed yet. The three current standards that are in use include the following:

- 1) WiMax is the oldest and works extremely well at fixed locations with speeds of roughly 3 to 6Mbps and peak rates of roughly 10Mbps. Right now, there are not any tablets that use this technology on the market but that will likely change over time.
- 2) HSPA+ is a child of 3G technology, sometimes called 3.5G. But the telecom companies were able to lobby the standards groups to get it labeled as 4G. The technology allows for speeds between 5 and 8Mbps which is a significant improvement over the older 3G speeds.
- 3) LTE is the first real wireless networking standard that was built from new technologies to produce true 4G network speeds. Since it is a new technology, it has very limited network coverage right now that is only in major cities right now. In fact, it is so new, that the first Motorola XOOM tablets do not ship with the hardware built in and must be returned for them to be upgraded.

## **3. Bluetooth and Tethering**

Bluetooth technology is primary a means of connecting wireless peripherals (such as keyboards or headsets) to mobile devices. The technology can also be used as local networking for transferring files between devices.

Another option is tethering. Tethering is a method of linking a mobile device such as a laptop, netbook or tablet with a mobile phone to share the wireless broadband connection. This can theoretically be done with any device that has a wireless broadband connection and Bluetooth with another Bluetooth device. So, a 3G capable tablet could share it with a laptop or a 3G mobile phone could share a connection with a tablet PC. The problem is that most wireless carriers have been able to force the hardware and software companies to lock out these features within the US networks. As a result, it really isn't a very functional method for the average user but is possible for those willing to unlock their devices to bypass the carrier restrictions.



#### 4. Wireless Base Stations / Mobile Hotspots / MiFi

Wireless base stations or mobile hotspots are a new form technology that allows an individual to connect a wireless router to a high speed wireless network such as 3G or 4G networks and allowing other devices that have standard Wi-Fi to share that broadband connection. The first such device was called the MiFi produced by Novatel networks. While these solutions are not as portable as having the wireless broadband built into the tablet itself, they are useful because it allows the connection to be used with a greater number of devices and gives users the flexibility of purchasing less expensive hardware.

The Apple iPad accounts for 97 percent of all tablet traffic in the US, despite the entrance of highly anticipated competitors like the Samsung Galaxy Tab, Motorola Xoom, BlackBerry PlayBook, Asus Eee Pad, and others (Yin, 2011). According to a report from comScore (comScore, 2011) that captured tablet traffic around the world (see Table 3), iPad is a far leader among other tablets traffic. For example, if iPad enjoys 21.8% of traffic, Android-based tablets took up only 0.6 percent of all traffic (that includes tablets, mobile phones and other devices, among which iPod Touch), while "other" tablets, took up 0.1 percent in the US. Canada is the leader of iPad traffic (33.5%), the US and UK stay at around 21%, and India is an outsider with 4% of iPad traffic. Interestingly, that even on the Indian market the iPad dominates 88 percent.

Country	iPad	Android	Other tablet	iPad Share of Tablet Traffic
Canada	33,50%	0,40%	1,30%	95%
Brazil	31,80%	1,60%	0,00%	95%
Germany	29,40%	0,90%	0,00%	97%
Spain	27,40%	0,80%	0,00%	97%
France	26,90%	0,60%	0,00%	98%
Singapore	26,20%	1,40%	0,10%	94%
Australia	25,90%	0,50%	0,00%	98%
US	21,80%	0,60%	0,10%	97%
UK	21,30%	0,30%	0,00%	99%
Chile	12,90%	0,60%	0,00%	95%
Argentina	12,40%	0,40%	0,00%	97%
Japan	11,30%	0,00%	0,00%	100%
India	4,00%	0,50%	0,00%	88%

Table 3. Share of Tablet Traffic for Selected Countries, May 2011<sup>1</sup>

The last column of Table 3. Share of Tablet Traffic for Selected Countries, May 2011 Table 3 – iPad Share if Table Traffic is displayed in the graph below (see Figure 13). All numbers are very high and percentages are close to 100%. It is seen that the iPad traffic leaders are Japan (100%), UK (99%), Australia and France (each 98%). United States register 97%, and the last in the list, India, enjoys 88 percent.

<sup>1</sup> ComStore, 2011,

[http://www.comscore.com/Press\\_Events/Press\\_Releases/2011/6/comScore\\_Introduces\\_Device\\_Essentials](http://www.comscore.com/Press_Events/Press_Releases/2011/6/comScore_Introduces_Device_Essentials)

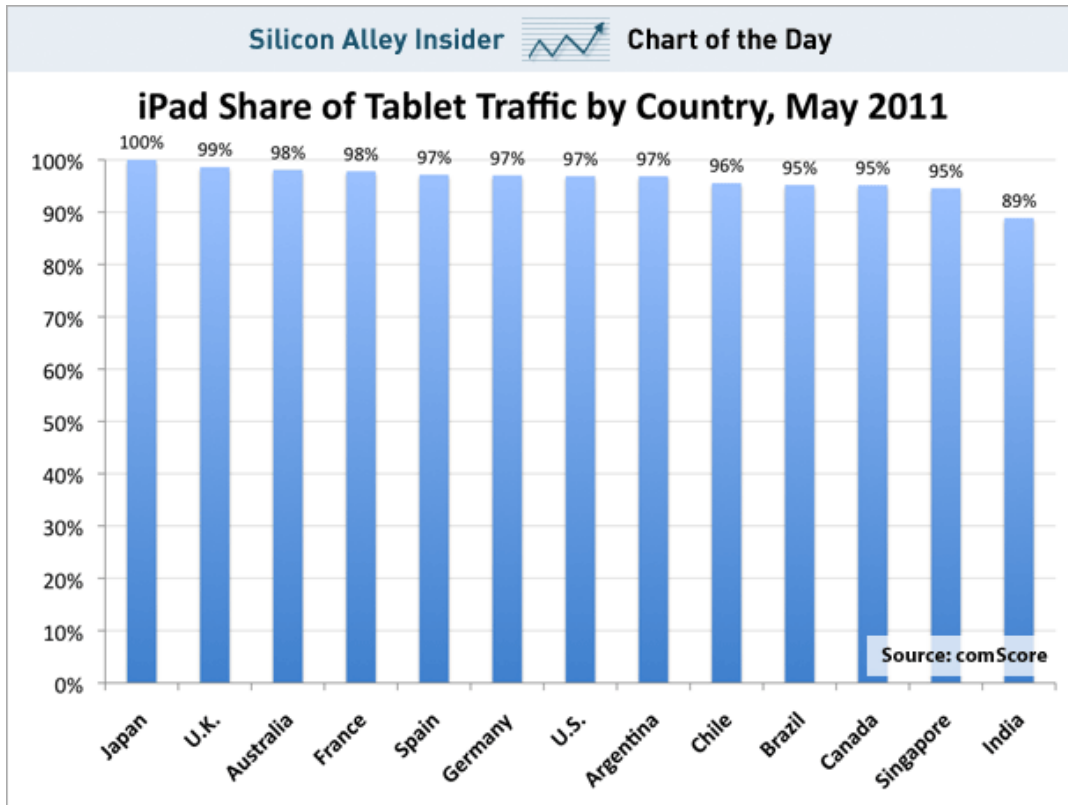


Figure 13. iPad share of the traffic by country, May 2011<sup>1</sup>.

#### 1.4.4. Global data about quantity of the devices

As of the end of January 2011 there were “102 tablets already released or in production from 64 vendors” (Lai, 2011).

Talking about the amount of tablets sold, BMO Capital Markets estimates that “15 to 16 million tablets were sold in 2010 and attributes the great majority—13 million—of those sales to Apple. BMO predicts that 45 million tablets will be sold in 2011” (Woyke, 2011). Indeed, Apple company reported that it shipped 7.33 million iPads in the last quarter 2010, but at the same time Samsung reported in Dec. that it had sold 1 million Galaxy Tab units by that point in time (Aune, 2011).

But according to iSuppli market research (Rhoda, Global Tablet Shipments to Rise by Factor of 12 by 2015, 2011) 19.7 million of tablet devices were shipped, see the results in Figure 14. The graph presents actual results of shipments of 2009 and 2010, and the forecast until 2015. Numbers are displayed for the media tablets, which are devices like iPad; PC-Type tablets that are tablets that have full PC functionality implemented via PC operating systems; and iPad. Global shipments of tablets are set to rise to 242.3 million units in 2015, up by a factor of more than 12 from 2010.

<sup>1</sup> PC Mag, 2011, <http://www.pcmag.com/article2/0,2817,2387530,00.asp>

Media tablet shipments will grow to more than 202 million units in 2015, up from 17.4 million in 2010. Shipments of PC-type tablets will climb to 39.3 million units in 2015, up from 2.3 million in 2010.

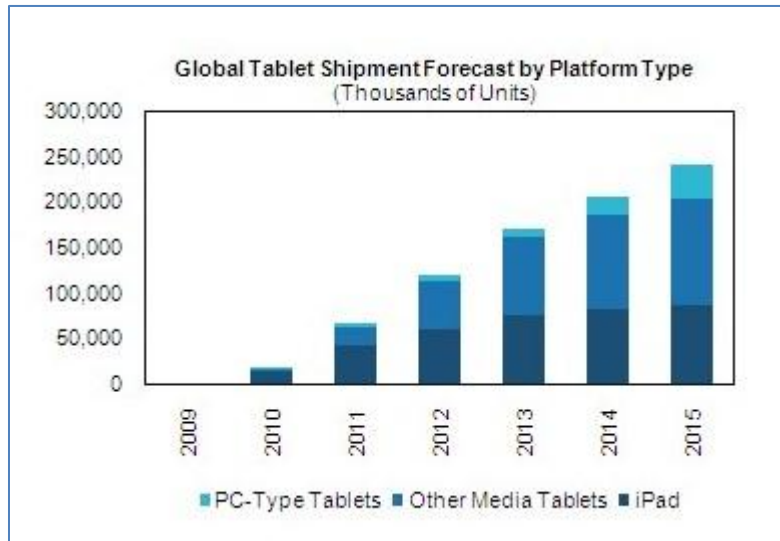


Figure 14. Global shipments of tablets forecast, 2009-2015<sup>1</sup>.

At the same time, Morpace Omnibus Report (2010) states that tablets is a category of media devices having a niche between laptops and smartphones. Tablet is generally considered as an option for a purchase instead of a netbook. “55 percent of netbook intenders have decided to either wait and see the iPad before making a decision or to purchase the iPad instead of a netbook... It appears that for many users, the tablet will replace the purchase and use of other devices such as netbooks, laptops, media players, etc”, declared in the report.

## 1.5. Mobile phone

### 1.5.1. Definition

As defined by Wikipedia, “a **mobile phone**, cellphone or hand phone is an electronic device used to make mobile telephone calls across a wide geographic area, served by many public cells, allowing the user to be mobile”.

Mobile phones can be categorized into two groups:

1. **Feature Phone** – “a mobile phone that has less computing ability than a smartphone”, as per Wikipedia. The main features are phone calls, sms, applications based on platforms such as Java ME, and not on the underlying hardware.
2. **Smartphone** – “a high-end mobile phone which combines the functions of a personal digital assistant (PDA) and a mobile phone” (Wikipedia).

<sup>1</sup> iSuppli, 2011, <http://www.isuppli.com/display-materials-and-systems/news/pages/global-tablet-shipments-to-rise-by-factor-of-12-by-2015.aspx>

## 1.5.2. History

### Until 1980

The beginning history of starts from the 1940's onward, from the innovation in taxi cabs, police cars and other service vehicles that used two way radios for communication with one another or with a central base. The first official mobile phone was used by the Swedish police in 1946. The technology was connected to the telephone network and was distinctive of two way radio technology. The phone was not very practical; it was only able to make few phone calls before the car's battery was drained.

In 1947, Douglas H. Ring and W. Rae Young, Bell Labs engineers, proposed hexagonal cells for mobile phones in vehicles. Philip T. Porter, also of Bell Labs, proposed that the cell towers be at the corners of the hexagons rather than the centers and have directional antennas that would transmit/receive in three directions into three adjacent hexagon cells (see Figure 15). However, although some technologies have been developed, electronics and other technologies would took decades to mature and to be developed, thus cellphone progress had to wait until 1960s.

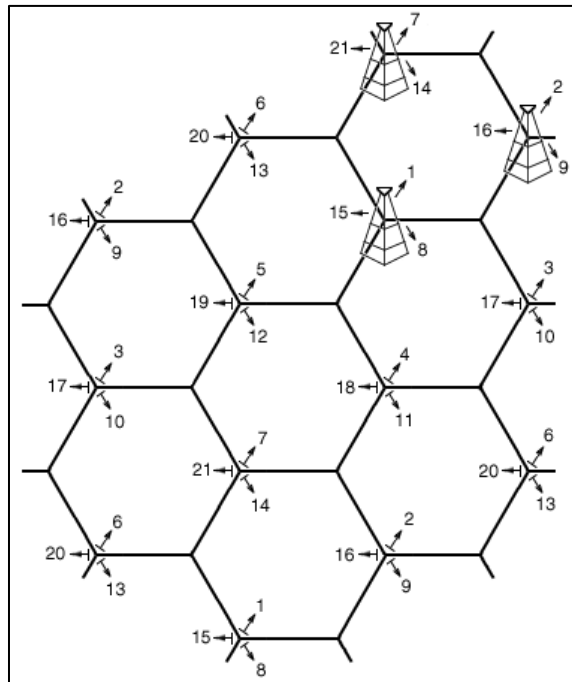


Figure 15. Cell towers at the corners<sup>1</sup>.

Most of the time, phones were installed in vehicles due to the large battery requirements. For instance, Eriksson developed a cellphone that was available in Sweden in 1950's. But it weighed 40 kg, making it ineffective for truly portable devices that are used today. Another example is the development of a system for motorists in the USSR in 1958 or the "Altay" national civil mobile phone service started in Moscow in 1963 and by 1970 was deployed in 30 cities across the USSR. Versions of the Altay system are still in use today as a trucking system.

<sup>1</sup> Wikipedia, 2009, <http://en.wikipedia.org/wiki/File:CellTowersAtCorners.gif>

By 1967, mobile phone technology was available; however, the user had to stay within one cell area. One base station of a cell was unable to hand a call to another one.

In 1970, Amos Edward Joel, from Bell Labs, developed the call handoff system. This technology facilitated continuity of a phone call from one area to another without dropping the phone call.

While the technology had been developed, it wasn't until 1971 that AT&T submitted a request to the Federal Communication Commission (FCC) for cellular service. FCC approved it in 1982 and allocated the frequencies of 824-894 MHz Band to analog Advanced Mobile Phone Service (AMPS). Analog AMPS was eventually superseded by digital AMPS in 1990.

Prior to 1973, cellular mobile phone technology was limited to phones installed in vehicles. There was a long race between Motorola and Bell Labs to produce the first portable mobile phone. But in 1973 Martin Cooper, a Motorola researcher and executive, made the first analogue mobile phone called Dyna-mite.

### **1980-1989. 1G, First Generation Cellphones**

The First Generation (1G) of mobile phones from the previous generation was the use of multiple cell sites, and the ability to transfer calls from one site to the next as the user travelled between cells during a conversation. The first commercially automated cellular network NTT was launched in Japan in 1979 and consisted of 23 base stations. By 1984 the NTT had been expanded and became the first nation-wide 1G network.

The next 1G network to launch was the Nordic Mobile Telephone (NMT) system in Denmark, Finland, Norway and Sweden in 1981. NMT was the first to feature international roaming.

Several other countries also launched 1G networks in the early 1980s including the US, UK, Mexico and Canada.

In 1980s cellphones grew in popularity due to the innovations in cellular networks. While most cellphones weren't made to be carried in hand, all phones were made for permanent installation in the car. They could easily hook up to a car's battery, via the DC outlet to make calls. The term "car phone" was extremely popular. Few cellphone models came as briefcases, to hold large batteries necessary to make phone calls.

In 1983, Motorola unveiled to the world, the first truly portable cellular phone Motorola DynaTAC 8000X. It was extremely lightweight for its time and was known as the Brick for its shape.

### **1990-1999. 2G, Second Generation Cellular Phones: Digital networks**

Cellular phones from the early 1990's are considered being second generation (2G), able to work on mobile phone systems such as GSM (Global System for Mobile Communications) and CDMA (Code Division Multiple Access). Digital mobile phone networks were in use in the United States in 1990 and in Europe in 1991. In 1992 Nokia released the Nokia 1011, a black, slimline GSM handset with 90 minutes of talk time and the ability to send short, textual messages to other users. As the phone caught on, GSM quickly spread throughout Europe and Asia, and by the end of 1995 the first commercial US GSM service had been launched.

2G mobile phones use digital circuit switched transmissions. This ultimately enabled quicker network signaling, lowering the amount of dropped calls and increasing call quality. As 2G digital networks were online, most of

the time, they replaced analog network frequencies, effectively making them obsolete. Phones based on 2G technology were much smaller than the brick telephones of the mid to late 1980's. Most 2G cellular phones were usually in the range of 100 to 200 grams, plus they were hand held devices that were truly portable without the need for a large battery. Advances in battery technology, as well as computer chip technology also helped to make 2G cellphones much smaller than their predecessors. As an example, in 1996 Motorola introduced the fresh style with the MicroTAC. Also Samsung released in 1996 a skinny and lightweight SGH-200, and in 1998 the high-end SGH-600 flip phone that “raved reviews for its slim design, 5-hour battery and voice-activated dialing” (Simon, 2010).

In 1999 the phones became available in a series of interchangeable covers with a variety of colors and patterns. This strategy kept the phone fresh and popular among teenagers, helping the Nokia 3210 enjoy a long period of success. But the screen was still monochromatic.

It was a Japanese electronics maker Sharp that forever altered the mobile-phone landscape with Japan-exclusive J-SH04 - first color screen and sleek, metallic enclosure that not only spiced up the sea of dull, black, grayscale handsets, it boldly pushed the cellphone into the 21st century by adding a 1MP camera to its backside.

It was the era when prices dropped and networks became clearer and more ubiquitous, cellphones slowly shed their luxury stigma and introduced functionality beyond calls and SMS messages.

### **2000-2009. Third Generation Cellular Phones**

Third Generation (3G) cellular phones is the technology that is currently available. Standards for 3G are generally different depending on the network. It is usually stated that 3G is not necessarily a rigid standard, but is a set of requirements that most networks and cellphone providers follow. There are two main requirements: 2Mbits of maximum data rate indoors and 384kbits outdoors. Technologies were continuing to improve and new innovations such as streaming radio and TV, Wi-Fi broke into the market.

In 2001, Japan saw the first 3G network launched. It was followed by South Korea in early 2002 and the US in May 2002 with theoretical speeds of 2.4Mbit/s and average speeds around 600kbps.

At the end of 1990s, 3G innovator NTT DoCoMo launched the world's first mobile Internet service in Japan. The suite of services bridged the gap between desktop apps and WAP-based cellphone platforms and was wildly popular in Japan.

In the cellphone market color screens, cameras and Bluetooth were to stay. Ericsson demonstrated the world's first Bluetooth phone, but still monochromatic screen, the T36 (released as the T39 in 2001). Soon in 2003, when Ericsson and Sony created a joint venture, they made a flagship release of the color screen Sony Ericsson T610. The phone featured 65536-colors screen, a variety of ringtones and games, and a thumb-friendly directional pad for simple navigation. With its clean lines and slick veneer, the T610 was as fashionable as it was functional, and its popularity signaled a dramatic shift in the market.

The next was Motorola RAZR V3 in 2004. A design marvel, the all-aluminum, dual-screen, thin, light it paved the way for so-called “fashion phones” that tempted users with glitz and gloss - often at the expense of functionality. The phone had a weak UI, battery and speaker issues, compound fractures.

Another phone that tipped the form-over-function scales was LG Chocolate featured an illuminated, touch-sensitive scroll wheel for navigation. The new focus on design helped cellphones ignite a new wave of innovation as consumers demanded thinner handsets.

As designs got smarter and mobile phones picked up more features, the line between PDAs and cellphones began to blur. The PDA-cellphone evolution continued in 1996 with the first of Nokia’s line of side-flip communicators. But cellphones didn’t truly become “smart” until 2000, when a dedicated OS arrived to properly manage all these tasks. Demoed as early as 1997 as part of Ericsson’s Penelope project--which included the prototype GS88 handset - the Symbian OS was born out of a partnership between Ericsson, PDA maker Psion, Motorola and Nokia. Packed with desktop-grade features such as pre-emptive multitasking, memory protection and Unicode support, the Symbian OS helped streamline generations of powerful smartphones from Nokia, Siemens, Samsung, Fujitsu, Sony Ericsson, Sharp.

By 2002, smartphones were fast taking the world. Sony Ericsson launched the stylish, touch-screen P800 and the Symbian-based User Interface Quartz (UIQ) platform, which opened the door for third-party software developers. RIM company updated its BlackBerry line of camera-less smartphones quickly achieved cult-like status due to their tight, push e-mail integration with Microsoft Exchange and Lotus Domino, miniature QWERTY keyboard tailored for thumb typing, and members-only BlackBerry Messenger service.

GPS which first landed in 2005 with the Siemens SXG75.

Although mobile phones had long the ability to access data networks such as the Internet, it was not until the widespread availability of good quality 3G coverage in the mid-2000s that specialized devices appeared to access the mobile Internet. The first such devices plugged directly into a computer through the USB port. Soon a new class of device appeared, the so-called "compact wireless router" which makes 3G Internet connectivity available to multiple computers simultaneously over Wi-Fi, rather than just to a single computer via a USB plug-in. Such devices became especially popular for use with laptop computers due to the added portability they grant. Consequently, some computer manufacturers started to embed the mobile data function directly into the laptop. Instead, the SIM card could be inserted directly into the device itself to access the mobile data services. Such 3G-capable laptops became commonly known as "netbooks". Other types of data-aware devices followed in the netbook's footsteps.

In January 2007, Steve Jobs demonstrated a revolutionary mobile phone - the iPhone. Unlike anything on the market, its touch-screen display with a “soft” keyboard, Safari Web browser, a powerful e-mail client and a touch-friendly reimaged Apple’s iPod.

Imitators popped up, but the iPhone stood in a class “all its own” until October 2008 when High Tech Computer Corporation (HTC) released the first phone based on Google’s open-source Android mobile platform.

Android wasn't quite as polished as the iPhone OS, but it was clear that a worthy competitor had arrived. Developers couldn't ignore Android's open platform. As the OS matured, too did the phones that ran it, beginning with Google's sleek Nexus One and culminating with Droid Incredible from HTC that featured several non-iPhone enhancements, including an FM tuner and 8 MP camera.

In 2010 Apple launched iPhone 4 with its brilliant retina display and long-overdue multitasking. But Motorola's Droid X appeared with its 40GB expandable capacity, larger screen and ability to turn itself into a 3G hotspot for five other devices.

The birth of 3G - with no small amount of help from the iPhone and Android - has pushed the mobile Internet well into the mainstream.

### **2010-2011. Fourth generation: All-IP networks**

By 2009, it had become clear that, at some point, 3G networks would be overwhelmed by the growth of bandwidth-intensive applications like streaming media. Consequently, the industry began looking to data-optimized 4th-generation technologies, with the promise of speed improvements up to 10-fold over existing 3G technologies. The first two commercially available technologies billed as 4G were the WiMAX standard and the LTE standard, first offered in Scandinavia.

One of the main ways in which 4G differed technologically from 3G was in its elimination of circuit switching (to establish a dedicated communications channel (circuit) before the nodes may communicate, and it remained for the duration of the session), instead employing an all-IP network - a treatment of voice calls just like any other type of streaming audio media, utilizing packet switching over Internet, LAN or WAN networks via VoIP.

"New features await the next generation of handsets - including Swype for fast text input, hyper-accurate GPS, on-demand video and live TV, and wave-and-pay purchases - as the distance between desktops and cellphones becomes less and less recognizable," (Simon, 2010).

#### **1.5.3. Network**

Networks serving the mobile phones are divided in so called generations. These networks were evolving from zero-generation (shortly, 0G) to the latest 4G, meanwhile the number of features, quality and speed improved. Each generation consisted of standards that were common in some countries, and different in others. The generations and their standards are as following:

##### **0G**

0G refers to pre-cellphone mobile telephony technology, such as radio telephones that some had in cars before the advent of cellphones (funSMS, 2010). One of the early examples for this technology is the first commercial mobile telephone service Mobile Telephone System (MTS) in the US in 1946.



## 1G

1G is short for first-generation wireless telephone technology. These are the analog cellphone standards that were introduced in the 1980's and continued until being replaced by 2G digital cellphones. 1G frequencies were typically 150MHz and up.

## 2G

2G is short for second-generation wireless telephone technology. It was the first digital generation. 2G cannot normally transfer data other than the digital voice call itself. Nevertheless, SMS messaging is available as a form of data transmission for some standards. GSM (Global System for Mobile Communications) and CDMAone are one of the best known 2G standards.

Two revisions or additions to this generation are sometimes referred to 2.5G and 2.75G.

**2.5G** “was invented for marketing purposes only”, according to some sources (funSMS, 2010). The combined introduction of GPRS (General Packet Radio Services) and the usage of CDMAone networks collectively came to be known as 2.5G. GPRS provided data transfer rates from 56-115kbit/s. Services like WAP (Wireless Application Protocol) and MMS (Multimedia Messaging) were introduced, along with Internet services.

**2.75G** was the name given to the evolution of EDGE (Enhanced Data rates for GSM Evolution) or Enhanced GPRS. Due to the introduction of 8PSK encoding, which facilitated higher data transfer rates of up to 236.8kbits/s, the previous rates almost tripled.

## 3G

3G is short for third-generation mobile telephone technology. 3G data transfer rates are 384kbits/s to 2Mbits/s, so it allows for previously unavailable services like video calls, video conferencing, mobile TV, online gaming etc. Along with these services, 3G provides greater security and privacy (PHOENIX, 2011).

3G was supposed to be a single, unified, worldwide standard, but in practice, it was divided into three standards:

- UMTS (Universal Mobile Telephone System) is the solution generally preferred by countries that used GSM, centered in Europe.
- CDMA2000's primary proponents are outside the GSM zone in the Americas, Japan and Korea.
- TD-SCDMA which was developed in China.

As with 2G, minor evolution of the standards resulted in **3.5G** and **3.75G**. Again, these standards allowed for higher data transfer rates, exceeding 2Mbits/s, reaching about 14Mbits/s. 3.5G also called High-Speed Downlink Packet Access (HSDPA) is a packet-based data with data transmission up to 8-10 Mbit/s.

## 4G

4G is short for fourth-generation of a wireless access technology. In 2009, the ITU-R organization specified the IMT-Advanced (International Mobile Telecommunications Advanced) requirements for 4G standards, setting

peak speed requirements for 4G service at 100 Mbit/s for high mobility communication (such as from trains and cars) and 1 Gbit/s for low mobility communication (such as pedestrians and stationary users). 4G standards are three:

- WiMax (Worldwide Interoperability for Microwave Access) is a telecommunications protocol that provides fixed and mobile Internet access. The current WiMAX revision provides up to 40 Mbit/s.
- LTE (Long Term Evolution) is a standard in the mobile phone network technology tree that produced the GSM/EDGE and UMTS/HSPA network technologies. Although LTE is often marketed as 4G, first-release LTE does not fully comply with the IMT Advanced 4G requirements.
- HSPA+ (Evolved High-Speed Packet Access) provides High Speed Packet Access data rates up to 84 Megabits per second (Mbit/s) on the downlink and 22 Mbit/s on the uplink through the use of a multiple-antenna technique known as MIMO (for “multiple-input and multiple-output”) and higher order modulation.

#### 1.5.4. Mobile Internet

The last studies show that the Americans access Internet more from a mobile network than the local connection (LAN or WiFi). comScore analyzed the differences in traffic patterns between iOS and Android devices to understand these splits by network access, with the results showing that iOS phones sourced a significantly higher share of device traffic from WiFi networks than Android devices (see Table 4). In the smartphone market, 47.5 percent of iPhone traffic occurred over WiFi networks compared to 21.7 percent of Android phones. Users of Android smartphones accessed the mobile networks 3 times more, than through WiFi/LAN (21.7 vs 78.3 percent). The difference is not so strong for the iPhones, and the share of the access is almost the same: 47.5% for WiFi/LAN and 52.5% for the mobile network access.

<b>WiFi/LAN Access vs. Mobile Network Access: Traffic by Device, May 2011, Total US</b>		
<b>Source: comScore Device Essentials</b>		
Smartphone	Share (%) of Smartphone Page Views	
	WiFi/LAN Access	Mobile Network Access
Google Android	21.7%	78.3%
iPhone	47.5%	52.5%

Table 4. Smartphones. WiFi/LAN vs. Mobile Network Access, US, May 2011<sup>1</sup>.

By 2013, more people in the world will access the Internet on a mobile device than on a PC, research firm Gartner expects.

<sup>1</sup> comScore, 2011, [http://www.comscore.com/Press Events/Press Releases/2011/6/comScore Introduces Device Essentials](http://www.comscore.com/Press%20Events/Press%20Releases/2011/6/comScore%20Introduces%20Device%20Essentials).

### 1.5.5. Smartphone operating systems

The most important software in any smartphone is its operating system (OS). An operating system manages the hardware and software resources of smartphones – it is a similar principle to an operating system such as Windows, Mac OS X, or Linux that controls a computer. Some OS platforms cover the entire range of the software stack: a kernel of the operating system, the middleware – the software that allows applications to talk to a network and to one another, and the applications - the actual programs that will run on the phone. Others may only include the lower levels (typically the kernel and middleware layers) and rely on additional software platforms to provide a user interface framework.

In this paragraph I will briefly describe them main mobile operating systems installed on the smartphones.

**Android** is the operating system for mobile devices, such as smartphones and tablets, created by Android Inc., purchased by Google. Android is an open platform, which means that anyone can download a software development kit and write an application for Android. Google provides device vendors with the OS code on an open-source basis too. Android consists of a kernel based on the Linux kernel, middleware, libraries and APIs written in C and application software running on an application framework which includes Java-compatible libraries. Android uses the Dalvik virtual machine with just-in-time compilation to run compiled Java code.

Android has seen a number of updates since its original release in October 2008. These updates to the base operating system typically fix bugs and add new features. Generally, each new version of the Android operating system is developed under a code name based on a dessert item. Below is a list of the most recent versions, and what they include: 2.0 and 2.1 (Eclair), 2.2 (Froyo), 2.3 (Gingerbread), 3.0, 3.1 and 3.2 (Honeycomb), with 3.2 being the latest stable release, 4.0 (Ice Cream Sandwich) - future release announced for October/November.

Android has its own application (app) store with over a thousand apps. It is tightly integrated with Google services, enabling a user to sync Google contacts, calendars, and email, YouTube, maps, etc. And as expected from Google, Android's killer feature is the efficient search engine that finds matching queries on the phone and the web, including search suggestions from both the web and third-party apps.

**iOS** (known as iPhone OS before June 2010) is Apple's mobile operating system. Originally developed for the iPhone, it has since been extended to support other Apple, Inc. devices such as the iPod Touch, iPad and Apple TV. Apple Inc. does not license iOS for installation on third-party hardware. iOS is derived from Mac OS X and is therefore a Unix-like operating system by nature. In iOS, there are four abstraction layers: the Core OS layer, the Core Services layer, the Media layer, and the Cocoa Touchlayer (an API for building software programs to run on iOS).

The user interface of iOS is based on the concept of direct manipulation, using multi-touch gestures, such as swipe, tap, pinch, and reverse pinch. Internal accelerometers are used by some applications to respond to shaking the device (undo command) or rotating it in three dimensions (switch from portrait to landscape mode).

Initial release was made in June 2007. The latest Apple's smartphone iPhone was released in June 2010 with the version iOS 4. The current version of the operating system (iOS 4.3.5) was released in July 2011, and the fifth version release is announced for the third quarter 2011.

Apple Inc.'s App Store contains a large variety of applications.

**Symbian** is a mobile OS and computing platform designed for smartphones and currently maintained by Nokia. Symbian is the successor to Symbian OS that was originally developed by Symbian Ltd (bought by Nokia in 2008). Symbian was Nokia's proprietary operating system until the company decided to open-source it in February 2010. In April 2011, Nokia stopped to open source any portion of the Symbian software and reduced its collaboration to a small group of pre-selected partners. Still source code published in 2010 remains available in third party repositories.

Symbian is mostly found on Sony Ericsson and Nokia devices. It's strongly focused on the phone functionality – like quick dialing, voice control, texting, taking pictures, sharing items over Bluetooth, etc. – but also has some PDA features and thousands of third-party apps. On February 2011 Nokia announced that it would migrate away from Symbian to Windows Phone 7.

The operating system consists of the kernel and middleware components of the software stack. The upper layers are supplied by application platforms like S60.

OS versions include Symbian^1, Symbian^2, Symbian^3, Symbian^4, Symbian Anna, Symbian Belle. Nokia announced that Belle would be coming to all existing Symbian^3 devices in the fourth quarter of 2011.

The Ovi Store is an app store where customers can download mobile games, applications, videos, images, etc. to their Nokia devices. Some of the items are free of charge; others can be purchased.

**BlackBerry OS** is a proprietary mobile operating system, developed by Research In Motion (RIM) for its BlackBerry line of smartphone devices. The operating system provides multitasking and supports specialized input devices that have been adopted by RIM for use in its handhelds, including the touchscreen. The BlackBerry platform is perhaps best known for its native support for corporate email - it supports up to 10 private or corporate email accounts and instantly pushes messages via RIM's efficient servers.

Initially the first version 1.0 of the OS was released in 1999, but the first smartphone version 3.6 – in 2002. The last stable release is 7.0 launched in May 2011. RIM develops and releases updated versions of its operating system to support each device, but it is up to the individual carriers to decide if and when a version is released to its users.

Third-party developers can write software using the available BlackBerry API classes. The OS also has the app store called BlackBerry App World, a reliable browser.

**Windows Phone** is a mobile OS previously known under the name **Windows Phone 7 (WP7)**. WP7 is a rebranding of Microsoft's old mobile OS called **Windows Mobile**. Microsoft started calling a device that runs Windows Mobile 6.5 or later version a "Windows Phone". Windows Phones come preloaded with Microsoft's

Pocket Word and Pocket Excel apps that allow editing office documents; Pocket Outlook handles email, calendar, and tasks.

The home screen, called the "Start screen", is made up of "Live Tiles" -links to applications, features, functions and individual items (such as contacts, web pages, applications or media items). Several features are organized into "hubs", which combine local and online content via Windows Phone's integration with popular social networks such as Facebook, Windows Live, and Twitter. Windows Phone uses multi-touch technology. It also features a free wireless phone backup and restore service called MyPhone..

The latest stable version is 7.1, and the future one – 7.5. (codenamed "Mango") was announced to be released in mid-October 2011.

OS app store called Windows Marketplace.

**webOS** is a mobile operating system based on a Linux kernel, initially developed by Palm and introduced in January 2009. Palm was later acquired by Hewlett-Packard in April 2010. The list of open source components used by the different releases of webOS, as well as the source code of and patches applied to each component, is available at the Palm Open Source web page.

Various versions of webOS have been featured on several devices, including Pre, Pixi, and Veer phones and the HP Touchpad tablet. However, in August 2011, HP announced that it would discontinue production of all webOS related hardware devices. HP is presently considering licensing webOS software to other manufacturers for placement on their hardware devices.

Officially vetted third-party applications are accessible from the device for wireless download by using the App Catalog.

**Bada** is a mobile operating system by Samsung Electronics for use on mobile phones, ranging from low-end feature phones to high-end smartphones. The first touchscreen smartphone running the new Bada operating system, version 1.0, Samsung Wave S8500 was commercially released in June 2010. The latest stable release 2.0 was launched in August 2011.

Bada, as Samsung defines it, is not an operating system itself, but a platform with a kernel configurable architecture, which allows using either a proprietary real-time operating system (RTOS) kernel, or the Linux kernel. On the kernel are layers for devices, services, and frameworks. The device layer provides core functions such as graphics, protocols, telephony and security. The service layer provides features such as SMS, mapping and in-app-purchasing. The top layer, the framework layer provides an application programming interface (API) in C++ for application developers.

Bada supports many mechanisms to enhance interaction, which can be incorporated into applications. These include various sensors such as motion sensing, vibration control, face detection, accelerometer, magnetometer, tilt, Global Positioning System (GPS), and multi-touch.

Samsung opened an international application store, Samsung Apps, for the Bada platform.

### 1.5.6. Global data about quantity of smartphones

The worldwide smartphone market grew 79.7% year over year in the first quarter of 2011 (1Q11), driven by a combination of vendors releasing highly anticipated models, widespread availability of older smartphones at lower prices, and sustained end-user demand. According to the International Data Corporation (IDC) Worldwide Quarterly Mobile Phone Tracker, smartphone vendors shipped a total of 99.6 million units in 1Q11, nearly double from the 55.4 million units in the first quarter of 2010. "Conditions in the smartphone market are creating a perfect storm for sustained smartphone growth," says Ramon Llamas, senior research analyst with IDC's Mobile Phone Technology and Trends team, according to the recent data (IDC, 2011).

Manufacturing companies show different trends of smartphones shipping in Q3 2009 - Q1 2011 periods. The chart below (see Figure 16) shows the figures from IDC. The overall growth of the smartphone market in the last few years is readily apparent. In Q1 2011, Nokia had its first major quarter-on-quarter decrease in three years, reflecting the highly competitive market and lack of competitiveness of Nokia devices, especially at the high end. Apple shipments increased strongly against the usual seasonal flatness. Samsung and HTC also had good Q1s, reflecting the growth of Android devices. RIM and Motorola both had small declines in shipments, most likely reflecting seasonal sales patterns in their core US market, according to All About Symbian (Blandford, 2011).

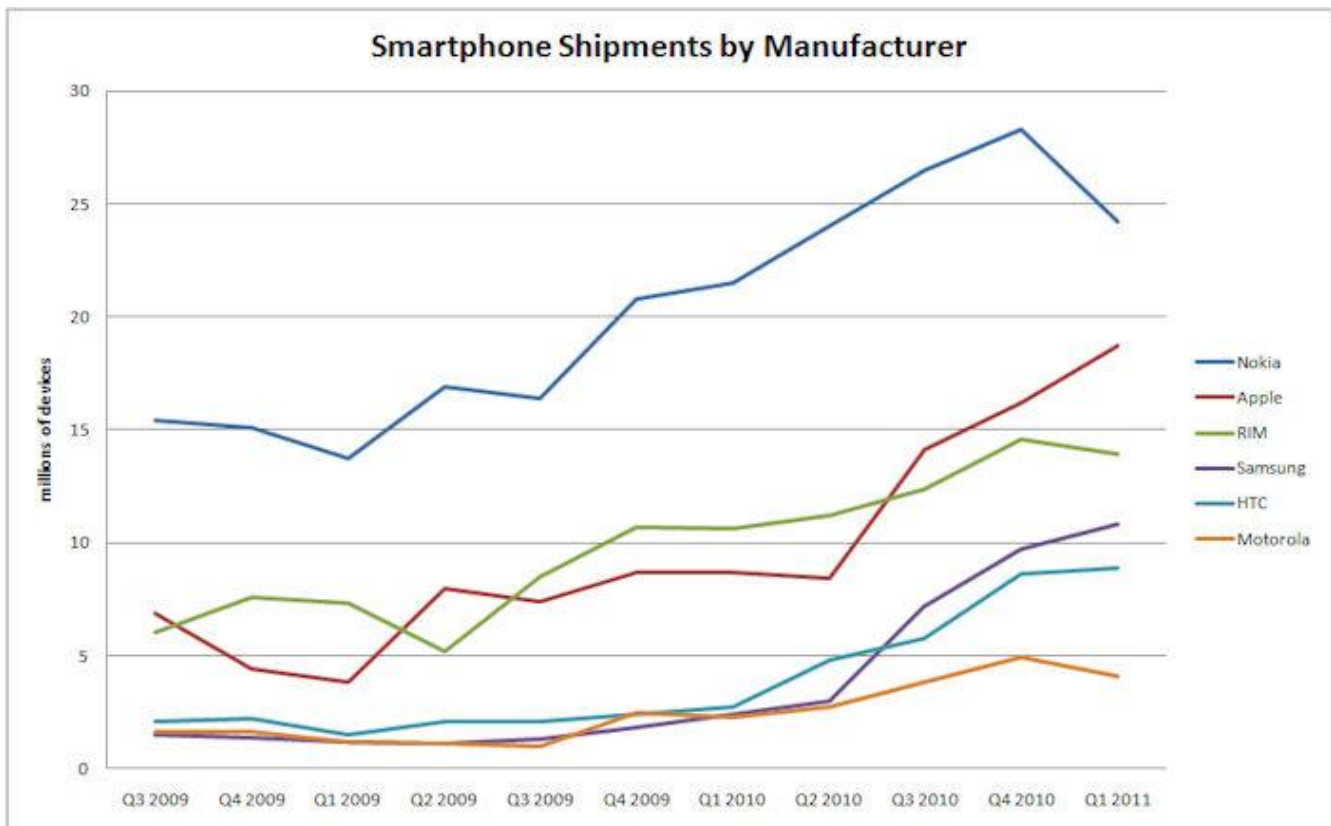


Figure 16. Smartphone shipments by manufacturer, Q3 2009-Q1 2011<sup>1</sup>.

<sup>1</sup> All About Symbian, 2011, [http://www.allaboutsymbian.com/news/item/12858\\_IDC\\_smartphone\\_shipment\\_figure.php](http://www.allaboutsymbian.com/news/item/12858_IDC_smartphone_shipment_figure.php)

As for the Q2 2011, the worldwide mobile phone market grew 65.4% year over year in the second quarter of 2011 (2Q11), marking the third consecutive quarter where total shipments exceeded 100 million units. According to the International Data Corporation (IDC), vendors shipped 106.5 million units in 2Q11 compared to 64.4 million units in the second quarter of 2010, see Table 5. Apple is the leading producer of smartphones shipped 20.3 millions of units, followed by Samsung and Nokia. Still being on the 3<sup>rd</sup> place, Nokia is the only manufacturer having a negative trend of shipments in Q2 2011 in comparison with Q2 2010, with -30%. Instead, Samsung had the biggest positive growth of +308%. HTC is on the 2<sup>nd</sup> position with +165%, and Apple on the 3<sup>rd</sup> with +141%. The smallest positive growth RIM shows – it gains only +10% (IDC, 2011).

<b>Vendor</b>	<b>2Q11 Shipments, millions</b>	<b>2Q11 Market Share</b>	<b>2Q10 Shipments, millions</b>	<b>2Q10 Market Share</b>	<b>2Q11/2Q10 Change</b>
Apple	20.3	19.1%	8.4	13.0%	141.7%
Samsung	17.3	16.2%	3.6	5.6%	380.6%
Nokia	16.7	15.7%	24.0	37.3%	-30.4%
Research In Motion	12.4	11.6%	11.2	17.4%	10.7%
HTC	11.7	11.0%	4.4	6.8%	165.9%
Others	28.1	26.4%	12.8	19.9%	119.5%
<b>Total</b>	<b>106.5</b>	<b>100.0%</b>	<b>64.4</b>	<b>100.0%</b>	<b>65.4%</b>

Table 5. Top Five Worldwide Smartphone Vendors, Shipment Volumes, Market Share, and Year-Over-Year Growth, 2Q11<sup>1</sup>.

Specialists make the prognosis for the year 2011 – market of the smartphones will continue to grow.

Total shipments of smartphones exceeded computers shipments for the first time in 2010, according to the study of IDC (Goldman, 2011). Manufacturers distributed 100.9 million smartphones to stores around the globe in the final three months of 2010, compared to 92.1 million personal computers, according to a study released this week by IDC. Over the past two years, smartphone shipments have tripled, while PC shipments grew a comparatively measly 45%.

<sup>1</sup> IDC, 2011, <http://www.idc.com/getdoc.jsp?containerId=prUS22974611>

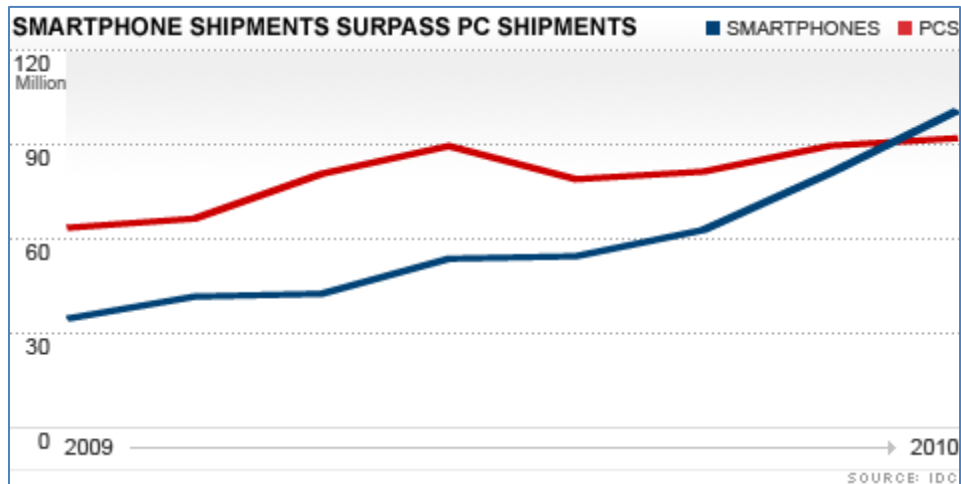


Figure 17. Smartphone shipments surpass PC shipments, 2009-2010<sup>1</sup>.

Of course, comparing smartphones to PCs isn't exactly fair. Americans, which make up the largest chunk of the smartphone market, tend to buy new devices every two years after their wireless contracts expire. PCs not only last longer, they are also more expensive. There's also the issue of saturation: Though there's room for growth in much of the world, 80% of Americans own a PC, compared to just 17% who own smartphones, according to Forrester Research.

Smartphones outnumber not only computers, but as predicted for 2014 will overtake other handsets, according to the forecast of Core Forecasts research (Buckland, 2011).

Smartphones represented 23% of all active handsets in Western Europe in 2010. They will account for more than half by 2014, and will have reached 72% by 2016 (see Figure 1). In its latest report on the UK communications market, Ofcom estimates that more than a quarter (27%) of adults and nearly half (47%) of children aged 12–15 now use a smartphone

At first glance, it seems likely that the customer base can only expand: Western Europe's population is still growing and people are adopting mobile services at an increasingly early age. However, we are also seeing evidence of a countervailing trend: the number of SIMs per customer is declining as bundles of cross-network minutes become more prevalent and the value of multiple-SIM ownership decreases. As a result, we expect the number of active handsets in the market to remain at about 2010 levels during the next five years. Smartphone ownership will reinforce this trend because individuals' attachment to one multifunctional handset will further reduce duplication of subscriptions.

<sup>1</sup> CNN, 2011, [http://money.cnn.com/2011/02/09/technology/smartphones\\_eclipse\\_pcs/index.htm](http://money.cnn.com/2011/02/09/technology/smartphones_eclipse_pcs/index.htm)



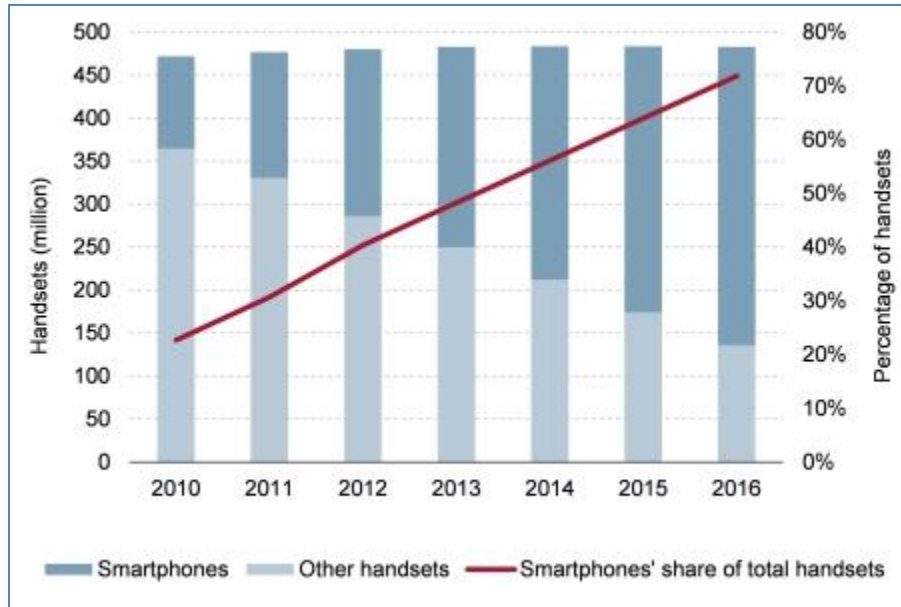


Figure 18. Active handsets by device type and smartphones' share of total handsets, Western Europe, 2010–2016<sup>1</sup>.

Smartphone pricing has started to decline significantly as sales have increased. It is expected that consumers will be able to buy a reasonable quality Android handset for less than EUR100 by the end of 2011. This price point will make the smartphone accessible to the prepaid market.

The main two operating systems for smartphones are Google's android and Apple's iOS, with the current dominance of the latter. However, the situation is changing. "Android is taking the smartphone market by storm," said Tina Teng, senior analyst of iSuppli.

In 2012 the company predicts that the Android Operating System will surpass the iPhone's iOS. The trend of growth of both OS is shown below (Figure 19). Even though the gap between the number of smartphones with iOS or Android is decreasing year by year, and it is the smallest in 2011. Instead, the gap is predicted to grow again since 2012 but at this time with the dominance of Android. Thus, Android will be used in 75 million smartphones by 2012, meanwhile iOS on 62 million.

<sup>1</sup> Analysys Mason, 2011, [http://www.analysismason.com/About-Us/News/Insight/Smartphone\\_penetration\\_Aug2011/?journey=117,55](http://www.analysismason.com/About-Us/News/Insight/Smartphone_penetration_Aug2011/?journey=117,55)

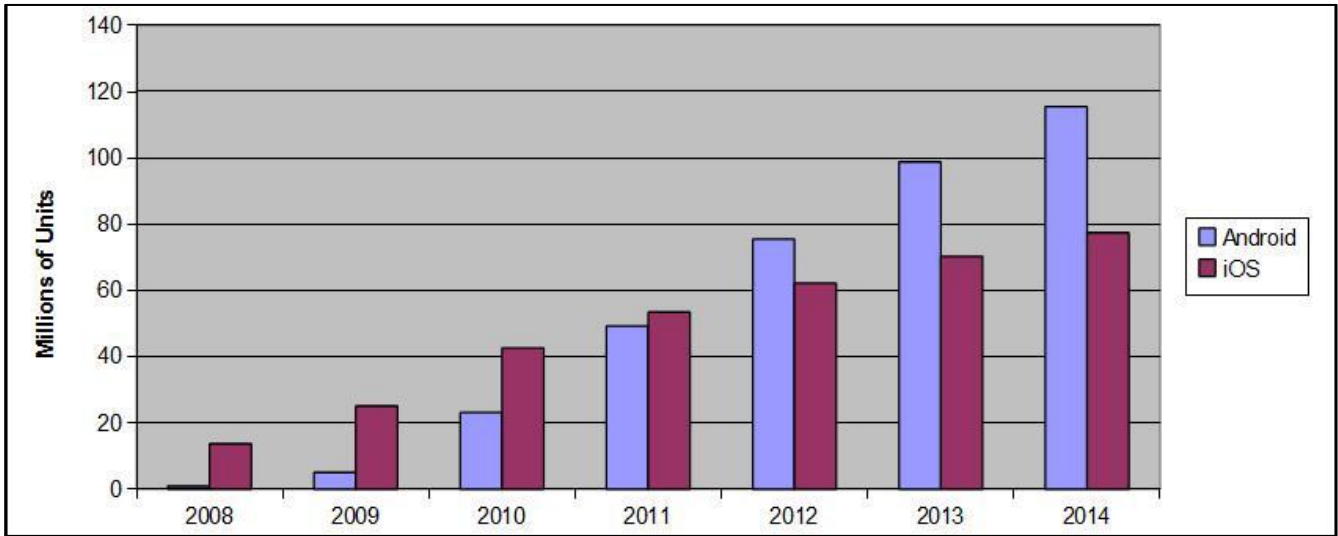


Figure 19. Android and iOS smartphones production forecast, 2008-2014<sup>1</sup>.

Particularly in the USA, Android is already the leading OS in the smartphone market, according to June 2011 data from Nielsen (The Nielsen Company, 2011). Google’s Android operating system (OS) now claims the largest share of the US consumer smartphone market with 39 percent. Apple’s iOS is in second place with 28 percent, while RIM Blackberry is down to 20 percent.

However, because Apple is the only company manufacturing smartphones with the iOS operating system, it is clearly the top smartphone manufacturer in the United States. Other leading manufacturers include HTC, whose Android phones represents 14 percent of the smartphone market and whose Windows Mobile/WP7 devices account for 6 percent of the market; and Motorola, whose Android devices are owned by 11 percent of smartphone consumers. Samsung’s Android devices are used by 8 percent of smartphone owners while their Windows Mobile/WP7 phones are used by 2 percent of smartphone owners.

<sup>1</sup> PC’s Telecom Blog, 2010, <http://pctelecoms.blogspot.com/2010/08/googles-android-to-outstrip-apples-ios.html>

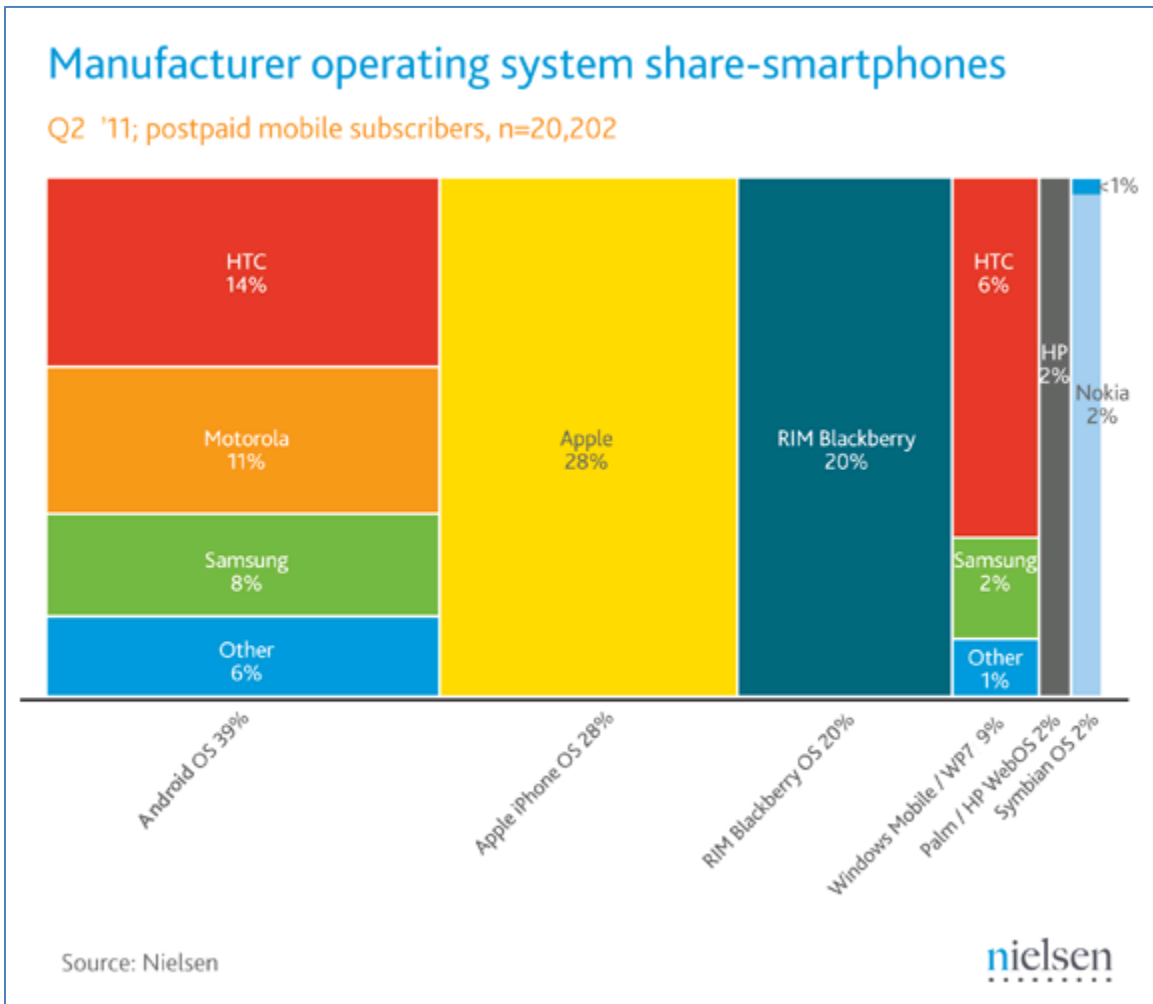


Figure 20. Smartphones market share by operating systems in the US, June 2011<sup>1</sup>.

Globally, Android-based smartphones dominate the smartphone market sales to the end users in the second quarter 2011, according to Gartner (Gartner, 2011). Figure 21 displays the result of the research: Android is the leader with 43%, followed by Symbian (22%), Apple (18%) and RIM (12%). Microsoft and Bada each each enjoys 2% of the global market share, and the others – remaining 1%.

<sup>1</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-u-s-smartphone-market-android-is-top-operating-system-apple-is-top-manufacturer/](http://blog.nielsen.com/nielsenwire/online_mobile/in-u-s-smartphone-market-android-is-top-operating-system-apple-is-top-manufacturer/)

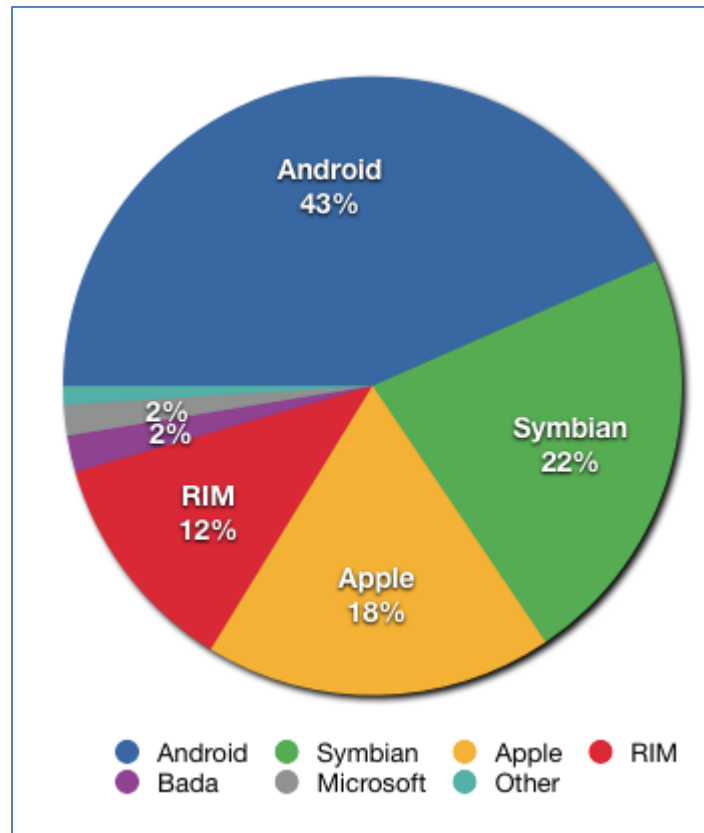


Figure 21. Share of worldwide 2011 Q2 smartphone sales to end users by operating system, according to Gartner<sup>1</sup>

## 1.6. Game console

### 1.6.1. Definition

Generally, “a **video game console** is an interactive entertainment computer or modified computer system that produces a video display signal which can be used with a display device (a television, monitor, etc.) to display a video game”, as defined in Wikipedia.

With regards to mobility game consoles can be of two types:

1. A **fixed game console** (or video game console, or game console, or console) is played on a specialized electronic device that connects to a common television set or composite video monitor.
2. A **handheld game console** (or handheld) is “a lightweight, portable electronic device with a built-in screen, game controls and speakers. Unlike video game consoles, the controls, screen and speakers are all part of a single unit” (Wikipedia).

In this chapter I will refer “console” to a console game, and “handheld” to handheld game console.

<sup>1</sup> Wikipedia, 2011, [http://en.wikipedia.org/wiki/File:Smartphone\\_share\\_current.png](http://en.wikipedia.org/wiki/File:Smartphone_share_current.png)

### **1.6.2. History of the fixed console**

The history of video game consoles is divided into seven generations according to the technological development and popularity (Gode, 2010).

#### **First Generation, 1972-1975**

The origin of video game console can be traced back to the 1950s, when computer games using vector displays, not video screens, came to the scene. But in 1972, Magnavox released the first video game console, Odyssey, which could be connected to a TV set. Initially, the Odyssey was successful only to some extent, and it was Atari's arcade game Pong which made the entry of video games and took the public attention to the emerging industry.

By 1975, Magnavox released a new console, the Odyssey 100 (with 2 games) and the Odyssey 200 (3 games) that had added features like onscreen scoring, ability to support up to four players. So, in 1975 gaming consoles initiated the consumer market.

There is a common confusion whether to consider the first generation consoles analog or digital. "The Odyssey was built using a combination of analog and digital circuitry. Many collectors confuse the use of discrete components to mean the system is analog. However, the games and logic itself are implemented using discrete transistors and diodes" (Wikipedia).

#### **Second Generation, 1976-1982**

In 1976, the Fairchild Video Entertainment System (VES) was released. This console made the first true use of the cartridge as game storage device. The VES had a programmable microprocessor and the cartridges only required a single chip to store the processor's instructions.

In 1977, manufacturers of older, obsolete consoles sold their systems at a loss to clear stock, creating an excess in the market and causing Fairchild and RCA to abandon their game consoles. The VES continued to be sold at a profit after the 1977 crash, and both Bally and Magnavox brought their own programmable cartridge-based consoles to the market. However, it was not until Atari released a conversion of the arcade hit 'Space Invaders' in 1980 that the home console industry was completely revived. Throughout the early 1980s, other producers released video game consoles that were technically superior to the Atari 2600. However, Atari dominated the console market in the early 1980s.

Another crash of the video game business came in 1983. A flood of consoles, low quality video games by smaller companies and a growing number of home computers caused consumers and retailers to lose faith and interest in video game consoles. Most video game companies filed for bankruptcy, or moved into other industries.

#### **Third Generation, 1983-1987**

In 1983, Japanese gaming giant Nintendo introduced the Family Computer. It supported high-resolution sprites and with more colored tiled backgrounds. Family Computer came over to the US in 1985 in the form of the

Nintendo Entertainment System (NES) and almost instantly gained immense popularity. Nintendo found its breakout hit game in 'Super Mario Bros'. Nintendo's success revived the video game industry and new consoles were soon introduced to compete with the NES, for example, Sega's Master System.

#### **Fourth Generation, 1988-1992**

In 1988, Sega, another electronics baron, retrieved market share by releasing its own high featured console called the Mega Drive in Japan and Sega Genesis in the US and in Europe. Two years later, Nintendo released its extremely popular Super Nintendo Entertainment System (SNES). This was the era when video game consoles were aggressively demanded by kids across North America.

#### **Fifth Generation, 1993-1998**

Initial fifth generation consoles started in 1993 and included the Atari Jaguar and the Panasonic 3DO, which were loaded with many more features than the Super Nintendo. But, the 3DO was more costly than the SNES and Sega Genesis combined together. They were better at rendering polygons, could display more onscreen colors, and the 3DO used discs that contained far more information than cartridges and were cheaper to produce.

However, in December 1994, Sony's PlayStation was released in Japan and soon after in North America. The PlayStation (PS) used CD as a game storage and earned Sony great respect as a video game company, becoming the first video game system to sell over 100 million consoles. Sony released a redesigned, smaller version of the PlayStation entitled the 'PSone' in 2000.

#### **Sixth Generation, 1999-2004**

This generation saw consoles moving towards PC-like features and mulled a shift towards using DVDs for storing game media. This led to enhanced playing experience as games were longer and had spectacular visually effects.

Furthermore, this generation saw another noticeable development in the history of game consoles. There was experimentation with LAN type online console gaming and introductions of flash drives and hard drives for game data storage. Consoles like Sega's Dreamcast, Sony PlayStation 2, Nintendo GameCube and Microsoft Xbox belonged to this era.

#### **Seventh Generation, 2005-2010**

The most remarkable feature introduced in this time period was the new disc formats - Blu-ray Disc and the HD DVD, with the latter getting discontinued soon. The use of motion as input, IR tracking (implemented on the Wii and demonstrated on the PS3) and standard wireless controllers were the highlights of this generation game consoles. This era included Microsoft's Xbox 360 (released in 2005), Sony PlayStation 3 and Nintendo Wii (both 2006).

## **Eighth Generation, 2011**

Nintendo announced their new console, the Wii U, planned release in 2012 - the first eighth generation home video game console. Sony has confirmed that the PlayStation 3 will still have a 10 year life cycle and that there will not be a new home console in the near future.

### **1.6.3. History of the handheld**

#### **Early Handheld Consoles, until early 1980s**

The origins of handheld game consoles are found in handheld and tabletop electronic game devices of the 1970s and early 1980s. Some gaming historians trace the origins of handheld games to early handheld calculators. The earliest handhelds were single-game machines. Unlike early fixed consoles, which had to be attached to a television in order to play them, handheld had built-in displays, just as they do today. On early machines, these displays were often simple arrays of LEDs (Light Emitting Diode). Because these machines only had to play one game, simple displays devised specifically for that game could be quite effective. Several games produced by Mattel in the mid-1970s used this kind of "screen."

Consoles of there years were the following:

- **Microvision**

The Microvision was released by the Milton Bradley Company in 1979. Its two games, Auto Race and Football, were very successful; the company was recognized by the industry for innovation in handheld game device displays. This system had the revolutionary feature of interchangeable cartridges, and can be considered the first handheld gaming console. It was really the only one until Nintendo came up with the Game Boy, and from there handheld gaming took off like a rocket. The Microvision game 'Cosmic Hunter' (1981) also introduced the concept of a directional pad operated by using the thumb to manipulate the on-screen character in any of four directions.

- **Game and Watch**

Gunpei Yokoi, Japanese video game designer of Nintendo, thought of an idea of a miniature game machine for killing time. So starting in 1980, Nintendo began to release a series of electronic games called the Game & Watch. Taking advantage of the technology credit-card-sized calculators, Yokoi designed the series of LCD-based games to include a digital time display in the corner of the screen. For later, more complicated Game & Watch games, Yokoi invented a cross shaped directional pad or "D-pad" for control of on-screen characters with a thumb. The thumb controller soon became standard ubiquitous across the video game industry as a replacement for the joystick.

- **Bandai**

In 1982, the Bandai LCD Solarpower was the first solar-powered gaming device. Some of its games, such as 'Terror House', featured two LCD panels, for an early 3D effect.

### **Modern Handheld Consoles, late 1980s - late 1990s**

The late 1980s and early 1990s saw the beginning of the handheld game console industry as we know it. As backlit LCD game consoles with color graphics consume a lot of power, they were not battery-friendly. By this point, rechargeable battery technology had not yet matured. Even though third-party rechargeable batteries were available, they involved a nickel-cadmium process and had to be completely discharged before being recharged to ensure maximum efficiency. The later batteries, which do not share this requirement for maximum efficiency, were not released until the late 1990s. This generation of consoles introduced connectivity to modem.

The handheld consoles of that time include:

- **Game Boy**

Released in 1988, the Game Boy by Nintendo had a monochrome screen. Low initial cost and battery economy were important concerns when compared to the Microvision. The Game Boy has been one of the most successful units ever created. Yokoi recognized that the Game Boy needed a killer app — at least one game that would define the console, and persuade customers to buy it. In June 1988, there was a demonstration of the game 'Tetris' at a trade show. Nintendo purchased the rights for the game, and packaged it with the Game Boy system. It was almost an immediate hit. As of March 31, 2005, the Game Boy and Game Boy Color combined to sell 118.69 million units worldwide (Wikipedia).

- **Atari Lynx**

Created in 1989, it was the first color handheld console, as well as the first with a backlit screen. It also featured networking support with up to 17 other players, and advanced hardware that allowed the zooming and scaling. The Lynx could also be turned upside down for left-handed players. However, all these features came at a very high price point, which drove consumers to seek cheaper alternatives. The Lynx also consumed batteries very quickly, and lacked the third-party support enjoyed by its competitors. Due to its high price, short battery life, production shortages, lack of compelling games, and Nintendo's aggressive marketing campaign, despite a redesign in 1991 the Lynx became a commercial failure.

- **Bitcorp Gamate**

The Bitcorp Gamate was the one of the first handheld game systems created in response to the Nintendo Gameboy. It was released in Asia in 1990 and distributed worldwide by 1991. Like the Sega Game Gear, it was horizontal in orientation and required 4 AA batteries. Unlike many later Gameboy clones, its internal components were professionally assembled. But the system's fatal flaw was its screen. Even by the standards of the day, its screen was rather difficult to use, because of this fact sales were quite poor, and Bitcorp closed by 1992.



- **Sega Game Gear**

The Sega Game Gear was the third color handheld console, after the Lynx and the TurboExpress. Released in 1990, it never reached the level of success enjoyed by Nintendo, the Sega Game Gear proved to be a fairly durable competitor, lasting longer than any other Gameboy rivals. The device was released in a variety of additional colors: black, navy blue, red, light blue, yellow, clear, and violet.

Following the success with the Game Gear, Sega began development on a successor during the early 1990s, which was intended to feature a touchscreen interface, many years before the Nintendo DS (released in 2004). However, such a technology was very expensive at the time, and the handheld itself would have a high cost. Sega released instead the Sega Nomad - at a bad time in the company's history. "It had already oversaturated the market with eight incompatible platforms: Genesis, Sega CD, 32X, 32X CD, Game Gear, Pico, Saturn, and Master System. As a result, few consumers paid attention to the Nomad launch, and the system sold poorly," PC World (Edwards, 2009).

- **Game.com**

The Game.com was a handheld game console released by Tiger Electronics in 1997. It featured many new ideas for handheld consoles and was aimed at an older target audience, sporting PDA-style features such as a touch screen and stylus. However, Tiger hoped it would also challenge Nintendo's Game Boy and gain a following among younger gamers too. Unlike other handheld game consoles, the first game.com consoles included two slots for game cartridges and could be connected to a 14.4 kbit/s modem.

- **Game Boy Color**

In 1998 the Game Boy was nine years old when it got its first successor - the Game Boy Color was released. It featured a full color screen, and it was also backwards-compatible. However, it did not have significantly more computing power than the Game Boy. By this time, the lack of noteworthy development in Nintendo's product line began allowing more advanced systems such as the WonderSwan Color to achieve moderate success.

- **Wonderswan Color**

The WonderSwan Color is a handheld game console designed by Bandai in 2000 and had a moderate success. The original WonderSwan had only a black and white screen. Although the WonderSwan Color was slightly larger and heavier, it featured 512KB of RAM, a larger color LCD screen, and compatibility with the original WonderSwan library of games.

Prior to WonderSwan's release, Nintendo had virtually a monopoly in the Japanese video game handheld market. But after, Bandai took approximately 8% of the market share in Japan partly due to its low price. However, with the popularity of the Game Boy Advance and the reconciliation between Square and Nintendo, the WonderSwan Color and its successor, the SwanCrystal quickly lost its competitive advantage.

## **2000-2009**

This generation of handheld devices blurs the lines separating multimedia devices, pocket computers, and game devices, emphasizing wireless Internet networking and online distribution of games--notably pushed by Apple on the iPhone and the iPod Touch. Since Apple's astounding success with the App Store, both Nintendo and Sony have stepped up their online distribution efforts with their Nintendo DSi and PSP Go consoles, respectively. Some authors, for example, from PC World (Edwards, 2009) claim that "the complete extinction of physical game media (cartridges, cards, and discs) seems imminent". Also, handheld game consoles merge with multifunction pocket devices such as smartphones as they compete for limited pocket space.

A number of **multifunction consoles** were also released in 2003-2004; the first being the Nokia N-Gage, a combination mobile phone, mp3 player, PDA, radio and gaming device. It was redesigned and re-released to address the design flaws of the original (the N-Gage QD); however, a number of important features such as MP3 playback, USB connectivity and FM radio reception were removed. Another example is the Tapwave Zodiac was PDA-handheld game console hybrid that supported documents, photos, music, Internet and movies and was compatible with Palm OS 5 hardware.

Consoles of this generation include:

- **Game Boy Advance (GBA)**

In 2001, Nintendo released the Game Boy Advance, which added two shoulder buttons, a larger screen, and more computing power than the Game Boy Color. The design was revised in 2003 when the Game Boy Advance SP, a more compact version, was released. The SP featured a "clamshell" design (like a laptop), a frontlit color display and rechargeable battery.

In 2005, the Game Boy Micro was released. This revision sacrificed screen size and backwards compatibility with previous Game Boys for a dramatic reduction in total size and a brighter backlit screen. Along with the Nintendo GameCube, the GBA also introduced the concept of connectivity. As of December 31, 2007, the GBA, GBA SP, and the Game Boy Micro combined have sold 80.72 million units worldwide.

- **N-Gage**

Nokia released the N-Gage in 2003. It was designed as a combination MP3 player, cellphone, PDA, radio, and gaming device. The system received much criticism about its physical design and layout, vertically-oriented screen and necessity to remove the battery to change game cartridges. The most well-known of these was "sidetalking", or the act of placing the phone speaker and receiver on an edge of the device instead of one of the flat sides.

- **Nintendo DS**

The Nintendo DS was released in November 2004. Among its new features were the incorporation of two screens, a touchscreen, wireless connectivity, and a microphone port. The DS's lower screen is touch sensitive, designed to be pressed with a stylus, a user's finger or a special "thumb pad". The console also features online capabilities via the Nintendo Wi-Fi connection and ad-hoc wireless networking for multiplayer games. It is backwards-compatible with all Game Boy games.

In January 2006, Nintendo revealed an updated version of the DS: the Nintendo DS Lite with a cleaner design, longer battery life, and brighter, higher-quality displays, with adjustable brightness. It is also able to connect wirelessly with Nintendo's Wii console.

In 2008, Nintendo announced the Nintendo DSi, with larger, 3.25 inch screens and two integrated cameras, SD card storage slot and internal flash memory for storing downloaded games.

As of December 31, 2009, the Nintendo DS, DS Lite and DSi combined sold 125.13 million units worldwide.

- **PlayStation Portable**

The PlayStation Portable (PSP) is a handheld game console manufactured by Sony. The system was released in Japan in December 2004. The PSP is the first handheld video game console to use an optical disc format, Universal Media Disc (UMD), memory stick as its primary storage medium. Other distinguishing features of the console include its large viewing screen, multi-media capabilities, and connectivity with the PlayStation 3, other PSPs, and the Internet.

### **2010-2011**

The 2010's so far show a likelihood of being revolutionary. The Nintendo DS's successor, **3DS**, shows the potential for another 3D revolution - autostereoscopes, being capable of showing three-dimensional effects without special glasses. The Nintendo 3DS features backward compatibility with Nintendo DS series software, including Nintendo DSi software.

The PSP's successor has also been announced, the PlayStation Vita. The Vita is the first handheld to have a touch pad that one cannot see.

#### **1.6.4. Global data about quantity of the devices**

In 2009 it was expected that the shipments of handheld game consoles would grow from 49.4 million units in 2008 up to 63.5 million units by 2013, according to iSuppli market research company (Chakraborty, Handheld video game player shipments to rise 4.9 percent in 2009, 2009). The global market for handheld video game systems rise by 4.9 percent in units during 2009, due to moves by Sony Corp. and Nintendo to freshen up their products (PlayStation Portable and DSi respectively). Figure 22 shows the prognosis of growth of shipments from 2008 until 2013, made by iSuppli.

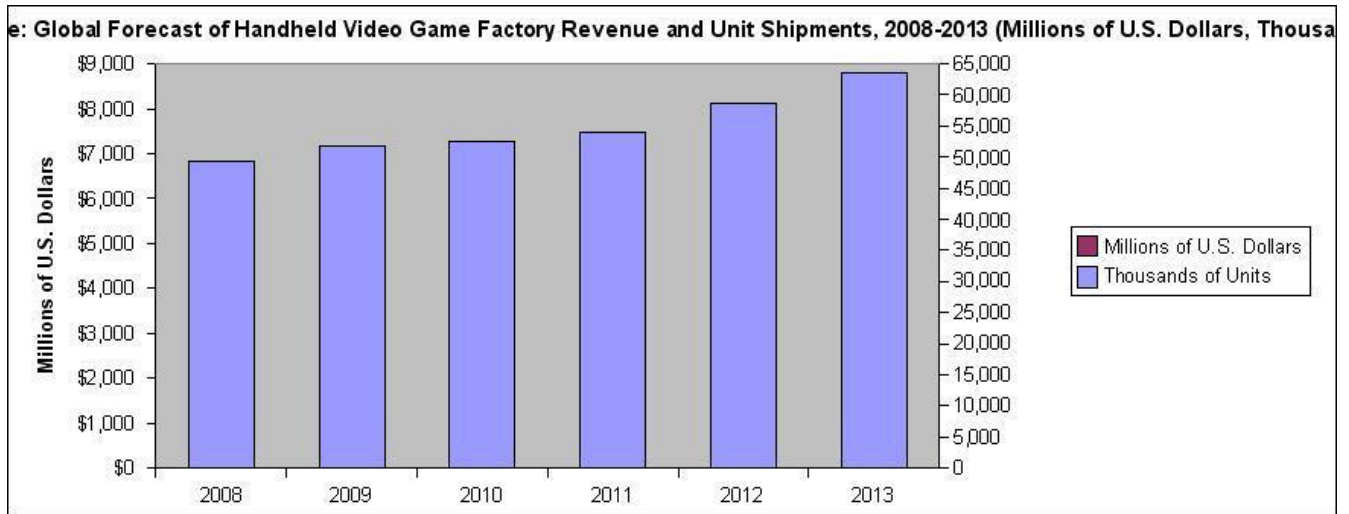


Figure 22. Revenue and shipments of handheld consoles forecast, 2008-2013<sup>1</sup>.

As for the game console market, in 2009 the total shipments of game consoles was around 42 million of units, as presented in Figure 23 below.

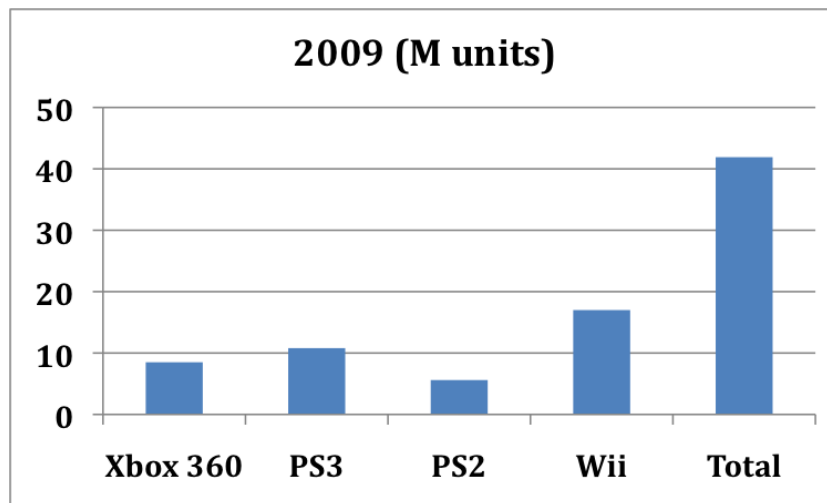


Figure 23. Shipments of game consoles<sup>2</sup>.

Instead of predictable in 2009 growth of shipments of game and handheld consoles, statistics of 2010 states the opposite. “With sales of console and handheld systems having stalled, the attention of the video game industry has turned to the fast-growing cellphone video game market”, according to the market research firm iSuppli Corp. Mobile phones equipped to play games and other forms of electronic entertainment vastly outnumber the gaming platforms.

<sup>1</sup> Chakraborty, 2009, <http://pcconsumerelectronics.blogspot.com/2009/05/handheld-video-game-player-shipments-to.html>

<sup>2</sup> Jon Peddie Research, 2010, <http://www.jonpeddie.com/blogs/comments/gaming-pcs-and-consoles-those-damn-numbers/>

In 2010, factory unit shipments of game-capable mobile phones are forecasted to reach 1.27 billion, up from 1.14 billion last year. In comparison, figures during the same period for consoles and handhelds are expected to be flat or down. Factory units for video game consoles will total 52.3 million in 2010, up a marginal 0.2 percent from 52.1 million in 2009. Handheld devices will fare worse, with factory units declining 2.5 percent to 38.9 million this year, down from 39.9 million in 2009.

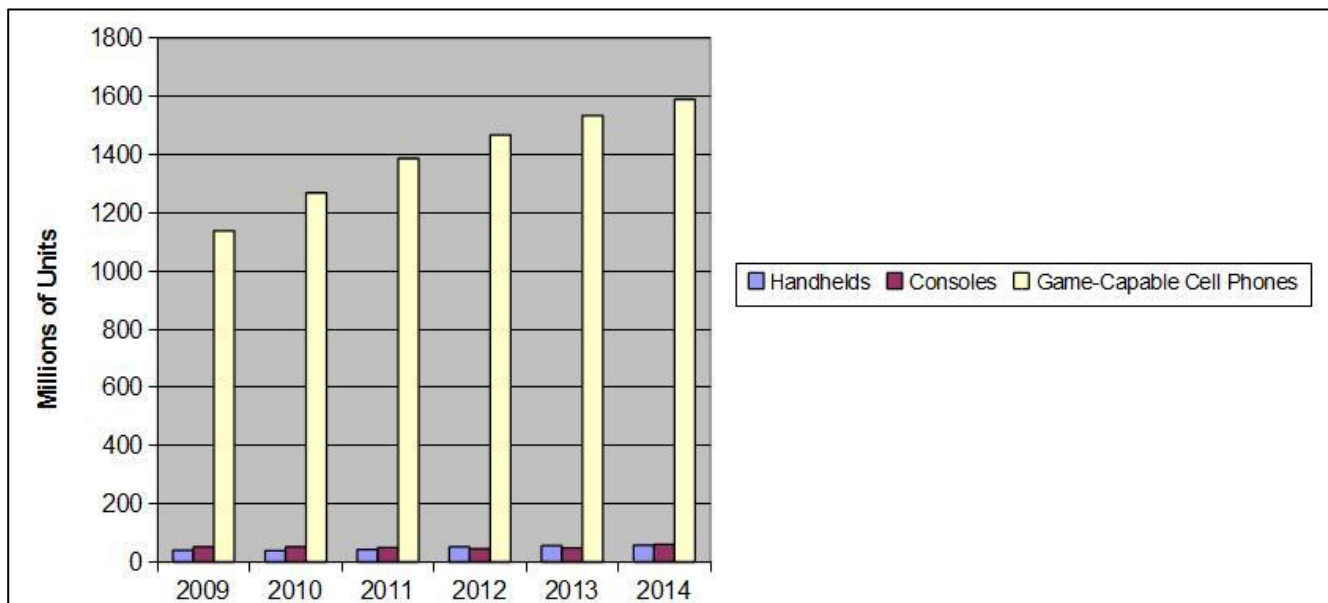


Figure 24. Handheld consoles, game consoles and game-capable cellphones shipments comparison, 2009-2014<sup>1</sup>.

Game console shipments will rise an essentially flat 0.2 percent year-over-year in 2010 to 52.3 million units, the research firm said. Handheld gaming device shipments dropped 2.5 percent to 38.9 million in 2010.

Current generation gaming devices are hitting maturity as growth slows. The Nintendo DS has been out since 2004, Xbox 360 launched in 2005 and PlayStation 3 and Wii have been out since 2006. At this point, iSuppli claimed, dedicated gaming devices "have attained market saturation." The firm said console shipments are expected to hit 59.9 million units in 2014.

iSuppli noted that Xbox 360 and PS3's upcoming respective motion-sensing devices are expected to provide some cushion to the slowdown. Nintendo released the 3DS in March 2011 that will lead to over 11 million unit shipments of 3D-enabled handheld game consoles by 2014. Whereas in 2011, game consoles will account for 65 percent of all 3D-enabled mobile devices shipments.

## UK

Just over half (54%) of all homes had access to a games console in Q1 2011 (Ofcom, 2011). The Figure 25 suggests, that about half (49%) had a fixed console connected to a TV and just under a third (30%) had a handheld/portable games player. Overall, for both fixed and handheld/ portable games players, people aged under 55 are significantly more likely to have home access than those who are older. Take-up of fixed consoles

<sup>1</sup> PC's Telecom Blog, 2010, <http://pctelecoms.blogspot.com/2010/08/cell-phone-gaming-soars-as-consoles-and.html>

is highest among consumers aged 16-34; for handheld/portable games, 35-54s are most likely to claim to have one.

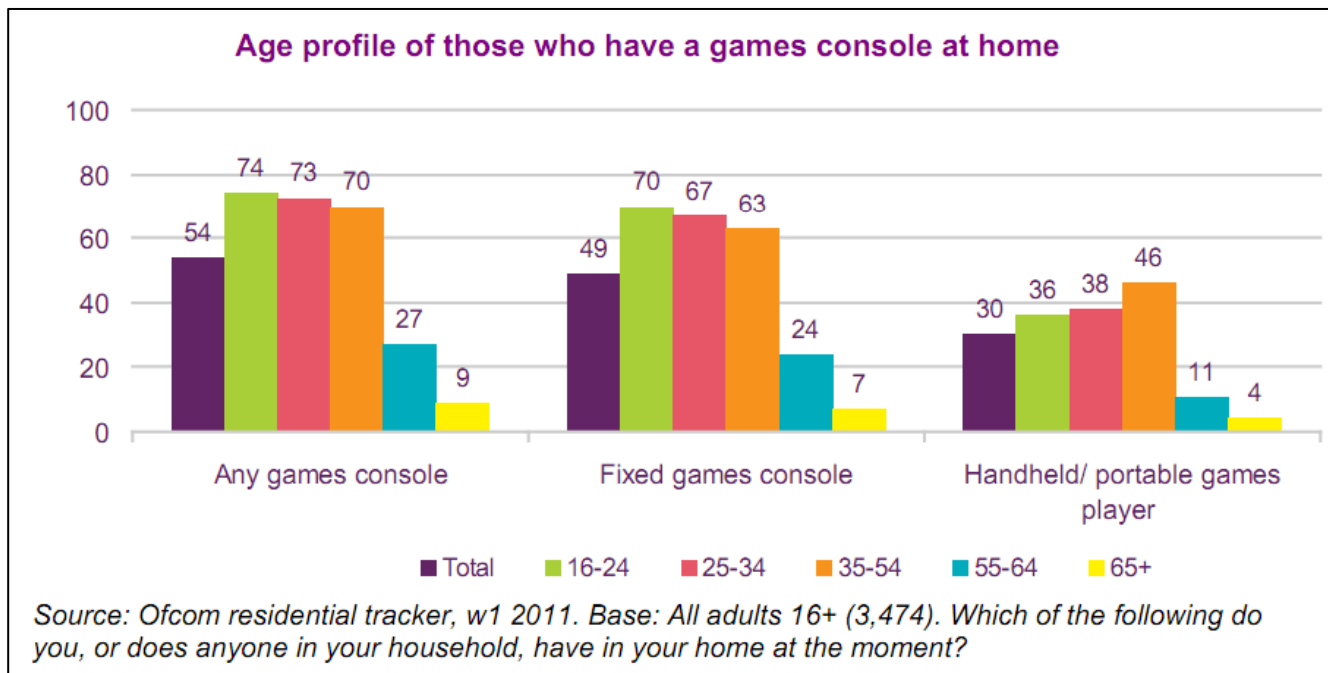


Figure 25. Age profile of those who have a games console at home in the UK, 2011<sup>1</sup>.

The presence of children in the household significantly increases the likelihood of a household having a fixed or handheld/ portable games console; over four in five homes (84%) with children have one, compared to a third (33%) without.

The same report states that a third of UK adults claim to personally use a console in the home, see the graph below (Figure 26). Fixed games consoles are the most popular, with three in ten (31%) using one, compared to 15% using a handheld/portable games player. Playing a games console in the home, whether fixed or handheld, is heavily skewed towards under-35s, with more than 7 in ten of those aged 16-34 doing so, compared to a third (34%) of 35-54s and less than one in ten of over-55s.

While there is no gender difference among users of portable/ handheld games consoles, fixed games consoles are more popular among males than female (35% vs. 26%).

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

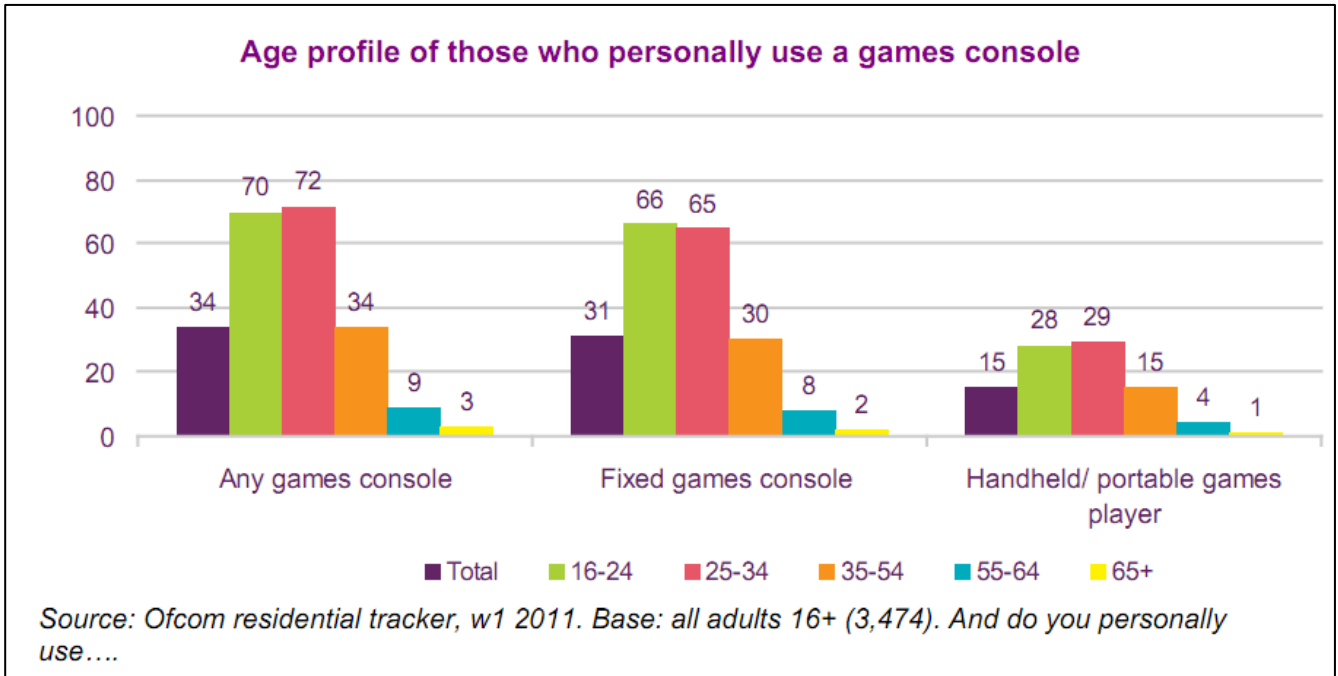


Figure 26. Age profile of those who personally use a games console in UK, 2011<sup>1</sup>.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

## 2. Media consumption

Media consumption has been increasing since the beginning of the 20<sup>th</sup> century. It has grown 7 times today since 1900 (from 10 hours per week up to 70 in 2011). Moreover it is predicted to grow even up to 9 times and will amount almost 90 hours per week in 2020. As showed on Figure 27, in 1900 an average person spent less than 10 hours per week, the majority of which was spent with paper media. During the next 20 years the boom of analog radio pushed the consumption time to go 50% up, and reached more than 15 hours per week in 1920. The introduction of television caused the paper media to decrease, whereas the TV became the champion of media consumption. The time spent with TV rose up very fast until 1980, and the total time spent weekly on media got 50 hours. At this time the digital TV technology began to change the picture. The growth of analog TV was getting slower until 2000, and since then has been falling down. The same trend was followed by the analog radio. Instead, digital TV, digital radio, Internet, games and wireless technology started to become more and more popular. Their growing dominance over the analog devices and paper media over the 20 years between 2000 and 2020 caused the growth of total weekly time spent with media up to 20 hours, from 60 in 2000 to almost 90 in 2020. The same happened in the history only once before, but in twice longer time period, during 40 year between 1940 and 1980, and was caused by the spread of analog TV.

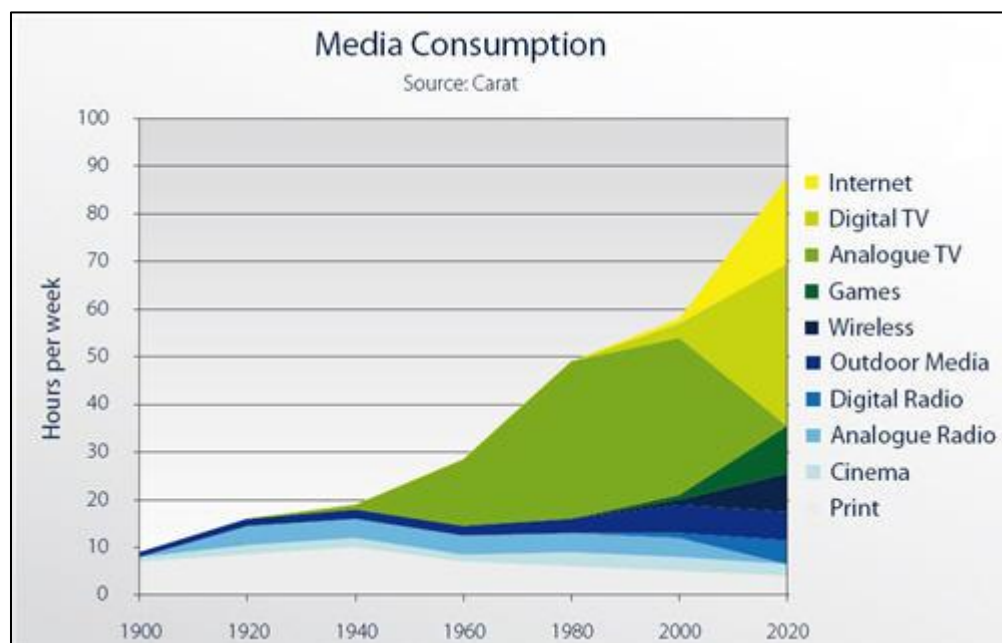


Figure 27. Media consumption trends, 1900-2020<sup>1</sup>.

The average number of minutes that an adult spends using telecoms, media and technology (TMT) services per day will increase by almost 40 minutes in 'Western' countries between 2011 and 2016, according to Analysis Mason's latest forecasts. "This presents an opportunity for stakeholders to reduce churn or generate additional revenue, by increasing engagement with their service, device or brand. The most-adaptive market players will be best-placed to maximize this opportunity. Individuals' behavior will evolve much more rapidly than the market as a whole" (Scott, 2011).

<sup>1</sup> Ross Dawson, 2008, [http://rossdawsonblog.com/weblog/archives/2008/08/seven\\_driving\\_f.html](http://rossdawsonblog.com/weblog/archives/2008/08/seven_driving_f.html)



As the time with the TMT devices will increase by 40 min per day, messaging, social networking and other text-based communication services will attract one of the most significant increases in usage during 2011-2016. “This will largely be a result of service adoption among the late majority (mainly older people) and the increasing availability and take-up of intelligent connected devices” (Scott, 2011).

Analysis Mason presented the percentage of time spent with different media devices for the Western user in the years 2011 and 2016 (see Figure 28). As for today TV is the device with the highest percentage of time spent, about 40%, the situation will change in the future. The time will drop down to 35% in 2016. Radio and “other” devices (like paper newspapers) will also experience the decline in media consumption. Instead, the time spent with tablet, mobile handset and PC will increase significantly, especially for the first two. For the tablet it will go up from less than 1% in 2011 up to 4% five years later, and from 5 to 10 percent for the mobile.

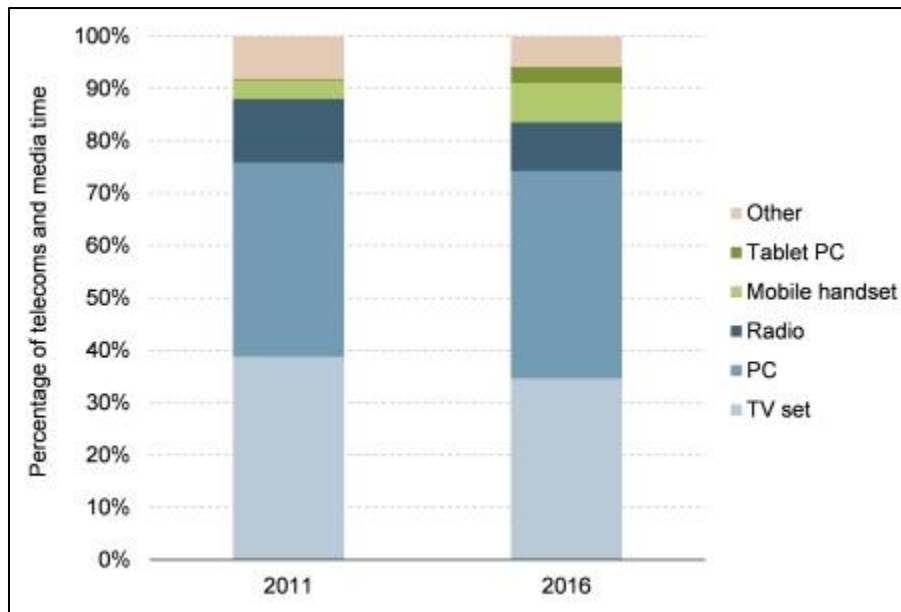


Figure 28. A ‘Western’ consumer’s average daily telecoms and media time, by device type, 2011 and 2016<sup>1</sup>.

Indeed, the low percentages of time spent with such devices like tablet, can also be explained by the fact that tablet is only starting to get popularity now. As of 2011, Pew Research Centre shows, only 8 percent of the American population owns a tablet PC, and 5% have an e-reader, in comparison to 85% of those who have a mobile phone (refer to Figure 29 below). Interestingly, the percentage of tablet owners has doubled since 2010 (when they were 4% of population), and increased for almost 2.5 times (5% in 2010). The research was conducted August 9 –September 13 and April 26-May 22, 2011 based on surveys in English and Spanish. Total number of 2277 adults aged 18+ were surveyed in 2011, in comparison to 3001 adults in 2010.

<sup>1</sup> Analysis Mason, 2011, [http://www.analysismason.com/About-Us/News/Insight/Consumer\\_behaviour\\_Jun2011/?journey=117,55](http://www.analysismason.com/About-Us/News/Insight/Consumer_behaviour_Jun2011/?journey=117,55)

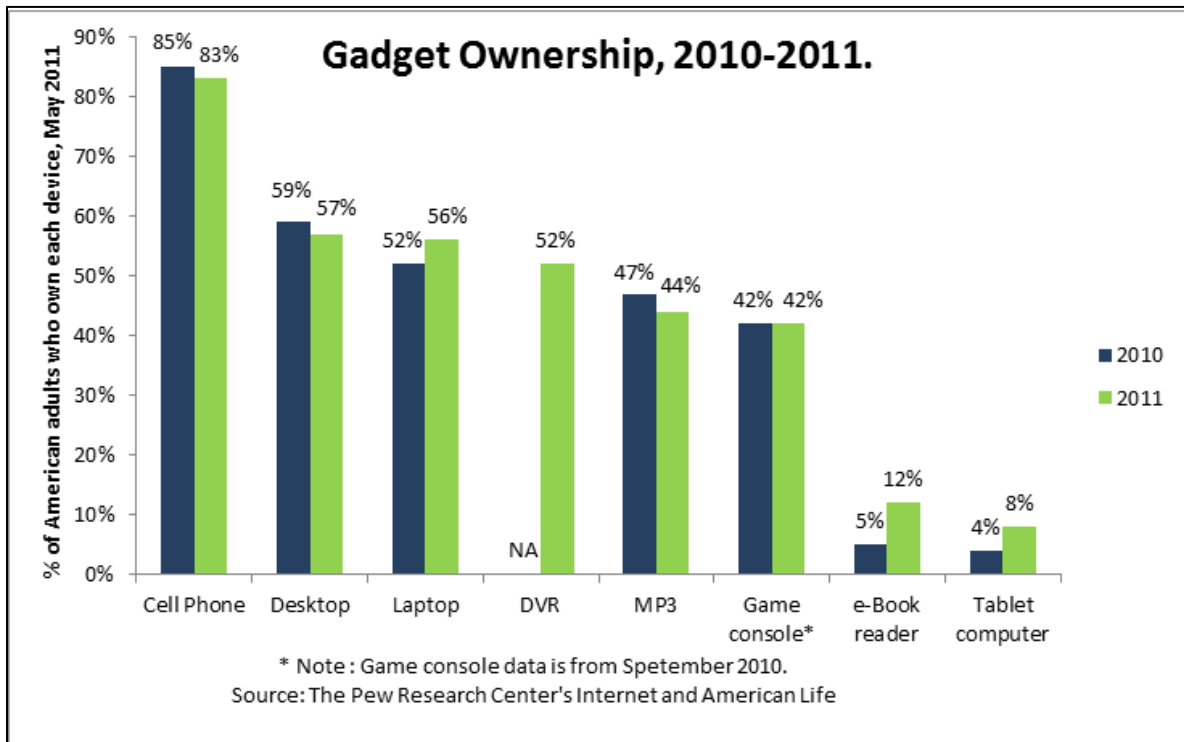


Figure 29. Gadget ownership in the USA, 2010-2011.

Many college **students** are dependent on digital technology in the classroom, according to a study released by CourseSmart and Wakefield Research, according to Mashable (Mashable, 2011). The study surveyed 500 American college students. 73% of them said they would not be able to study without some form of technology, and 38% said that they could not even go more than 10 minutes without checking their laptop, smartphone, tablet or e-reader. 70% of the students said they use keyboards rather than paper to take notes.

Technology was also a preferred method for getting in touch with teachers — 91% of the students cited email as a method for seeking extra help from their instructors, whereas 8% use social networks to contact the teachers.

## 2.1. TV

### The USA

Television is the most popular digital device in our days. It reaches more adults each day than other medium, as stated by TVB Media Comparisons Study 2010 in the US (presented on Figure 30 below). Television reaches almost 90% of adults 18+ in the average day, while radio reaches approximately 61% and newspapers, 39%. The same holds true across all demographic groups.

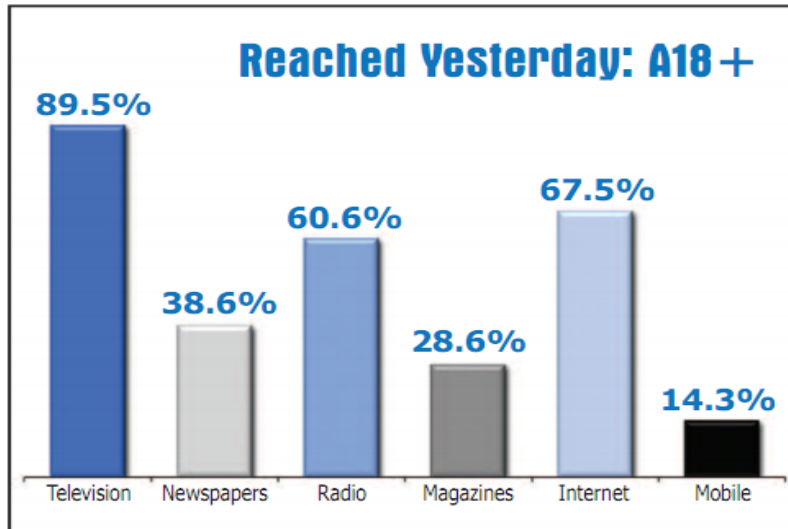


Figure 30. Media sources reached a percentage of population, US, 2010<sup>1</sup>.

The leading media role of television is confirmed by an American study performed by Arbitron Inc. and Edison’s (Arbitron/Edison’s Research, 2011). The study was conducted in January 2011 as a telephone survey (landline and cellphone) over 2,020 people aged 12 and older. As shown on Figure 31 below, TV is the leader among digital platforms in the USA: 98% of Americans older than 12 years use or own TV sets.

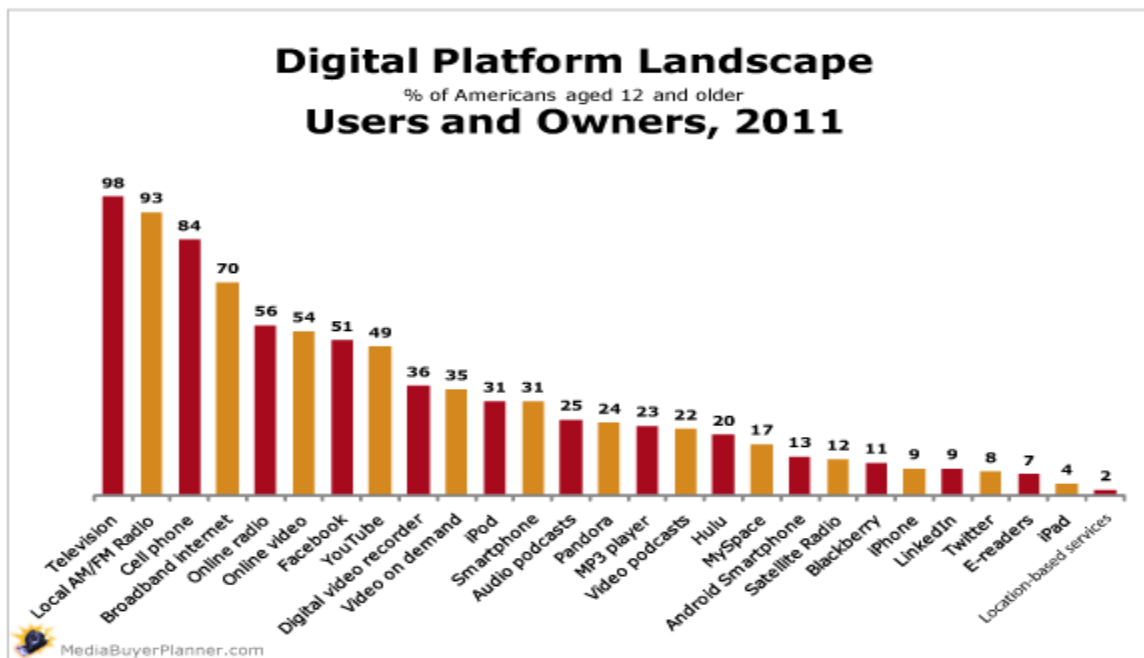


Figure 31. American digital platform landscape <sup>1</sup>.

<sup>1</sup> TV Basics, 2010, [http://www.tvb.org/media/file/TV\\_Basics.pdf](http://www.tvb.org/media/file/TV_Basics.pdf)

## Europe

Figure 32 confirms the same fact in Europe: TV is the champion in the consumption of the media devices. European Interactive Advertising Association (EIAA, Mediascope Europe , 2010) states that 94% of Europeans watch TV in a typical 7-day-week in 2010. TV watching is followed by newspapers and radio (each about 65%), and Internet (54%).

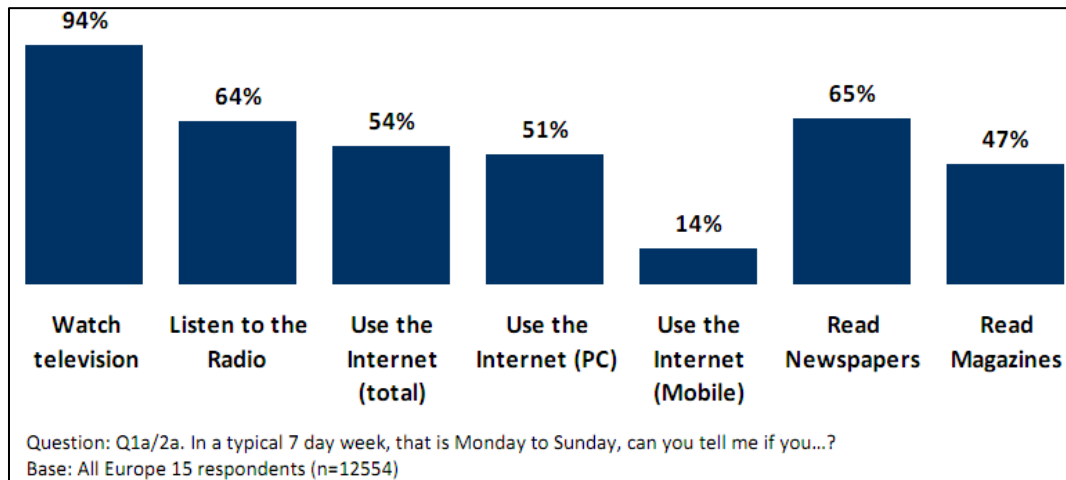


Figure 32. Percentage of Europeans using each media in a typical week.<sup>2</sup>

The same report says that Italy and Belgium share the leading position among European countries. 98% of Italians watch TV in a regular basis in a typical week in 2010.

### 2.1.1. Overall time spent

#### The USA

The Nielsen Company (The Nielsen Company, 2010) gathered statistics of how much time an American user spends watching a traditional TV, Time-Shifted (TS) TV and Digital Video Recorder (DVR) TV. The traditional TV is an 'old generation' device that broadcasts television signals but doesn't contain features neither to record the TV programs nor to program the preferred list of channels or content. TS and DVR TV have some differences in term of cost and flexibility for the user's choice. DVR TV has the potential for a high degree of personalization and integration with mixed media applications including Video on Demand (VoD), Internet TV, and personal photo and video storage. The main attractiveness of this technology is that the viewers can watch their favorite shows when it is convenient for them, and can skip content that doesn't interest them. But the user interface is generally sophisticated, and not all users can easily understand how to use it. That is why it might frighten some of them (Mahony, 2008). On the other hand, TS TV lets a user watch only content from the pre-determined list by the service provider. This list usually includes a top rated content, but some specific one

<sup>1</sup> Media Use Statistics, 2011, <http://www.frankwbaker.com/mediause.htm>

<sup>2</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)

can be absent. That is the biggest shortage (Mahony, 2008). But the advantage is that the cost of subscription to a program is shared between all the subscribers of the network, and it is cheaper than in DVR case. Also the user interface is much simpler and more familiar.

Thus, the Nielsen Company’s survey is based on a sample of 1,372 US households. Telephone interviews were used to collect the information from the sample households. Interviews were conducted with a randomly selected household member at least 12 years old. The results are presented on Figure 33. It shows that the traditional TV is the far leader among the others, more intelligent TV, with 158:47 hours monthly time spent (or 5:08 hours daily) in Q1 2011. The second in the rating is DVR TV enjoying 1/6 of the leader’s time – 26.14 hours monthly (or 51 min daily). And the last one is TS TV with 10:46 hours spent time per month (or 20 min per day) on average American of age 12 years and older. TV view increased 22 min per month over the year 2010.

TABLE 3. Monthly Time Spent in Hours: Minutes – Per User 2+

	Q1 11	Q4 10	Q1 10	% Diff Yr to Yr	Hrs:Min Diff Yr to Yr
Watching TV in the home*	158:47	154:05	158:25	0.2%	0:22
Watching Timeshifted TV* (all TV homes)	10:46	10:27	9:36	12.2%	1:10
DVR Playback (only in homes with DVRs)	26:14	25:52	25:48	1.7%	0:26
Using the Internet on a computer**	25: 33	25: 49	25: 54	-1.4%	-0:21
Watching Video on Internet**	4: 33	4: 24	3: 23	34.5%	1:10
Mobile Subscribers Watching Video on a Mobile Phone^	4:20	4:20	3:37	20.0%	0:43

Source: Nielsen. Based on total users of each media. Additional Note: TV viewing patterns in the US tend to be seasonal, with usage patterns different in winter months than summer months—sometimes leading to declines/increases in quarter to quarter usage.

Figure 33. Monthly time spent on TV in the USA, Q1 2011.<sup>1</sup>

Different American research companies show different statistics of the average time the US consumer spends with the TV (see Figure 34). For the year 2010, The Nielsen Company accounts 317 min/day for 2+ aged population, whereas Television Bureau of Advertising suggests that the Americans of 18+ spend 305 min/day, for the same age group eMarketer’s result is 264 hours. Fleishman-Hillard and Harris Interactive states that Internet users spend 120 min watching TV per day. Let’s assume that on average, the time spent with the traditional TV is 300 minutes (or **5 hours**) per day. This number is the closest to the data of the Television Bureau of Advertising.

<sup>1</sup> The Nielsen Company, 2011, [http://www.tvb.org/media/file/nielsen\\_cross-platform\\_report\\_Q1-2011.pdf](http://www.tvb.org/media/file/nielsen_cross-platform_report_Q1-2011.pdf)

<b>Comparative Estimates: Average Time Spent per Day Watching TV Among US Consumers, 2008-2010</b>			
<i>minutes</i>			
	<b>2008</b>	<b>2009</b>	<b>2010</b>
The Nielsen Company, Aug 2010 <sup>(1)</sup>	-	-	317
GfK MRI, June 2010 <sup>(2)</sup>	-	298	-
Television Bureau of Advertising (TVB), May 2010 <sup>(3)</sup>	-	-	305
Knowledge Networks Inc., May 2009 <sup>(4)</sup>	-	285	-
<b>eMarketer, Dec 2010 <sup>(5)</sup></b>	<b>254</b>	<b>267</b>	<b>264</b>
Edison Research and Arbitron, June 2010 <sup>(6)</sup>	-	-	205
Ipsos OTX MediaCT, Sep 2010 <sup>(7)</sup>	204	216	204
Fleishman-Hillard and Harris Interactive, June 2010 <sup>(8)</sup>	-	-	120
Forrester Research, Dec 2010 <sup>(9)</sup>	-	-	111
The Media Audit, Sep 2010 <sup>(10)</sup>	-	210	-
Yankee Group, April 2010 <sup>(11)</sup>	-	197	-
<small>Note: (1) 2+, on traditional TV, data for Q1 2010; (2) 18+; (3) 18+, data for Jan 2010; (4) 12-64; (5) 18+; (6) 12+, data for Feb 2010; (7) 13-74, among internet users, live/DVR; (8) among internet users, data for Jan 2010; (9) 18+, among internet users, offline TV; (10) 18+, broadcast and cable TV; (11) among internet users, TV and video</small>			
<small>Source: eMarketer, Dec 2010; various, as noted, 2009 &amp; 2010</small>			
122900	www.eMarketer.com		

Figure 34. Comparative Estimates: Average time spent per day watching TV among US consumers, 2008-2010<sup>1</sup>.

Going more in details into the American population, the studies show (Television Bureau of Advertising, 2011), that traditionally, women in TV households have spent the most time viewing TV, with the about 5:31 hours a day in 2009 (see Figure 35 below). And it is a constantly growing trend since 1998. Women are followed by men, who experience almost 5 hours of daily viewing since 2005 (4:54 to be precise). Teens and children have been viewing at about the same levels, near 3.5 hours. But teens are the only generation whose trend of TV consumption is decreasing, 3:26 hours per day in 2009 in comparison to 3:27 in a year before.

<sup>1</sup> eMarketer, 2010, <http://www.emarketer.com/blog/index.php/time-spent-watching-tv-tops-Internet/>

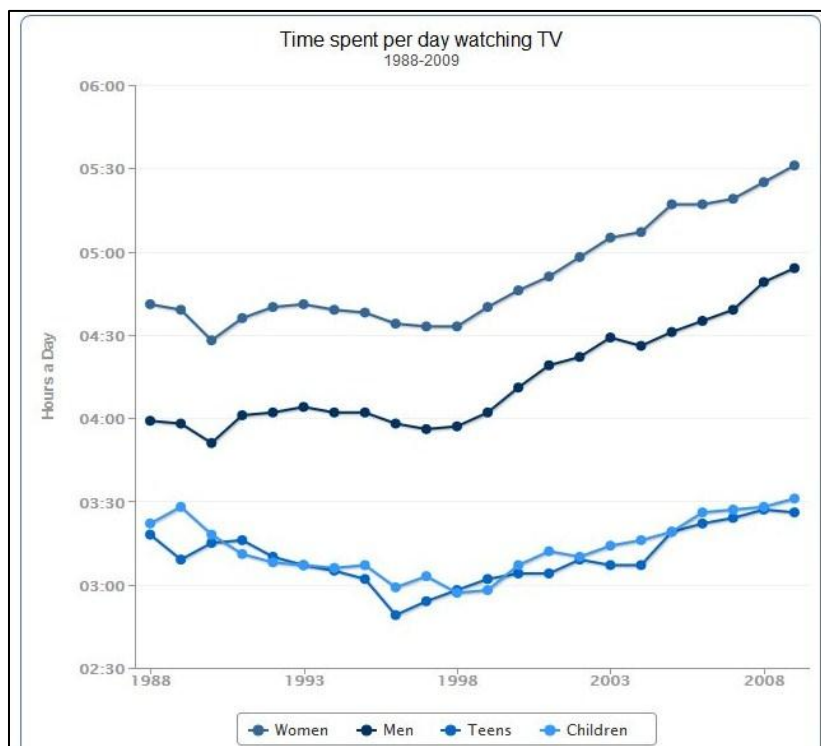


Figure 35. Time spent per day watching TV in the USA, trend 1988-2009.<sup>1</sup>

## UK.

In comparison to the average US citizen who spends 5 hours of TV watching per day, an average British spends one hour less with the television. According to 2011 BARB report (Thinkbox, 2011), the average person watched a total of 28 hours, 21 minutes a week (**4 hours, 3 minutes a day**) of linear TV. This is an increase of 6 minutes a week (51 seconds a day) on the same period in 2010.

Also according to BARB, non-live, ‘time-shifted’ viewing accounted for 9% of the UK’s TV consumption during January to June 2011. This has increased from 7.1% in the same period in 2010. In households that own digital television recorders (**47%** of households), average **DVR** watching represented 14.7% of total viewing. This figure has increased from 13.7% in the same period last year. Therefore, DVR TV is more popular than TS TV in Britain, which is vice versa in the US.

## In the world.

Globally, the average time spent watching TV reached in 2009, three hours and 12 minutes per day, up to three minutes compared with 2008, according to a study by the company Eurodata TV Worldwide (Romanian Association of Audience Measurement, 2010).

<sup>1</sup> Television Bureau of Advertising, 2009, <http://adage.com/article/mediaworks/time-spent-watching-tv/227022/>

In terms of analysis by region, North American consumers spend the most time watching TV, with an average of four hours and 40 minutes a day, followed by those in the Middle East, who are watching TV, on average four hours and 34 minutes, and those in Europe, which watching TV, on average, three hours and 42 minutes.

In Latin America, a regular consumer watching TV, on average, three hours and 30 minutes, while consumers in the Asia - Pacific spend in front of small screens about two hours and 41 minutes.

In Africa the average time spent by the consumer in front of televisions at three hours and 52 minutes.

<b>Region</b>	<b>Time spent watching TV, 2009, hours</b>
North America	4:40
Middle East	4:34
Europe	3:42
Latin America	3:30
Asia/Pacific	2:41
Africa	3:52
<b>Globally on average</b>	<b>3:49</b>

Table 6. Time spent watching TV in different regions of the world, 2009.

Deloitte expects in 2011, aggregate television viewing will likely reach 4.49 trillion hours. The global television audience is expected to grow by 40 million to 3.7 billion viewers.

### 2.1.2. Usage habits

#### The USA

The peak time of **DVR TV**, that is according to Deloitte predictions for 2011-2012 will reach 50% of penetration in the US households (Deloitte, 2010), is in the evening, according to The Nielsen Company (The Nielsen Company, 2010). From Figure 36 we can see that as for May 2010 the primetime is at 9 PM and 10 PM (12% and 13% of people watching), whereas the next most popular time for DVR playback is around the peak, and is at 8 PM and 11 PM – which is the time before going to sleep.



## DVR Playback by Hour –P18-49 Percentage of DVR Playback

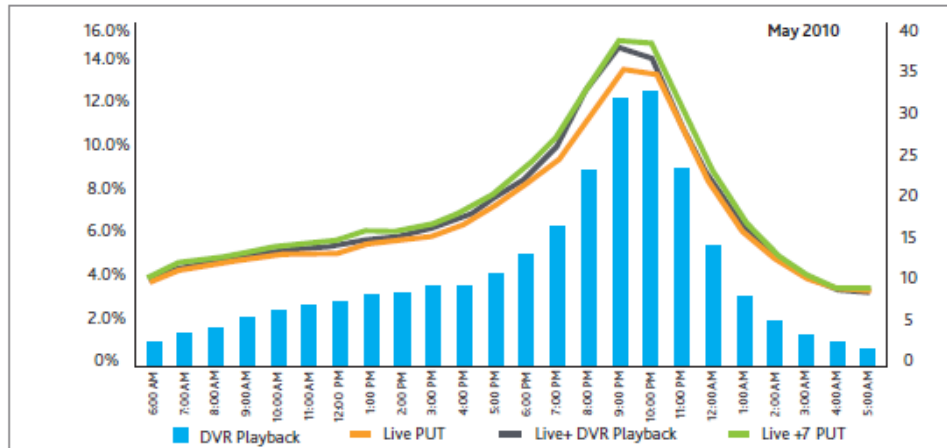


Figure 36. Percentage of users watching a DVR at different time of the day, 2010<sup>1</sup>.

The top-ranked **time-shifted genres** during the 2009-2010 broadcast season, was Science Fiction. On the 2<sup>nd</sup> place is the Situational Comedy, and General Drama close behind, followed by Variety/Reality programs. News and sports genres received relatively little lift from playback, since viewers generally prefer to watch these types of shows live.

Indeed, the fact that people watch TV before sleep is confirmed by US National Sleep Foundation (Rosenberg, 2011). In his article ‘Widespread Communication Technology Use Before Sleep’ Rosenberg reports that almost everyone (95%) uses some type of electronics like a television, computer, video game or cellphone at least a few nights a week within the hour before bed. However, about two-thirds of adults (30-64 year olds) and half of young generation (13-29 year old) watch television every night or almost every night within the hour before going to sleep.

The peak time of watching TV from Figure 36 is agreed in the article ‘Average amount of time Americans spend watching TV’ where the **traditional TV** is taken in consideration (Quilty, 2008). The author says that the prime time viewing is when most new episodes of TV serials are run. It includes Monday through Saturday evenings, from 8:00 - 11:00 PM. But the average individual spends 1 hour in front of TV during the prime time, whereas the average amount of time per individual (over the age of 2) is about 5 hours per day. Therefore, the majority of TV viewing takes place outside of prime time, throughout the day and night. It means that for a lot of people, TV is friendly background noise when it's time to clean the house, iron, do laundry, make dinner or do some mechanistic activities, either at home or at the gym.

Watching television shows in 3D has become a regular activity for the majority of **3DTV** owners, according to the latest research from the Strategy Analytics Connected Home Devices service (Strategy Analytics, 2011), performed in July 2011 online; the sample consisted of n=2000 individuals in the US and n=2801 in Europe (France, Germany, Italy, UK) ages 15-74 years; the sample of 3DTV owners was n=238. According to the results, two-thirds of 3DTV owners across the US and Europe are watching at least one show in 3D on a weekly basis.

<sup>1</sup> The Nielsen Company, 2010, <http://blog.nielsen.com/nielsenwire/wp-content/uploads/2010/12/DVR-State-of-the-Media-Report.pdf>.

41% of 3DTV owners claim to be watching shows in 3D at least once a day or several times a day. The survey also found that 3DTV owners typically own two pairs of 3D glasses, although a small minority (13%) claims not to own any 3D glasses.

## Europe

Europe is experiencing fewer cable operators, more IPTV, pay DTT, satellite operators and mobile phone/mobile broadcast TV packagers, the recent report (The European Audiovisual Observatory, 2010) states. Preferences of the Europeans in terms of source of a channel are the following. Of the 7 200 European channels more than half are regional or local channels, 43% are national channels and 6% international (see Figure 37 below).

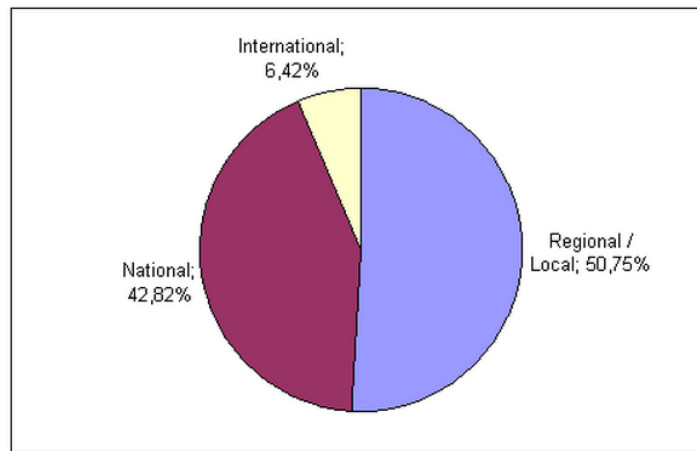


Figure 37. European TV channels by geographical coverage (2009)<sup>1</sup>

Europeans' favorite genres of channels are the following (The European Audiovisual Observatory, 2010) and presented in the figure below (refer to Figure 38):

- 1) Film/TV fiction – 496 channels;
- 2) sport – 419;
- 3) entertainment – 318.

Among the least attractive channels are religious, minority interest groups and dating/games.

<sup>1</sup> The European Audiovisual Observatory, 2010, [http://www.obs.coe.int/about/oea/pr/mavise\\_end2009.html](http://www.obs.coe.int/about/oea/pr/mavise_end2009.html)

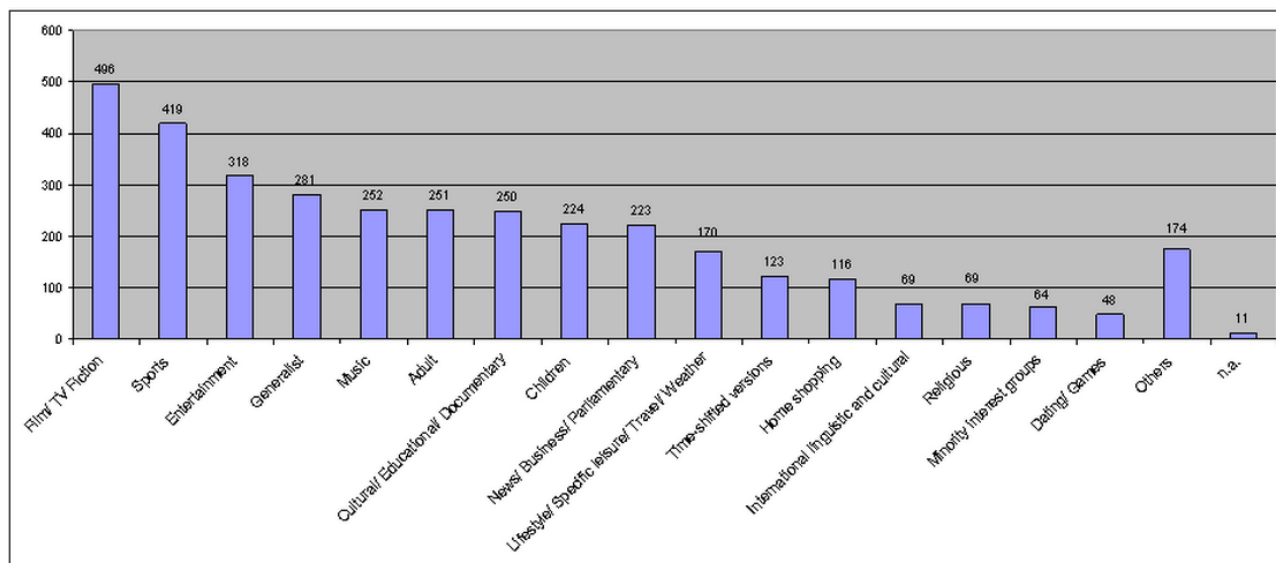


Figure 38. European TV channels by genre in 2009<sup>1</sup>.

EIAA (EIAA, Mediascope Europe, 2010) made a research asking to 11902 Europeans, at what time of the day do they typically watch TV. The results are displayed in Table 7. The absolute majority (84% of respondents) prefer to watch TV during the evening. Approximately half of the respondents watch TV during the night and the day (54% and 50% accordingly). And only 22% watch it in the morning when they wake up.

	'When you wake up'	'During the Day'	'During the Evening'	'During the Night'
Watch TV	22%	50%	84%	54%

Table 7. Time of the day the TV is used<sup>2</sup>.

## UK

As the UK's digital switchover programme nears its final phase (it will complete in 2012), take-up of **digital TV** on main sets stood at **93%** of UK homes at the end of Q1 2011, according to the recent study (Ofcom, 2011).

<sup>1</sup> The European Audiovisual Observatory, 2010, [http://www.obs.coe.int/about/oea/pr/mavise\\_end2009.html](http://www.obs.coe.int/about/oea/pr/mavise_end2009.html)

<sup>2</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)

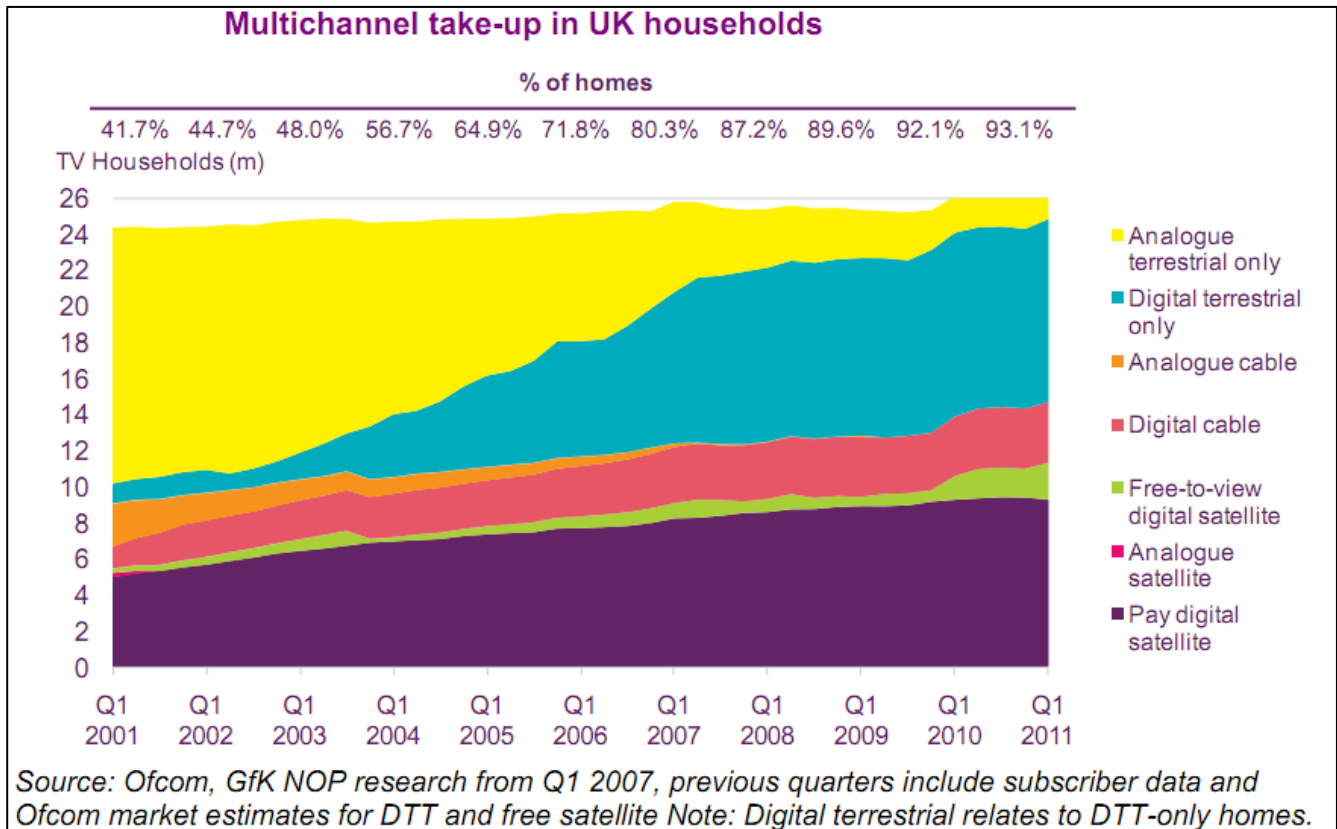


Figure 39. Digital TV penetration in UK, 2001-2011<sup>1</sup>.

“The number of UK homes watching **on-demand TV** has risen from 78% in 2008 to 89% in 2010, according to a survey by TV marketing body Thinkbox” (Talbot, 2010). Viewers are choosing to watch catch-up episodes of their favourite shows, rather than new on-demand programmes however.

David Brennan, research and strategy director at Thinkbox, said: “Live, linear TV is benefiting from on-demand TV services and social media. The Internet has given viewers the ability to catch-up with missed shows, to interact in real time via social media, and to even transact while watching.”

Of those questioned in the study, 60% claimed to watch catch-up TV at the same time as surfing the Internet, at least two or three times a week, with over half doing their shopping online. A further 44% admitted using social networks, such as Facebook and Twitter, while watching TV. More in detail this phenomenon is discussed in the paragraph 2.7.

Commercial TV’s increased viewing has led to an increase in the number of **TV ads** viewed. Commercial impacts (the number of ads viewed at normal speed) during January to June 2011 were up 4.7% on the same period last year, and have grown by 22.1% over the last five years to a new record high. The average viewer watched 47 ads a day during the first six months of 2011 compared to 45 ads during the same period last year, adding up to 2.7 billion TV ads seen at normal speed every day in the UK.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

According to recent research commissioned by PRmoment (PR Moment, 2011), the BBC comes out as the favourite source of TV news in the UK. Half of the adults questioned said that BBC is their preferred news network of choice. The peak time for viewing news (see Figure 40) is the evening (44 per cent watch between 6 PM and 7 PM, and 33 per cent watch between 10 PM and 11 PM).

### What time of day do you watch the news?

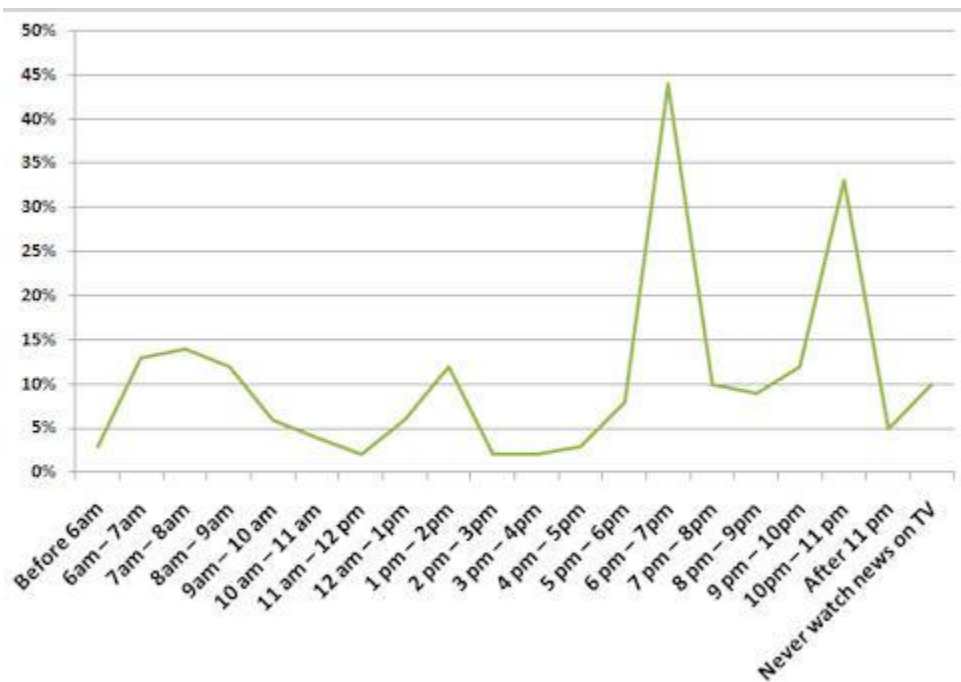


Figure 40. News watching time in UK, 2011<sup>1</sup>.

**3D content** was launched first by BSkyB in April 2010, broadcasting selected sporting events (Ofcom, 2011). Virgin Media now offers access to some 3D content. The latter launched an on-demand 3D film service in September 2010, where consumers pay to rent content. Sky has pursued an alternative 3D model, launching a dedicated linear 3D channel in October 2010. The BBC became the first UK free-to-view channel to broadcast a 3D TV event in June 2011, carrying the 2011 Wimbledon tennis finals on all digital platforms where the BBC HD channel was available (including Sky, Virgin Media, Freesat and Freeview HD).

In 2010 users with **DVRs** at home, were viewing the Live content in 86% of time. Whereas 7% of viewing time was spent on watching the content on the same day when the broadcast was missed, and other 7% within 1-7 days after.

When the British are asked which medium they would miss the most if it were taken away, there are clear differences in response by age-group, as shown in the graph below (Figure 41). Overall, 44% say they would most miss their TV – a decline of six percentage points on 2009, while 17% said they would most miss the

<sup>1</sup> Opinion Research, 2011, <http://www.prmoment.com/569/most-british-consumers-turn-to-the-bbc-for-their-news-and-most-people-watch-the-news-in-the-evening.aspx>

Internet – more than double the proportion five years ago (8% in 2005). Just over one in ten (12%) say they would most miss their mobile, and 10% listening to the radio.

For young adults aged 16-24, the picture is quite different – 28% say they would most miss their mobile, and 26% the Internet – with the latter increasing from 18% in 2009. Broadcast media are less likely to be cited by this age group, with TV being the most-missed medium for 23%, and radio by 3%.

For people aged 55-64, 49% say they would most miss TV, 17% radio, and 8% newspapers/magazines. One in ten (10%) would most miss the Internet and 1% mobile phones.

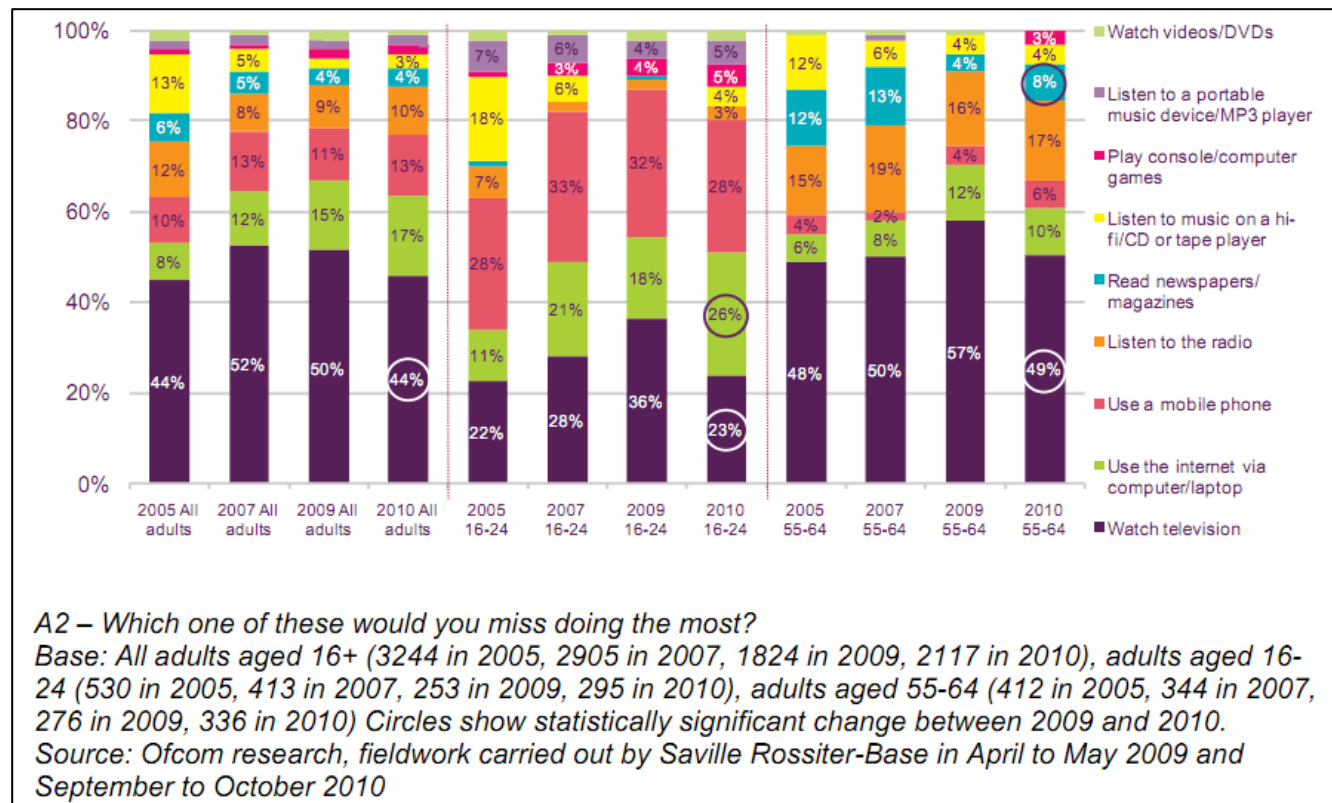


Figure 41. Which media activity consumers would miss the most, UK, 2010<sup>1</sup>.

## 2.2. Radio

Invented in 19<sup>th</sup> century radio is still one of the most popular traditional media.

### The USA.

According to Arbitron/Edison’s (Arbitron/Edison’s Research, 2011), local AM/FM radio is the 2<sup>nd</sup> most popular media platform in the USA, after TV, for the Americans aged 12 and older. The percentages of Americans who prefer different media platforms are summarized in Figure 42. There we can see that even though TV is certainly the leader with 98% of people watching it, local AM/FM Radio is popular among 93% of Americans. More recent trends of digital radio, including online radio and satellite radio are also in the list. Online radio is

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

on the 5<sup>th</sup> position with 56% (after cellphone and broadband Internet), and finally the satellite radio is placed number 20 with 12% of population listening to it.

# 2011 Digital Platform Landscape

% of Americans Aged 12 and Older Who Use/Own Platform/Devices

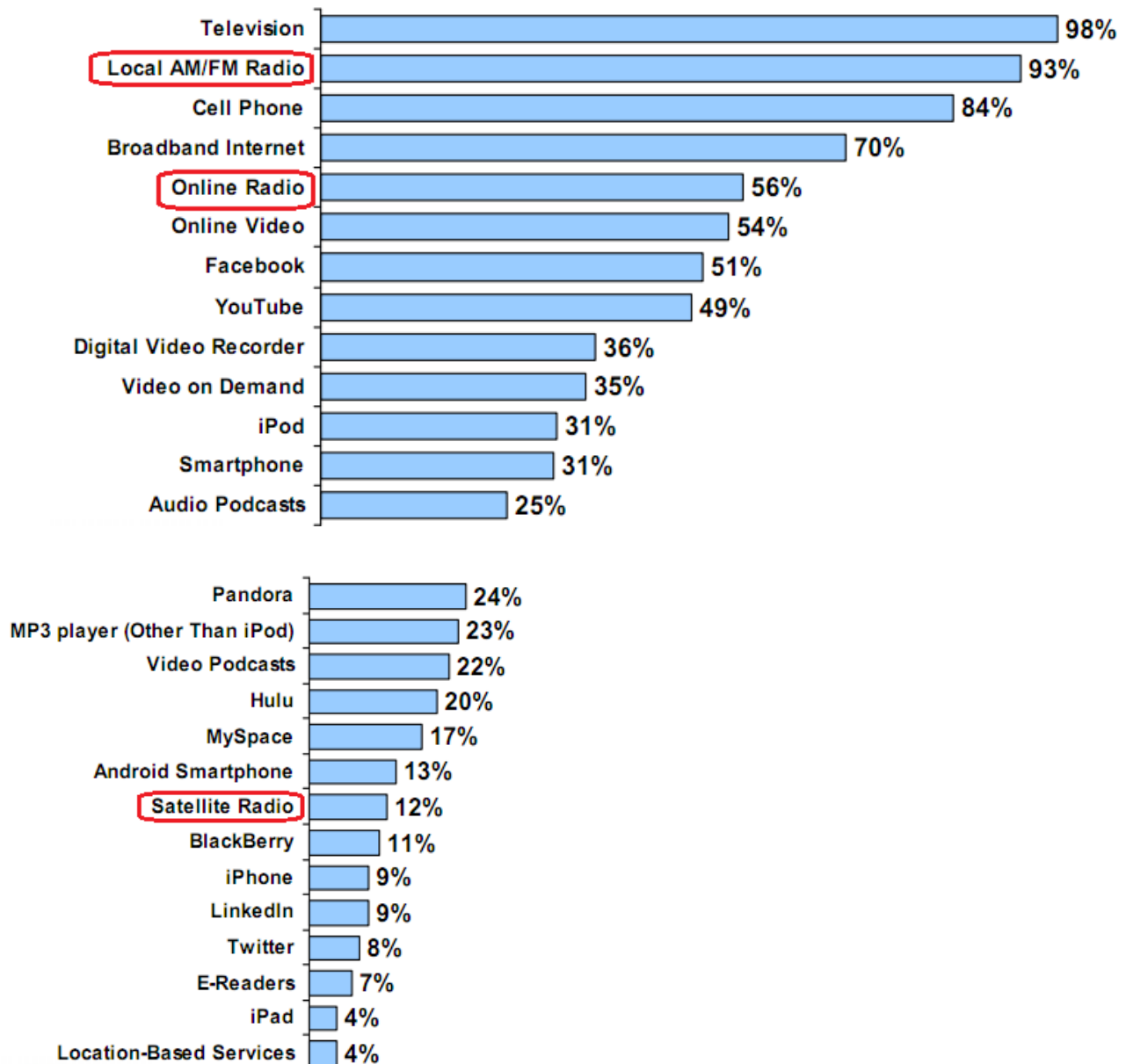


Figure 42. The Popularity of the US Media Platforms<sup>1</sup>

<sup>1</sup> Arbitron/Edison's Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)

## Europe

As for the Europeans the situation is roughly the same. According to 2010 year statistics (EIAA, Mediascope Europe , 2010), radio is the 3<sup>rd</sup> ranked in the Europe with 64% of Europeans listening to it in a typical 7 day week, placed after television and newspapers (the results of the survey is presented on the Figure 43). Actually, radio is almost sharing the 2<sup>nd</sup> position with newspapers because they differ with only 1% (65% of respondents stated they were reading newspapers in comparison with 64% who listen to the radio).

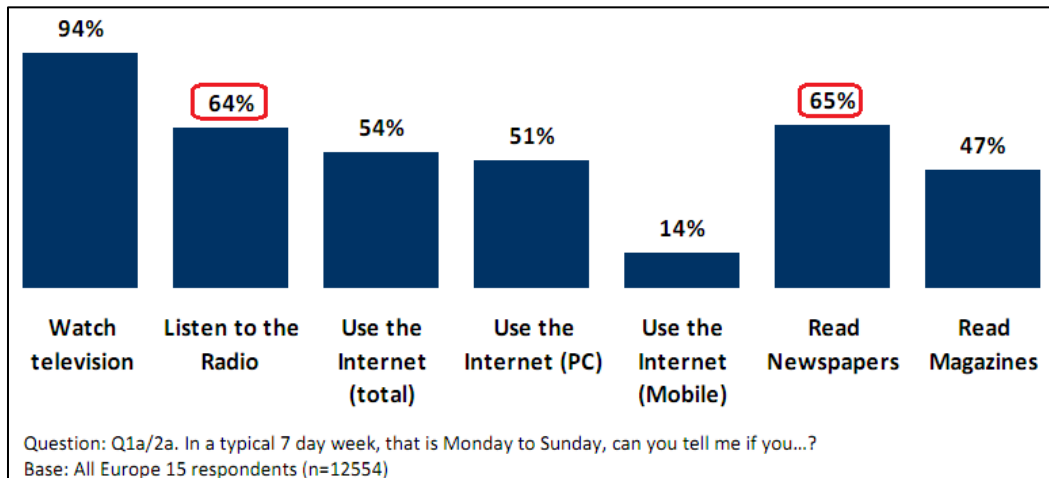


Figure 43. Media devices popularity in Europe<sup>1</sup>.

The same report compares the popularity of the media platforms in the year 2006, 2008 and 2010 (see Figure 44). It shows that 78% of people were listening to radio in 2006. After 2 years the number of listeners decreased by 3%, but by 2010 increased by 1% again, reaching 76%. But this statistics shows cumulative consumption of radio, including online radio, traditional one, radio from digital TV, satellite radio, etc. It might be that the traditional radio is being declined whereas the online radio is getting more and more popularity. And the overall effect might give a growing effect.

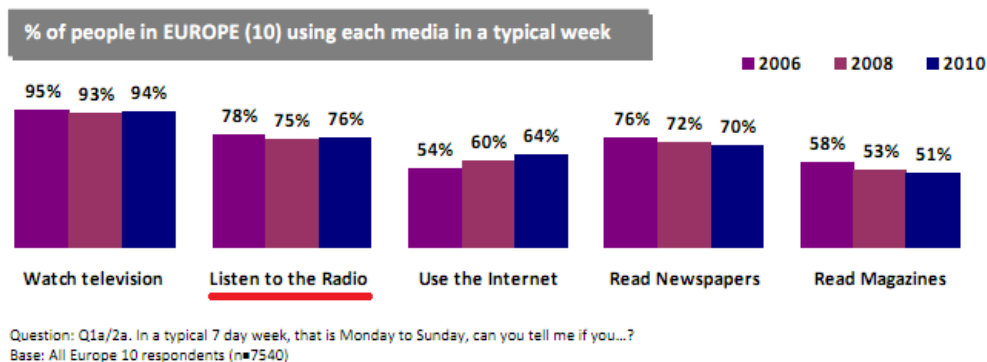


Figure 44. Percentages of Europeans using each media in a typical week, years 2006-2010<sup>2</sup>.

<sup>1</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA European Media Landscape Report SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA%20European%20Media%20Landscape%20Report%20SUMMARY.pdf)

<sup>2</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA European Media Landscape Report SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA%20European%20Media%20Landscape%20Report%20SUMMARY.pdf)



It really seems that radio is being revitalizing in 2011. The growing trend of radio in Europe, particularly in the Italian market, is confirmed also by the recent study (The Nielsen Company, Connexia and the Milan Polytechnic School of Management, 2011). The report states a rise in approval of radio advertising (47 percent, +6 points in 2011 vs. 2009). Indeed, this can be influenced by the fact that the radio content can be consumed from the huge variety of devices such as television, the Internet, iPads, mp3 players, mobile phones and many more.

**UK**

The number of weekly radio listeners in the UK reached a new high of **91.6%** of the adult population in Q1 2011, up by 1% since Q1 2010.

**Analogue** radio accounted for a **65.5%** share of listening, whereas the **digital** radio reached for over a quarter (**26.5%**) of all listener hours as stated in the recent research (Ofcom, 2011). Digital radio’s share of listening hours in Q1 2011 was 2.5% higher than the same quarter in 2010. Listening through a DAB radio accounted for the largest share of digital listening, at 16.7% of the total. Digital television represented a further 4.1%, while the Internet accounted for the remaining 3.6%.

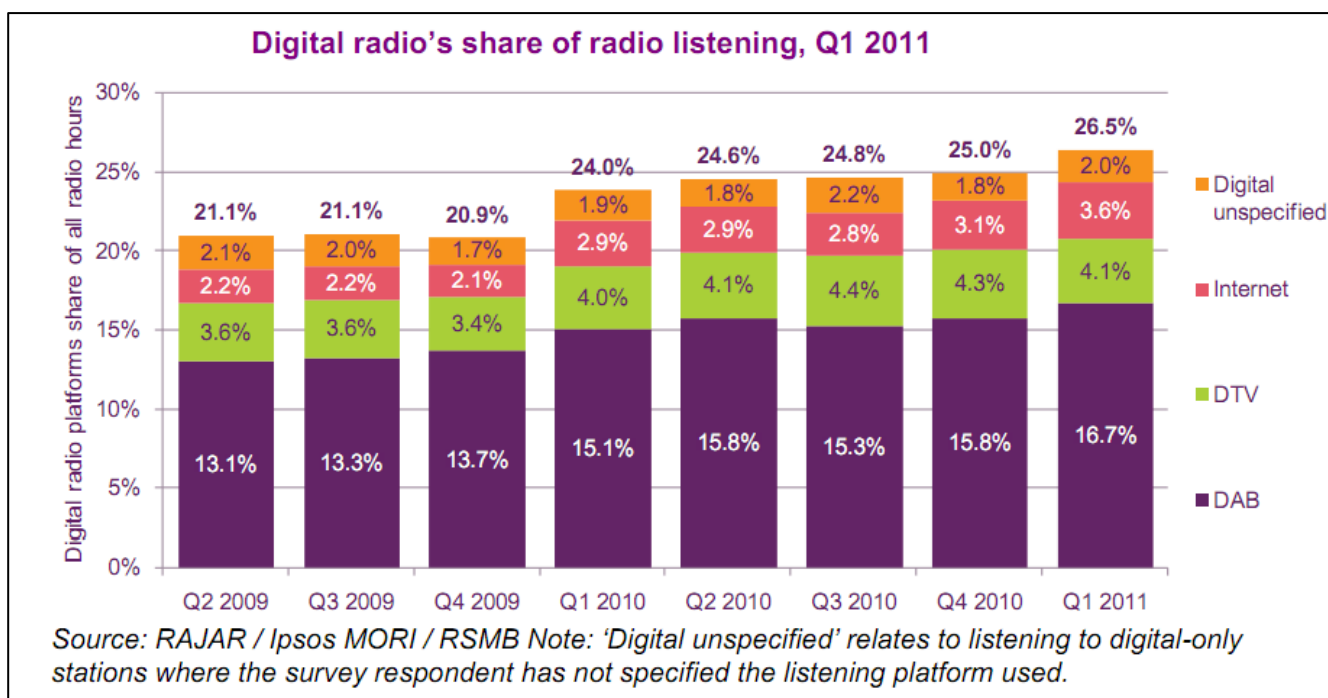


Figure 45. Digital radio’s share of radio listening, UK, Q1 2011<sup>1</sup>.

Among all 15+ UK adults, RAJAR figures showed that hours of radio listening rose by 2.1% in 2010 to 1,036 million per week. Listeners in the 15-24 age group were the only group for whom listener hours did not increase in 2010, falling instead by 4.3%. Listening among 65-74 year-olds increased the biggest year on year, up by 6.3%.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

## 2.2.1. Overall time spent

### The USA

**Traditional Radio (not online)** consumption has decreased for 15% in 2010 for 5 years since 2005 and reached **6 hours per week**, as stated on Mashable (Indvik, 2010), as shown on the Figure 46. This is twice less than time spent with TV or using Internet, but is double of time dedicated to paper magazines and newspapers. On the contrary, using Internet is getting more and more popular, having a growth of 121%. It seems that the traditional media is moving online.

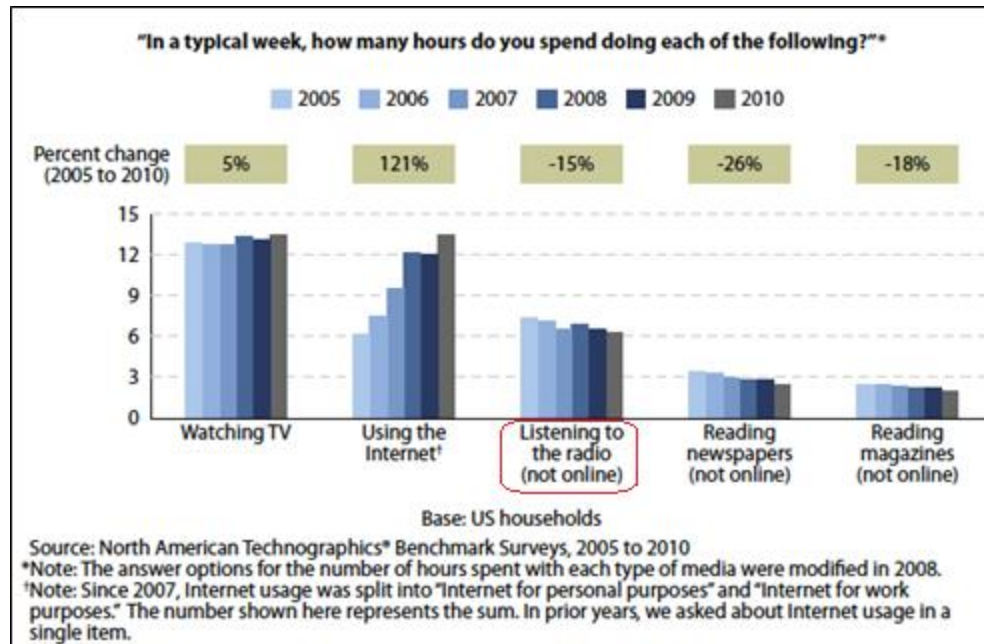


Figure 46. Hours spent on different media in the USA in 2005-2010<sup>1</sup>.

Unlike the decrease of popularity of the traditional analog AM/FM radio, the online radio is becoming more and more attractive for the Americans. In 2011 time spent with **online radio** has increased almost 50% among the weekly listeners since 2008, as the Nielsen Company report claims (Arbitron/Edison's Research, 2011); the trend of online radio consumption is presented on the graph below (refer to Figure 47). In 2011, the average time spent with online radio is **9h 47min per week**, in comparison to 6h 13 min in 2008. Therefore, listening to the online radio per week is 50% longer than listening to the AM/FM radio. But that does not mean According to Arbitron/Edison's (Arbitron/Edison's Research, 2010), three-quarters of Americans expect they will listen to as much AM/FM radio in the future despite advancements in technology. It looks like the consumption of the traditional radio will remain with around 6 hours per week. Instead, the online radio listening will grow in the next years.

<sup>1</sup> Mashable, 2010, <http://mashable.com/2010/12/13/Internet-tv-forrester>

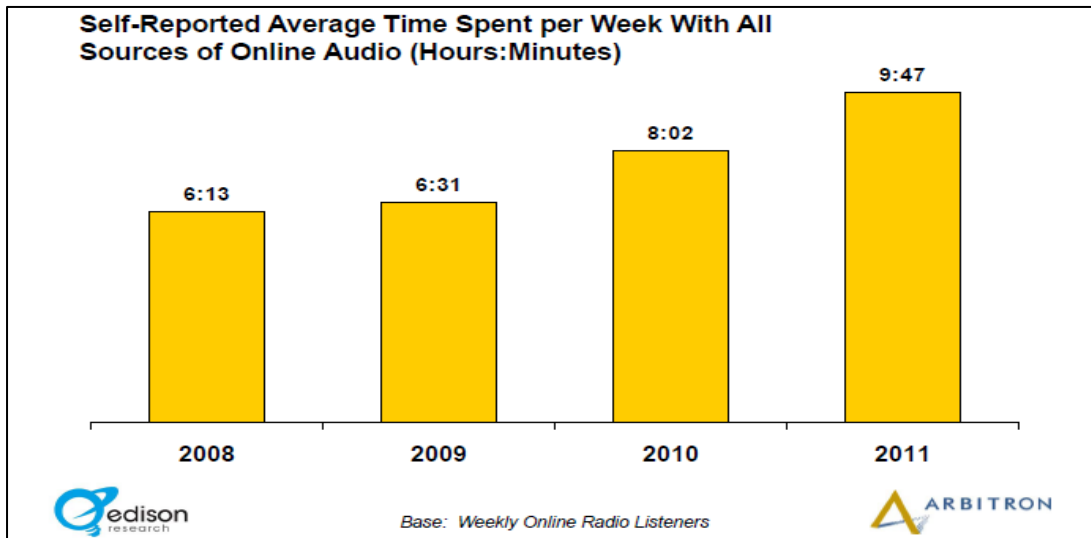


Figure 47. Time spent with the online radio in the USA<sup>1</sup>.

## UK

Listening to the radio online in the UK remains more popular than listening to other audio content online through. 18% of households used the Internet to listen to the radio, in comparison to 7% used free streaming services.

Figure 48 illustrates that older listeners are less likely to listen through a digital radio platform. For listeners under 64, at least half claim to listen to digital radio on a monthly basis. In the 65-74 age group the figure falls to 42%, and to 25% for the over-75s.

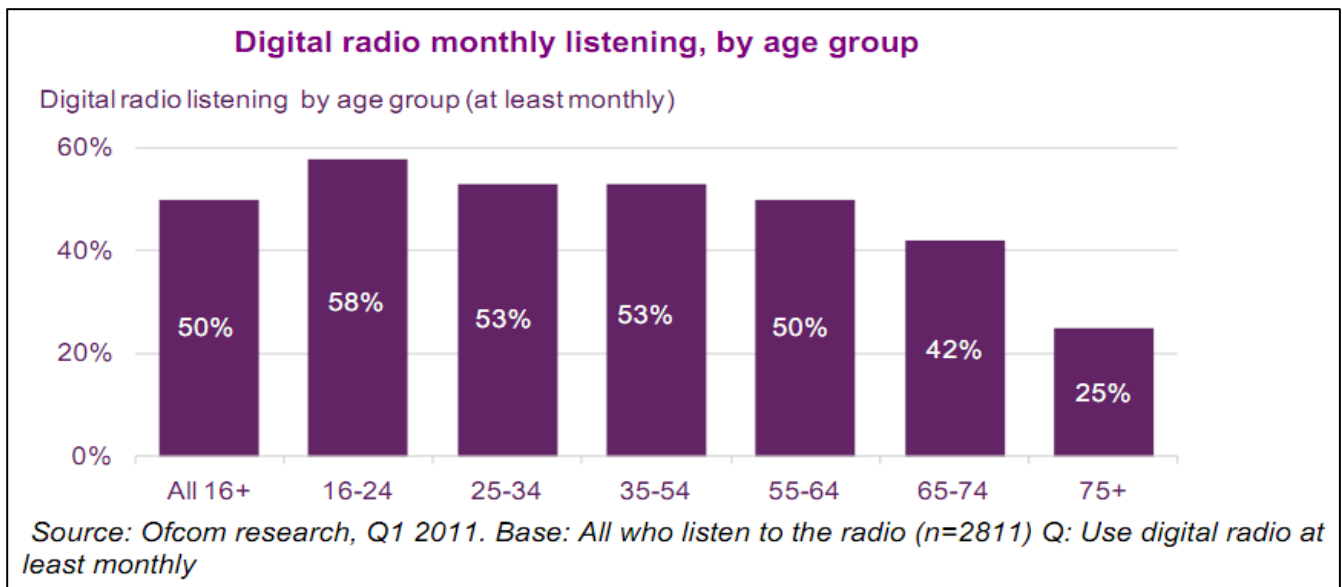


Figure 48. Digital radio monthly listening, by age group, UK, 2011<sup>1</sup>.

<sup>1</sup> Arbitron/Edison's Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)

Average time spent listening to radio increases with age, as says in the report (Ofcom, 2011). Figure 49 below presents the demographic profile of average weekly listening hours for adults in the UK in the year to Q1 2011. It shows that listening increases with age, peaking in the 55-64 age group. It is higher among **men** than women, with the former listening on average to **2.2 more hours** per week than the latter. Overall, the average British adult of 15+ years old listens to 20.3 hours of radio per week (or 2.9 hours/day).

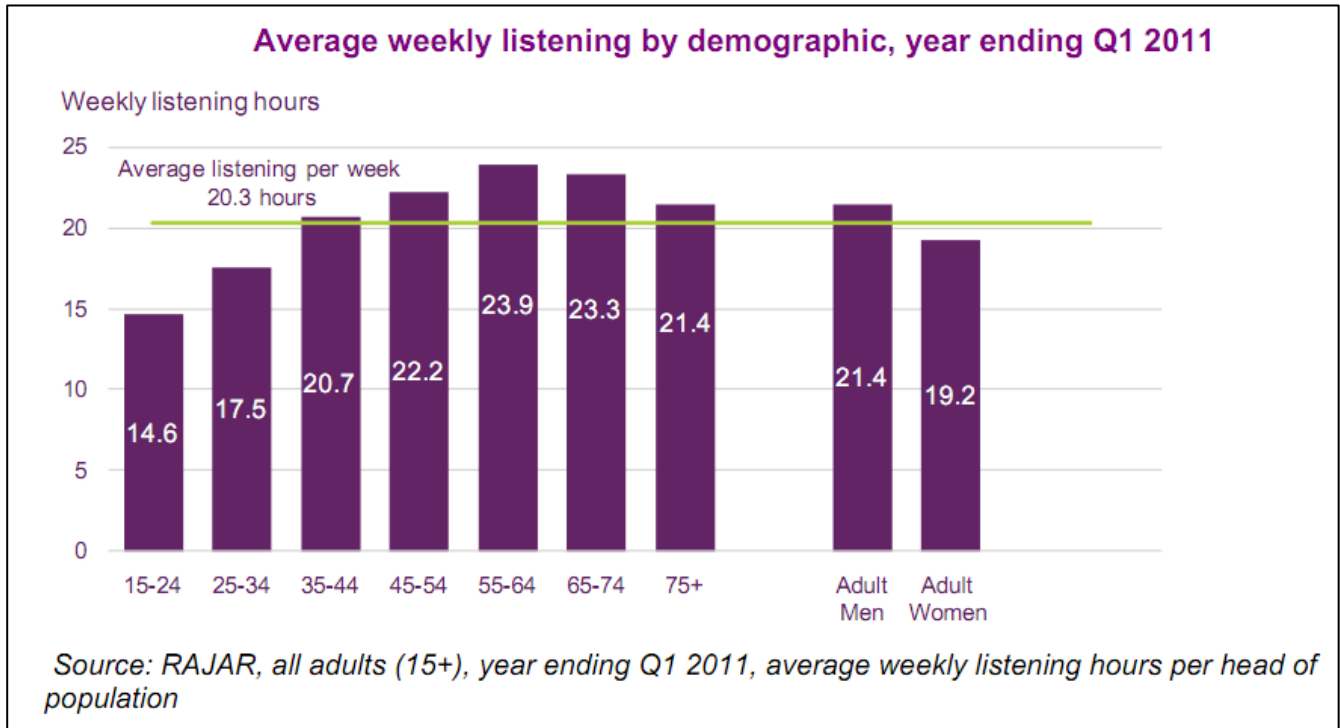


Figure 49. Average weekly listening by demographic in UK, year ending Q1 2011<sup>2</sup>.

There was a five-year decline in listening hours from 2005 to 2010, with a 2.9% fall in overall listening, according to RAJAR research. The 15-24 age group remains the one demonstrating the sharpest decline, with all listener hours among all adult groups under 44 showing a reduction. The only 3 age groups that show the increase in radio listening hours, are those of 45-54 year old, 65-74 and 75+, with the latter showing the greatest positive change in the listening hours amounting 6.9%.

### 2.2.2. Usage habits

#### The USA.

##### 1. Traditional radio.

According to The Nielsen Company (Study, 2009), 'Within Ad Supported Media, Broadcast Radio Reach is Second Only to Live Television', traditional broadcast radio is the leader among the audio sources, listened **at home** and **at work** almost in half of the cases, i.e. at home 47% of total minutes for audio sources and 54% at work (see Figure 50). Traditional radio was absolute audio leader **in the car** – in almost three quarters of the

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

<sup>2</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

time people consume audio from the broadcast radio. Broadcast radio also continues to play a major role to all ages, with almost 80 percent of those aged 18 to 34 listening to broadcast radio in an average day.

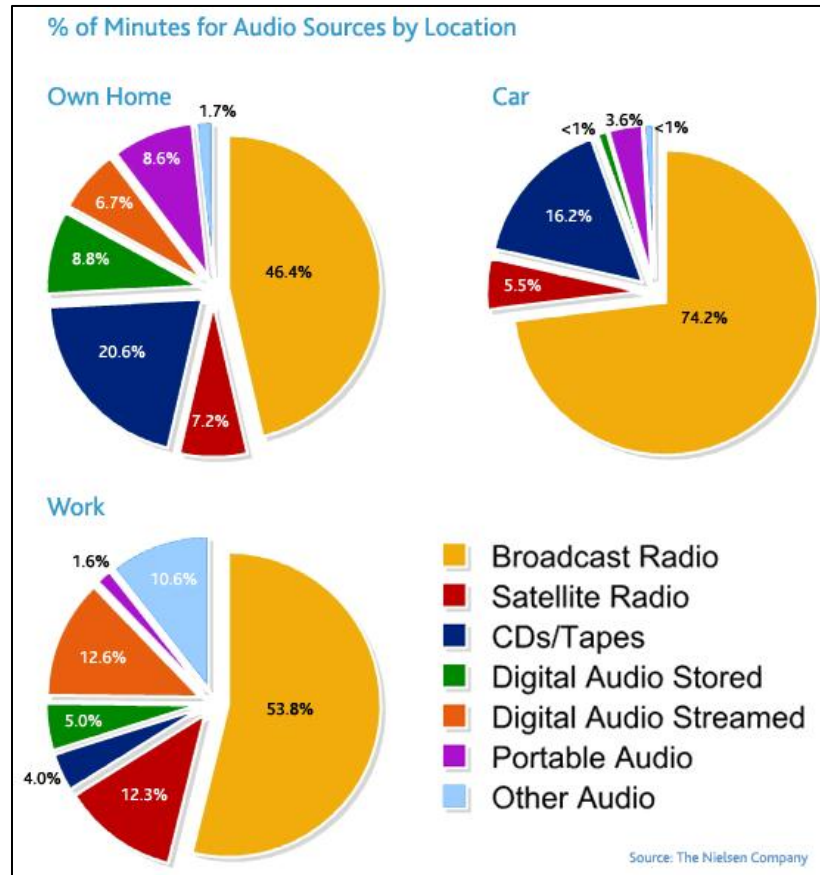


Figure 50. Percentage of minutes by audio sources by location in the USA, 2009<sup>1</sup>.

## 2. Satellite radio

Satellite radio is also listened at home, work and in the car (Study, 2009), but is far from the leader represented by the traditional radio. As seen on Figure 50, 7.2% of total minutes of audio listened from home was made through satellite radio, in comparison with 46.6% of the traditional radio. Satellite radio is more preferred at work (12.3%) and is a trend in the car. One critical factor for the success of satellite radio is the deployment of in-car receivers. As of 2008, the biggest manufacturing in the automotive industry offer satellite radio as original equipment. To name some of them: BMW, Mercedes-Benz, Ford, Volvo, Honda, Porsche, Toyota and many others. While crystal clear audio, uninterrupted playlists and anywhere access make Satellite Radio an enticing experience.

## 3. Online radio

<sup>1</sup> The Nielsen Company, 2009, [http://blog.nielsen.com/nielsenwire/media\\_entertainment/within-ad-supported-media-broadcast-radio-reach-is-second-only-to-live-television-study-finds/](http://blog.nielsen.com/nielsenwire/media_entertainment/within-ad-supported-media-broadcast-radio-reach-is-second-only-to-live-television-study-finds/)

Online radio service has been getting popularity for the last few years, due to the boom in the development of the Internet and thanks to the increasing variety of devices and services offered by the online radio.

According to Arbitron/Edison's (Arbitron/Edison's Research, 2011), **number of people listening weekly to the online radio has doubled** every 5 years since 2001 in the USA. As it is shown in the Figure 51 below, 22% of US population older than 12 years have listened to the online radio in the previous week, in comparison to 12% in 2006, and 5% in 2001.

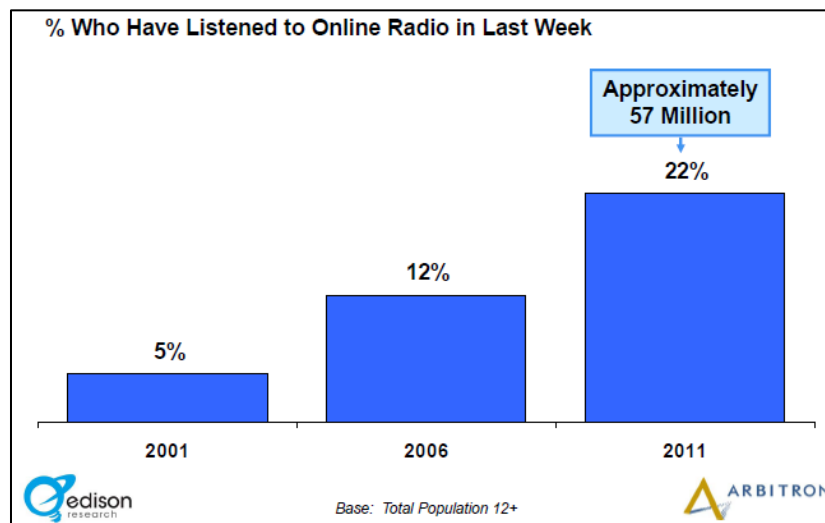


Figure 51. Growth of online radio US listeners 2001-2011<sup>1</sup>.

The main reasons why people prefer the online radio is found out in the recent studies by Arbitron/Edison's (Arbitron/Edison's Research, 2010). The top reason the Americans stated was the opportunity 'to control or choose the music played' (refer to Figure 52). The 2<sup>nd</sup> and 3<sup>rd</sup> reasons were 'more music variety' and 'fewer commercials' respectively.

<sup>1</sup> Arbitron/Edison's Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)

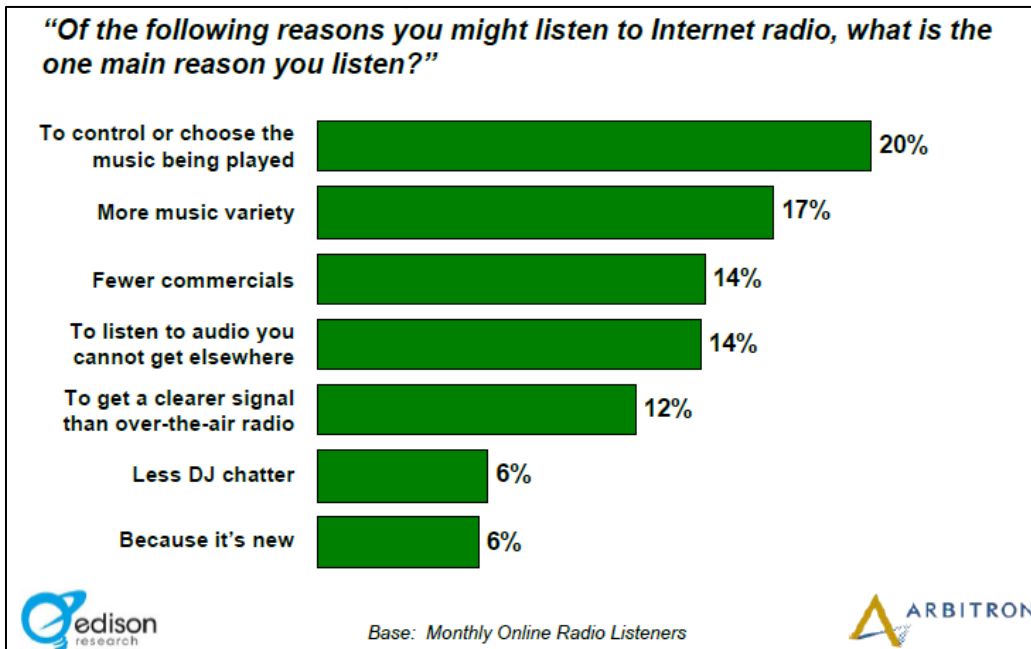


Figure 52. Top reasons to listen to the online radio in the USA, 2010<sup>1</sup>.

But online radio is still a compliment to the traditional over-the-air FM/AM one, and does not substitute it. There are 89% listeners to AM/FM radio and 11% of **exclusive** online radio listeners, who do not listen to AM/FM (Arbitron/Edison’s Research, 2011).

It is interesting to name a trend where the online radio is growing these days. The latest studies (Arbitron/Edison’s Research, 2011) show a rising popularity of the online radio listened from a cellphone in the car (see Figure 53). Since 2010 there is a significant rise (almost double) in consumers who **used their cellphones** to listen to the **online radio in the car** (11% in 2011 vs. 6% in 2010). Consequently, according to some authors (Shields, America’s Media Thirst Unquenchable, 2011), a big driver of online radio usage is its mobile accessibility.

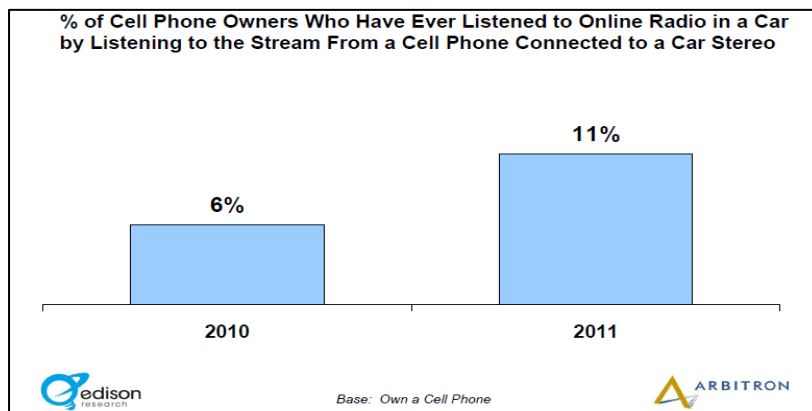


Figure 53. Growth of users listening online radio from their cellphones in the car<sup>1</sup>.

<sup>1</sup> Arbitron/Edison’s Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)

Another place where people enjoy listening online radio is at work, which means during the day hours. More than 20% of those who listens to the radio at work, do it on their computers.

## Europe

Listening to the radio is the most popular media consuming activity in the morning, when one wakes up (with 58% of respondents confirming), the recent studies declare (EIAA, Mediascope Europe , 2010). Table 8 indicates that listening to the radio is followed by watching TV (2<sup>nd</sup> place with 45%) and using Internet (3<sup>rd</sup> position with 29%). During the daytime radio is also one of the leaders. Navigating on Internet is the only activity that overpasses listening to the radio (71% vs. 68%). But later the hour after the midday, less popularity gains radio among its listeners. People usually prefer other media devices to the radio in the evening or during the night, when radio is on the 4<sup>th</sup> place out of 5. Finally, listening to the radio is twice less popular in the night than in the evening (21% vs. 42%).

	'When you wake up'	'During the Day'	'During the Evening'	'During the Night'
Watch TV	22%	50%	84%	54%
Read Newspapers	45%	57%	38%	16%
Read Magazines	20%	62%	55%	23%
Listen to Radio	58%	68%	42%	21%
Use the Internet	29%	71%	75%	43%

Question: Q1b/2b. What times of the day do you typically...during week?

Base: All Europe using each type of media – TV (n=11902) Nsp (n=8454) Mgz (n=5879) Rad (n=8351) Int via PC (n=6823) Int via Mob (n=1699) All Int (n=7162)

Table 8. Media use by time of the day in Europe, 2010<sup>2</sup>.

According to EIAA's European Media Landscape Report (2011), a quarter (25%) of all European Internet users surveyed listen to the radio online.

## UK

The locations where radio listening takes place have remained relatively unchanged over the last five years. In vehicle listening accounted for a fifth of all radio consumption in Q1 2011, according to RAJAR (Ofcom, 2011). As shown on Figure 54, 65% of radio listening takes place in the home. A further 15% of listening takes place at work or away from the home.

<sup>1</sup> Arbitron/Edison's Research, 2011, [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)

<sup>2</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)



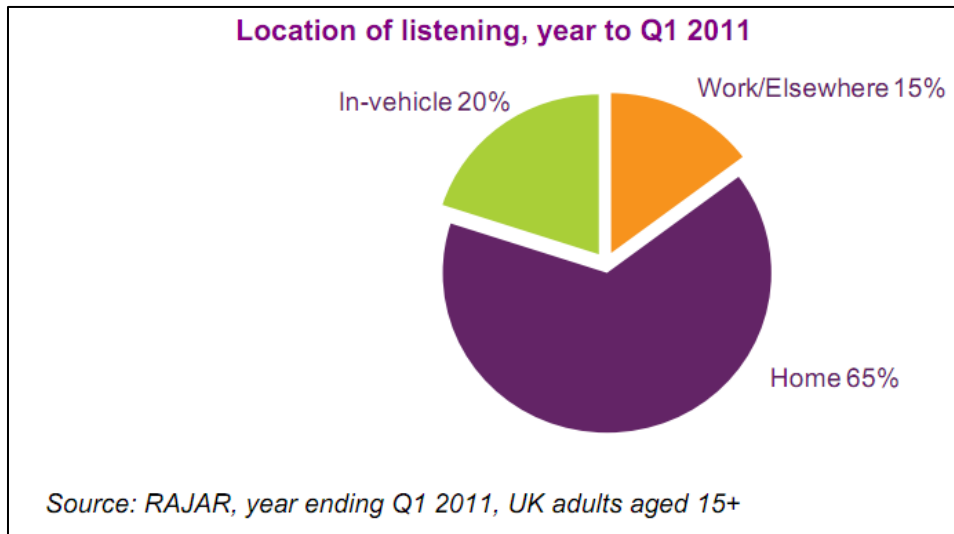


Figure 54. Location of listening radio in UK, year to Q1 2011<sup>1</sup>.

### 2.3. Computer

Today's computers produced for a personal use, can be classified in three categories:

- 1) Desktop computers
- 2) Laptops
- 3) Netbooks

#### USA

According to Pew Internet (Zickuhr, 2011), desktop computer ownership has fallen from almost 70% of US population owning them in 2006 to 57% in 2011, whereas laptops (including netbooks) have gained in popularity from 30% in 2005 to 56% in 2011. In 2011, for the 1<sup>st</sup> time in the history of these two devices, the percentage of ownership has converged at the point of 56-57%.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

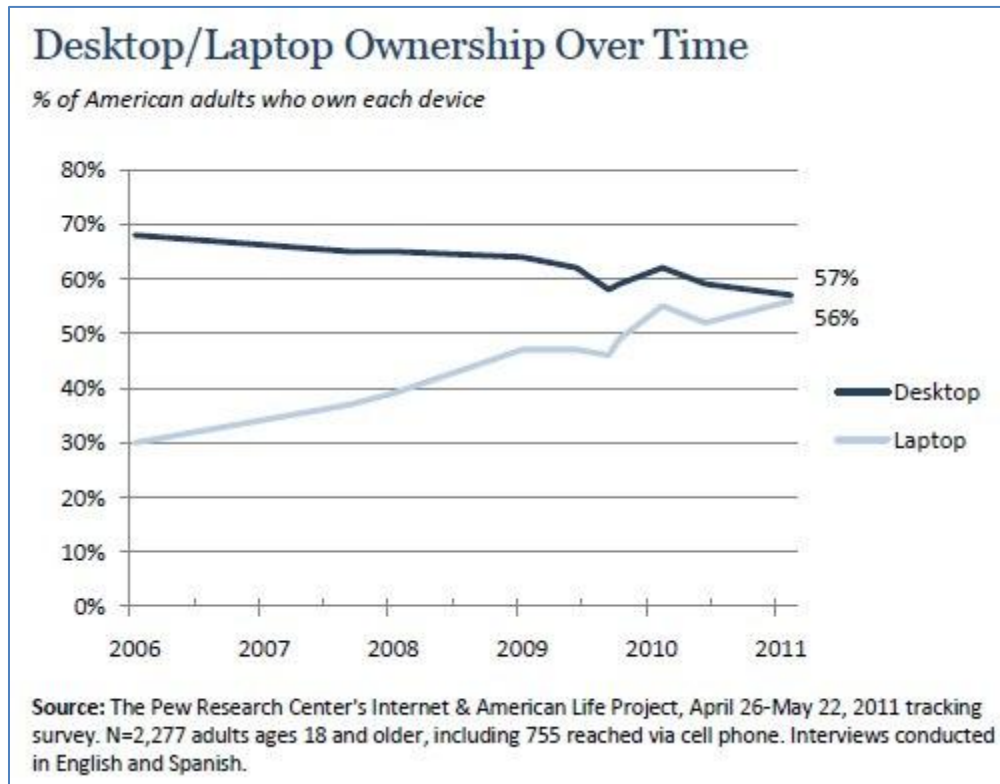


Figure 55. Ownership of desktop vs laptop in the USA over time, 2006-2011<sup>1</sup>.

But the number of laptop/netbook owners has a clear dependency on the age, the Pew Internet report suggests (Zickuhr, 2011). The older is the generation, less chances to own a laptop/netbook. The least laptops among all age groups possess 75+ year-olds - only 10% of them have such device. The leaders are 18-24 year-olds, with 70% of laptop ownership. As a general trend, all generations older than 35 years more probably have a desktop than a laptop. And the leaders (69%) are the Americans of 35-46 year old.

### 2.3.1. Overall time spent

#### USA

Americans are spending as many hours online as they do in front of their TV screens, according to a survey results published on Mashable (Indvik, 2010).

The average American now spends roughly 13 hours per week using the Internet and watching TV offline, Forrester finds, based on its survey of more than 30,000 customers. The Internet has long captivated the attention of younger Americans to a greater extent than TV and is now proving more popular among the age group of 31-44 years for the first time ever. 45-54 year-olds are spending the same amount of time per week using both media.

Notably, while the amount of time Americans spend watching TV has remained roughly the same in the past five years, Internet use has increased by 121% in the same time frame.

<sup>1</sup> Pew Internet, 2011, <http://www.pewInternet.org/Trend-Data/Device-Ownership.aspx>

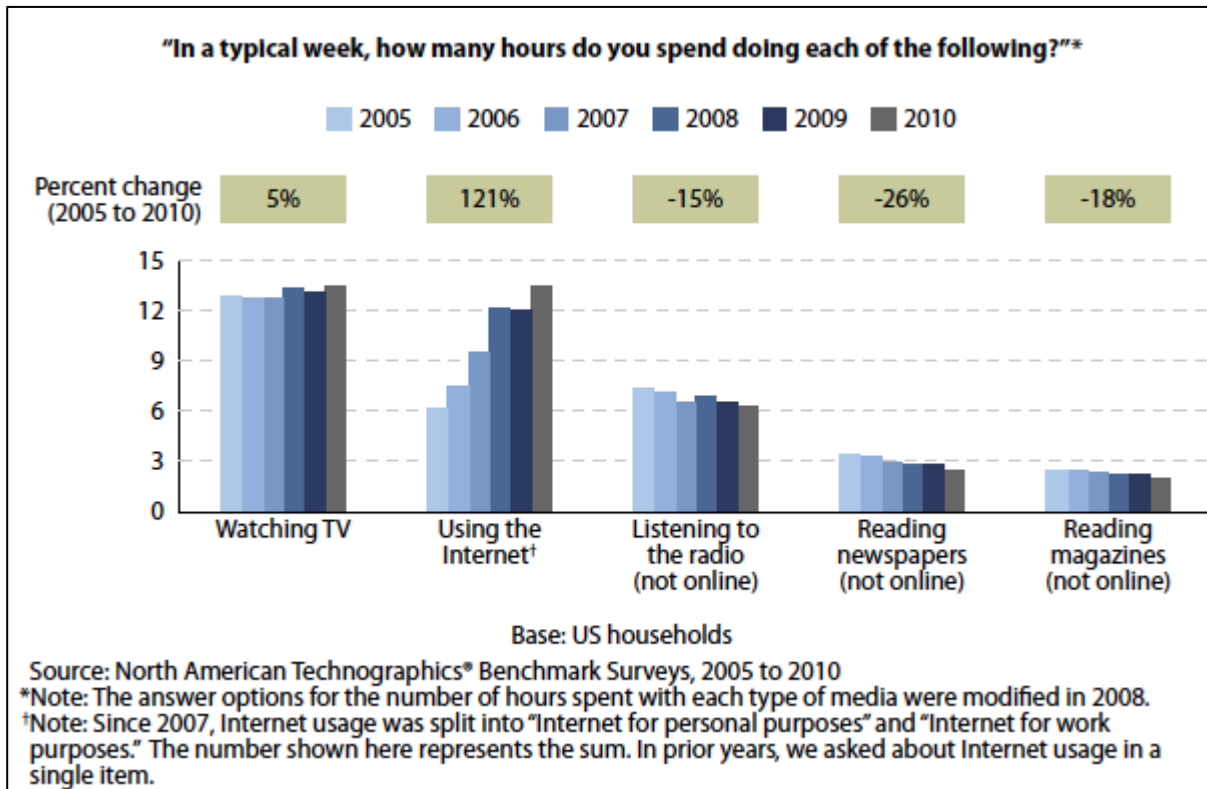


Figure 56. Time spent with different media in the USA, 2005-2010<sup>1</sup>.

In 2010 Americans of all generations spent more weekly time with Internet for personal, rather than professional purposes, the same study claims (Indvik, 2010). Generally, the younger the individual more time he/she spends for the personal interest, as shown on Figure 57 below. The leaders are 18-34 year olds who spend 11.9 hours per week, in comparison to almost twice less for the professional purpose (6.5 hours). 35-44 age group uses 10.3 hours for private purpose, whereas 45-54 and 55-64 spend the same - 9.1 hours; and 65+ category spends only 8.1 hours.

The trend differs completely when talking about Internet for the professional usage. Here the leaders are 31-44 year olds with 7.8 weekly hours spent, followed by those of age 45-54 with 7.6 hours and of 18-30 with 6.5 hours. Seniors of 65+ consume only 2.5 hours per week for the professional use, which is not surprising as it is generally a retirement age.

<sup>1</sup> Mashable, 2010, <http://mashable.com/2010/12/13/Internet-tv-forrester/>

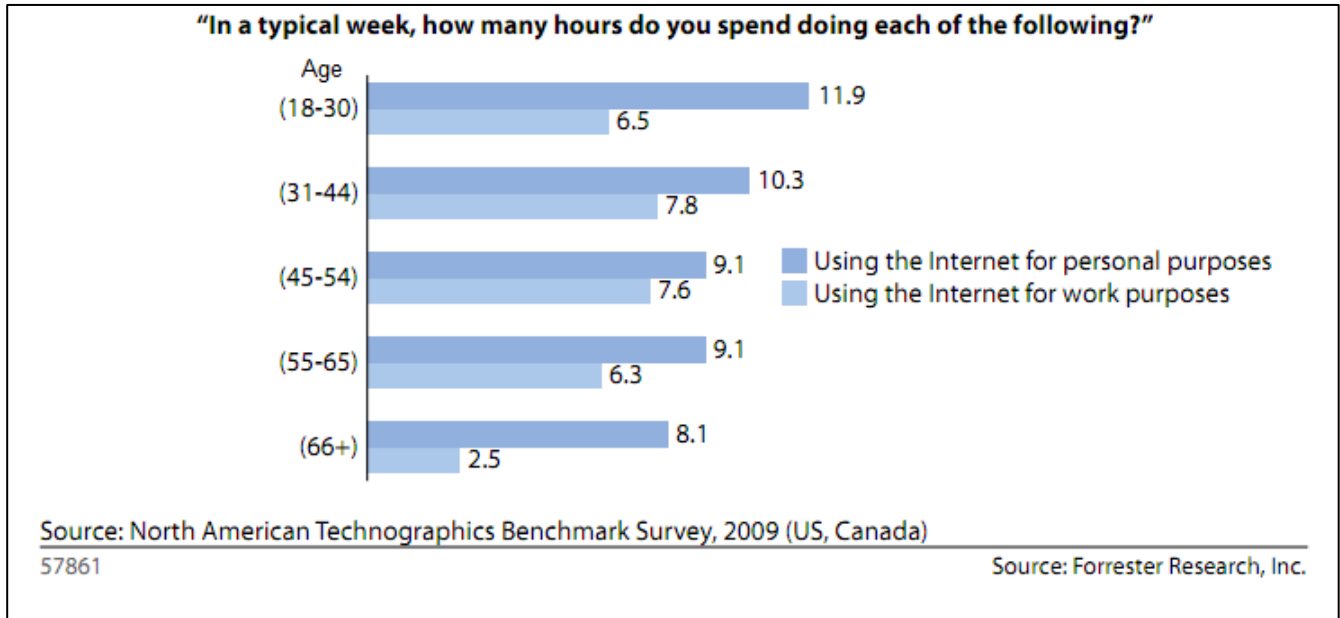


Figure 57. Time spent on Internet for personal and professional purposes across generations, US, 2009<sup>1</sup>.

## UK

Not only are younger British more likely to access the **Internet at home from PC**, those who do so are likely to spend more time online, according to UKOM/Nielsen study (Ofcom, 2011). The study was performed on 33,000 users aged 2 and older. Only Internet use on PCs is captured; Internet use on mobile phones and on other devices such as games consoles, tablet computers and Internet-connected televisions is not included. Overall as presented on Figure 58, Internet users spend around 50 hours a month online at home – this rises to **65 hours a month**, or more than two hours a day, among 25-34 year-old men who are the leaders in home Internet consumption. It shows that in April 2011 men in the UK spent slightly more time than women accessing the Internet.

<sup>1</sup> Forrester, 2010, [http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer\\_2010.pdf](http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer_2010.pdf)

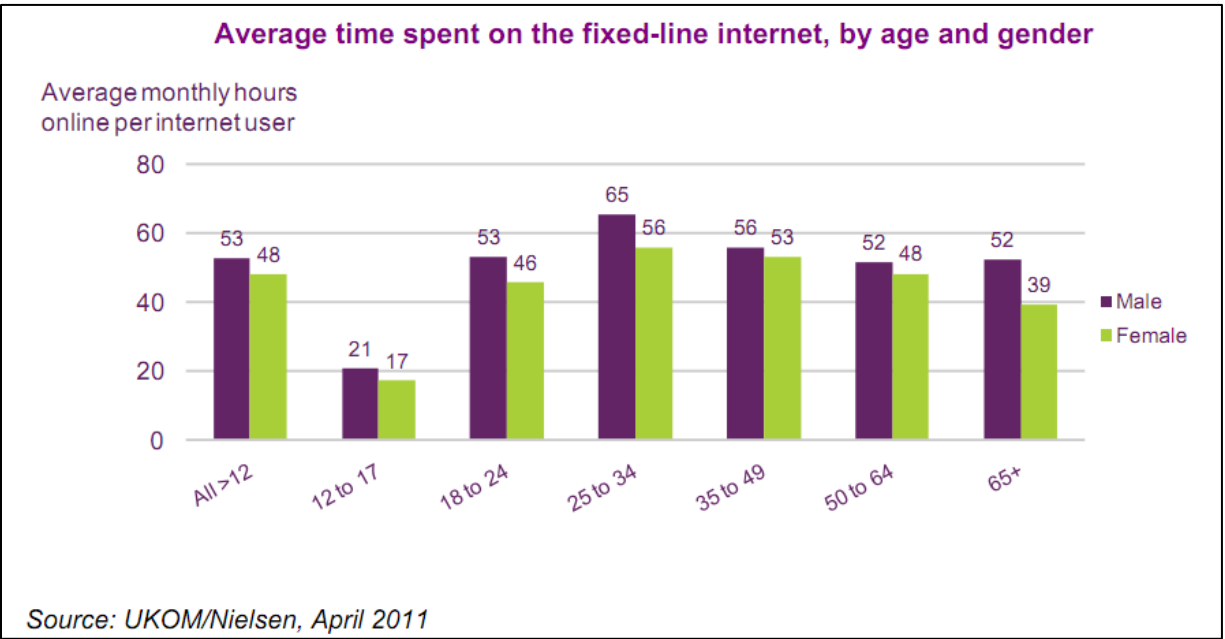


Figure 58. Average time spent on the fixed-line Internet, by age and gender, UK, 2011<sup>1</sup>.

### 2.3.2. Usage habits

#### USA

In 2010 Americans spent nearly a quarter of their time online on social networking sites and blogs, up from 15.8 percent just a year ago (43 percent increase) according to a research (The Nielsen Company, 2010). The research revealed that Americans spend a third their online time (36 percent) communicating and networking across social networks, blogs, personal email and instant messaging.

“Despite the almost unlimited nature of what you can do on the web, 40 percent of US online time is spent on just three activities – social networking, playing games and emailing leaving a whole lot of other sectors fighting for a declining share of the online pie,” said Nielsen analyst Dave Martin.

The top 10 activities ranked by Internet time spent are presented on Figure 59. The diagram shows how much time an average American would spend on each activity if the total Internet time was 1 hour. Social networking and blogging is the absolute leader with 15% (or equivalent to 13m 36s). Online games overtook personal email to become the second most heavily used activity behind social networks – accounting for 10 percent of all US Internet time. Email is on the 3<sup>rd</sup> position dropped from 11.5% of time in 2009 to 8.3% in 2010. The major portals also experienced a decline in share, but remained as the fourth heaviest activity, accounting for 4.4 percent of US time online.

Instant messaging, watching videos/movies on video-specific and movie-related websites only, search, software info, multi-category entertainment and auctions – all have almost equal online time share, amounting around 4%.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)



**Figure 59. Top 10 ranked activities by share of the Internet time in the US, 2010<sup>1</sup>.**

Fully 65% of adult Internet users now say they use a social networking site like MySpace, Facebook or LinkedIn, up from 61% one year ago. This marks the first time in Pew Internet surveys that 50% of all adults use social networking sites (M. Madden, 2011). “The graying of social networking sites continues, but the oldest users are still far less likely to be making regular use of these tools,” said Mary Madden, Senior Research Specialist. The survey was conducted over 2,277 US adults, age 18 and older. Telephone interviews were conducted in English and Spanish by landline (1,522) and cellphone (755).

Looking at usage on a typical day in 2011, 43% of online adults use social networking, up from 38% a year ago (see Figure 60). Out of all the “daily” online activities, only email (which 61% of Internet users access on a typical day) and search engines (which 59% use on a typical day) are used more frequently than social networking tools.

<sup>1</sup> The Nielsen Company, 2010, [http://blog.nielsen.com/nielsenwire/online\\_mobile/what-americans-do-online-social-media-and-games-dominate-activity/](http://blog.nielsen.com/nielsenwire/online_mobile/what-americans-do-online-social-media-and-games-dominate-activity/)

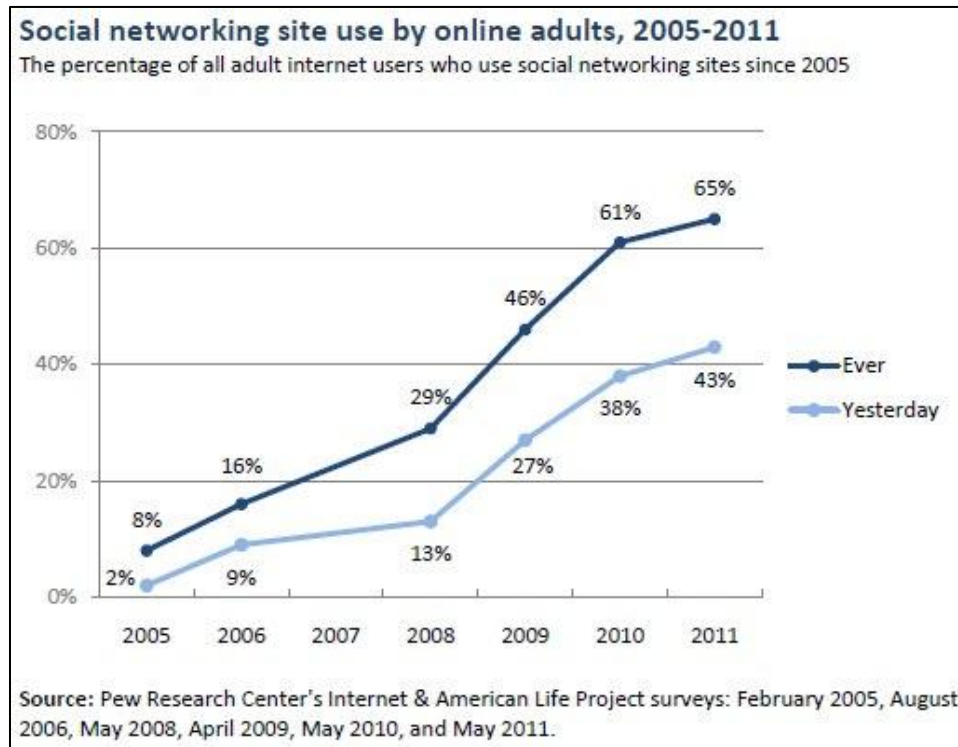


Figure 60. Social networking site use by online adults, US, 2005-2011<sup>1</sup>.

Among Internet users, social networking sites are most popular with women and young adults under age 30. 69% of women use social networks in comparison to 60% of men. Women are also more active in their use of these sites, with almost half of female Internet users using social networking sites on a typical day (48%), compared with 38% of male Internet users.

It is interesting to see the list of the online activities the US and Canadian population was doing at least once per month in 2010 and 2007 (see the diagram below, Figure 61). General activities like email are attractive because of their functional integration with consumers' existing lives. Once consumers understood the concept of sending electronic messages, it became easy to substitute traditional letter writing (or even phone calls or in-person meetings) with a quick email, or instant messaging (IM). Therefore, the percentages of people using IM, email or sending/receiving photos via email does not change much in 2010 compared to 2007. E.g. email monthly usage remains with 92% of adults. Other, more specialized behaviors like blogging are still limited to a distinct group of online consumers with 33% of consumers in 2010 vs. 31% in 2007.

Instead the recently adopted activities experience the fast growth. In 2007, slightly more than one-third of online respondents were shopping online, and the number is almost doubled in 2010, 60% do so. According to the research (Anderson, 2010), e-commerce has broad appeal because, like email, it is based on a behavior that consumers are already doing: in this case, shopping. The barriers of moving this offline behavior online are higher than for other replacement activities like email but don't require learning a brand-new behavior. Age

<sup>1</sup> Pew Internet Report, 2011, <http://www.pewInternet.org/~media//Files/Reports/2011/PIP-SNS-Update-2011.pdf>

group of 31-44 are fueling e-commerce adoption: 68% of them are shopping online. Although fewer 45+ year olds are buying online, they outspend the generation of 31-44 years by more than \$4.5 billion a year.

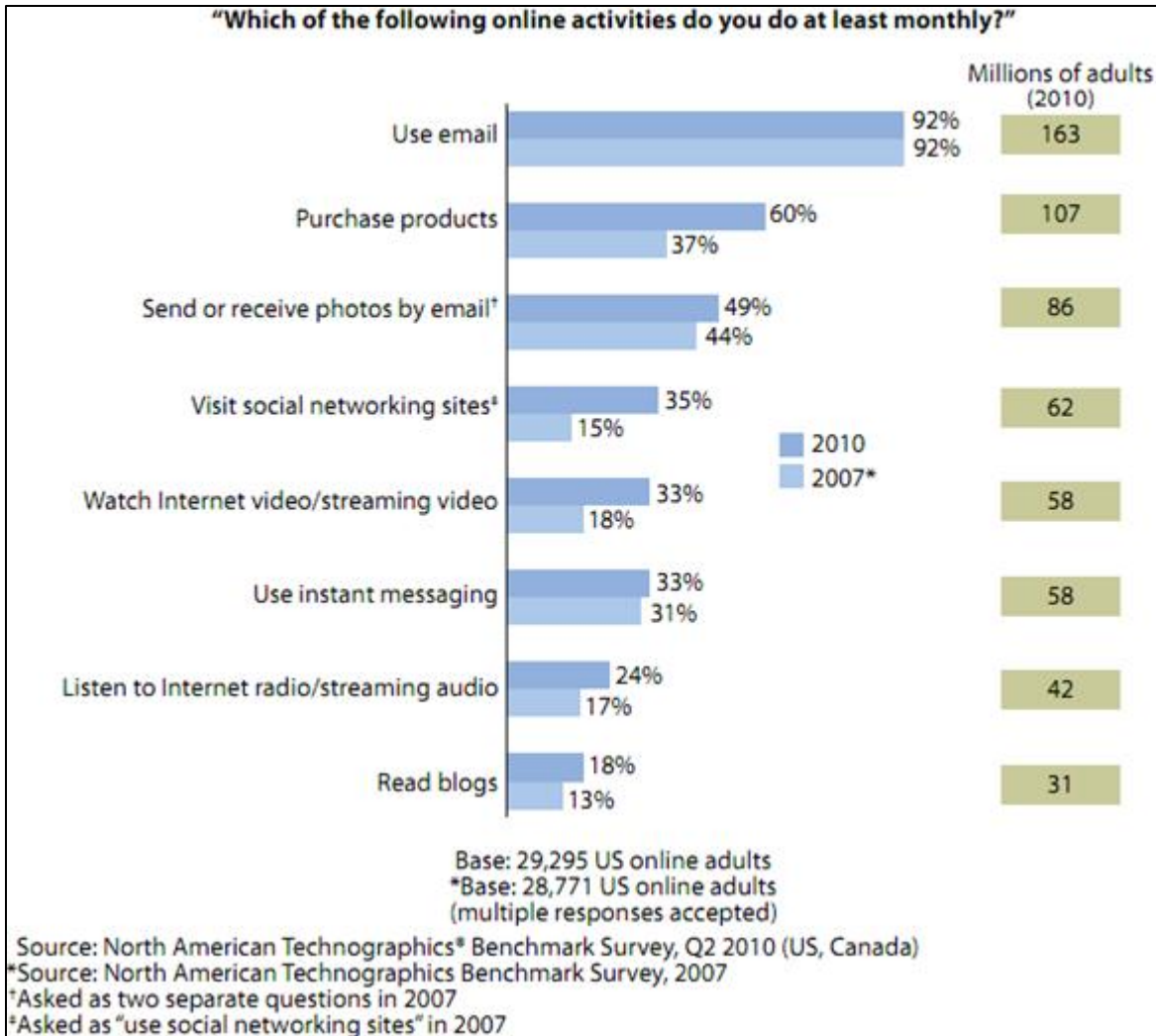


Figure 61. Online activities by popularity of usage at least monthly, US, 2007-2010<sup>1</sup>.

Another American survey committed by Pew Internet (Purcell, 2011) finds that **92%** of online adults use **search engines** to find information on the Web, including 59% who do so on a typical day. This places search at the top of the list of most popular online activities among US adults. But it is not alone at the top. Among online adults, **92%** use **email**, with 61% using it on an average day. Email and search form the core of online communication and online information gathering, respectively. Perhaps the most significant change over that time is that both activities have become more habitual. In 2002, 49% of online adults used email each day, while just 29% used a search engine daily. Of course, the Internet population has grown substantially since 2002. So, the overall number of users of both email and search engines has also grown. In January 2002, 52% of all Americans used search engines and that number grew to 72% in the most recent survey. In January 2002, 55% of all

<sup>1</sup> Forrester, 2010, [http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer\\_2010.pdf](http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer_2010.pdf)



Americans said they used email and that number grew to 70% in the current survey. The survey was conducted from April 26-May 22 2011 among 2,277 adults ages 18 and over, including surveys in English and Spanish and on landline and cellphones.

The graph below (Figure 62) shows how these two activities compare over time to some other popular online activities. Search engine and email are on the 1st place with 92% of Internet users, online news are on the 2nd with 76%, followed by online shopping (71%) and social networks (65%). Interestingly that people use social networks not only for getting in touch with their friends, but also to find job. And the digital resume are increasingly popular, with job seekers creating infographic resumes, video resumes and other visual resumes that set them apart from other job applicants.

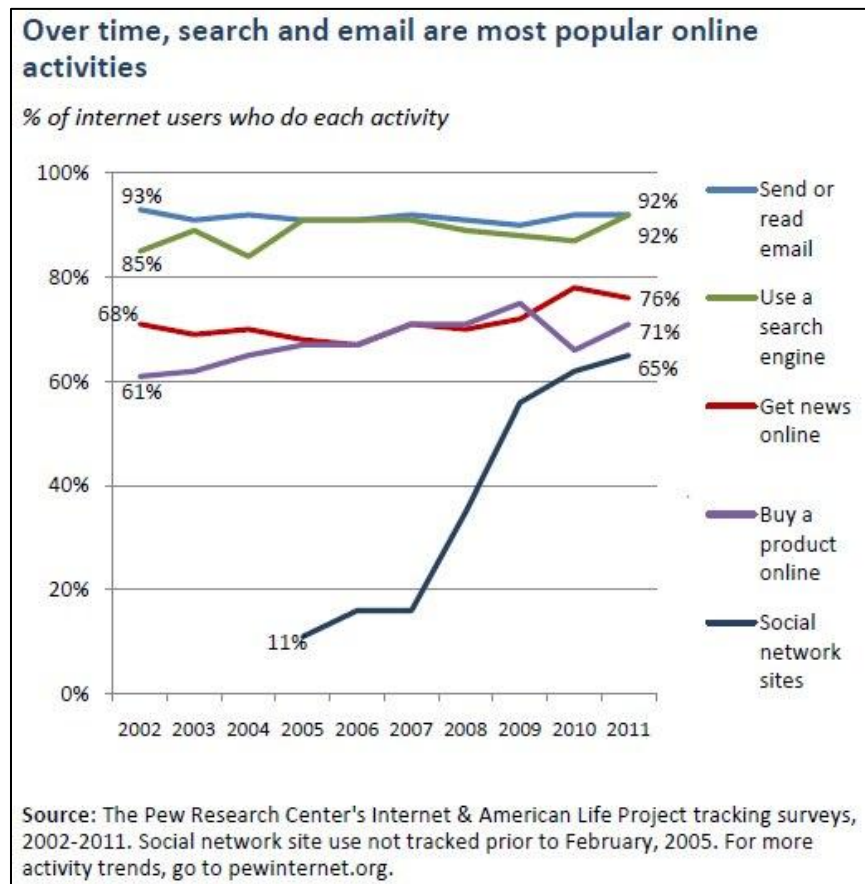


Figure 62. Percentage of Internet users and the activities they do online, US, 2002-2011<sup>1</sup>.

**UK**

As stated in the latest study (Ofcom, 2011), for the first time in Q1 2011 in Great Britain household Internet take-up (78%) exceeded PC ownership (77%) as a small proportion of households went online via mobile phones only.

<sup>1</sup> Pew Internet Survey, 2011, <http://www.pewInternet.org/Reports/2011/Search-and-email/Report.aspx?src=prc-headline>

Reasons for using the Internet vary by age. Figure 63 shows some of the reasons for using the Internet by consumer group. There are differences between generations in their motivations for using the Internet. Older people in general appear to have a much more functional approach to the Internet, using it primarily ‘to find out or learn things’ (72% of over-65s) and ‘for contact with other people’ (51% of over-65s) and are less likely to use it ‘for fun’ (20%), ‘to relax’ (24%) or ‘to pass the time’ 22%). By contrast, younger people are much more likely to also use the Internet for entertainment: 74% of 16-24s say they use the Internet ‘for fun’, 53% ‘to relax’ and 52% ‘to pass the time’.

There are also some differences between men and women. Women are slightly more likely to use the Internet to contact other people (64% compared to 62% of men), but are less likely to use the Internet ‘to relax’ (35% compared to 45% of men) or ‘to keep up to date with news’ (31% compared to 42% of men).

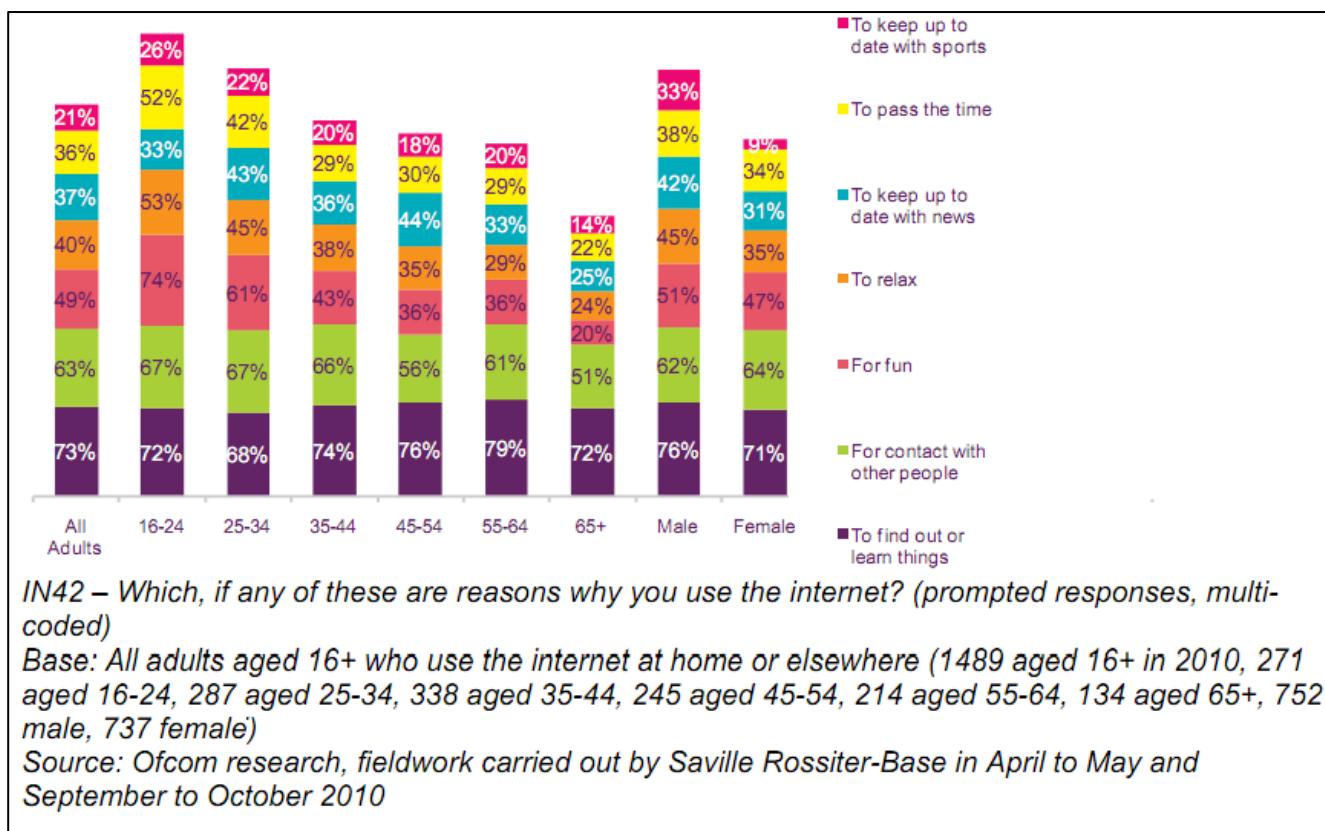


Figure 63. Reasons for using the Internet, by age and gender, 2010<sup>1</sup>.

As with Internet use on PCs, according to the latest study (Ofcom, 2011), PC users are more likely to use all types of Internet services than mobile phone users, see detailed in Figure 64. The only service that is almost equally popular on both devices is social networking (62% of users consuming it from PC vs. 75% from mobile). PCs most commonly used Internet services are search engines, email and reading news or info websites; with 95, 94 and 82 percent respectively. Playing online games is the least popular in the list.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)



Figure 64. Comparative use of Internet by PC and mobile user, UK, 2011<sup>1</sup>.

Search engine Google had the **highest reach** of any online brand, with 79% of active Internet users visiting its homepage, averaging 133 visits in April 2011. Google users spent an average of 54 minutes on the site, doing an average of 133 searches.

Facebook was easily the most popular website in terms of time spent on PCs, accounting for 169 million hours in April 2011 (more than 2.5 hours for every person in the UK), ahead of eBay (30 million hours), Google (28 million hours) and YouTube (22 million hours).

Six in ten broadband users use social networking, but there are signs that it may be reaching saturation. Total time spent on social networking sites was just 1.3% higher in April 2011 than in April 2010, and in 2010 just 3% of people said they did not yet have a social networking profile but were interested in having one.

An increasing number of Internet users are **creating content**. In 2010, 54% of Internet users said they had a social networking profile (up from 44% in 2009), 53% said they had uploaded photos (up from 49%) and 17% said they had uploaded a video (up from 11%). More than **90% of social networking time is spent on Facebook**.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

Nearly three-quarters of Internet users **shop online**. In Q1 2011, 73% of UK Internet users claimed to use their broadband connection for purchasing goods or services. Visitors to coupon and reward sites increased by 25% in the year to April 2011 when nearly 40% of Internet users visited at least one such site. Number of users of such reached around 15 million. The highest profile coupon site is Groupon, which, from its January 2010 has grown rapidly, becoming the UK's most-visited coupon and reward site in October 2010 and reaching 16% of UK Internet users by April 2011.

UK consumers have been relatively early adopters of online shopping, facilitated by the historic popularity of catalogue shopping, high penetration of credit cards, a willingness to trust online payment systems and the early launch of retailers such as Amazon.co.uk, which had a high-profile launch in 1998. Research by Mediascope Europe at the end of 2009 found that, on average, UK Internet users estimated that they spent on average £1,031 online, across an average of 19 transactions – more than double the number of purchases by consumers in France, Germany, Italy, Spain and the Netherlands, and around twice the value. **Female** Internet users are slightly more likely to visit mass merchandising sites than male.

For many consumers, a key benefit of Internet shopping is the ability to compare prices before making an online or offline purchase. As of April 2011, more than one in seven Internet users (16%) visited the leading comparison website, moneysupermarket.com.

The use of websites is only part of the online experience for most Internet users –it is increasingly popular to use **applications** for playing games, watching audio-visual content and uploading one's own content. Figure 65 indicates that around 4 in 10 home Internet connections are used for playing games (38%), downloading music or video (37%) and watching video (40%), with smaller proportions watching online TV programmes (23%), listening to the online radio (18%) and uploading content (16%). (Note that people do not generally consider updating social networking profiles as "uploading content").

For all types of media content except listening to the radio, reach is highest among the youngest age group and lowest among the oldest. Radio has similar levels of take-up among all age groups except the over-65s.

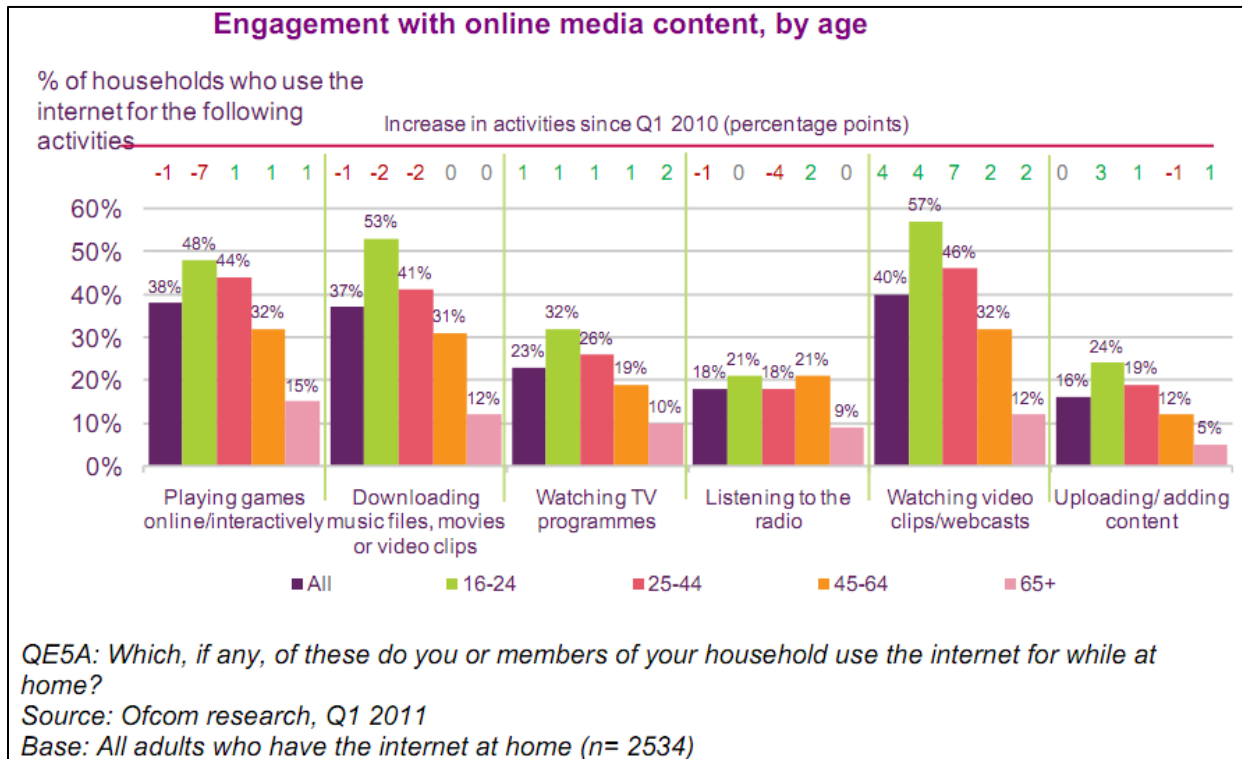


Figure 65. Engagement with online media content, by age, UK, 2011<sup>1</sup>.

Within the media literacy research (Ofcom, 2011), the UK consumers were asked about their concerns about using the Internet. As the Internet has matured as a medium and as users have got more and more used to it, concerns about it have decreased among all age groups. Overall, 54% of all users surveyed in 2010 said they had some concerns, compared to 73% in 2007. As shown on Figure 66, older users are most likely to have concerns, with two-thirds of over-65s (66%) saying they had concerns, compared to just one-third of 16-24s (34%). The biggest single cause of concern among all age groups was offensive/illegal content, with 40% of adults preoccupied. On the second place are the issues of security, with 21%. They are followed by the risks to society (18%). Personal privacy and advertising close the list with 10 and 7 percent respectively.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

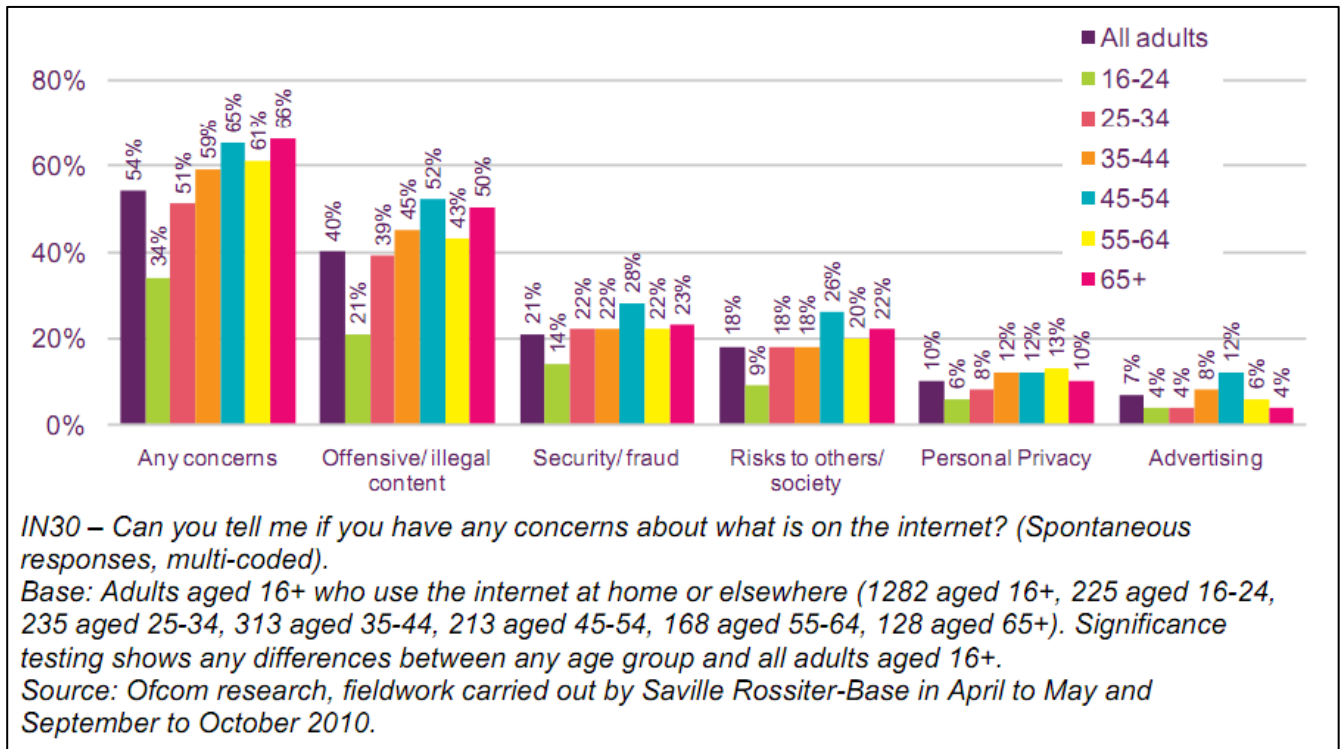


Figure 66. Concerns about the Internet among users, by age, UK, 2010.<sup>1</sup>

## Globally

**Cloud** computing is getting an increasing popularity among users of all over the world. It allows to store files, documents and other content on the web, as well as to manage and access the content is accessible from any web browser or connected device. Google Apps, which includes Gmail, Google Calendar and Google Docs, is one of the best known consumer cloud applications. Google Docs is very popular with startups, businesses and individuals. Dropbox is one of the most popular cloud and file storage solutions because it makes sharing files with other users or across computers dead simple. The service is focused on consumers, but many businesses use it, too. Dropbox has an API and is supported by a multitude of web and mobile applications.

## 2.4. Tablet

### The USA

According to the forecasts (Sonderman, 2011), in 2011 about 8 to 12 percent of US adults own a tablet. Another source (Frank N. Magid Associates, Inc., 2011) also reports 12% as the number of tablet owners in 2011, this is equivalent to 28 millions of users.

More probably the owner or the tablet is a man (60%), and the most common the device is between 25-34 y.o., 29% for both sexes. 18-34 year olds are on the 2nd position with 19%, and 35-44 y.o. on the 3rd, 17%.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

	% who own or use a tablet (composition)		
<i>N-Size</i>	<i>Total N=291</i>	<i>Male N=175</i>	<i>Female N=116</i>
	100%	60%	40%
8-11	10%	10%	10%
12-17	11%	7%	17%
18-24	19%	21%	16%
25-34	29%	30%	27%
35-44	17%	20%	13%
45-54	9%	7%	11%
55-64	6%	5%	7%

Table 9. Tablet owner profile, 2011<sup>1</sup>.

The study (Frank N. Magid Associates, Inc., 2011) states that tablets will become more popular among women in 2012 than in 2011 (45% vs. 40%). And the dominant age will be still 25-34. Interestingly, whereas in 2011 the generation of 18-24 of tablet ownership was over 35-44 year-olds as for male, female and both sex categories, the situation will change in 2012. Percentages of 18-24 and 35-44 will be absolutely the same: 13% for females, 20% males, and 17% for both.

	% who plan on purchasing a tablet in the next 12 months (composition)		
<i>N-Size</i>	<i>Total N=447</i>	<i>Male N=247</i>	<i>Female N=200</i>
	100%	55%	45%
% who are current tablet owners	38%	39%	32%
8-11	9%	9%	9%
12-17	13%	9%	18%
18-24	17%	20%	13%
25-34	26%	28%	25%
35-44	17%	20%	13%
45-54	13%	11%	15%
55-64	6%	5%	8%

Table 10. Tablet owner profile prediction for 2012<sup>1</sup>.

<sup>1</sup> OPA, 2011, <http://onlinepubs.ehclients.com/images/pdf/MMF-OPA -- Portait of Todays Tablet User -- Jun11 %28Final-Public%291.pdf>

In 2010, as shown on Figure 67, on average 4% of US population owned a tablet, according to Pew Internet (Zickuhr, 2011). Generally, younger adults (18-46 y.o.) were more likely to have a tablet, than the older adults.

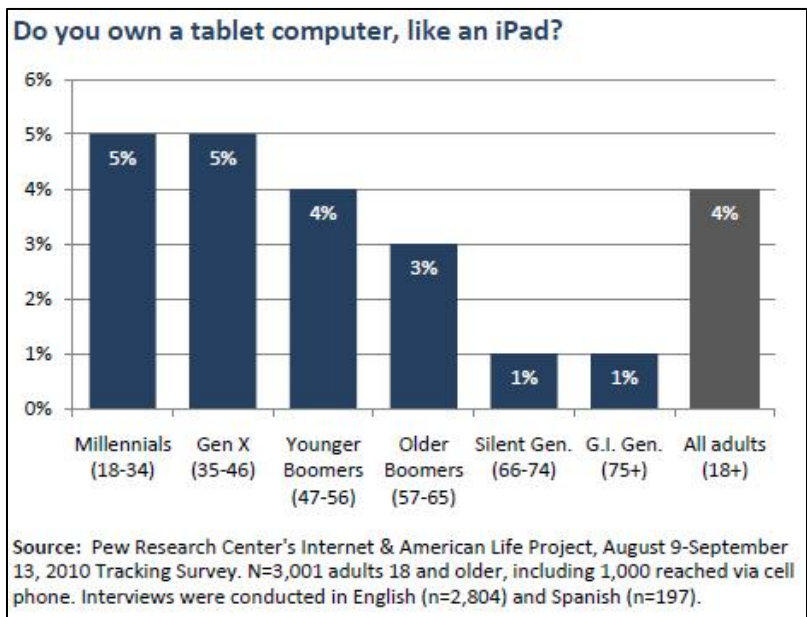


Figure 67. Demographics of tablet owners, US, Q3 2010<sup>2</sup>.

On the other hand, the report counts 5% of US adults to have an e-reader in Q3 2010. Among the leaders were the generations of 47-56 and 66-74 year old (7 and 6 percent respectively). 18-46 share the 2nd place with 5% of owners (see Figure 68 below).

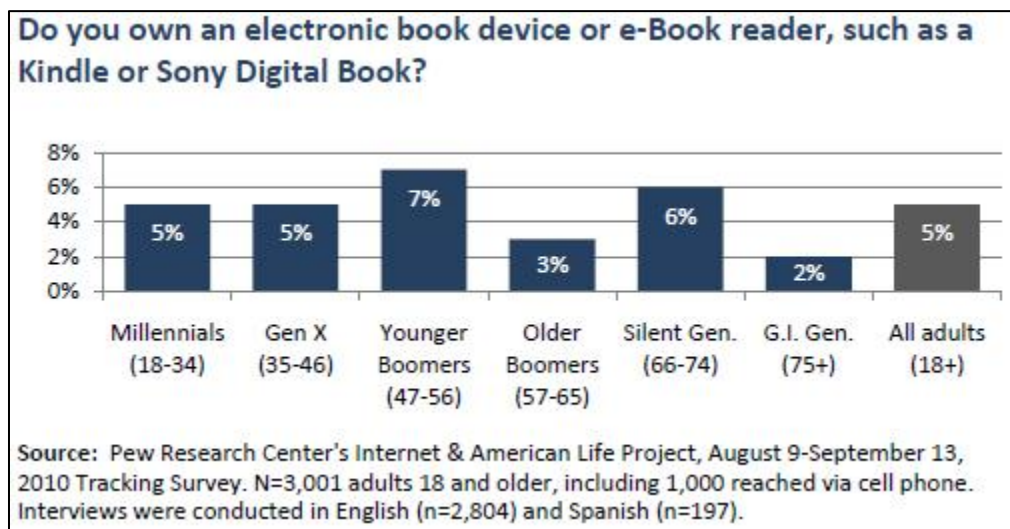


Figure 68. Demographics of e-reader owners, US, Q3 2010<sup>1</sup>.

<sup>1</sup> OPA, 2011, <http://onlinepubs.ehclients.com/images/pdf/MMF-OPA -- Portait of Todays Tablet User -- Jun11 %28Final-Public%291.pdf>

<sup>2</sup> Pew Internet, 2011, <http://www.pewInternet.org/Reports/2011/Generations-and-gadgets/Report/eBook-Readers-and-Tablet-Computers.aspx>



Historically, in the US tablet and e-reader owners tended to be male and of the younger age. But according to Nielsen’s latest Q2 2011 quarterly survey (The Nielsen Company, 2011), the situation has changed.

Firstly, as of Q2 2011, 55+ age group are the leaders among all other age groups to own an e-reader and are on the 2<sup>nd</sup> position in the rank to own a tablet (refer to the graph below, Figure 69). Back in Q3 2010, 55+ were already on the leading place with 25% of those who had an e-reader, but they even increased up to 30%. That means nearly 1 in 3 e-reader owner is older than 55. Moreover, if in Q3 2010 tablet owners of age 55+ were the smallest among all age groups (amounting only 10% of all owners), by Q2 2011 they reached the 2<sup>nd</sup> position with 19%. Instead, 25-34 year olds were the biggest cluster (26%) in 2010 and lost 4% in 2011.

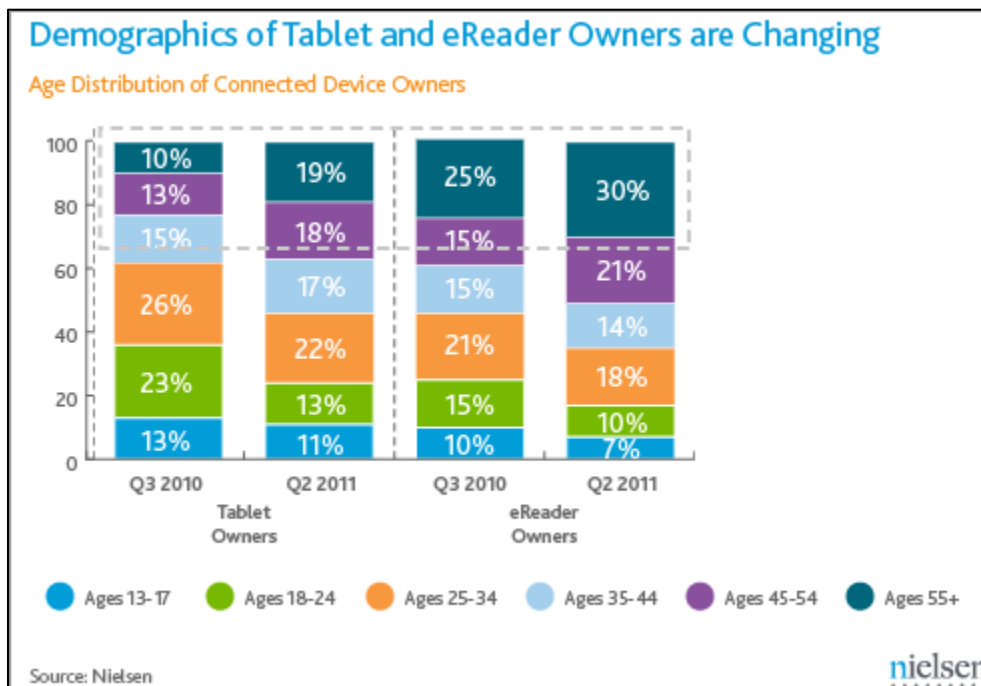


Figure 69. Comparison of demographics of Tablet and E-reader owners, US, 2010-2011<sup>2</sup>.

Secondly, the data by gender underlines key changes in the e-reader category. In 2011, 61% of all e-reader owners are female, compared to less than half (46 percent) in Q3 2010. Men are still dominating in the Tablet category, where percentage of women is 43%.

<sup>1</sup> Pew Internet, 2011, <http://www.pewInternet.org/Reports/2011/Generations-and-gadgets/Report/eBook-Readers-and-Tablet-Computers.aspx>

<sup>2</sup> Nielsen Wire, 2011, <http://blog.nielsen.com/nielsenwire/?p=28695>

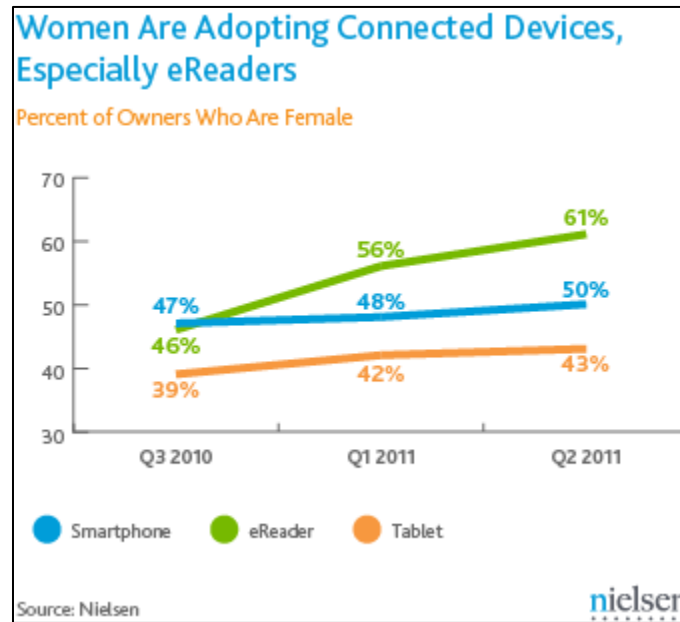


Figure 70. Percentage of female owners of smartphones, e-readers and tablets, US, 2010-2011<sup>1</sup>.

As for the future predictions, Samsung Mobile announced the results of an online survey that showed that mobile tablets are becoming the new must-have device for an overwhelming majority of Americans (Business Wire, 2011). The survey revealed that **90%** of US consumers either already own a tablet or would consider buying one.

## UK

Apple's launch of the iPad in May 2010 has created the impulse for a major new category of hand-held touchscreen computers - tablets. Five main tablet platforms (operating systems) are available on the UK market: iPad, Android, Blackberry, Windows and HP. Research by Enders Analysis in April 2011 found that 6% of UK mobile phone users claimed to own a tablet, with a further 24% interested in owning one.

UK site Amazon.co.uk announced in May 2011 that it was selling twice as many e-books as hardcover books, and data from the Publishers Association show that digital books' share of the total book market increased from 2% in 2009 to 11% in 2010. Ofcom research indicates (refer to Figure 71) that 4% of adults claimed to use an e-reader in Q1 2011. Unlike other connected devices, e-readers are as popular with older age-groups as younger age-groups: 4% of 16-24s and 4% of 55-64s claimed to own an e-reader while take-up was highest among 35-54s (6%). The study indicates twice less popularity of tablets among the Britons – on average 2 percent of them own such a device, nevertheless the interest in purchase of tablets is increasing.

<sup>1</sup> Nielsen Wire, 2011, <http://blog.nielsen.com/nielsenwire/?p=28695>

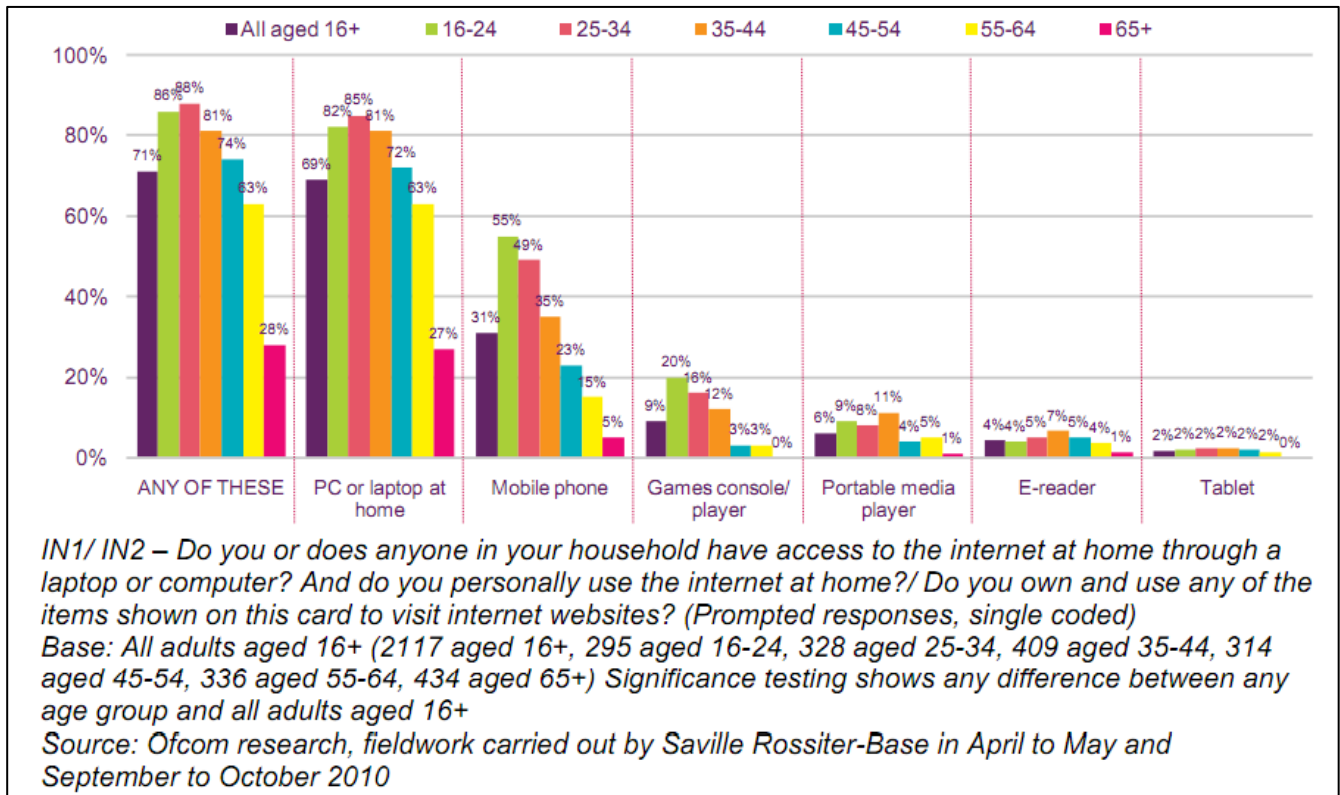


Figure 71. Devices used to visit Internet websites by age, UK, 2010<sup>1</sup>.

### 2.4.1. Overall time spent

#### The USA

A survey (Google Admob, 2011), commissioned in the US in March 2011 over 1,430 respondents has found out that on average 68% of tablet owners spend **at least 1 hour** per day with their tablets (see Figure 72). And 38% of respondents spend more than 2 hours per day. About 1 in 5 respondents said they were spending from 30 min up to 1 hour with their tablets.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

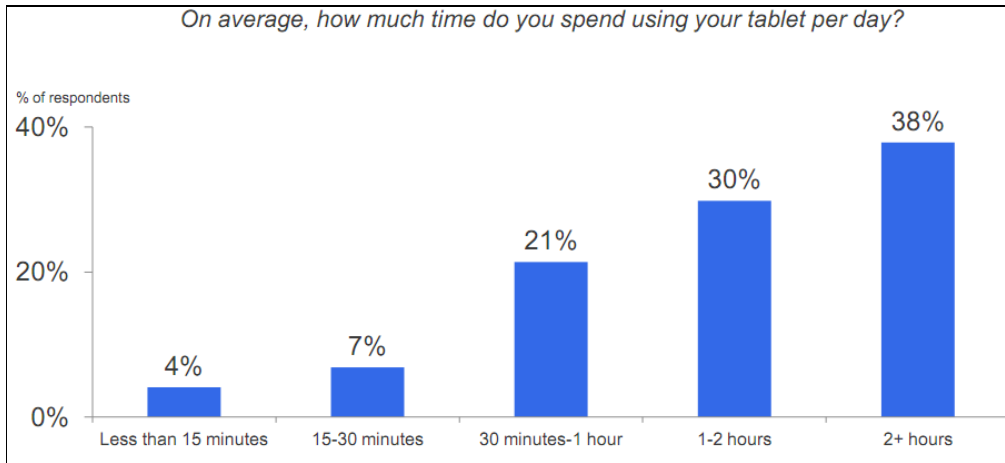


Figure 72. Percentage of tablet owners and time spend with a tablet, US, 2011<sup>1</sup>.

Tablet owners say they **spend more time** every day with their tablets than doing other activities, Google study reports (Google Admob, 2011). As presented on the graph below (see Figure 73), the majority of respondents (59%) spend more time with the tablet than **reading a paper book**. More than half (52%) say they spend more time with a tablet than listening to the radio. More than 1 in 4 tablet owners even spend more time on with tablets than with their laptops/desktops or smartphone. Finally, almost third (34%) spend more time with tablets than with TV.

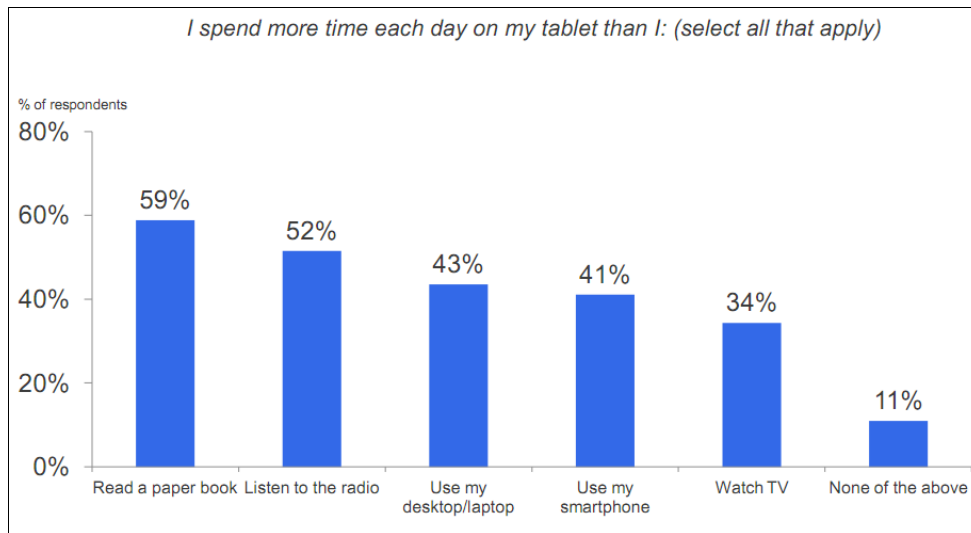


Figure 73. Percentage of tablet owners who prefer spend time with tablet than doing other activities, US, 2011<sup>2</sup>.

The Google Admob Tablet Survey (2011) reports that almost three quarters of respondents (77%) experienced **a decrease in their desktop PC or laptop usage** after they had started to use tablets. Nevertheless, for 72% of tablet owners tablets are **not the primary computers**, and are for the 28%.

<sup>1</sup> Google Admob, 2011, <http://services.google.com/fh/files/blogs/AdMob%20-%20Tablet%20Survey.pdf>

<sup>2</sup> Google Admob, 2011, <http://services.google.com/fh/files/blogs/AdMob%20-%20Tablet%20Survey.pdf>

### 2.4.2. Usage habits

As many authors claim, tablets are in the niche between smartphones and laptops. And it is generally considered as an option for a purchase instead of a netbook. Therefore, it would be interesting to make a pair comparison of people's habits in usage of tablets with smartphones, netbooks and laptops. Recently such a comparison was performed (Morpace Omnibus, 2010) over total of 4,000 consumers comprised of 210 tablet intenders, 157 netbook intenders, 676 laptop intenders, and 550 smartphone intenders were surveyed May-August 2010.

#### 1. Tablet vs. Netbook.

As it is shown on the Figure 74 below, users consider tablets twice more convenient than netbooks for reading e-books: roughly 70% vs. 35%. Moreover, tablets seem more comfortable to browse Internet, listen to the music and radio, play games, watch downloaded or stream movies and TV, run entertainment applications and text messages.

Nevertheless, netbooks still dominate in such activities like social networking, accessing content on company intranet and CRM apps. Email and usage of word processing and spreadsheet software are almost equal to be performed on both devices.

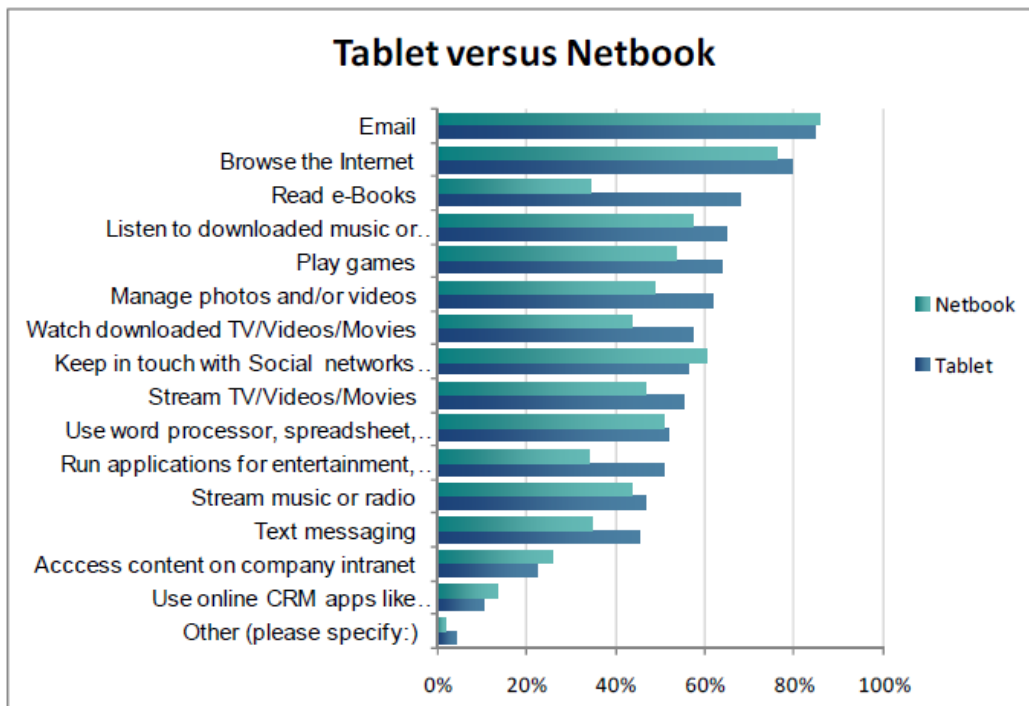


Figure 74. Tablet versus Netbook, 2010<sup>1</sup>.

<sup>1</sup> Morpace Omnibus, 2010

## 2. Tablet vs. Laptop

The biggest difference between two devices appears when considering reading e-books, use word processing software and texting messages (Figure 75). Tablet is much more used for e-books (69% vs. 17%) and texting (45% vs. 25%), whereas the laptop dominates (67% vs. 52%) for using spreadsheets and word processors.

For other activities the difference is less than 10%. Watching a stream movie or listed to downloaded music slightly favors tablets, although watching downloaded video seems more preferable on the laptop (58% to 48%).

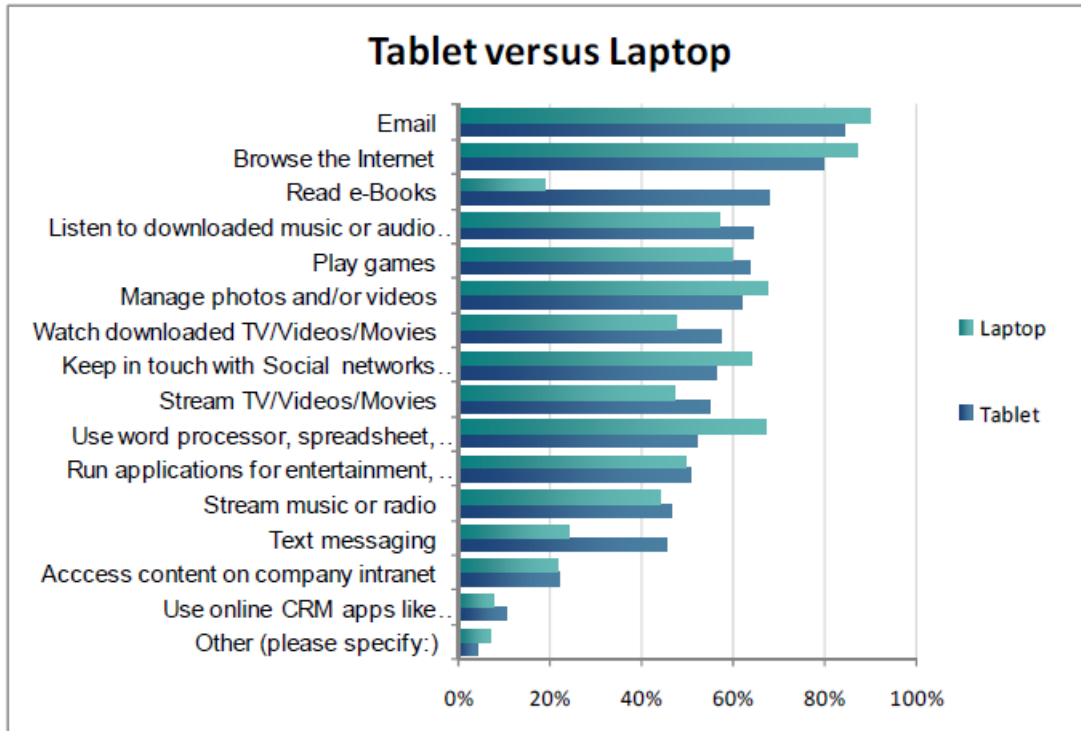


Figure 75. Tablet versus Laptop, 2010<sup>1</sup>.

Figure 76 shows the activities the Americans prefer to do on a tablet than on a PC. Using applications is considered by the users as the most critical why to use tablets, 80% of respondents prefer to use them on a tablet vs. only 15% on a computer. Listening to music, playing games, watching videos, social networking, browsing Internet, getting the local news and weather – all of them are the activities with twice more people preferring to do them on a tablet than on a pc. On the other hand, reading a book or online shopping can be performed with less preference on any of these devices.

<sup>1</sup> Morpace Omnibus, 2010

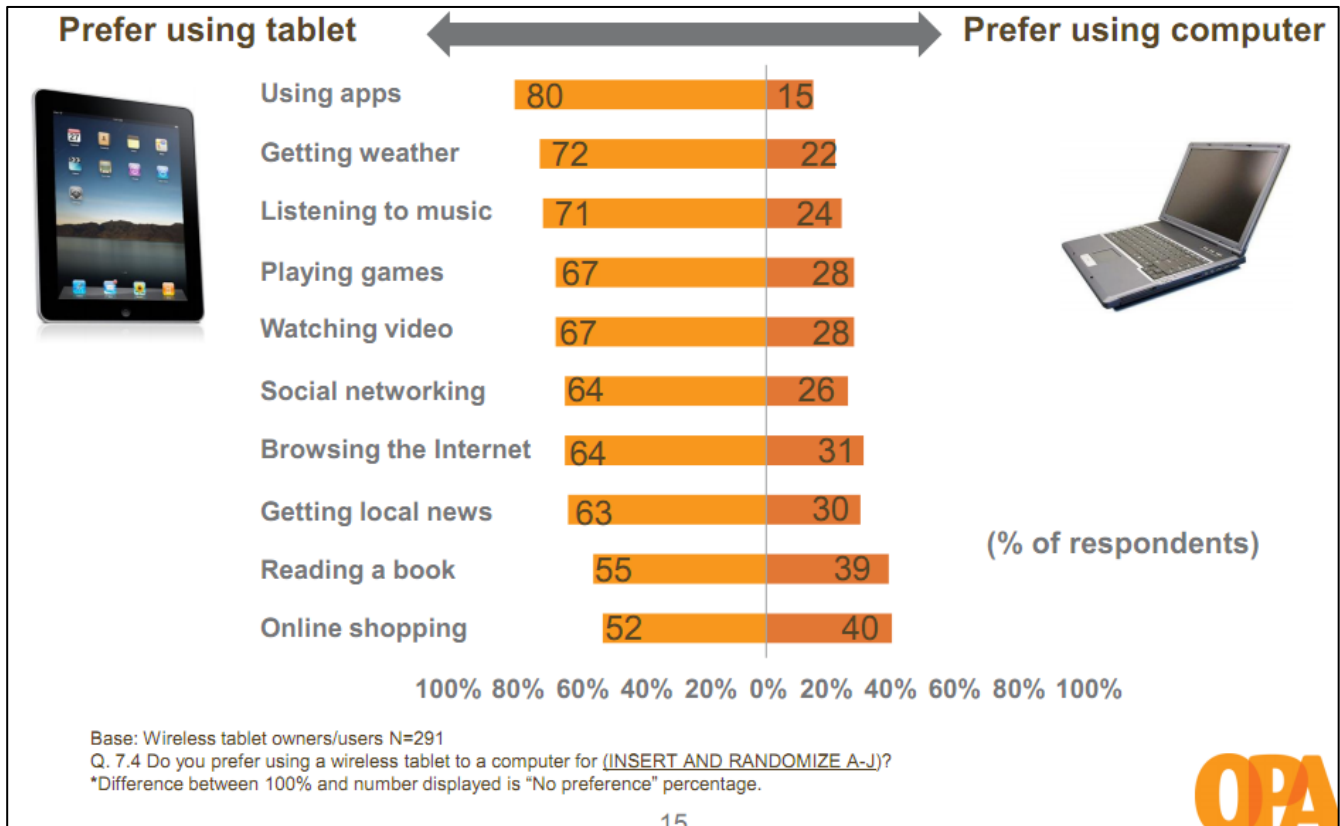


Figure 76. Preference of using tablets vs. computers, US, 2011<sup>1</sup>.

### 3. Tablet vs. Smartphone

If comparing tablets with smartphones, text messaging is the major reason why people prefer using smartphones. Texting is twice more popular 90% on a phone vs. 45% on a tablet. Smartphones are also more a bit likely to be used for email and social networking.

Reading e-books is almost 4 times more preferred from a tablet than the smartphone. Tablets also strongly dominate in watching videos and using word processing applications.

<sup>1</sup> OPA, 2011, <http://onlinepubs.ehclients.com/images/pdf/MMF-OPA -- Portrait of Today's Tablet User -- Jun11 %28Final-Public%291.pdf>

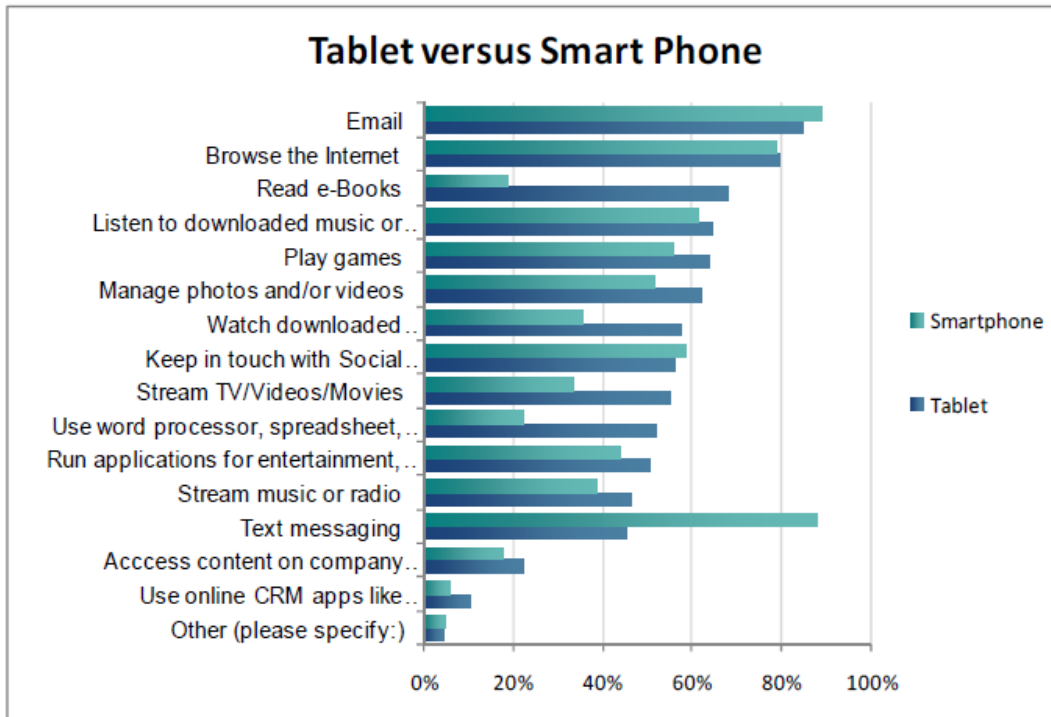


Figure 77. Tablet versus Smartphone, 2010<sup>1</sup>.

### The USA

The recent research in the USA (The Nielsen Company, 2011) has found out where and how the consumers used their connected devices. During the study 12000 connected device owners were surveyed in the US, in the Q1 2011. The study reports that the majority (70%) of tablet owners in the USA use them in parallel with watching TV (see Figure 78), compared to twice less percentage of the e-reader owners (35%). Instead, the most favourite situation when the e-reader is used is lying in bed (61%), and is the 2<sup>nd</sup> popular place to be used for tablets (57%).

44% of respondents claim they use the tablet when staying with friends or family, compared with only 17% of e-reader users, which for the adult population means in the evening or on weekends. Therefore, using tablet is much more lonely process.

More than 3 in 10 e-reader owners and 4 in 19 tablet owners use them whilst waiting for something.

<sup>1</sup> Morpace Omnibus, 2010



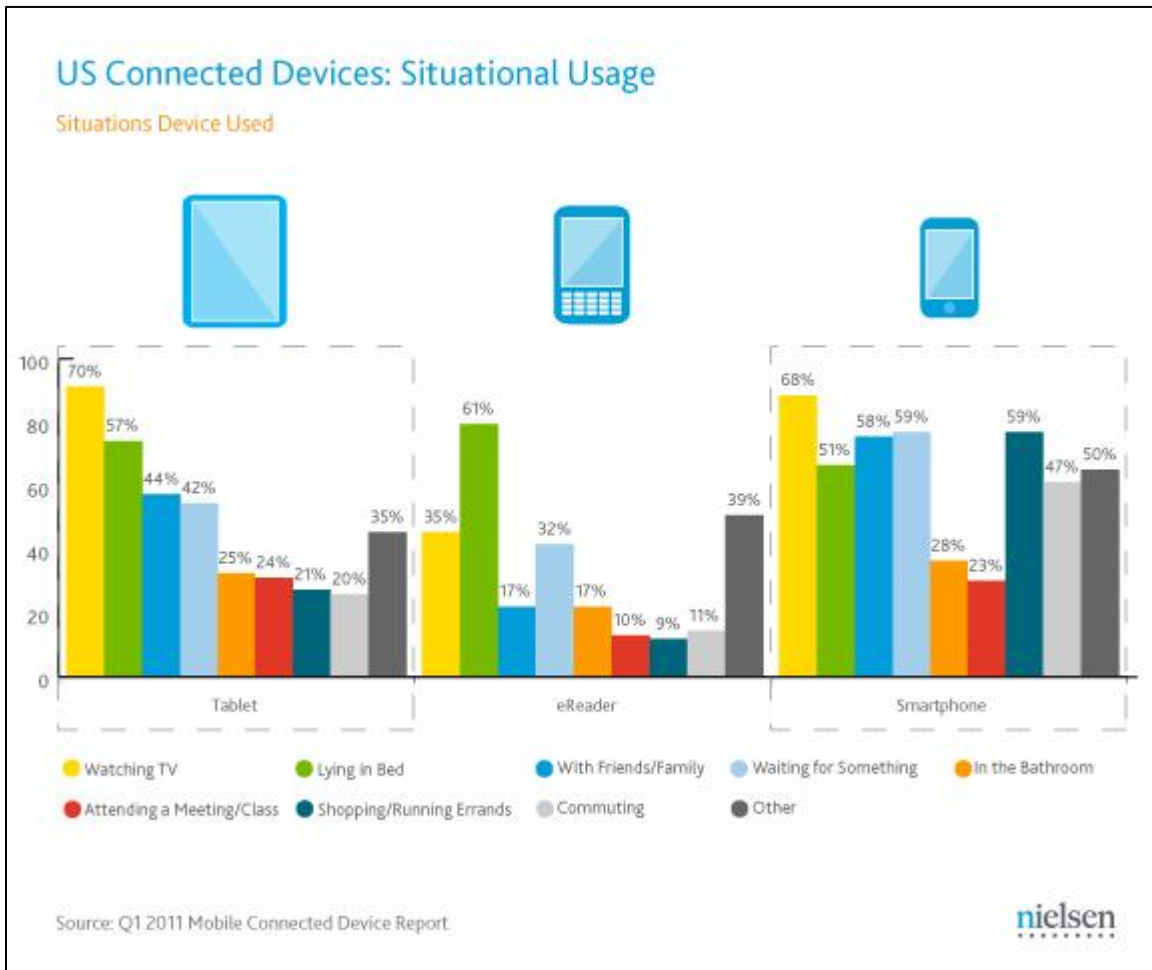


Figure 78. Situations when the connected devices are used, US, 2011<sup>1</sup>.

As presented on Figure 79, according to the recent study (Google Admob, 2011) tablets are most of all used at home – 82% of respondents confirm that. Instead only 7% use it at work, and 11% during commuting.

<sup>1</sup> Nielsen Wire, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-the-u-s-tablets-are-tv-buddies-while-e-readers-make-great-bedfellows/](http://blog.nielsen.com/nielsenwire/online_mobile/in-the-u-s-tablets-are-tv-buddies-while-e-readers-make-great-bedfellows/)

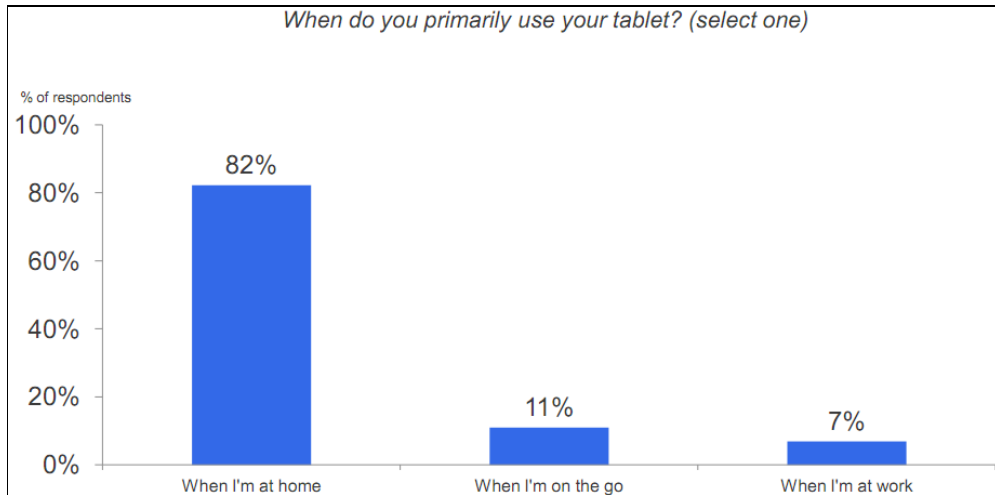


Figure 79. Percentage of tablet owners and situations stayed with tablet, US, 2011<sup>1</sup>.

Moreover, tablet owners enjoy their tablets not only at home, but more frequently on the **weekdays** than on the weekends (69% of respondents vs. 31% respectively). And they prefer to use them more **at night** than in the daytime (62% vs. 38%).

The same study (Google Admob, 2011) reports the ranking of the most popular activities on the tablet. The top activity was **playing games**, 84% of respondents confirming. Tablets are also used for searching information and email (78% and 74% respectively), and 61% of tablet owners use them for reading the news and almost half of consumers reading e-books.

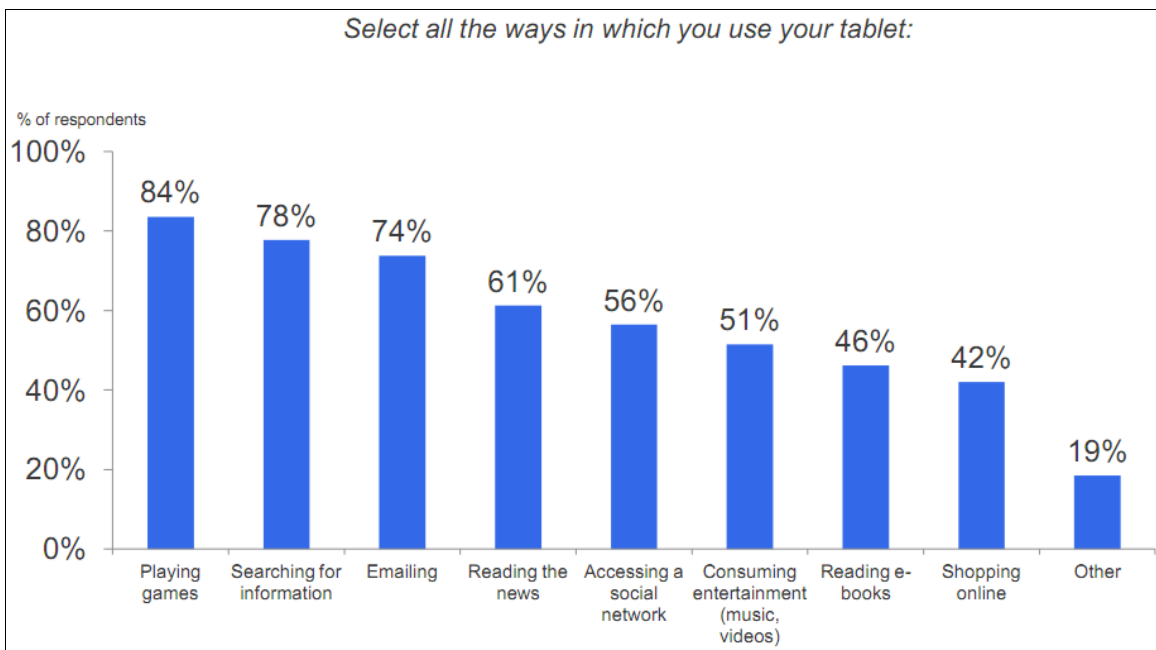


Figure 80. Percentage of tablet owners and the ways the tablets used, US, 2011<sup>1</sup>.

<sup>1</sup> Google Admob Report, 2011, <http://services.google.com/fh/files/blogs/AdMob%20-%20Tablet%20Survey.pdf>

On the contrary to the Google report (Google Admob, 2011) stating that gaming is the top activity, OPA survey (Frank N. Magid Associates, Inc., 2011) indicates that the top activity on a tablet is **access to content and information** (87%). It is followed by checking email, 64%, and accessing Internet, 63%. Playing games is only on the 4<sup>th</sup> place with 58%.

OPA performed an online survey of 2,482 people (2,051 between the ages of 18 and 64; and 431 people of age 8 and 17) on April 15 - April 20, 2011 in the US. In comparison, the Google surveyed 1430 respondents in the US in March 2011.

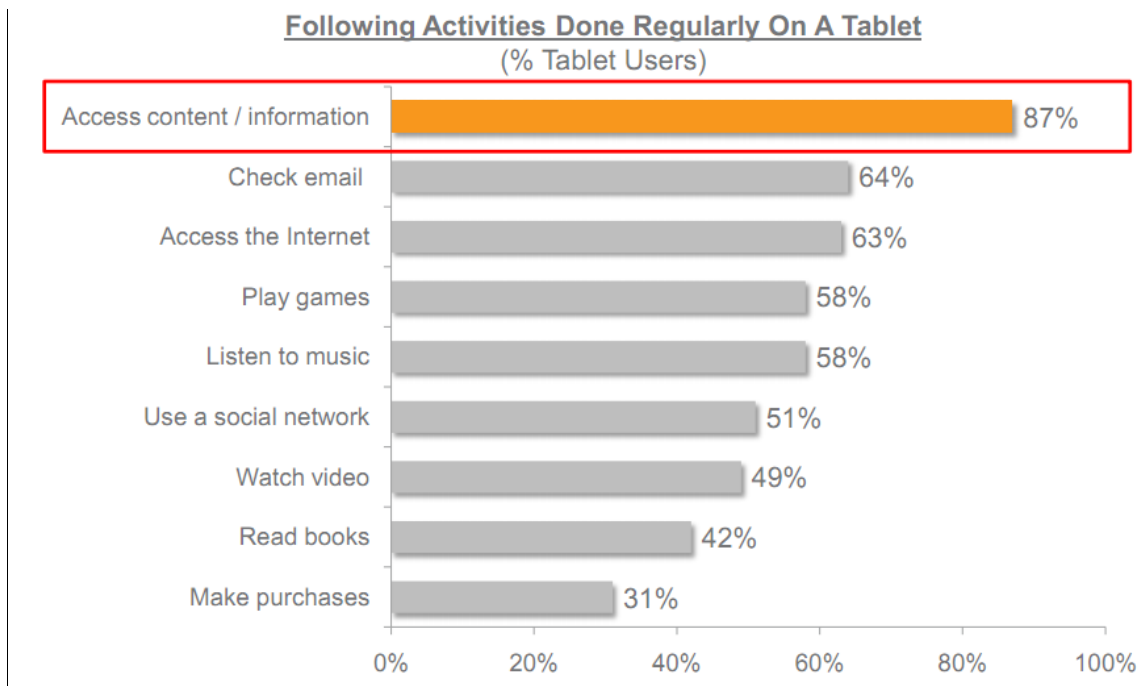


Figure 81. Activities done regularly on a tablet, 2011<sup>2</sup>.

The Samsung Mobile survey (Business Wire, 2011) examined the most common use cases for mobile tablets among Americans who already own or would consider purchasing a mobile tablet, include:

- 76%: reading the news or books
- 64%: watching TV shows or movies
- 61%: listening to music
- 56%: updating their social networking profiles

More than half (53%) of survey respondents would choose to use their mobile tablet to **play games** instead of on a PC or standalone video game console. In addition, the survey showed Americans would use a tablet to

<sup>1</sup> Google, 2011, <http://services.google.com/fh/files/blogs/AdMob%20-%20Tablet%20Survey.pdf>

<sup>2</sup> OPA, 2011, <http://onlinepubs.ehclients.com/images/pdf/MMF-OPA -- Portait of Todays Tablet User -- Jun11 %28Final-Public%291.pdf>

take pictures or film videos (44%), video chat with loved ones (41%) or stay connected with their co-workers (34%). The survey, commissioned by Samsung Mobile, was conducted by Kelton Research and included 1,000 Americans ages 18 and older.

Using an **e-reader** for assigned reading hasn't yet got popularity among the American **students**. A 2010 study by OnCampus Research found that 74% of college students surveyed still preferred to use a printed textbook. But the CourseSmart survey (Mashable, 2011) suggests that further etextbook adoption might be on the way. Nearly half of the 98% of students in the survey who owned a digital device said they regularly read etextbooks. 63% had read an etextbook on their device at least once, and the majority of the survey group agreed that etextbooks are easier to carry, simpler to search, cheaper and better than traditional textbooks for reading on-the-go.

The Mashable also reports (Mashable, 2011) that nearly 3 out of 4 American **students** who own tablets, prefer them to traditional textbooks. Nearly 90% of students think they help to study more efficiently. And almost half of all college students believe tablets will replace textbooks completely within 5 years.

### **Professional use**

Interestingly, tablets were introduced as a useful and powerful device in the Universities. Even more - in 2010 Tablet University was founded, and the courses have been specially optimized to work with tablet computers.

Even **airlines** introduced tablets to replace paper manuals on board. Mashable (Warren, 2011) reports that United Airlines are replacing its pilots' flight decks with **iPads**. Rather than carry around 38 pounds of operating manuals, charts and logbooks, the 11,000 pilots at United and Continental will use a pre-loaded iPad which weighs less than 1.5 pounds. This project will save nearly 16 million sheets of paper a year which is equivalent to more than 1,900 trees not cut down. Saving 326,000 gallons of jet fuel a year reduces greenhouse gas emissions by 3,208 metric tons.

Other airlines, including Alaska Airlines, Delta and British Airways, also have started converting some or all of their pilots to using electronic flight bags with iPad.

## **2.5. Mobile phone**

Mobility company published 'Statistics About Mobile Phone Usage' (Mobility, 2010). It compared the penetration of mobile phones in the following countries: Brazil, USA, Canada, Australia, China, UK, Russia and Japan. The report states that the highest penetration is registered in Russia (1.3) followed by UK (1.2), Australia and Brazil (both 1.0).

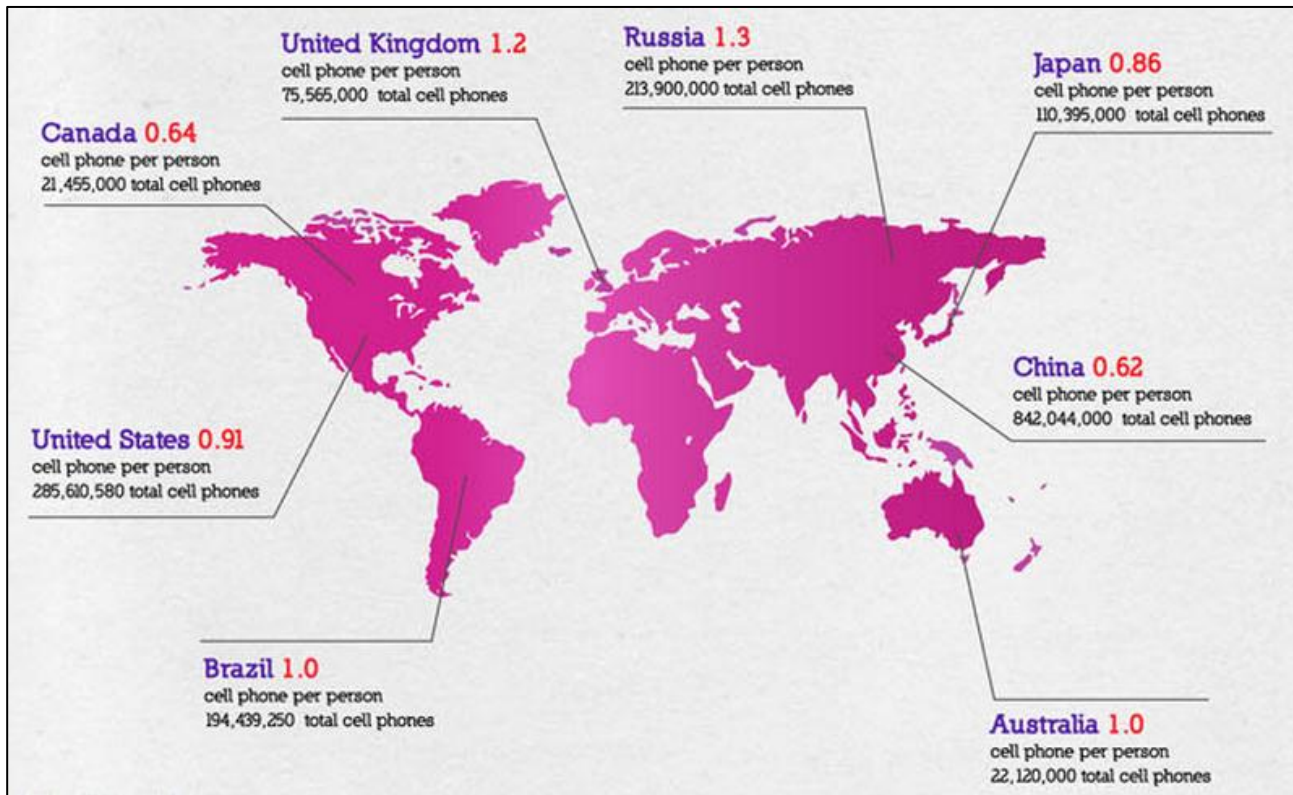


Figure 82. Penetration of mobile devices in different countries<sup>1</sup>.

Mobicity also reports the top 10 countries with the highest penetration on mobile phones and the rating is as follows (Mobicity, 2010):

Rating	Country	Penetration rate, %
1	United Arab Emirates	195
2	Estonia	194
3	Hong Kong	161
4	Italy	152
5	Bulgaria	147
6	Lithuania	141
7	Portugal	139
8	Singapore	136

<sup>1</sup> Mobicity, 2010, [http://www.mobicity.com.au/marketing/Infographic/mobile\\_phone\\_usage.html](http://www.mobicity.com.au/marketing/Infographic/mobile_phone_usage.html)

9	Czech Republic	134
10	Russia	133

Globally, the penetration of mobile phones sits on 71% in 2010 (Wikipedia).

Penetration of **smartphones** stands at more than 40 percent in Western Europe and 38 percent in the US as consumers snap up the latest models and download apps. While fewer than 20 percent of Asia Pacific mobile users currently have smartphones, interest in upgrading is high: nearly half of consumers intend on buying a smartphone in 2011, according to Nielsen research (The Nielsen Company, 2011). In Latin America, the market share of multimedia phones is growing dramatically as they satisfy consumers who want the features offered by smartphones but are unable to afford them.

iPhones users have on average 48 apps on their handsets and Android phone users 35 apps.

### The USA

According to Pew Internet report (Zickuhr, 2011), 85% of US population has a mobile phone, as displayed on Figure 83. The highest popularity is among 18-34 year-olds, 95% possess a mobile phone. The lowest percentage, 48%, is for the generation of 75 years and older.

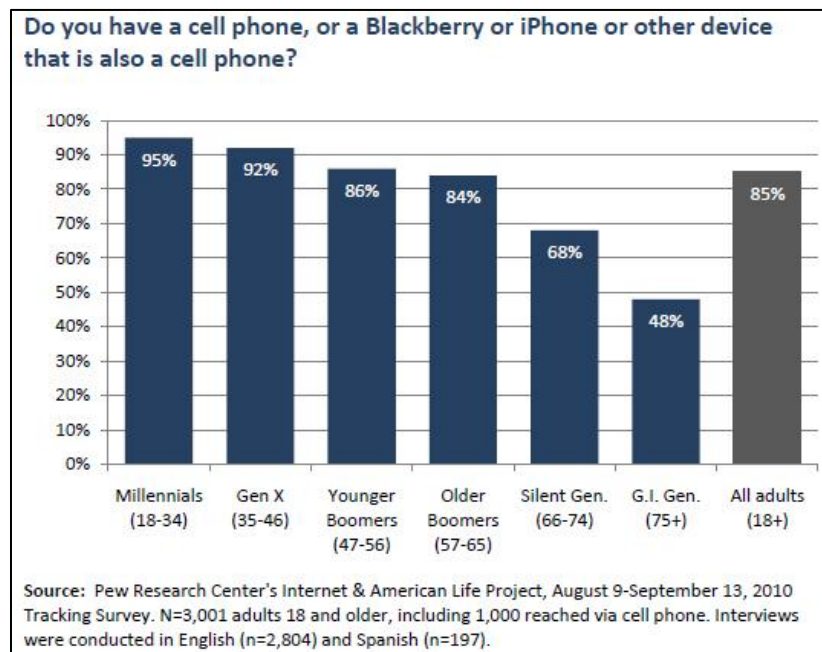


Figure 83. Fig. Cellphone ownership by generations, US, 2010<sup>1</sup>.

<sup>1</sup> Pew Internet, 2011, <http://www.pewInternet.org/Reports/2011/Generations-and-gadgets/Report/Cell-phones.aspx>

The Nilesen Company estimates **38%** of Americans have a smartphone in 2011. And the biggest consumers of smartphones are 25-34 year-olds – half of them own such device. 18-24 year-olds are on the second place with 45%. And the last in the list are people of age 65+ (see Figure 84).

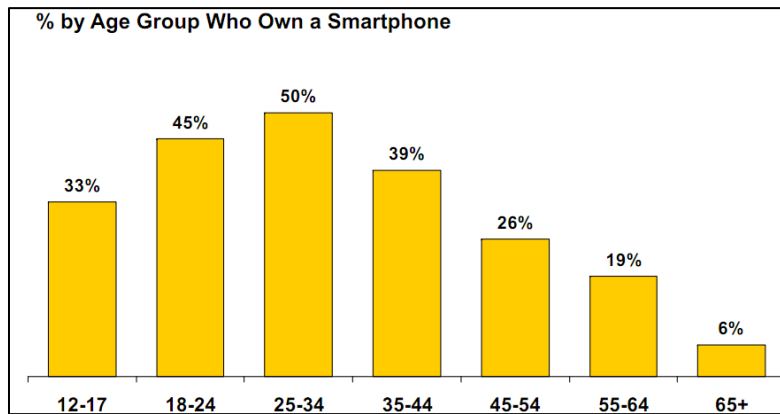


Figure 84. Smartphone ownership by generations, US, 2011<sup>1</sup>.

Smartphones continue to grow in popularity. According to Nielsen’s survey of mobile consumers in the US (The Nielsen Company, 2011), 38 percent now own smartphones. And 55 percent of those who purchased a new handset in the past three months reported buying a smartphone instead of a feature phone, up from 34 percent just a year ago.

Android continues to be the most popular smartphone operating system, with 38 percent of smartphone consumers owning Android devices. However, while Android also leads among those who recently purchased a new smartphone, it is the Apple iPhone that has shown the most growth in recent months.

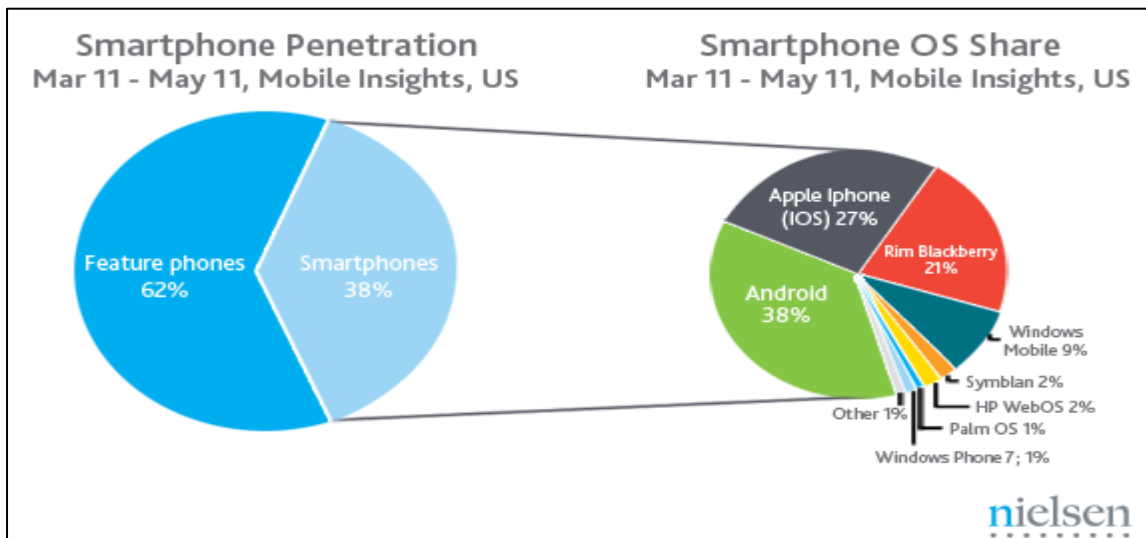


Figure 85. Smartphone penetration and OS share in US, 2011<sup>1</sup>.

<sup>1</sup> Arbitron/Edison’s Research, 2011, [http://www.edisonresearch.com/Infinite Dial 2011.pdf](http://www.edisonresearch.com/Infinite_Dial_2011.pdf)

## UK

One quarter (27%) of UK adults are **smartphone** users. This represents an estimated 12 million adult consumers, according to the latest research (Ofcom, 2011).

As discovered by Ofcom (see Figure 86), Smartphone ownership is much higher among younger teens than in the general adult population; almost half (47%) of all teens aged 12 – 15 have one. There are no differences in take-up by gender among teens. Also, there are significantly higher levels of take-up of smartphones among males (32% vs 21% females), in younger age groups (50% among 16-24s, 42 % among 25-34s), and in higher socioeconomic groups. The least popular are smartphones among 55+ year-olds (7%).

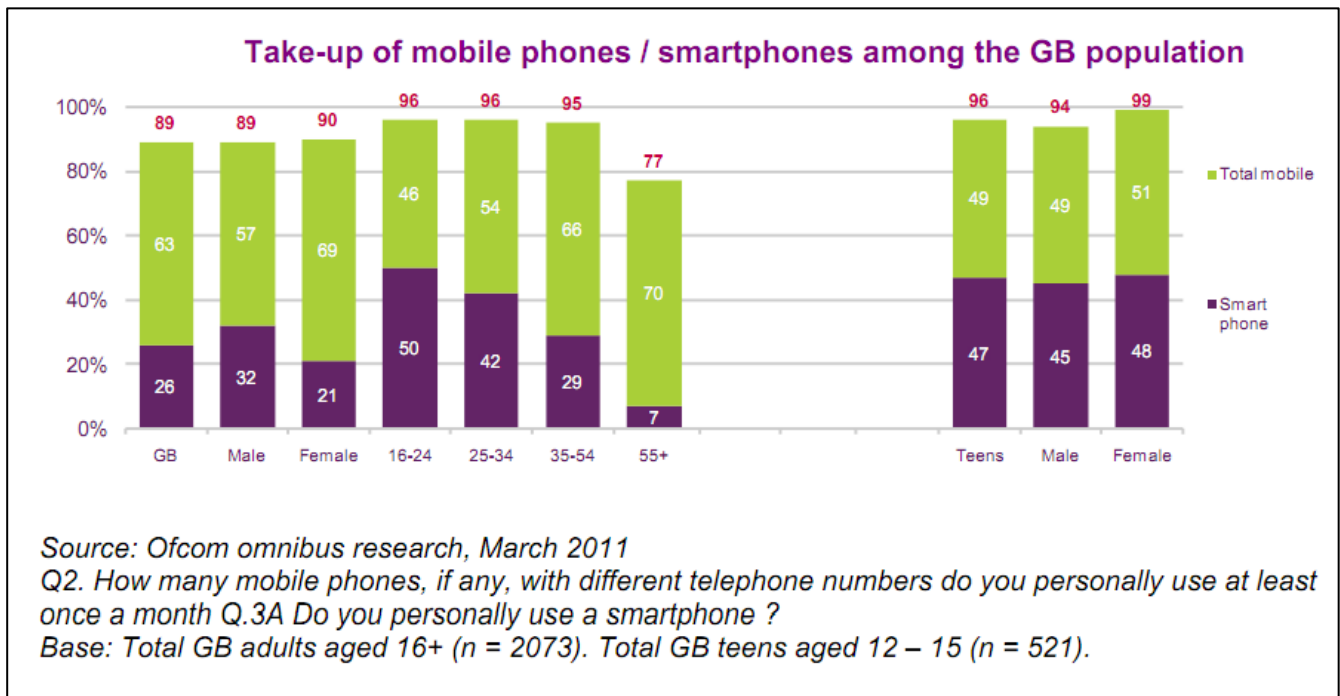


Figure 86. Mobile phones and smartphones penetration in UK, 2011<sup>2</sup>.

The Apple iPhone is the most popular brand overall, but BlackBerry handsets are the most popular choice among younger consumers. Female teens, in particular, appear to have a preference for BlackBerry handsets (44%). The evidence suggests that this preference is driven by the BlackBerry messenger service (BBM) which offers a free alternative to texting (SMS).

### 2.5.1. Overall time spent

#### The USA

The way US consumers spend their Internet time on their mobile phones is slightly different to how they use Internet from computers. In a Nielsen survey (The Nielsen Company, 2010) of mobile web users, there is a rise

<sup>1</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-us-smartphones-now-majority-of-new-cellphone-purchases/](http://blog.nielsen.com/nielsenwire/online_mobile/in-us-smartphones-now-majority-of-new-cellphone-purchases/)

<sup>2</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)



in the prevalence of social networking behavior, but the dominance of email activity on mobile devices continue with an increase from 37.4 percent to 41.6 percent of US mobile Internet time, as displayed on the diagram below (Figure 87).

Portals remain as the second heaviest activity on mobile Internet (11.6 percent share of time), despite their double digit decline and social networking’s rise to account for 10.5 percent share.

Other mobile Internet activities seeing significant growth include music and video/movies, both seeing 20 percent plus increases in share of activity year over year. As these destinations gain share, it’s at the cost of other content consumption – both news/current events and sports destinations saw more than a 20 percent drop in share of US mobile Internet time.

The survey tracks self-reported mobile Internet usage from over 5,000 respondents each month.

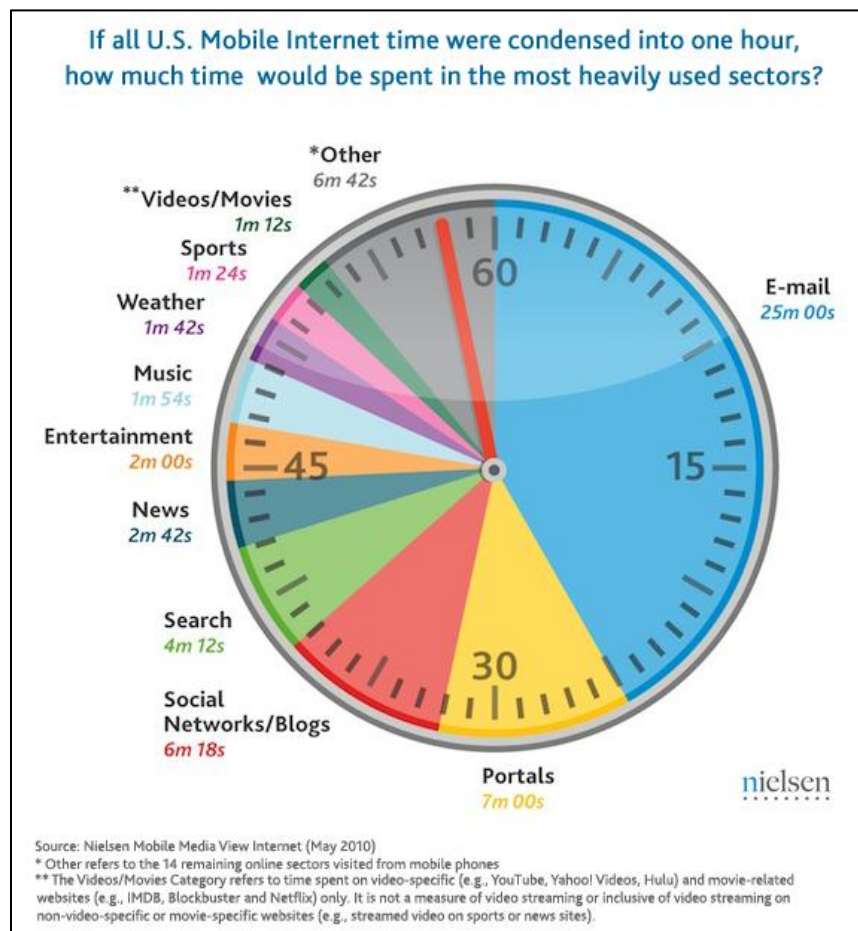


Figure 87. Mobile Internet most famous activities, US, 2010<sup>1</sup>.

<sup>1</sup> The Nielsen Company, 2010, [http://blog.nielsen.com/nielsenwire/online\\_mobile/what-americans-do-online-social-media-and-games-dominate-activity](http://blog.nielsen.com/nielsenwire/online_mobile/what-americans-do-online-social-media-and-games-dominate-activity)

## 2.5.2. Usage habits

### Globally

According to the recent global research (GSM Arena, 2011), the most popular daily usage of the mobile phone is **making calls** (84.6% of mobile owners worldwide make daily calls), see Figure 88. In terms of geography, voice calls are most popular in Africa (89.5%) and least popular in Oceania (5th place at 77.6%).

**Alarm clock** is globally on the second place (82.7%), but it even tops the chart for several user groups which are women (81.3%) and ages 18-24 years (83.5%). As with other so wildly popular features, usage differences across continents are negligible. The reasons of popularity is that the phone is always with you, it's loud enough to wake up and it might have a few features like sleep cycle recording or a gentle wake-up.

Alarm clock feature even overpasses **SMS** service, which is on the third place by popularity having share of 78.7%. But SMS even gets the number one place in Oceania with 87.7%. SMS is also enjoying higher than average popularity with Asians (83.8%). Surprisingly, only 75.8% of teenagers send SMS daily, which is less than average. One possible explanation is that some teens are already switching to instant messaging – our data shows that one third of them are already using this feature daily. The only generation that is not as keen on SMS are users of over 50 years of age.

### Most used daily

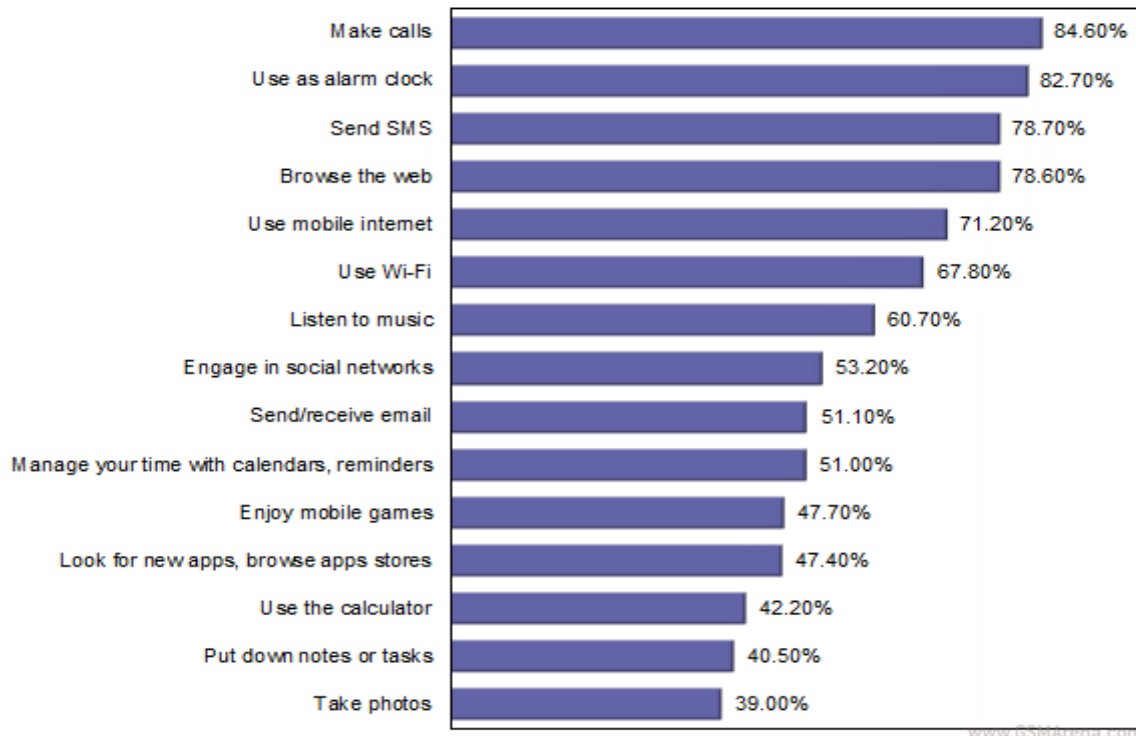


Figure 88. Most used daily activities on the mobile phone, globally, 2011<sup>1</sup>.

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p3.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p3.php)

Multimedia messages (**MMS**) never reached much popularity are now among the least used things on a mobile phone. Despite being widely available, MMS is used by just 4.9% of all people daily. It's mostly North Americans that send these messages – one in seven (14%) users does so every day. Female users are also using MMS fairly regularly, exceeding the average usage more than twice.

**Web browsing** is on the third place in the list of the most daily used activities. The proportion of users who browse the web on their phones was 78.6% daily and over 96% total. In fact, just one in 80 respondents have never browsed the web on their handsets. Women daily usage is more than 10% lower than that of men. The same goes true for people over 50, while the numbers for other age groups are consistently high. Oceania holds the lead in mobile web browsing with over 83% of the users visiting at least one web site on their phone each and every day. South Americans rank lowest here at just 73.4%.

Over 90% of the respondents are avid **mobile Internet** users with over 71% using it daily. Teenagers are the only ones to score well below average probably because of the cost. Oceania is the leader in consumption of mobile - over 82% of them use it every day.

Providing Internet connection to another device is high on the priority list of most manufacturers these days. **Tethering** is relatively popular even if most of the people tend to only use it on occasion (more than half of population). All groups up to 32 years of age use tethering about the same while after that there's a notable decline (41-50 year-olds do tethering the least). Europeans are the single group with the least interest in tethering, while users in Oceania show the widest usage.

Interestingly, Wi-Fi loses to mobile Internet usage but the reason is that it's still not available to all the people that might possibly need it. Women tend to use Wi-Fi less than men, while age group distribution is quite even. Only the 50+ users tend to be slightly off the track. Africa is well below the average Wi-Fi daily usage, whereas Oceania is almost 10% ahead from the average (Figure 89).

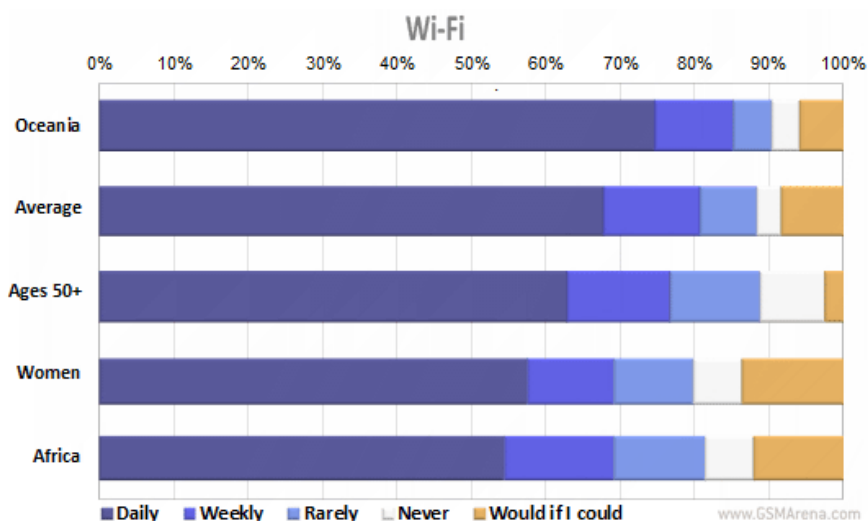


Figure 89. Wi-Fi usage globally, 2011<sup>1</sup>.

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p6.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p6.php)

**60.7%** of all people **listen to music** on their mobile phones every day, while another 34.6% do so every now and then. And it's another feature that highly depends on age. In fact listening to music is the top daily activity in the teenager age group, while it only ranks 12th among the 50+ users. Across continents, it's Europeans that listen to music the least, while Asians score more than 10% above the average on daily usage.

**FM radio** receiver is still pretty important – one in five users turn on their radio app daily, while another 56.6% use it from time to time. South Americans are the most active here (23%), while users in Oceania are the least interested in the feature (13%).

Apparently, **online radios** are not a good enough alternative just yet. Maybe people wouldn't waste megabytes from their pricey data plans that could be better used elsewhere. And a constant data connection is way more taxing on the battery than FM radio tuner. Unlike listening to music, radio isn't really dependent on age – users in the 18-24 age category use it the most, but the difference across the age groups isn't that big.

These days more and more people are using their cellphones to engage in **social network** activities, the report states (GSM Arena, 2011). As presented below on Figure 90, by current count, **53.2%** of users update their status, upload photos, read updates, etc. on their cellphone every day, while another 26.6% do it occasionally. Naturally, it's the younger users (up to 24 years) who are the most active, with the number using the feature daily nearing 60%. Expectedly, with users over 50, the percentage drops below 25. In geography terms, it's Oceania in the lead, while conservative Europeans are not as enthusiastic about handheld social networking.

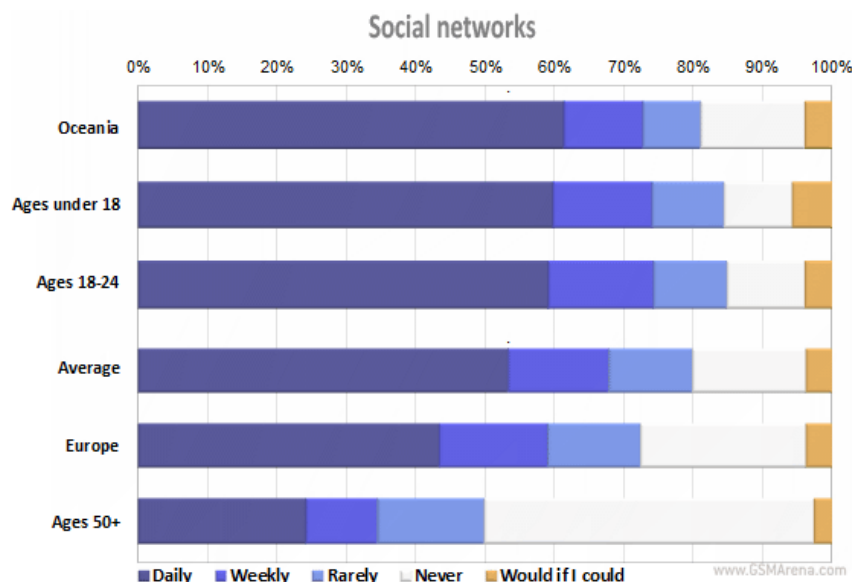


Figure 90. Social networks popularity, globally, 2011<sup>1</sup>.

**Emailing** is still far from the top spots, but it's already being used daily by more than half of all people. Another 32.8% use it on occasion, which gives an impressive **total of 83.9%**. Teenagers send or receive email the least (just 30% daily users). However with those over 24 years the daily percentage rises above 60% -

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p6.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p6.php)

understandable, given the importance of email in most jobs nowadays. The maximum number of email users is registered in Oceania and North America (62 and 65 percent respectively).

**Mobile gaming** is currently enjoying so much success that app stores offer the number of high-quality games. Popularity with youngster exceeds 60% as far as daily gaming is concerned and while interest in mobile games gradually drops as age increases the overall result is 47.7%, as shown on the diagram below (Figure 91). And if to include those that play games on occasion the result is over 90%. Asian users game the most on their cellphones, while Europeans are not much into that. Women tend to play mobile games less than men, though the difference is quite subtle.

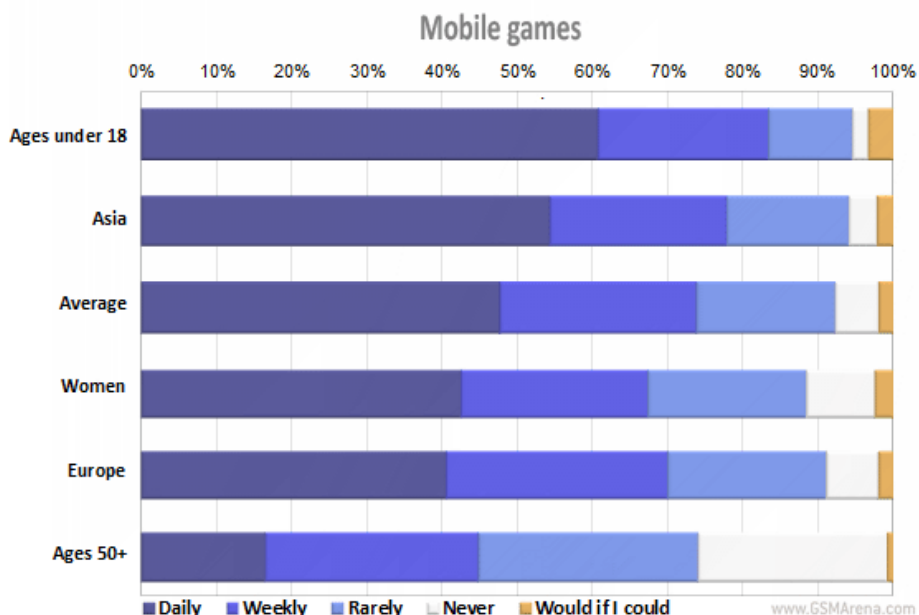


Figure 91. Playing mobile games on a cellphone, globally, 2011<sup>1</sup>.

Almost 45% of the people check out their **mobile application (app)** stores daily, while the total visitors who browse app stores are twice that number. Women and users over 50 do so less regularly, while teenagers hang there the most. Across regions, Europeans look for new apps less than all other continents, while Asians are the most active in the app stores. Differences here are pretty minor though

Surprisingly, **RSS feeds** are best appreciated by those aged over 50, with those aged 25-32 coming a distant second. Teenagers on the other hand use that feature half as much. The RSS feeds are most popular among North Americans, while South Americans tend to use them the least.

The poll results for **taking picture** feature report 39% of daily usage, that doesn't sound like much, but that is explained with the fact that there are just not many things one need to shoot every day, for example capturing labels instead of writing notes, scanning barcodes etc. However the total user base of 98.6% for this feature leaves no doubt that people like to take photos with their cellphones. Generally, women take pictures less than men, less than 40% do that daily. And photography seems to be an age dependent – teenagers are most likely

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p8.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p8.php)

to take photos on a daily basis, while 50+ users only use the camera on their handsets once a week. Interestingly that women use the so-called special shooting modes, like **panorama** stitch, more than men, despite shooting less. These extra camera features are also more popular than average for users in Asia.

**Video capture** isn't as popular as still photography for mobile phone users, 18% vs. 39% of mobile phone owners daily using these features. Smartphone video capture is still as not as digicams in video recording with lossless digital video zoom, autofocus and image stabilization. And just like still photos, videography is an age thing – the younger are the most likely to shoot a video clip each day. And women are far less likely to do it than men.

Nearly 90% of people use their cellphones for translating. And 30% of people globally on average use the **language tools**. Those under 18 use language tools the most and their popularity gradually drops as we move towards older users. Interestingly, use of the feature on a daily basis in Asia is more than double that in Europe.

**Instant messaging (IM)** is another area where mobile phones have been vastly improving recently. IM's only problem at this stage is pretty data-traffic-intensive. Still, **one in three** users globally and about half of those aged 18-24 use an IM service daily. South Americans, Asians and Africans show the highest daily usage numbers, all around 40%, while Oceanians seem least interested, 23%.

**Digital maps** are readily accessible, free and accurate – no wonder their daily popularity gets almost 25% on average globally. Women are using this feature much less than. In terms of age, popularity peaks in the 25-32 year group with interest notably dropping among both very young users (who don't drive yet) and users aged over 50 (who prefer either regular maps or dedicated SatNav units). North Americans need their cellphones as a digital map the most, while Europeans use this feature the least. Even Africa, where the map coverage is questionable in places, is ahead of the old continent.

**GPS navigation** on the other hand is still not as readily available everywhere. Most platforms don't offer free navigation just yet and hardly cover the whole world. Nokia released Ovi Maps navigation free, Google launched its Google Maps navigation for free as well. Usage among different groups varies in the exact same way as digital maps: 25-32 year-olds and North Americans use it the most, while women, youngsters and Europeans do it the least.

**14.8%** are already checking out at least one video per day on their handsets, 22.9% only find the time once a week. And there are some that are still waiting for cellphones to improve the screen quality and processing power. Like listening to music, **video watching** is a territory the youngsters. Just one in 20 people over 50+ turns on their phone to watch a movie every day, in the under 18 age group it's one in five. Geographically, Asian users watch movies the most. Europeans are at the other end of the spectrum.

Driven by music videos and short funny clips, **online videos** popularity is almost double that of regular movies. Once again, women are far less impressed by mobile videos than men, while age distribution is distinctly skewed towards the young. Users living in North America tend to watch online video from their handsets the most, while African users have selected the "Would if I Could" option more than those in any other continent (Figure 92).

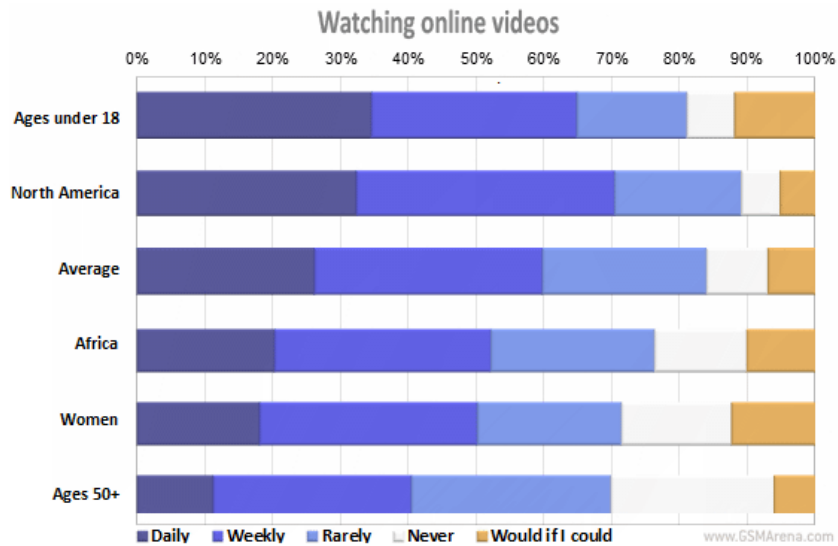


Figure 92. Watching online videos on a cellphone, globally, 2011<sup>1</sup>.

**Music recognition** services daily use 5.8% of people globally. The fact that 43% of our readers use music recognition occasionally is not surprising, as generally there is no a new song that someone would want to check out every day. Teenagers are who use such services the most. Ages 41-50 are using this feature the least. Geographically speaking, North Americans are the leaders to consume those services (8%), while South Americans are the least uninterested (4%). The rest are pretty close to the average.

The cellphone is also widely used as **calculator** (42% of people do that every day), **to take notes** (40%), **as a flash drive** (27%), **as a flash light** (24%) and even **weight tracking** tool (7%). The last one is especially popular among women (daily used by 10% of women) and in Asia (8.5%).

Cellphones are becoming increasingly good at handling **office documents** – 16.6% of all people browser or edit such files on their handsets every day. Another 58% only need the feature once a week or more rarely. Women and teens tend to use document viewing/editing on their phones the least. Interestingly though, both groups have the highest percentage of “Would if I could” answers. People aged 41-50 on the other hand are the biggest fans of mobile office apps. Europeans view or edit documents on a daily basis half as much as Asians.

Another feature that’s twice more popular in Asia than in Europe is **eBook** reader. Overall eBooks are only used by 9.8% of all users on a daily basis. Usage peaks with ages 18-24, while the other age groups are hovering around the average.

**Magazines and newspapers** tend to be better suited to cellphones than eBooks (17% on average). They also have a different usage pattern in terms of age – people over 50 do double the newspaper and magazine reading the teenagers do. Women also seem less interested than men, the feature is most popular in Asia.

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p8.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p8.php)

## Most missed

A list of features that people would like to have on their phone is presented below on Figure 93. The features most of that have been missing exist due to various reasons – either the phone doesn't support them, or carrier bills are too high, or they just haven't been available yet.

As presented on Figure 93, on the top of the list is **video-calling** with 22.9%. People who have the feature enabled apparently have no interest in using it (as clearly seen this feature is absent from the list of the most used mobile features, Figure 88), while those who don't have video-calls are pretty eager to try them. That's why GSM arena experts feel that despite the high demand this feature might not substantially gain in popularity in the future – it has been tried and rejected once already. Europe is where the feature is used the least. Interestingly, women make the most video-calls.

The prospects of the next two features in this list are better (Streaming over TV-out and remote controlling another device). Those have only recently started making their way to mass-market devices and cellphones have been becoming increasingly good at them. And as mobile data speeds are improving remote-controlling a PC or TV is becoming more and more of an enjoyable experience.

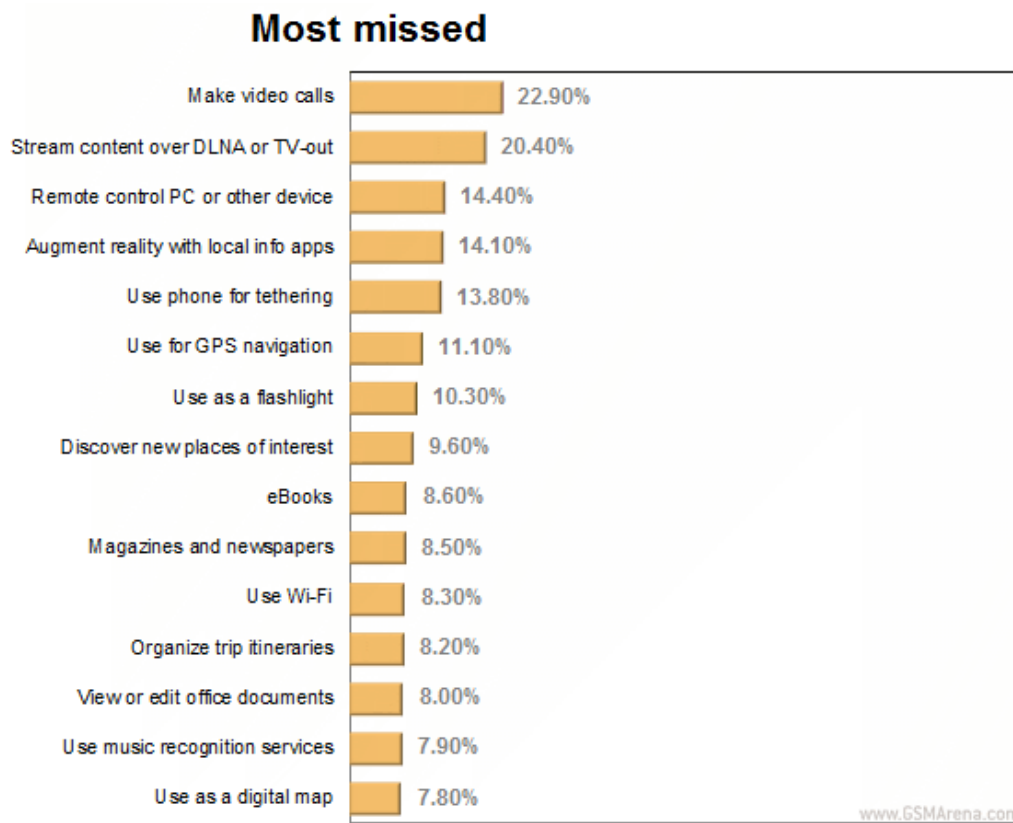


Figure 93. Most missed features on the mobile phone, globally, 2011<sup>1</sup>.

<sup>1</sup> GSM Arena, 2011, [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p4.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p4.php)



## The USA

Mobile phones have become a thing hard to live without. Almost half of Americans of 16-24 year-olds named a mobile phone “as their favourite life-changing gadget” (Borland, 2008).

Pew Internet (Zickuhr, 2011) surveyed 2252 US adults of age 18 and older in May 2010. People were asked if they **ever** used their cellphones for the following activities. And the answers were:

- 1) 76% of adults have ever taken a picture
- 2) 72% - send/receive text messages
- 3) 38% - access Internet
- 4) 34% - play game, record video, email (each activity)
- 5) 33% - listen to music
- 6) 22% - send/receive instant messages.

The younger the age group, more it showed involvement in these activities.

**Smartphone** owners in comparison to other cellphone owners use **phone functions** more frequently, according to Arbitron (Arbitron/Edison’s Research, 2011). Smartphones overrun other cellphone twice or more such activities as browsing Internet, social networking, listening to the music and online radio, watching video and gaming (see Figure 94 below). 87% of smartphone users vs. 70% of feature phone users make calls several times per day. And it is the most popular activity to do with the phone.

Texting messages is on the 2<sup>nd</sup> place, with 76% of smartphone owners and 53% of feature phone owners.

The mobile Internet connects more users. 40% of smartphone owners log onto the mobile Internet. While many companies now offer apps, mobile users access companies’ content through their mobile sites.

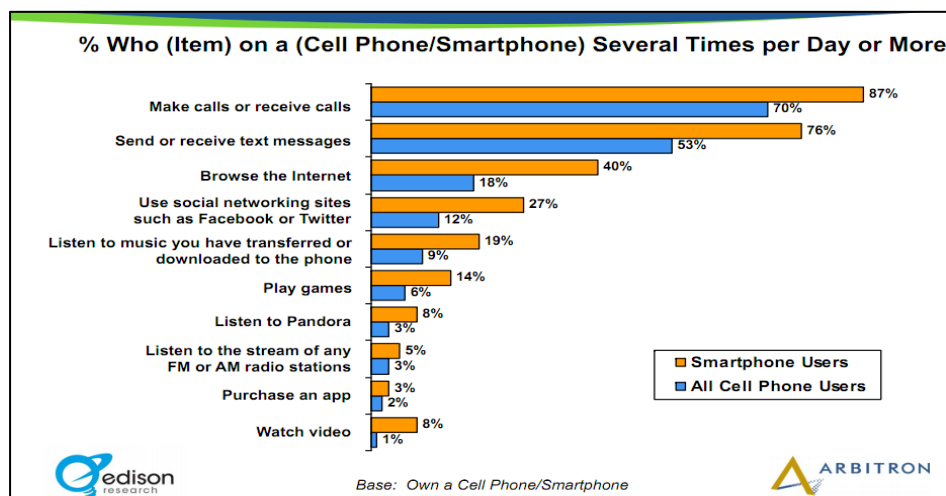


Figure 94. Activities people do on the cellphone and smartphone, 2011<sup>1</sup>.

<sup>1</sup> Forrester, 2010, [http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer\\_2010.pdf](http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer_2010.pdf)

**Social networking** sites have proven to be one of the most popular types of sites that users are accessing – more than quarter of smartphone owners do that several times per day or more. According to Facebook, 200 million consumers now access their site through a mobile device globally. Mobile social networking is the most popular among 35-54 year-olds (36%) and among 25-34 year-olds (34%), as The Nielsen Company (2009) reports, see The generation of age 18-24.

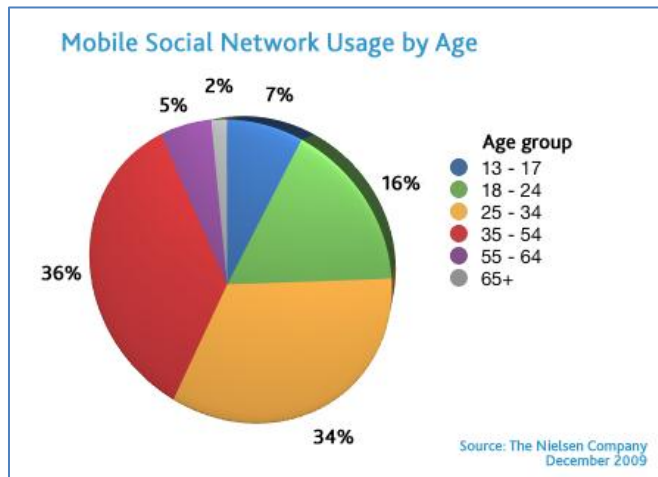


Figure 95. Mobile social network by age, 2009.

Recently Flurry Analytics (Newark-French, 2011) has found out that in 2011 for the first time Americans spend more time with **mobile applications** than with web, that includes both desktop (the open web, Facebook) and the mobile web, see Figure 96. This statistics is even more remarkable if we consider that it took less than three years for native mobile apps to achieve this level of usage, driven primarily by the popularity of iOS and Android platforms.

Flurry found that the average user now spends 9% more time using mobile apps than the Internet. This was not the case just 12 months ago. Last year, the average user spent just under 43 minutes a day using mobile applications versus an average 64 minutes using the Internet. Growing at 91% over the last year, users now spend over 81 minutes on mobile applications per day. This growth has come primarily from more sessions per user, per day rather than a large growth in average session lengths. Time spent on the Internet has grown at a much slower rate, 16% over the last year, with users now spending 74 minutes on the Internet a day.

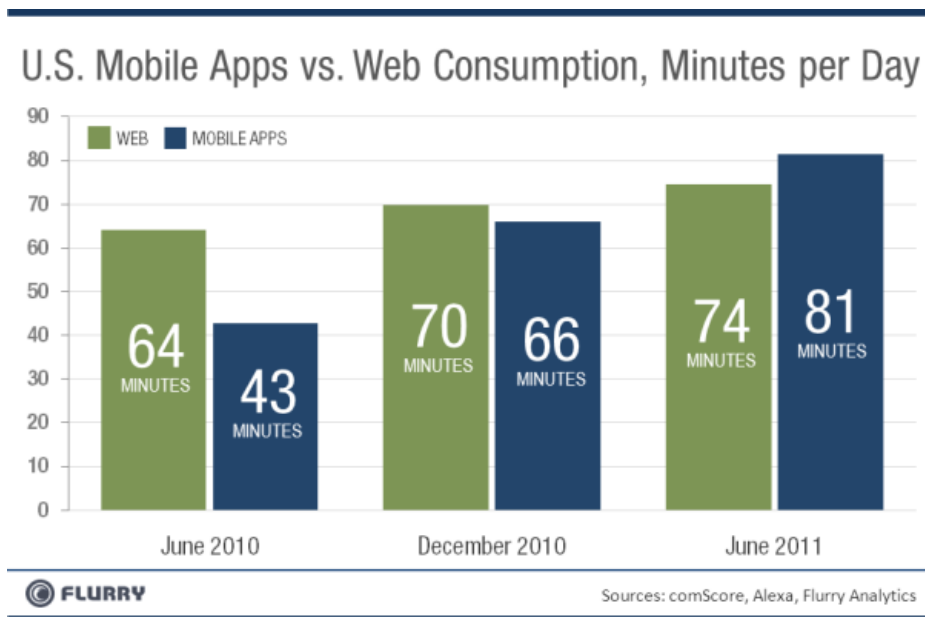


Figure 96. US mobile apps vs. web consumption, minutes per day, 2010-2011<sup>1</sup>.

As a note of interest, Facebook has increasingly taken its share of time spent on the Internet, now making up 14 of the 74 minutes spent per day by consumers in 2011, or about one sixth of all Internet minutes. Considering “Facebook’s recent leak regarding Project Spartan, an effort to run apps within its service on top of the mobile Safari browser,” according to Flurry (Newark-French, 2011).

When consumers use their mobile phones to check the news, weather, email, or their social networks, they often have a choice between the mobile web version or a specially-created mobile app. As more and more Americans prefer using application on their mobiles, than browsing Internet, it is interestingly to see which categories most occupy consumers’ time. Flurry (Newark-French, 2011) captured time spent per category from May 2011 across all apps it tracks that accounts to more than 85,000. The results are shown in the pie chart below (Figure 97).

The chart shows that **Games** and **Social Networking** categories capture the significant majority of consumers’ time. Consumers spend nearly half their time using Games (47%), and a third in Social Networking apps (32%). Combined, these two categories control 79% of consumers’ total app time. Furthermore, consumers use these two categories more frequently, and for longer average session lengths, compared to other categories. Therefore, Games and Social Networking apps deliver the most engaging experience on mobile today. Also, Games typify the most popular kind of app played on the Facebook platform itself.

**Twitter** is becoming widely used from the mobile phones, when people post about emergencies “from tornadoes to terrorist attacks”, CNN reports (Gahrn, 2011). Increasingly, emergency response officials monitor these posts to enhance their understanding of the unfolding situation - and this information can prove very useful. The beauty of social media, said Russ Johnson, director for US public safety and homeland security, is

<sup>1</sup> Flurry Analytics, 2011, <http://blog.flurry.com/bid/63907/Mobile-Apps-Put-the-Web-in-Their-Rear-view-Mirror>

that it "multiplies your ability to have sensors on ground to gather information." Johnson even gives guidelines which information to include in the emergency posts so that to get attention from relevant organizations.

Back to Figure 97, the third most popular activity is reading **news** (9%), followed by **entertainment** (7%). Other activities account only 5% of user's time.

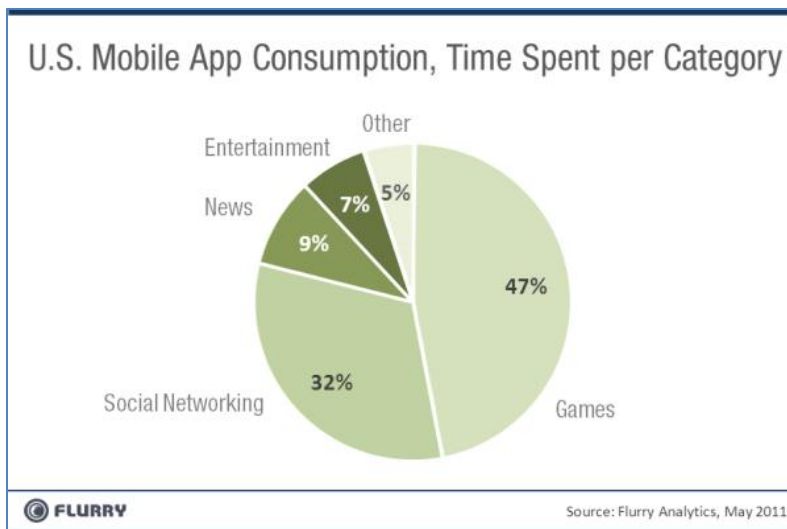


Figure 97. US mobile app consumption time spent per category, 2011<sup>1</sup>.

Let us see more in detail at the preferences of the US **Android** smartphone owner. According to first-reported data from Nielsen Smartphone Analytics (Kellogg, August), the average Android consumer in the US spends 56 minutes per day actively interacting with the web and apps on their phone, as presented on the chart below (Figure 98). Of that time, two-thirds is spent on mobile apps while one-third is spent on the mobile web.

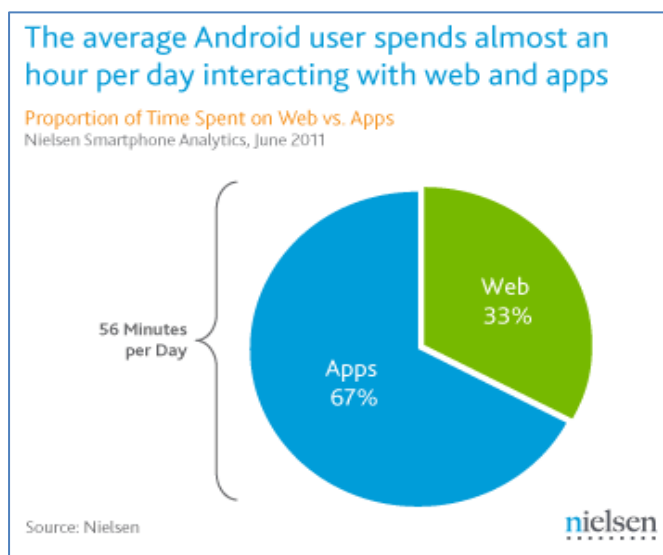


Figure 98. Portion of time spent on web vs. apps by the average Android smartphone user, US, 2011<sup>1</sup>.

<sup>1</sup> Flurry Analytics, 2011, <http://blog.flurry.com/bid/63907/Mobile-Apps-Put-the-Web-in-Their-Rear-view-Mirror>

Despite the hundreds of thousands of apps available for Android, a very small proportion of apps make up the vast majority of time spent. In fact, as presenter in Figure 99, the top 10 Android apps account for 43 percent of all the time spent by Android consumers on mobile apps. The top 50 apps account for 61 percent of all time spent. With 250,000+ Android apps available at the time of this writing, that means the remaining 249,950+ apps have to compete for the remaining 39 percent of the pie.

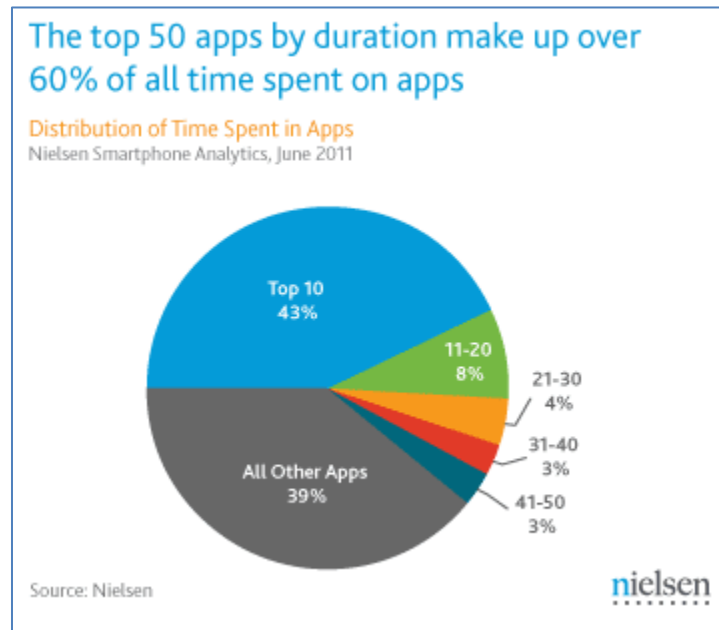


Figure 99. Distribution of time spent on apps by the US Android smartphone user, 2011<sup>2</sup>.

Media is migrating to mobile phones. In 2010, 17% of online mobile owners were **listening to music** on their mobile devices. And while video and TV viewing is limited to 8% of online mobile consumers, this is still double what it was two years ago. Whilst iPhone owners access media content easily through iTunes, non-iPhone owners also engage with mobile media through sites and applications like YouTube, Pandora, and Grooveshark.

A recent Nielsen study names **Google Search** as the top Web site accessed on mobile phones.

Americans also involve their smartphones in the **shopping** activity. Even when they are looking for a new **car**, as the study suggests (Greystripe, 2011). US touch smartphone users are nearly three times more likely to buy a new car than the US adult population. 15.6% of consumers in Greystripe's network are considering buying a new car in the next year in comparison to 5.5% of Americans who purchased a new car last year.

In addition, they use their mobile devices throughout the auto purchase process to do research, compare prices, find dealerships, and contact sellers or dealerships (see Figure 100). 78% of people looking to buy a new car in the next year indicated that mobile will have a role in their car purchase process.

<sup>1</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/](http://blog.nielsen.com/nielsenwire/online_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/)

<sup>2</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/](http://blog.nielsen.com/nielsenwire/online_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/)

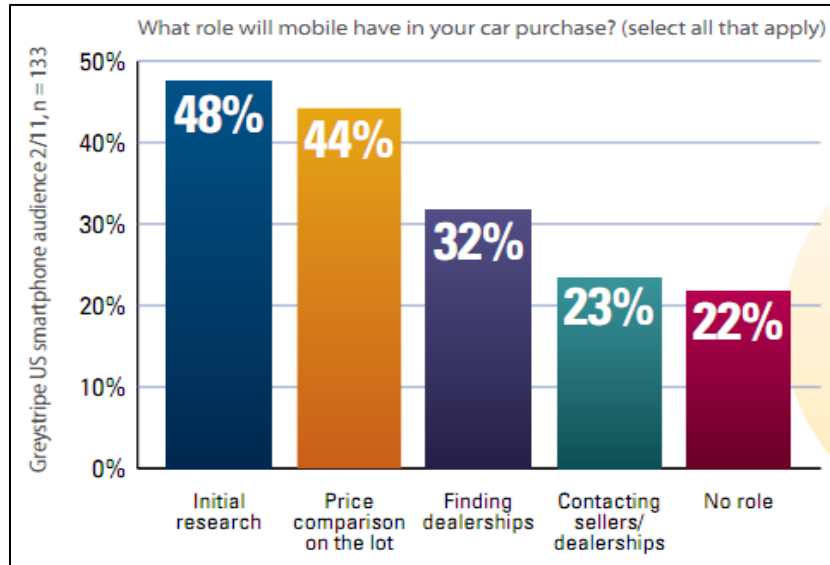


Figure 100. Smartphone owners involvement in car purchase stages, US, 2011<sup>1</sup>.

Another involvement in the shopping process show so called “**Smartphone Moms**” – female smartphone users with children, the study (Greystripe, 2011) during Q4 2010 and Q1 2011 found out.

The Smartphone Mom is a key decision maker—99% play a role in their household’s purchasing decisions. The phenomenon has evolved over the last two years by spreading significantly more on 55+ year old women in the category whose number increased from 8% in Q3 2009 up to 26% in Q1 2011, as shown on Figure 101.

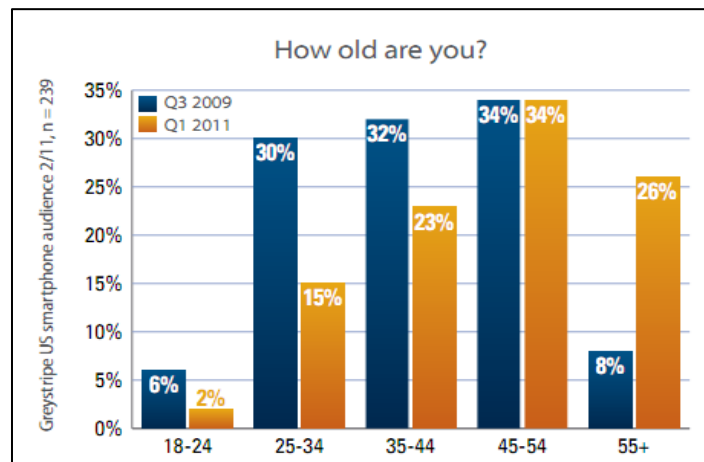


Figure 101. “Smartphone mom” age evolution, US, 2009-2011<sup>2</sup>.

66% of Smartphone Moms indicated that their mobile devices play a role in shopping, see Figure 102. More specifically, 45% of women said they were using their smartphones to find location of the nearest store, 36% were comparing prices, almost 1 in 3 moms were researching new product with their smartphones.

<sup>1</sup> Greystripe, 2011, <http://www.greystripe.com/wp-content/uploads/2011/04/Greystripe-AIR-0411-14.pdf>

<sup>2</sup> Greystripe, 2011, <http://www.greystripe.com/wp-content/uploads/2011/05/Greystripe-AIR-Moms-0511-4.pdf>

Interestingly, that more than quarter of moms were writing the shopping list on their smartphones and 15% were making direct purchases with their devices.

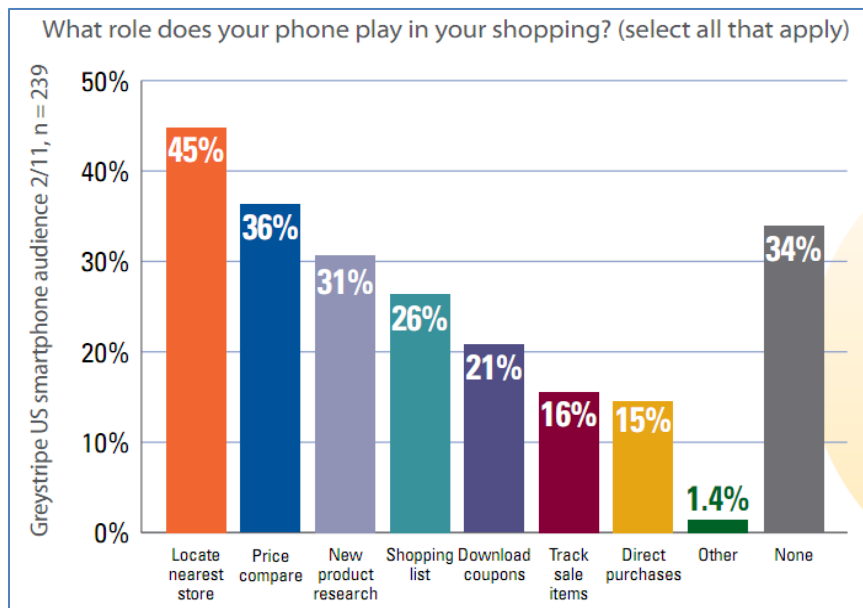


Figure 102. Smartphone role in the purchase process of a “smartphone mom”, 2011<sup>1</sup>.

Moreover, the Smartphone Mom welcomes ads—91% prefer free apps with advertisements over paid apps without advertisements.

Another new trend of mobile usage is **mobile payment**. According to the recent newspapers (Duryee, 2011), another mobile payments service was launched in August 2011 in the United States - The Pago. Consumers on one end will use a mobile application to place orders and pay; on the other end, merchants will use an iPad to track incoming orders, accept payments and track and reward customer loyalty. The loyalty or offers-like system allows service providers like restaurants or salons to reward regulars with discounts or to offer specials when they have a few available hours in the afternoon. “They get all of this ability to collect data and be able to communicate directly with their customers, without having to pay 50 percent to Groupon,” Leo Rocco, the Pago founder said.

## Europe

According to the CBS study (CBS Outdoor, 2010) over 9665 Europeans from six markets (the UK, France, Spain, Italy, Ireland and the Netherlands), the mobile usage trends are as following:

1. Talking by phone and texting SMS are two of the Top 5 activities of Europeans while waiting for a transport.

<sup>1</sup> Greystripe, May 2011, <http://www.greystripe.com/wp-content/uploads/2011/05/Greystripe-AIR-Moms-0511-4.pdf>

2. Europeans use smartphones in the transport. They play games, text, download, etc. 36% of British people use their mobile phone to access Internet while travelling.
3. Almost the same percentage of people is in touch in social networks from home or being on the way, as shown in the Table 11. Actually, more people use Twitter on the way than at home.

Social Media	At Home	On- the- Move
Facebook	56%	54%
Twitter	5%	11%
Linked In	3%	3%

Table 11. Comparison of percentage of Europeans consuming Social Media.

4. Using smartphones people interact with different sort of media. 33% of Europeans regularly access Internet from their smartphones. They scan the bar codes using a smartphone camera. Also, they browse information about a product, having seen an advertisement in the street.

## UK

By Q1 2011, 28% of households had Internet access via mobile phones, according to the study (Ofcom, 2011). Traditional services: calling on a mobile phone and sending SMS are the most common activities in UK, performed both on the feature phones and smartphones. Generally, calls are more important among adults and text messages among teens and younger adults. But the study suggests that smartphone users in Great Britain make calls more often than feature mobile phone users. Figure 103 shows that 81% of smartphone owners make and receive calls on their mobile every day, compared to 53% of regular phone user. Smartphone users also send texts more often, 79% of smartphone owners claim to make and receive SMStexts on their mobile every day, compared to 50% of regular phone users.



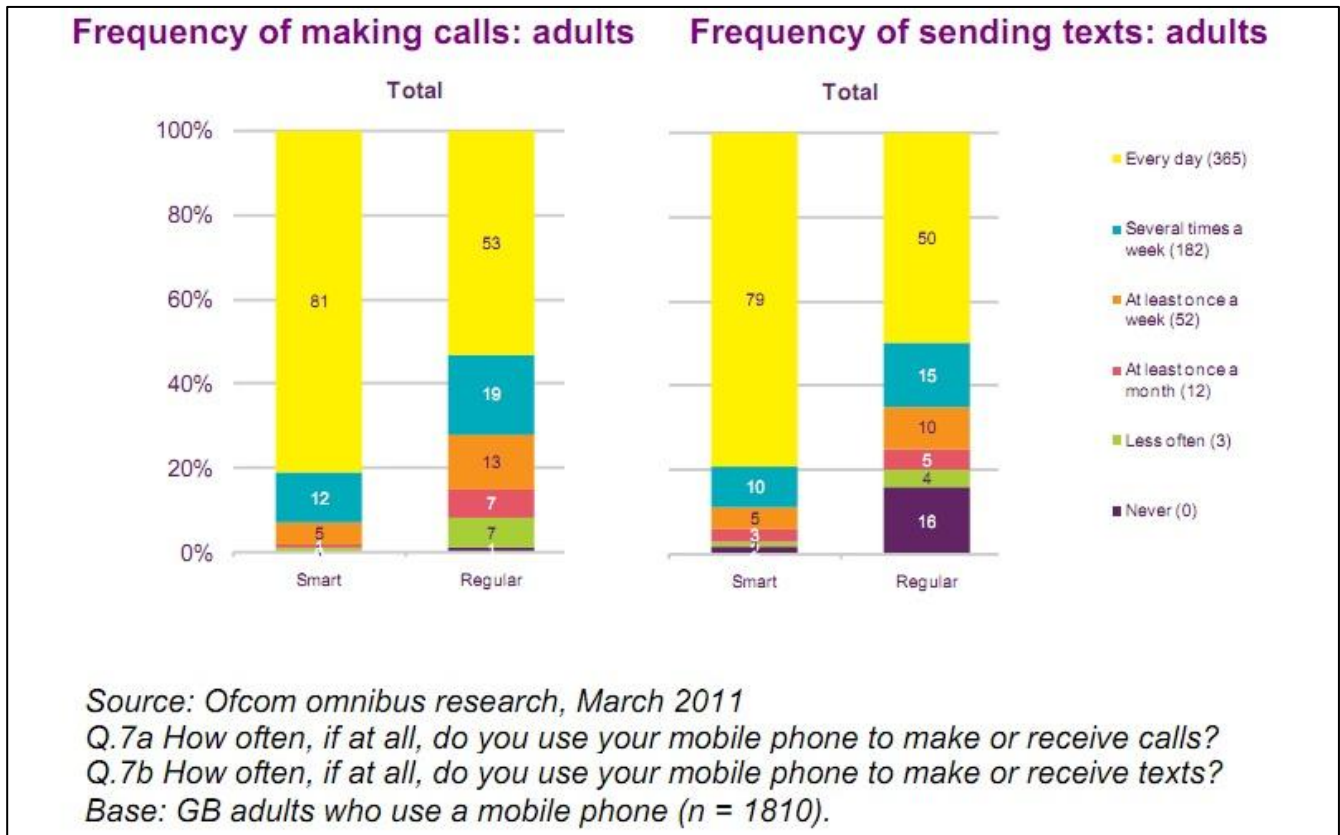


Figure 103. Frequency of making calls and sending SMS from feature phone in UK<sup>1</sup>.

Age habits on receiving or making SMStexts can be seen among both regular and smartphone users, with younger people sending or receiving significantly higher numbers of SMStexts than older people. Women also tend to send or receive more texts than men, regardless of whether they have a regular mobile phone or a smartphone.

**Smartphone specific activities**, popular among the UK adults are ranked, according to the recent study (Ofcom, 2011), are displayed in the figure below (see Figure 104). Among GB adults, the top three activities **ever used** on a smartphone (other than making and receiving calls and texts) are Internet surfing (69%), taking photos/videos (68%), and email (67%).

The top three functions **used regularly** are email (46%), Internet surfing (41%), and social networking (40%). The least-used features are accessing content (TV programmes, sports news, general news, video clips).

In general, teens use the various functions on their smartphones more than adults do. Younger adults (16-34s) are significantly more likely than average to use their smartphone for Internet surfing, social networking and instant messaging.

<sup>1</sup> Based on Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

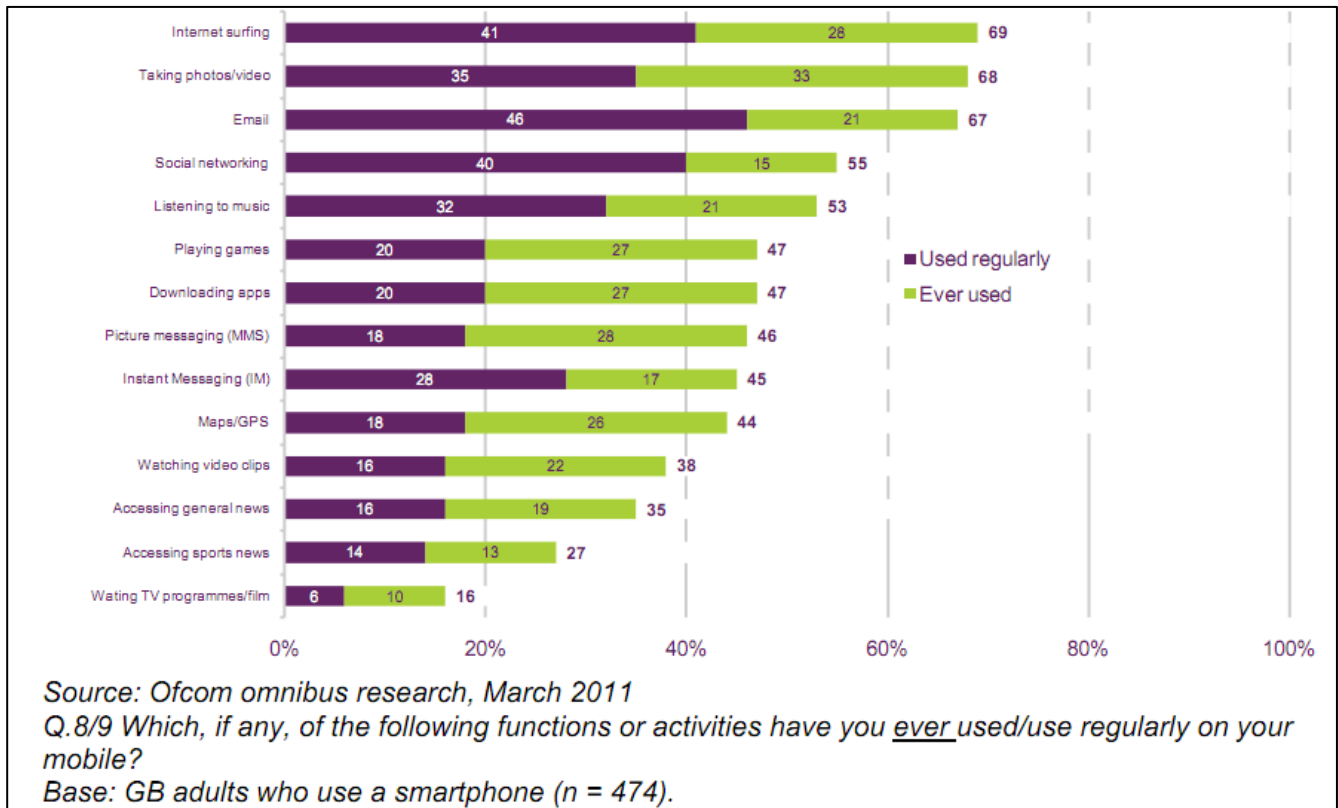


Figure 104. Activities conducted on a smartphone: UK adult, 2011<sup>1</sup>.

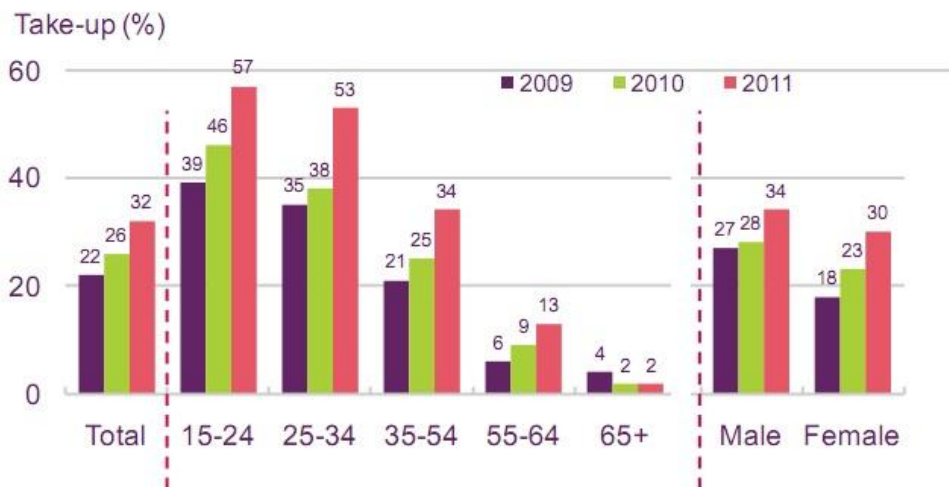
Nearly one in three mobile users access the Internet on their phones in 2011. The driving force of this phenomenon is social networking - this is the most popular Internet service, with 57% of mobile phone Internet users spending an average of **5 and a half hours a month** on social networking sites.

While Facebook was a clear leader in terms of the amount of time mobile phone users spent on it, Google sites had a bigger reach, with nearly 9.5 million unique mobile phone visitors (compared to Facebook's 7.5 million visitors). BBC Online had the third largest number of unique visitors, with 3.7 million.

There are significant differences in the use of Internet services on mobile phones, by age, socio-economic group and gender (Figure 105). Over half of all adults under the age of 34 use the Internet on mobile phones, compared to 34% of 35-54s, 13% of 55-64s and just 2% of over-65s.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

### Use of internet on mobile phones, by demographic



QD28A: Which if any, of the following activities, other than making and receiving voice calls, do you use your mobile for?

Source: Ofcom technology tracker, Q1 2011

Base: All adults 16+ (n = 3474 UK, 460 16-24, 540 25-34, 1204 35-54, 535 55-64, 735 65+, 1679 male, 1795 female)

Note: Data show the proportion of adults who use a mobile phone for any of the following activities: Instant messaging, downloading apps or programs, email, internet access, downloading video, video streaming, visiting social networking sites.

Figure 105. Mobile Internet usage by age in UK, 2011<sup>1</sup>.

“The idea of the mobile wallet is gaining popularity around Europe”, states Rory Cellan-Jones (2011), BBC News. The service launched in the UK gives the opportunity for the customers to make purchases via their mobile phones. “The service is made possible by Near Field Communication (NFC), the short-range wireless technology that underpins many wireless payment systems.”

#### 2.5.3. Countries comparison by mobile phone usage at different times of the day

Smartphones are used consistently throughout the day. But there are moments of the day when the users are more active and less active in doing activities like email, social networking, gaming, Internet, music, location and SMS.

TNS, a market research group, presented a Mobile Life report with the statistics of performing the particular activity at throughout a day, from 6 am to 10 pm, in different countries of the world. They performed 34,000 interviews with mobile users across over 43 countries (including the BRIC countries, Indonesia and several key African markets) to provide insight into how consumers across the world are using and interacting with mobile technology

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

The company released an online tool, where the user can select any pair of countries to make a comparison between them in terms of the mobile phone usage at different times of the day. For my research I made six comparisons that are presented below.

1. USA and UK.

Key findings:

- SMS remains the biggest usage in both markets.
- No commuting peak – though interestingly location-based services peak here – while there is a definite lull during dinner time in the evening.
- No spike in mobile Internet usage or mobile social networking in the evening suggests that other platform, i.e. computers, tablets etc are preferred (and available) terminals for the web.
- No great peak in music or gaming activity in the evening shows that other non-mobile entertainment is used, though a peak in music during commuting time clearly shows that many do use their phone for music.

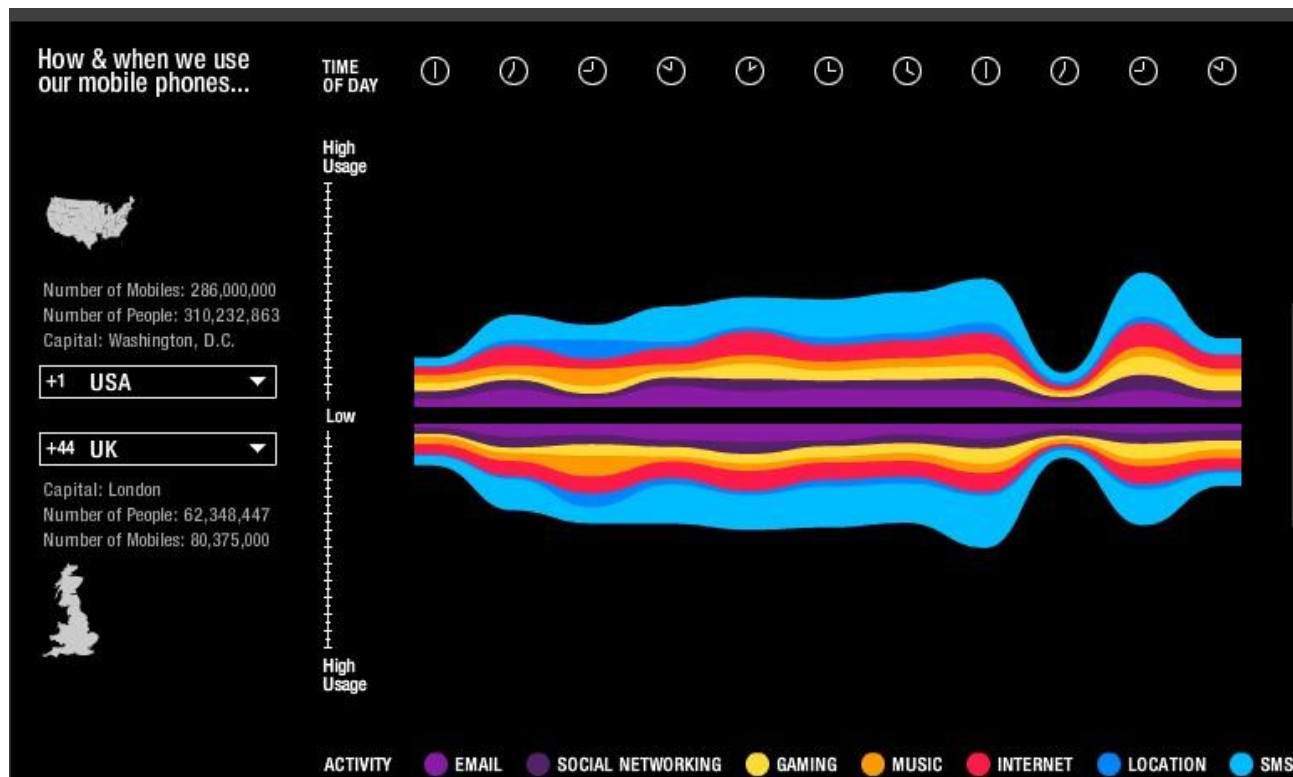


Figure 106. Mobile phone usage throughout a day, USA vs. UK<sup>1</sup>.

2. India and South Korea.

Key points – India:

<sup>1</sup> Mobile Life, 2011, <http://discovermobilelife.com/>

- SMS is the most popular mobile activity although music and gaming usage – alongside mobile Internet surfing – remain constant for much of the day
- Mobile social networking peaks during the afternoon, although not at the expense of SMS suggesting that many relieve the mid-afternoon boredom with Facebook or Twitter
- There is a noticeable peak for music playing on mobile during the morning commute

Key points – Korea:

- SMS remains by far the most popular activity across every part of the day.
- Personal entertainment – gaming and music – are most popular during the morning commute
- Mobile social networking most popular during the morning

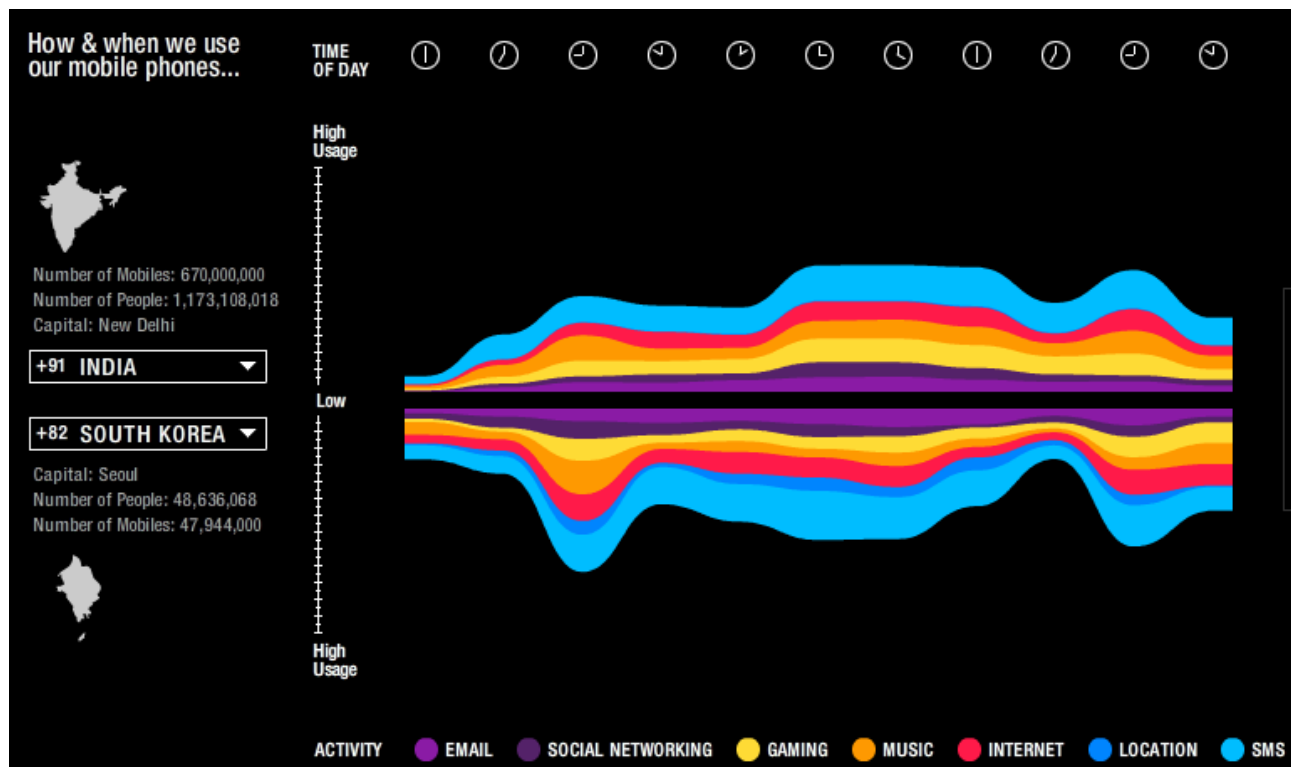


Figure 107. Mobile phone usage throughout a day, India and South Korea<sup>1</sup>.

### 3. China and Japan

Key points – China

- Mobile Internet peaks in the evening, perhaps indicative of more users preferring mobile to fixed-line, or less access to fixed-line Internet at home
- Gaming peaks in the evening, suggesting that, for many in China, their mobile is a primary gaming portal used at home and not just to fill time when out and about

<sup>1</sup> Mobile Life, 2011, <http://discovermobilelife.com/>

## Key points – Japan

- General mobile phone usage is fairly constant across the day – demonstrating mature consumer behaviour
- Dinner etiquette sees significantly reduced usage of all services on mobile for evening meal times
- In the evenings, Japanese mobile users are most likely to listen to music on their phone than any other activity
- Limited mobile social networking takes place
- Mobile email is more popular than SMS through the entire day – reflecting Japanese mobile phone culture

Going into more detail on “Japanese mobile culture” and SMS, it is worth noting the following comment from Gen Kanai: “In Japan, SMS is basically not used as it is only really supported within a carrier (i.e. Softbank user to Softbank user.) For mobile messaging, it is email in Japan, not SMS.”

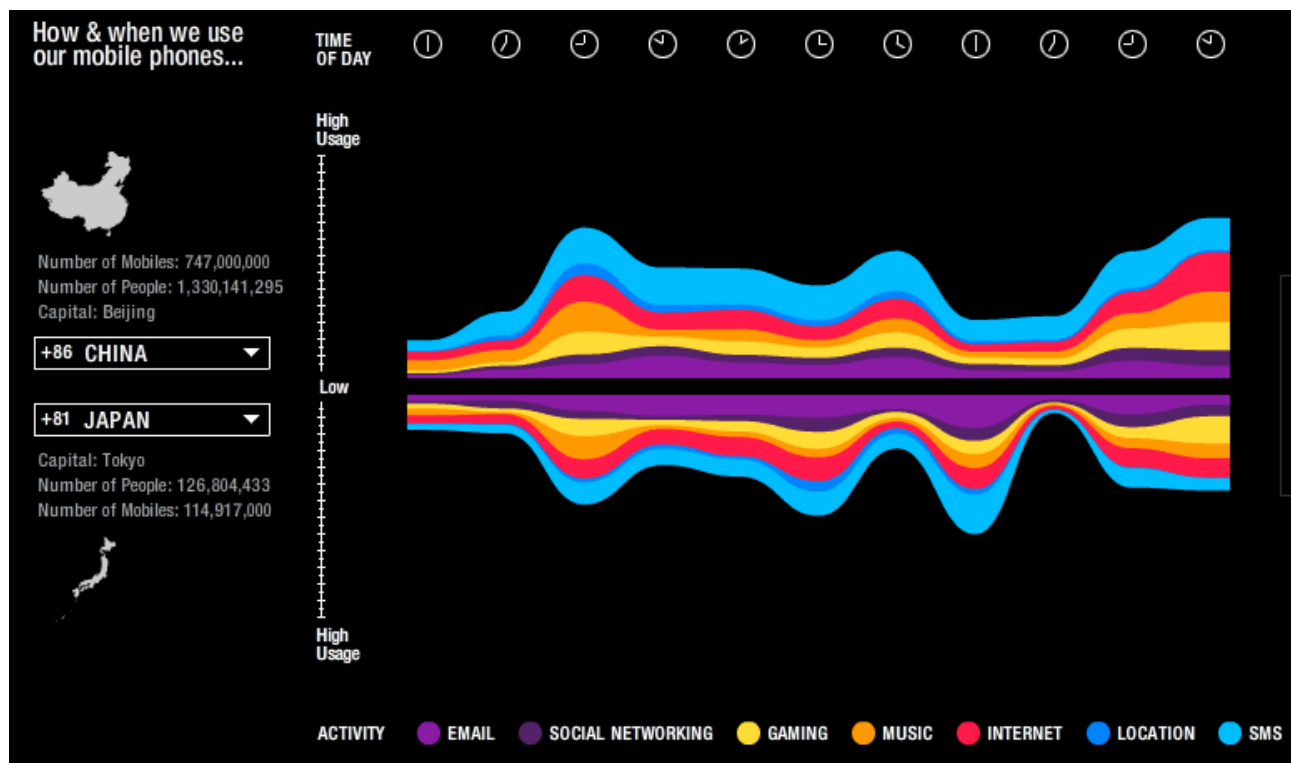


Figure 108. Mobile phone usage throughout a day, China and Japan<sup>1</sup>

## 4. Russia and Italy

### Key points – Russia

- Highest peaks in usage the mobile are during commuting, at 9 am and 6 pm, especially gaming and listening to the music in the morning

<sup>1</sup> Mobile Life, 2011, <http://discovermobilelife.com/>

- The greatest downfall is at 7pm
- After 7 PM the intensity of the usage is never as high as earlier, at 9 PM peak is compared only with the biggest dropdown in the daytime which happens at midday
- Usage of email is comparatively low

#### Key points – Italy

- SMS is the dominating activity during all day, even after the 7 PM dropdown
- Constant usage of mobile throughout the day, without visible peaks
- No after work commuting peak
- Listening to music on mobile is not so popular
- Actively checking email is registered from 10 am to 3 pm, with slight but constant fall until the bedtime

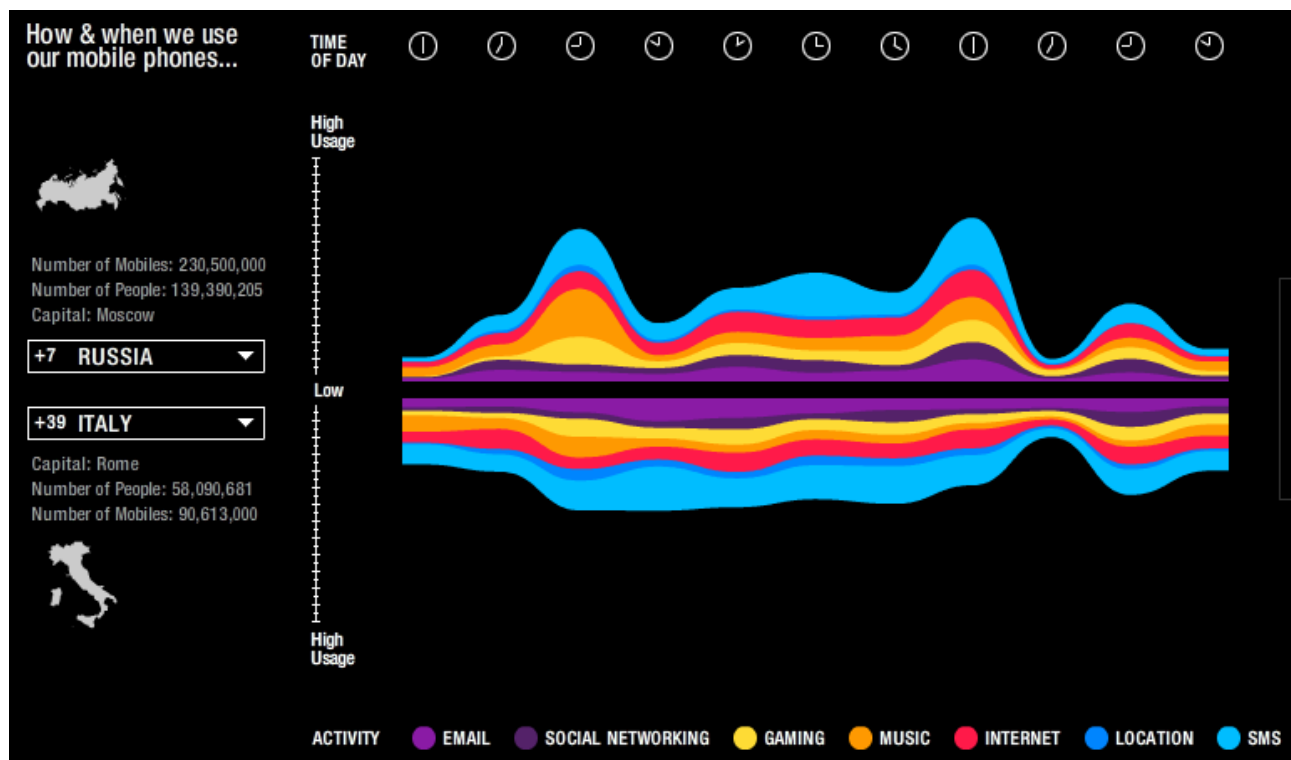


Figure 109. Mobile phone usage throughout a day, Russia and Italy<sup>1</sup>

## 2.6. Game console

Pew Internet (Zickuhr, 2011) recently reported numbers of the percentage of the US population who own a fixed game console, like Xbox or Play Station. As of October 2010 data showed on Figure 110, overall 42% of adult Americans older than 18 years possess a game console. The ownership of a game console is correlated with the age. The biggest fans of console (63%) are 18-46 year-olds.

<sup>1</sup> Mobile Life, 2011, <http://discovermobilelife.com/>

Generally, “adults with children living at home are nearly twice as likely as non-parents to own a game console - 64% of parents do so, compared with 33% of non-parents,” (Zickuhr, 2011). This means that children might have role of influencer. Or of some parents, who initially bought a console for children, later on become gamers themselves.

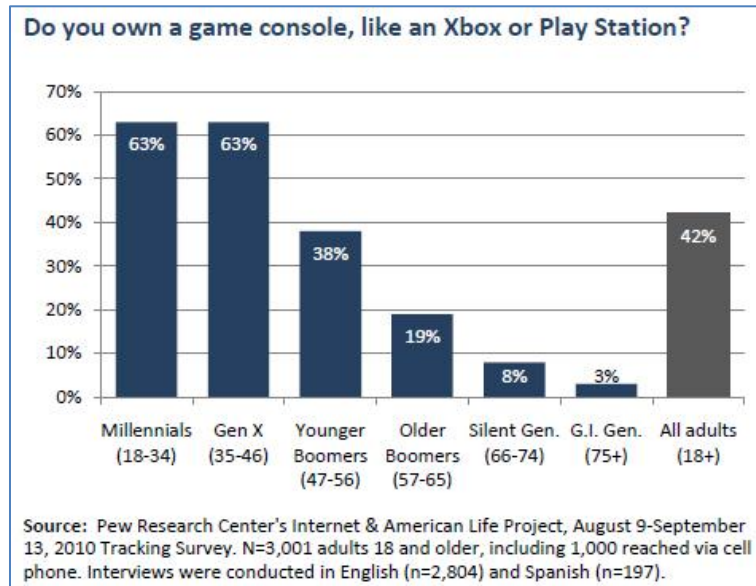


Figure 110. Console owner statistics by generations<sup>1</sup>.

### 2.6.1. Overall time spent

#### The USA

According to the Nielsen report, the total amount of time in hours differs markedly by console, see Figure 111. The numbers in the figure reflect a consumer-reported share of time rather than electronically measured hours.

Users 13+ spend 4.9 total hours per week on the Xbox 360, 4.1 hours on the PlayStation 3 and 1.4 hours on the Wii. Males drive these averages for all three consoles, surpassing females in time spent.

<sup>1</sup> Pew Internet, 2011, <http://www.pewInternet.org/Reports/2011/Generations-and-gadgets/Report/eBook-Readers-and-Tablet-Computers.aspx>



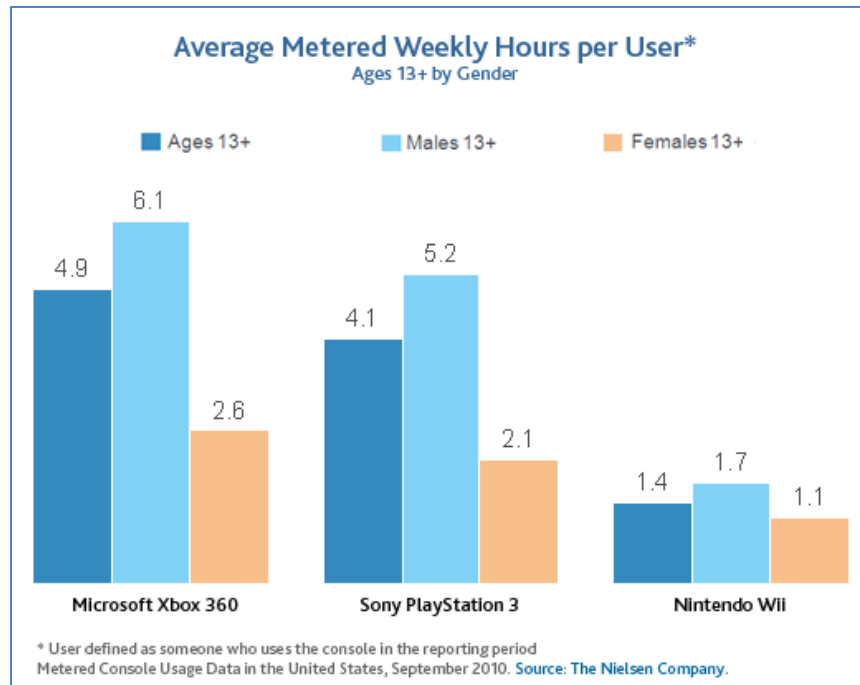


Figure 111. Weekly hours spent with a game console by gender, US, 2010<sup>1</sup>.

## 2.6.2. Usage habits

### The USA.

An American report (The Nielsen Company, 2010) suggests that while **gaming** remains at the forefront of how users say they spend their time with a console, as presented in the graph below (Figure 112). 87 percent of users age 13+ say they have played video games of some kind for Microsoft Xbox 360 and Nintendo Wii, with 80 percent saying they have done so for PlayStation 3. Much of this is the result of traditional offline play, but nearly half of Xbox 360 and Sony's PlayStation 3 users say they play games online, and about quarter of time of users of Wii.

Beyond pure gaming, consoles also are extending their sphere of influence to the digital living room. As more multimedia services become available online, consoles will evolve into true entertainment centers, allowing media streaming and other video or picture content to be delivered directly to supported devices like televisions and computers. (Chakraborty, Cell phone gaming soars as consoles and handhelds sputter, 2010). The data confirm this trend - the second-most popular use of consoles is for watching **DVDs/Blu-Rays**, most noticeably for PlayStation 3 but also for Xbox 360. DVD is not a standard feature on the Wii and Blu-Ray format is not supported by Xbox 360.

After gaming and DVD/Blu-Ray viewing, roughly a quarter of users say they have used a variety of applications. The most notable in terms of contribution to console usage time is **video-on-demand and streaming** services such as Netflix, MLB Network and ESPN3.

<sup>1</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/](http://blog.nielsen.com/nielsenwire/online_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/)

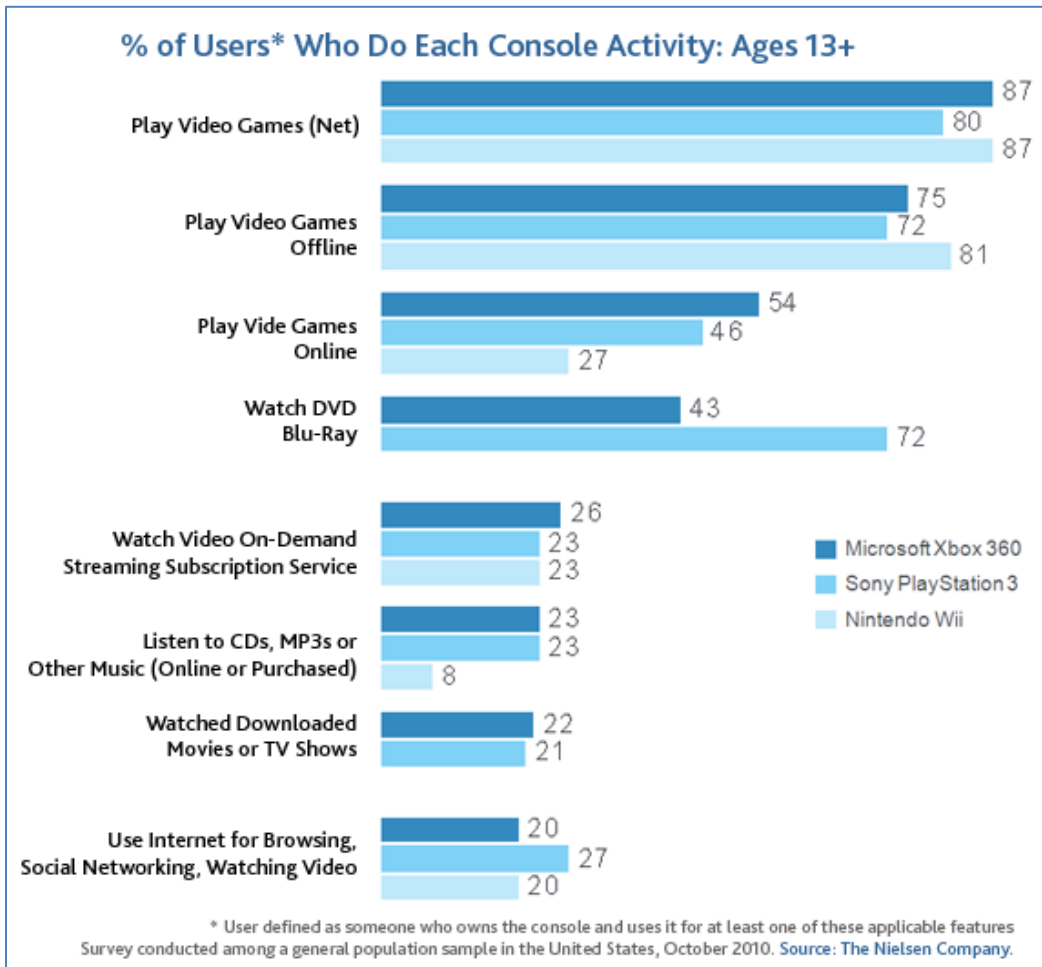


Figure 112. Percentage of users who do different activities on a fixed game console, US, 2010<sup>1</sup>.

Talking about locations of the game console in the US home, the Nielsen Company (The Nielsen Company, 2011) suggests that half of the latest breed of 7th Generation gaming consoles are located in the living / family room (refer to Figure 113). The system most likely to be found in this family-friendly space is the Wii (59%), a reflection of the Nintendo console’s motion-controlled, social gaming style. Comparatively, the Xbox 360 and PlayStation 3 platforms are less likely to reside in the living room.

Beyond the living / family room, the next most popular location for consoles is decidedly more solitary: the bedroom, with one in five systems residing in kids’ bedrooms specifically. Here, the Xbox 360 clearly leads the way, with 28% of the Microsoft system’s units located in kids’ rooms, nearly double the rate for Wii (14%) or PS3 (16%). The master bedroom is on the third place by popularity - 10% of 7th Generation systems are located there.

<sup>1</sup> The Nielsen Company, 2010, [http://blog.nielsen.com/nielsenwire/online\\_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/](http://blog.nielsen.com/nielsenwire/online_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/)

The US National Sleep foundation (Rosenberg, 2011) found that people play video games during the hour before going to sleep at least a few times a week. Among them the greatest age group is 13-18 year-olds with 36%. They are followed by 28% of 19-29 year-olds, 15% of 30-45 year-olds and 12% of 46-64 year-olds.

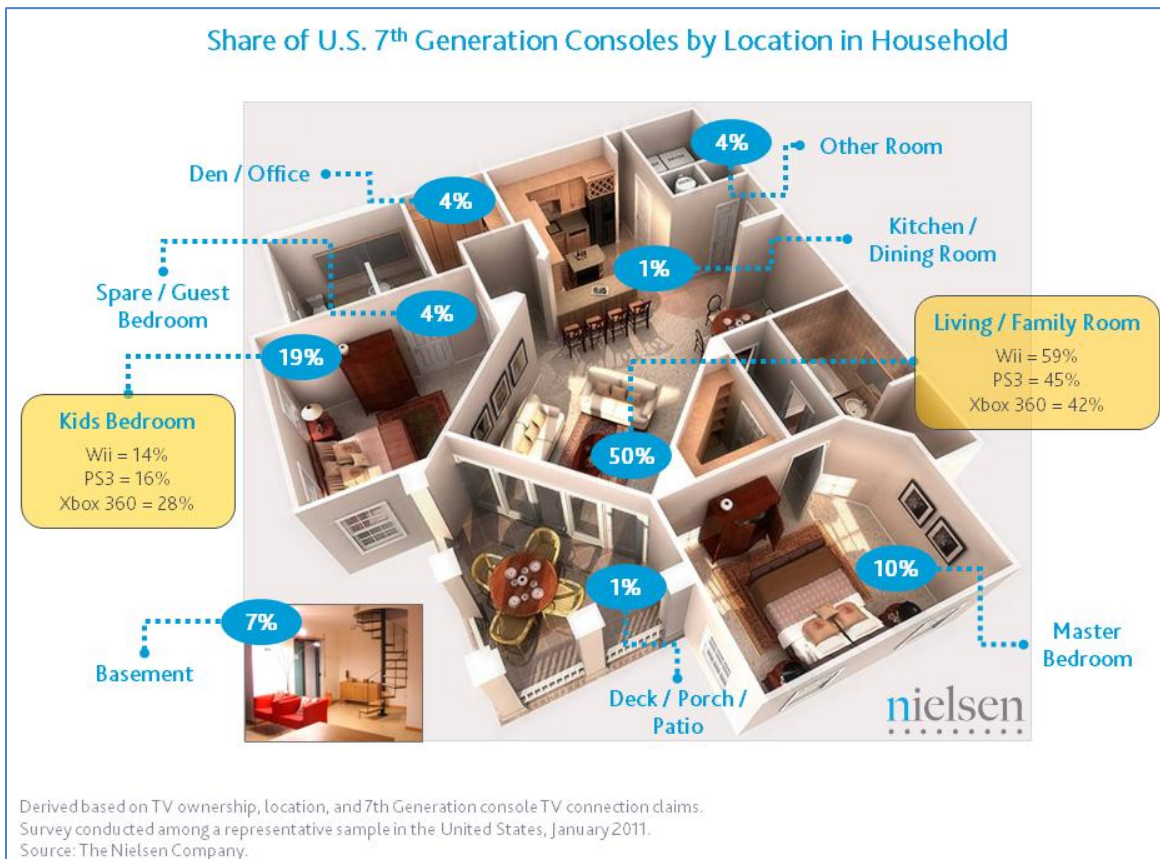


Figure 113. Share of consoles by location, US, 2011<sup>1</sup>.

## UK

As games console functionality has increased in recent years, so has the range of activities that they can support. According to the study (Ofcom, 2011) significant minority of games console players are using their devices for far more than just traditional gaming (see Figure 114).

Just over a fifth (22%) with access to a console use it to watch video content. This is mostly audio-visual content from the web (11%), or programmes on BBC's iPlayer (9%). 4% use a console to watch live TV programmes; this rises to 7% of 16-24s. Alongside using consoles to access audio-visual content, online gaming is used by just over a fifth (22%) of console players. This is more popular among males than females (26% vs. 18%) and those aged 16-24 (32% vs. 24% among 25-34s, 19% among 35-54s and 11% among 55-64s).

<sup>1</sup> The Nielsen Company, 2011, <http://blog.nielsen.com/nielsenwire/consumer/u-s-console-gaming-the-living-room-beyond/>

Just under a fifth (19%) of people with access to a console in their home use it for watching DVDs. This is more likely among people aged 16-24 (26%) than 35-54s (16%) and 55-64s (10%).

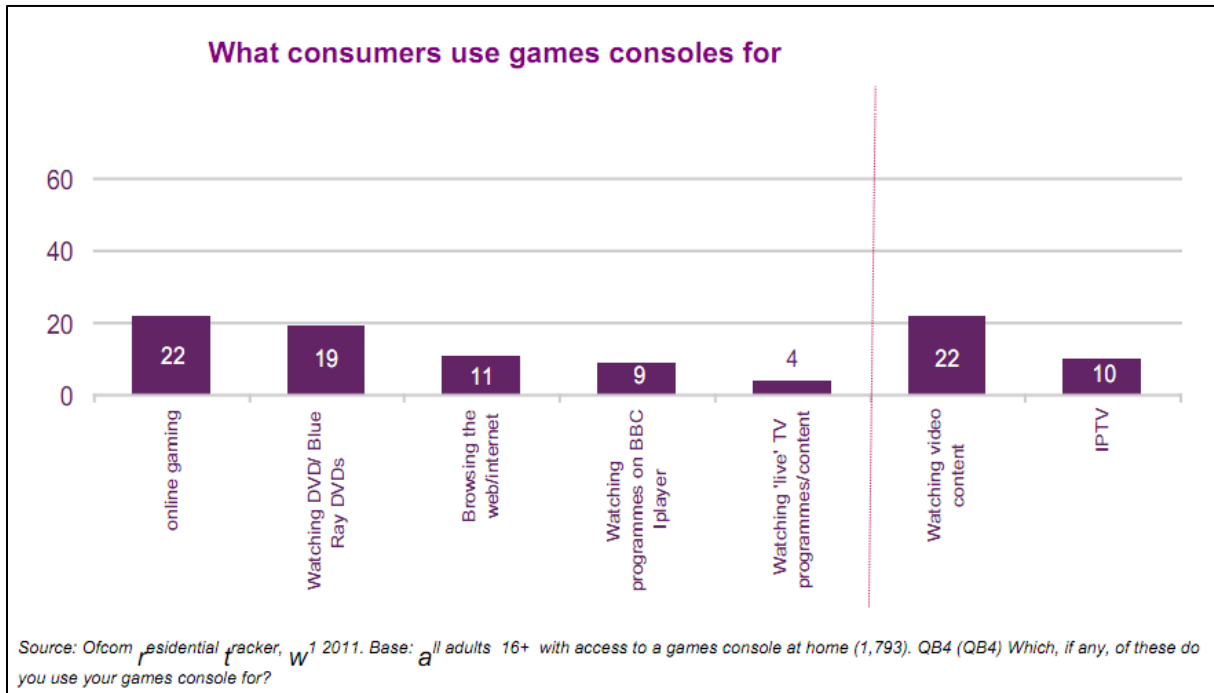


Figure 114. What the UK consumers use games consoles for, 2011<sup>1</sup>.

The growing functionality of smartphones is affecting people's other leisure activities, as presented on Figure 115. 7% of adult smartphone users claim to play less console/PC games, now that they have a smartphone. This is more than 4 times greater among teens, with 30% of teen smartphone users claiming that.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

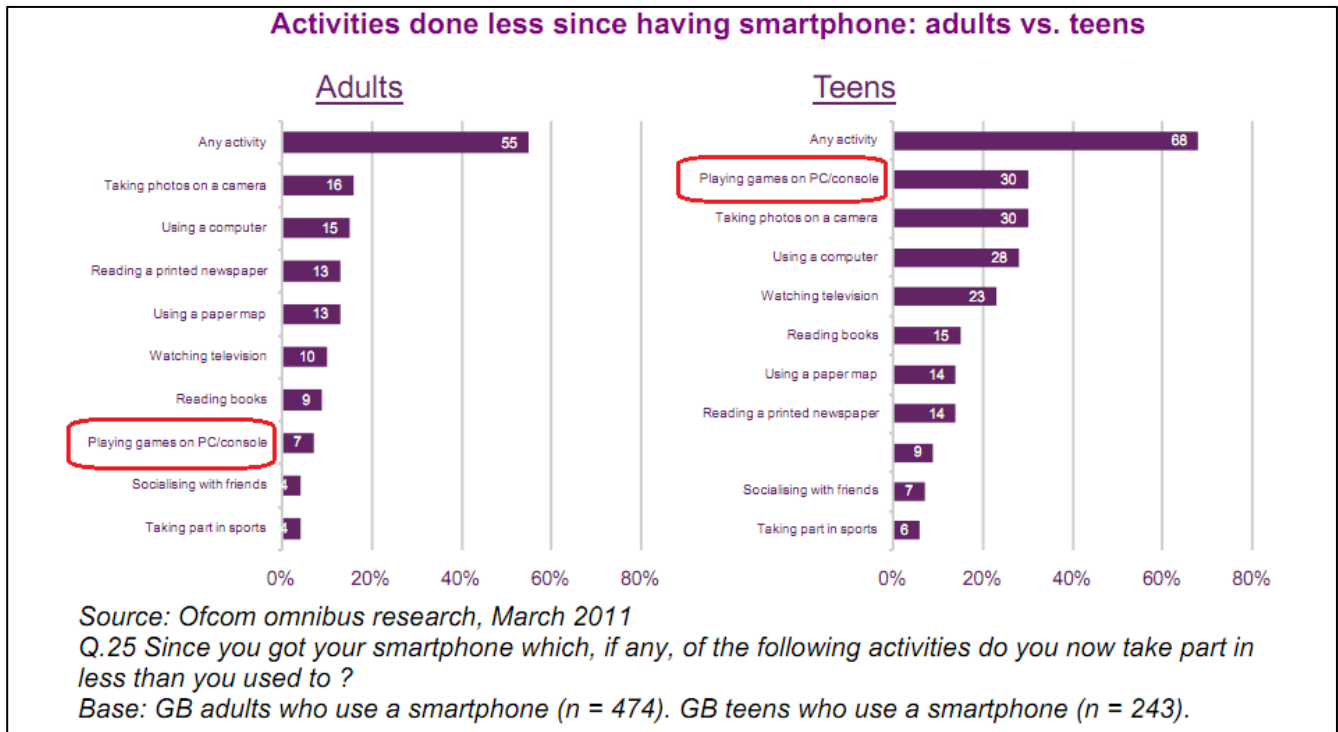


Figure 115. Activities done less since having smartphone: adults vs. teen, UK, 2011<sup>1</sup>.

5% of 16-24 year old respondents claim they would miss the most playing console.

## 2.7. Multitasking

Nowadays multitasking is an increasingly common human activity. According to Forrester research (Reitsma, 2010), multitaskers as people who “consume content from multiple media channels simultaneously”. Different studies confirm that regular simultaneous media consumption for online, newspapers, magazines, radio, TV and direct mail is up anywhere. Dispersed, unfocused attention is something common in our days. Indeed, with so much digital stimuli surrounding us in this Information Age, it seems nearly impossible not to multitask. Different sources reveal that “three out of every four Americans use television and Internet simultaneously and half do so every day” (Shields, Simultaneous Viewing and Surfing Commonplace, 2010). Yahoo concludes that this disproves the myth that “traditional media is dead,” instead affirming “convergence is a reality”.

Generally, people multitask so that to shrink the total time dedicated to two or more devices individually. Indeed, as multitasking is a parallel consumption of media, the time spent with one device overlaps with time spent with another device. This creates the effect of increasing one’s performance - accomplishing more tasks at a time, shrinking time up to twice when multitasking with two devices.

### 2.7.1. The most popular combinations of devices

#### The USA

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

The most common multitasking activity is the consumption of TV and Internet. The majority of the studies are focused on this researching of this kind of multitasking. Indeed, they show that nearly 60% of Americans watch television while also using their computers to access the Internet at least once per month. "Computers" include desktops, laptops, netbooks, because in 2009 tablets were not yet very popular.

Again, as for the US population, Technographics (2010) reported survey conducted in 2009 on 18-24 year-old multitaskers. They were asked about activities they do in parallel with navigating on the Internet.

1. The most popular combination was to watch TV, 40% (Figure 116).
2. The second is texting on a cellphone, 34%.
3. 29% were talking on the phone.
4. 22% listening to the radio.
5. The least famous activity was reading a newspaper, 9%.

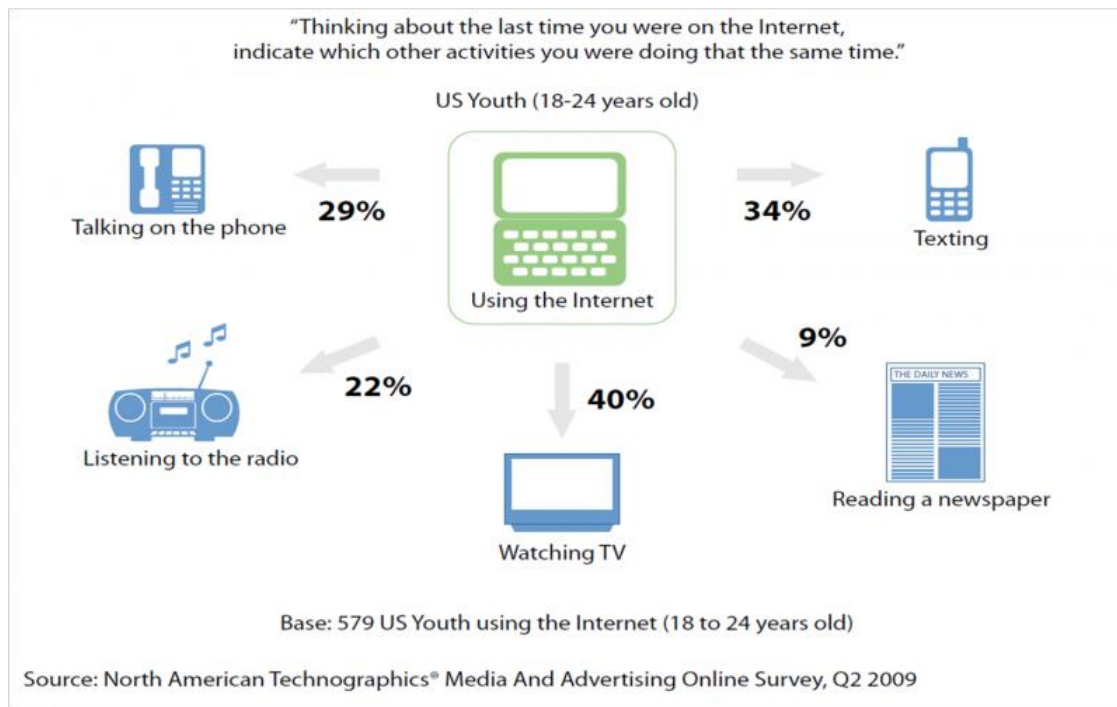


Figure 116. Media devices usage in parallel with the Internet by US youth, 2009<sup>1</sup>.

According to Nielsen's recent survey (The Nielsen Company, 2011) of nearly 12,000 tablet, smartphone and e-reader owners, multitasking that combines these devices with TV is very popular among Americans. The tablets show the highest simultaneous usage - 30% of time tablet are used in pair with watching TV. Smartphones are used 20% of time together with TV and e-readers 15% of time (see Figure 117 below).

<sup>1</sup> Forrester, 2010, [http://blogs.forrester.com/category/media\\_consumption](http://blogs.forrester.com/category/media_consumption)

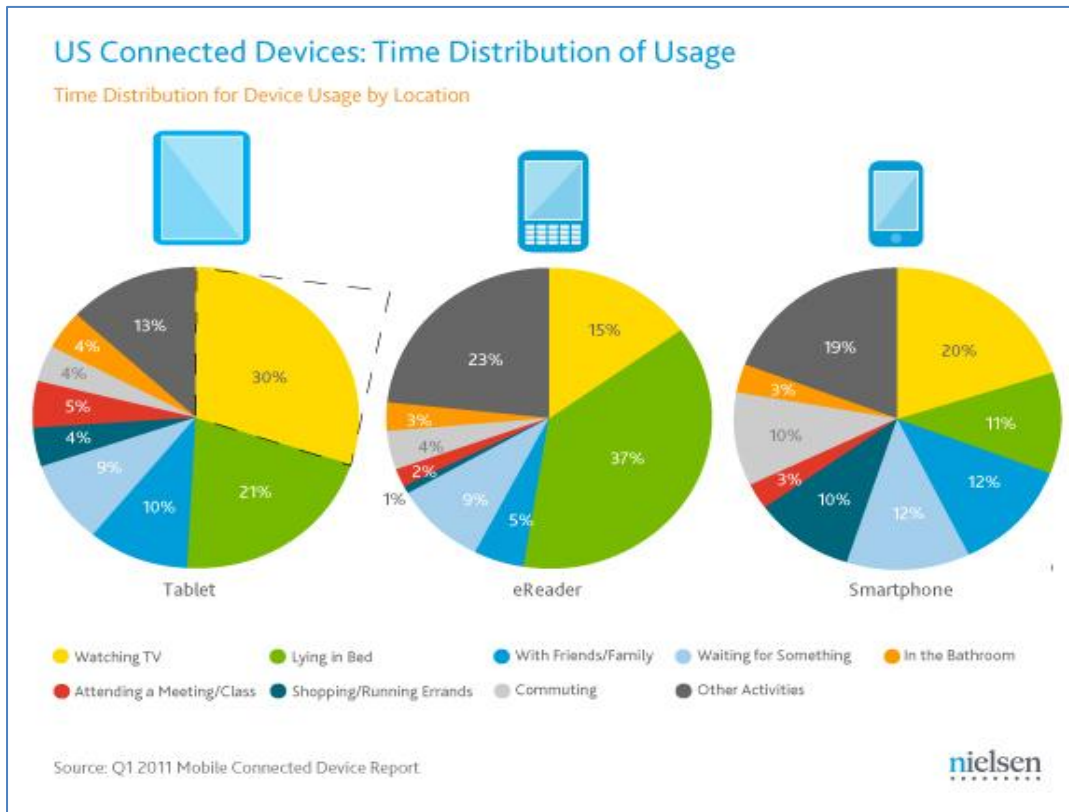


Figure 117. Time distribution of the device usage by location, US, 2011<sup>1</sup>

## Europe

As by December 2010, overall 76% of all people across Europe mesh media i.e. use at least two different media at the same time (EIAA, Mediascope Europe , 2010).

Europeans also “deepen their engagement with the Internet whilst watching TV”, European Interactive Advertising Association reports (EIAA, 2009). 38% of European multitaskers choose to consume TV and Internet simultaneously at least once per week, in comparison with 22% in 2006.

Indeed, looking at media use by day (see Table 12) we see that both TV and Internet usage behaviour has similar trend: both have the prime time “during the evening”. The peak popularity of Radio is “during the day”, and this is the second most popular time for Internet usage. Therefore, Internet on PC is most meshed with TV and Radio.

Across Europe the highest growth is in the number of people who say they sometimes consume TV and Internet at the same time and this is convergence in action. Additionally if you look at the meshing patterns across all the media you will see the conversion with digital media (so TV with Internet) increasing whilst the old media patterns of TV and newspaper concurrent use are starting to decrease. This is really showing us that

<sup>1</sup> The Nielsen Company, 2011, [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-the-u-s-tablets-are-tv-buddies-while-ereaders-make-great-bedfellows/](http://blog.nielsen.com/nielsenwire/online_mobile/in-the-u-s-tablets-are-tv-buddies-while-ereaders-make-great-bedfellows/)

media habits are changing and the Internet is not just another media but it is actually changing the way people spend their media time.

**Media use by day part across EUROPE (15)**

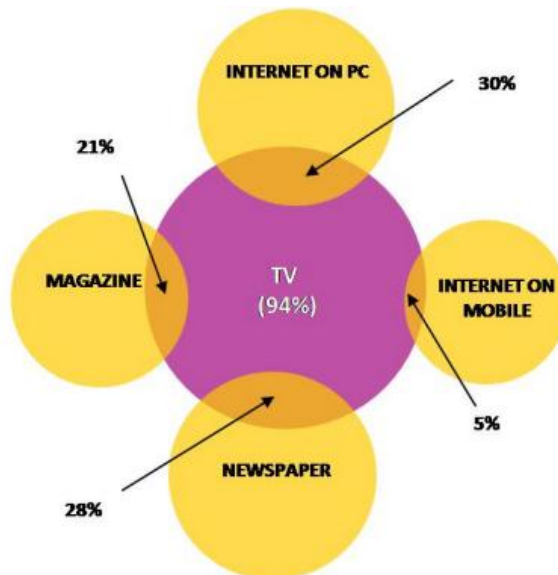
	'When you wake up'	'During the Day'	'During the Evening'	'During the Night'
<b>Watch TV</b>	22%	50%	84%	54%
<b>Read Newspapers</b>	45%	57%	38%	16%
<b>Read Magazines</b>	20%	62%	55%	23%
<b>Listen to Radio</b>	58%	68%	42%	21%
<b>Use the Internet</b>	29%	71%	75%	43%

Question: Q1b/2b. What times of the day do you typically...during week?

Base: All Europe using each type of media – TV (n=11902) Nsp (n=8454) Mgz (n=5879) Rad (n=8351) Int via PC (n=6823) Int via Mob (n=1699) All Int (n=7162)

Table 12. Media use by day part across Europe, 2010<sup>1</sup>.

Watching TV in parallel with Internet is the most popular combination, according to December 2010 study (EIAA, Mediascope Europe , 2010), as presented on Figure 118. On the second place is to watch TV and read a newspaper, with 28% of those who watch TV confirming this behavior. Consuming TV content together with magazine is on the third place with 21%, and on the fourth position is watching TV in parallel with browsing Internet on a mobile phone, 5%.



Question: Q5b-f. When you're mainly .... which other media do you sometimes use?

Base: All Europeans (15) who watch TV (n=13918)

Figure 118. Meshing of media sources, Europe, Dec.2010<sup>1</sup>.

<sup>1</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)



Other survey discoveries are the following:

- 65% of European radio users mesh media,
- 67% use another media whilst they read newspapers,
- 70% mesh media when reading magazines,
- 67% use other media whilst on their PC/laptop,
- 70% of mobile Internet users media mesh when online.

### 2.7.2. Demographics

According to the recent studies, about 40% of Europeans and nearly 60% of US population are TV and computer multitaskers. And it seems that all age groups are turning to multitask.

Studies have established that younger generations are more likely to multitask and use multiple media simultaneously than older generations. Indeed, according to the European study (EIAA, 2009), more than half of multitaskers (54%) are population between **16 and 34** year old, see Figure 119. And 25-34 year-olds are 29% and represent the leaders in this category. On the contrary, the smallest group of multitaskers includes people of age 55 and older. Although, 55+ category is the smallest among multitaskers, their number increased by 75% from 2006 to 2009. At the same time this generation has one of the highest percentages of non-multitaskers (23%), sharing the leading position with 35-44 year-olds (24%).

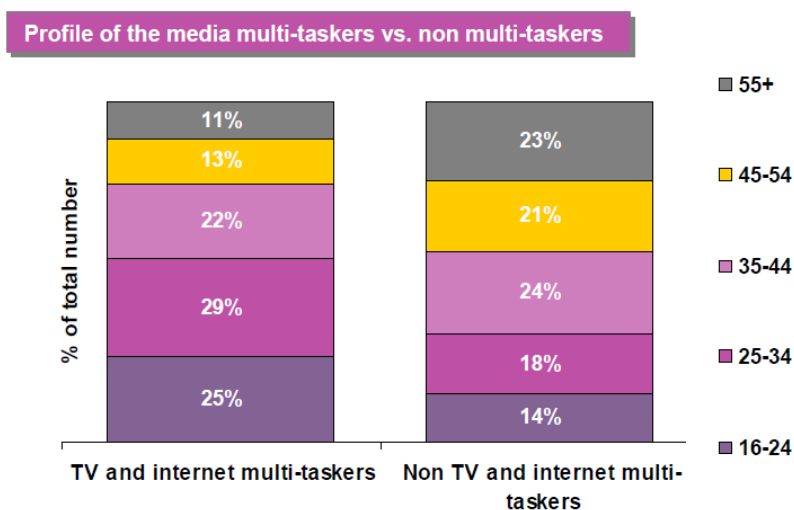


Figure 119. Age profile of European TV and Internet multitaskers vs. non-multitaskers<sup>2</sup>.

<sup>1</sup> EIAA, 2010, [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)

<sup>2</sup> EIAA, 2009, <http://www.eiaa.net/Ftp/casestudiesppt/EIAAMediaMulti-taskingReport-Pan-EuropeanExecutiveSummary.pdf>

## UK

In UK the average person now multitasking to cram nearly nine hours' worth of media within little over seven hours of their time every day. According to Ofcom (Bachelet, 2010), media multitasking now accounts for 20% of all media usage, rising to 29% within the **16 to 24** age group, as shown in Figure 120.

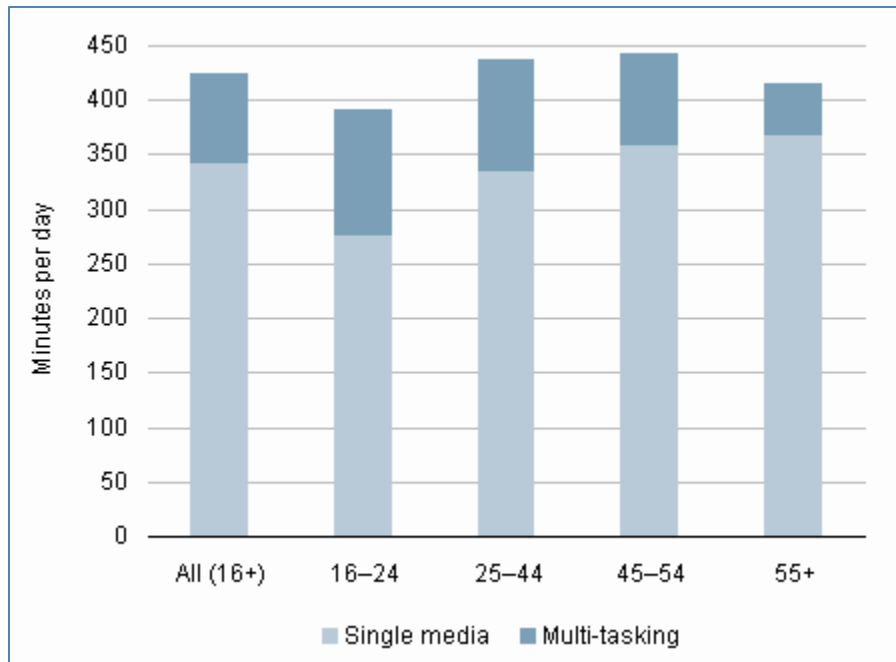


Figure 120. Daily media consumption in the UK, based on research carried out for Ofcom in April/May 2010<sup>1</sup>.

This trend in media consumption patterns is largely attributed to the smartphone ownership, which has doubled to just over a quarter of the population aged 16 and over within the two previous years. Indeed, when Apple launched the iPhone in 2007, it revolutionized the way in which consumers access mobile content by providing a far more intuitive interface than before. So it is much easier for consumers to access various services on a mobile device, and to simultaneously consume media on other devices, such as a TV. These services, as revealed by Ofcom's research are the following. Less than a quarter of the time spent by 16 to 24 year-olds on their mobiles is for voice calls, while Internet access, social networking, audio and video consumption account for more than a quarter of their time, and text messaging for half of it.

## The USA

An American study from Boston College (S. Adam Brasel, 2011) about concurrent usage of TV and computer also states the fact have established that younger generations are more likely to multitask and use multiple media simultaneously than older generations. The scientists explain that the brain probably becomes less flexible with the age. In comparison to adults, **students** enjoy multitasking the most, and also they fell more effective in this activity in general. Moreover, they switch more often between the media, even though

<sup>1</sup> Analysys Mason, 2010, [http://www.analysismason.com/About-Us/News/Insight/Media\\_usage\\_Insight\\_Sep2010/](http://www.analysismason.com/About-Us/News/Insight/Media_usage_Insight_Sep2010/)

students and adults not significantly differ on the number of TV channels changed or the number of Web sites opened.

The study was conducted over 20 younger students and 22 older staff members into their media lab individually. Participants were seated in front of an Internet-connected computer and cable-connected television, and had thirty minutes to use either media in any way they wanted.

Media studies show that 59 percent of Americans now use the television and Internet simultaneously.

### **2.7.3. Behaviour**

Alison Fennah, executive director at the EIAA, says that the overall media behavior changes once a user becomes a television and computer multitasker. "They absorb all of these media messages and it turns them into a broader Internet user; one that does lots of different things online and spends much more time online [compared with those who do not use multiple media simultaneously]," (Roberts, 2009).

Media multitaskers are more likely to change their mind about a brand (48% vs. 36%) and make more purchases following web research. But they are more likely to switch brands when booking a holiday or buying an fast moving consumer good product, than when making an expensive purchase such as a car.

Multitaskers are more likely to own a laptop than a desktop pc, than non-multitaskers (69% vs. 54%). The move from desktop to laptop computers has made it easier for individuals to use both computer and TV simultaneously. Multitaskers also connect to Internet via mobile phone or Wi-Fi, 57% vs. 43% of non-multitaskers. But multitaskers not only switch between TV and pc, they also do many things on pc at the same time.

The web activities the TV and pc multitaskers and non-multitaskers perform are shown in the figure below (Figure 121). As a general trend, TV and Internet multitaskers are more engaged and entertained online. That is clearly seen from Figure 121: all web activities are more popular among multitaskers, than those who are not. Media multitaskers are heavy communicators online (53% vs. 33% of non-multitaskers) and 51% use Instant Messenger (vs. 27%). Using the Internet for entertainment is also key to media multitaskers with 38% watching film, TV or video clips on the web (vs. 21% of non-multitaskers), 37% listening to the radio online (vs. 25%) and more than a one in three (34%) downloading music (vs. 22%)

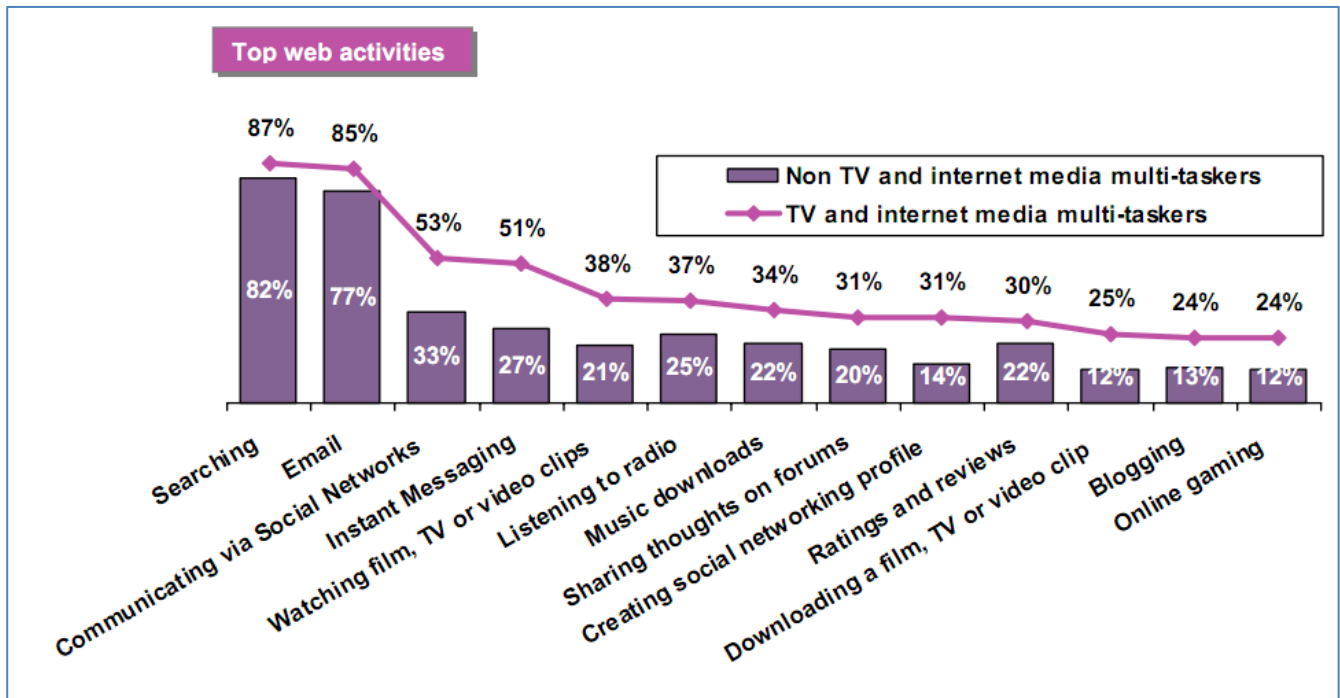


Figure 121. Top web activities popularity among multitaskers vs. non-multitaskers<sup>1</sup>.

## 2.8. Hybridization

Hybridization is technological feature of a device that provides content that originally was not designed for this device. For example, GPS navigation map was originally designed for the special devices - GPS navigators, but now it can be used from a mobile phone.

The American studies suggest that the number of people listening weekly to the online radio has doubled every 5 years since 2001 in the USA and reached 22% of US population older than 12 years. And 11% of Americans are exclusive online radio listeners, who do not listen to AM/FM. Fixed games consoles neither are used only for gaming: 72% of Sony Play Station 3 users watch Blu-Ray and 43% of Xbox 360 users watch DVD. Console owners also utilize them for listening CD, MP3, for watching TV shows or downloaded music, as well as for the Internet browsing.

23% of the British PC Internet users watch TV on Internet at home; 18% of users listen to online radio. 82% of computer users ever used PC Internet for reading news and information websites, in comparison to 35% of mobile Internet users. Concerning a fixed console, 19% of Britons use it for watching DVD, 11% - for browsing Internet, 4% - for watching live TV programs.

At least once a week 14% of Italians watch a TV program on the Internet, 11% listen to the Internet radio and 27% read a newspaper on the Internet.

<sup>1</sup> EIAA, 2009, <http://www.eiaa.net/Ftp/casestudiesppt/EIAAMediaMulti-taskingReport-Pan-EuropeanExecutiveSummary.pdf>

Globally, 23% of mobile phone owners watch videos on their phones at least once per week. 53.2% of owners engage in social network activities and more than 30% use instant messaging daily on their cell phone every day.

The hybridization is strongly linked to the concept of convergence of media devices. The data above shows that content natively designed to be enjoyed on a specific platform (such as a radio program) is now consumed from other media devices different from radio sets (for example on TV, Internet, and mobile phone). Today the hybridization of the PC Internet is already rather widespread, whereas mobile and TV hybridization has less diffused at the time. And fixed console and TV hybridization is popular even less.

Examples of devices with content hybridization and the popularity of this feature among consumers in 2011 are presented in the table below.

Device with content hybridization	Content	Device that originally was designed for the content	Popularity among consumers, globally, 2011
TV	Internet (web pages, video, audio, applications, etc.)	Computer	10% <sup>1</sup>
	Digital radio transmission	DAB	9% <sup>2</sup>
Internet on Computer	TV programs	TV	Not available
	Digital radio transmission	DAB	Not available
	Newspaper articles	Newspaper	27% <sup>3</sup>
Mobile phone	Music	MP3 player	95%
	Analog radio programs	Radio set	75%
	Web	Computer	96%
	GPS navigation map	GPS navigator	79%
	Films/videos	Computer	72%
	Office documents	Computer	64%
	Book	Paper	49%
	Newspaper, magazine	Paper	56%

<sup>1</sup> In the UK

<sup>2</sup> In Italy

<sup>3</sup> In Italy

	Games	Portable game console	92%
Fixed game console	DVD/Blue-ray disk	DVD/Blue-ray disk player	57%
	CD/MP3	CD/mp3 player	18%
	Internet (web pages, video, audio, applications, etc.)	Computer	22%
	IP TV programs	TV	10% <sup>1</sup>

The data from the table above is summarized in the Figure 122.

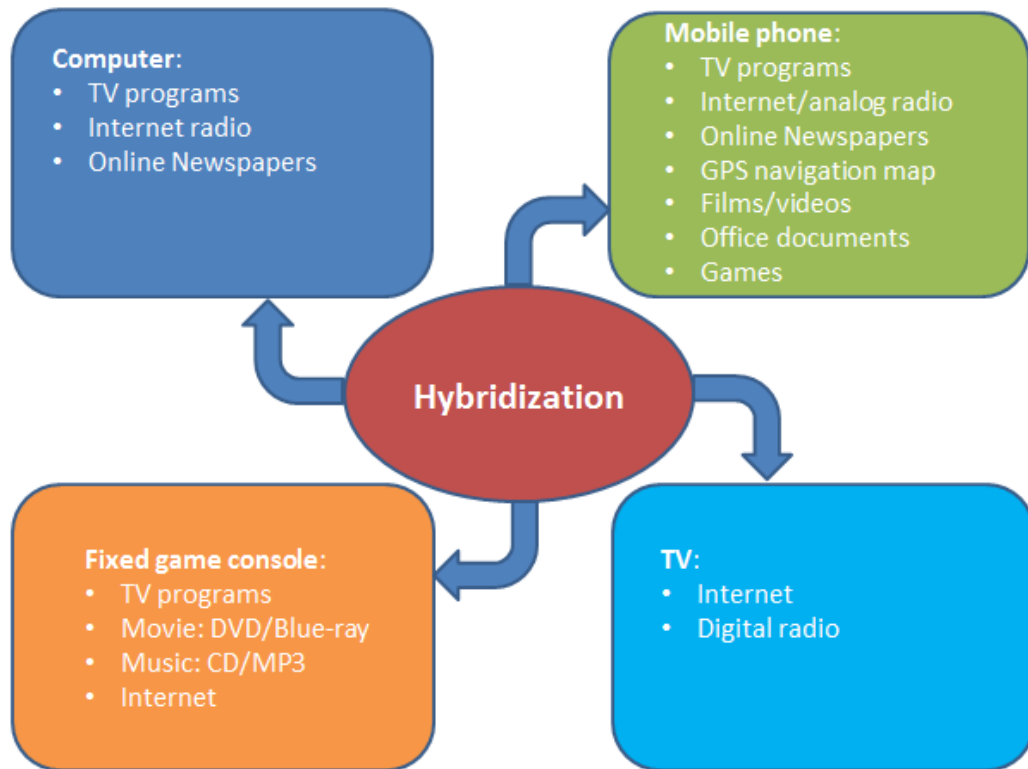


Figure 122. Hybridization.

<sup>1</sup> In the UK

### 3. Focus groups

#### 3.1. Theory

##### 3.1.1. Introduction

As many sources suggest, the most common or at least one of the most common methods of the qualitative research is focus groups. Focus groups help to understand a lot about how consumers feel and think. According 'Qualitative Research Methods: A Data Collector's Field Guide' (Natasha Mack, 2005), "Focus groups are often used to determine what service or product a particular population wants or would like to have". Focus groups provide qualitative information from well-defined target audiences. The information then can be used for decision making and developing marketing strategies and advertising campaigns, and position a particular product or service with respect to their target audience. The method can also discover more about consumer habits and product usage. They can reveal how products and services are used by consumers and which are consumer's attitudes toward them. Quality of service can be evaluated as well. In addition, idea generation is another area in which focus groups are useful to businesses. Participants are encouraged to talk about their problems and unfulfilled needs. In this case ideas about possible new products and services can be generated.

The process of focus group research is displayed in the figure below:

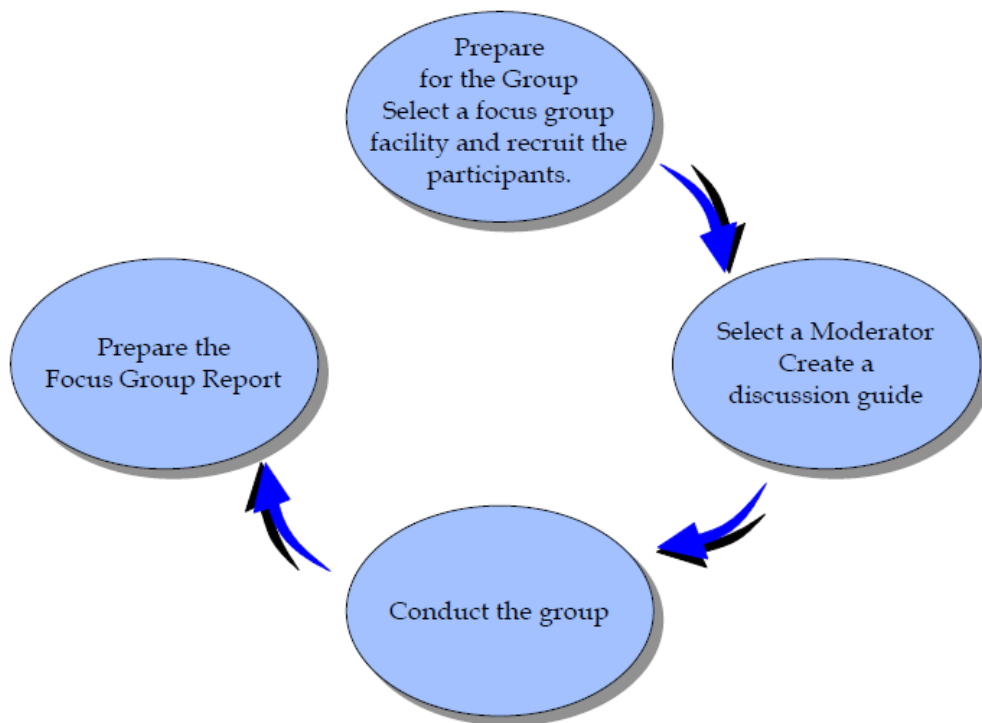


Figure 123. Stages in conducting a focus group.

1. On the preparation stage the researchers state the objectives of the research ,select the focus group participants and prepare all the necessary facilities, like a room where the interview will be conducted, recording devices, etc.

2. Second, researchers prepare a predefined list of questions and select a moderator who will lead the interview. Later on, during the interview the moderator can change this list according to the answers and behavior of the group, but the initial list of questions is important in terms of a discussion guide to follow, so that not to forget the crucial points.
3. The third stage is the main one. Focus groups are basically multiple interviews, or sessions. During these sessions one or two researchers (also called facilitators) and several participants meet as a group to discuss a given research topic. These interviews are usually audio or video-recorded. The first researcher, called moderator, leads the discussion, ask participants to respond to open-ended questions in unstructured and natural manner, while the second researcher takes notes on the discussion.
4. Lastly, the researchers analyze the results of the interview and present the focus group report.

### **3.1.2. The process of focus group**

The focus group approach requires that researchers prepare a focus group well in advance to carry out the research. Focus groups typically consist of 8 to 12 people from the target consumer group. Gary Witt, 'Using Consumer Research to Improve Sales' (Witt, 1998) suggests, "Size is important because you want the group small enough so everyone has an opportunity to talk, but large enough to give a diversity of perceptions. Try to stay away from members who would naturally dominate the others, like a boss with his/her employees." The goal for group composition is to find individuals who are highly representative of the total (role-alike) population. They are selected on the basis of certain shared characteristics (like "smartphones owners" or "over 25 year-old" etc.). Therefore, the researchers should obtain a homogeneous group composition.

Whenever possible, focus groups should be conducted in a location affording a maximum degree of privacy to participants. A relaxed place with informal atmosphere is preferred. Audio and/or video recording devices should be prepared in advance. Researchers ask the permission about the recording before the interview. It is important to remind the participants of the focus group time and place in advance.

Usually about a dozen of questions will be asked during one session. These questions and their schedule should be pre-prepared in advance because of the following reasons:

- so that to ensure each group is given adequate opportunity to discuss all the key issues in a similar fashion, because so that the get reasonable results more than one session is needed.
- if the facilitator has been invited in from outside and is unfamiliar the organization it would be easier for him to stay focused on the topic;
- for any facilitator the list of questions would help to stay on track and on time.

Moderators play an important role in the success of focus groups. Generally, anyone can play a role of moderator, ranging from the clients themselves to professional researchers, academicians, marketing consultants, psychologists, and professionals. But well-trained moderators can provide a great deal of added value in terms of their past experience, skills, and techniques.



During the interview the moderator encourages all members to voice their opinion, and to respond to the opinions of others. In this sense moderators are not the interviewers but are rather discussion leaders who follow an outlined plan of how the discussion should flow. They try to stimulate discussion but say as little as possible. They allocate available time to make sure the required topics are covered. When the discussion digresses, it is up to the moderator to refocus the group on the topic at hand. Because each session is only a one-time occurrence, it's useful for a moderator to have few ground rules that sustain participation, yet do so with focus. The rules are:

- a) to keep focused,
- b) to maintain momentum,
- c) to get closure on questions.

Time duration of each session varies from 1 to 3 hours. But many sources suggest 90 minutes interviews.

Once all of the test concepts have been discussed and evaluated by the group, the moderator moves the discussion into the final phase. During this phase the best concepts are identified and their strengths and weaknesses discussed. After that the moderator closes the session by thanking the participants and giving them any final instructions. Participants should leave with a positive feeling about the experience and the client, if the client has been identified.

After the participants have left, it is standard practice for the moderator and the client observers to have a post group discussion. Sometimes clients require a written report, sometimes they do not. In the first case principally moderator and facilitator write a summary of their notes as soon as possible after each meeting when the events in the memory are still fresh. After that the moderator prepares a report about the results of the session or group of sessions as interpreted by the moderator. The final report may include information about the background of the problem, purpose of the focus group, details of the sessions, results, and conclusion.

Focus groups are a widely used in market research of the **advantages** they offer.

- In comparison with other qualitative-research methods, such as in-depth interviews with one or two individuals at a time, focus groups are much faster and more cost-effective. Focus groups also allow clients to participate by viewing the discussions, something that is usually not possible with in-depth interviews.
- It gives a combined effect of group interactions which results in more output than would be obtained individually. "Participants are likely to be more spontaneous in focus groups than in one-to-one interviews, and their informal comments may produce unexpected results," states David P. Bianco, 'Reference for Business' (Bianco, 2011).
- Focus groups method can stimulate new ideas, if participants talk about their problems and unfulfilled needs. Researchers go deeply behind the facts, analyzing the tone and emotions of the participants. There are no rigid rules during the interview and respondents anything they want in front of the group.

- Focus groups are very flexible and spontaneous, because the moderator leads the discussion according to the behavior of the participants, their enthusiasm, willingness, and interests.
- Even though being flexible, the method is structured and specialized in the topic discussed. A moderator follows the list of predefined questions as his guideline, even though he decides during the session whether to omit some questions or include the new ones. The method extracts information that describes a group's overall reaction, but not an individual.

Focus groups are not the optimal technique for all research situations. Here are the following **disadvantages** of the method:

- Success of the focus group interview strongly depends on the moderator who has an essential role during the interviews. Poorly trained moderators are likely to fail to generate quality output from their focus groups. Instead, skilled moderators are difficult to find, and when their services are available, they are often expensive.

During the session, the moderator leads the interview in such a way so that to achieve a natural conversation. Individuals are allowed tell personal stories, experiences, go back to the earlier questions, disagree, insist, etc. A well-designed guide of questions encourages group members to relax, open up, think deeply, and consider alternatives.

- The topic itself must be tested on compatibility with the focus group method in the sense that's usually it is difficult to have the participants share their real feelings towards some sensitive topics publicly. Focus groups do not produce reliable data in this case.
- It becomes quite an arduous task to tabulate, interpret and analyze the data. In addition, there is a possibility of misjudge the participants' considerations. Then the question about validity of the results is raised, because a report based on focus groups will feature patterns formed by words, called themes or perspectives. The method is not designed to create generalizations to the whole population; therefore numerical analysis is not a preferred technique. In fact, it is inappropriate to report a result of focus groups by percentage.
- If an argument makes too many speakers to speak simultaneously, the audio records might be messy and difficult to analyze.
- Some participant may feel uncomfortable or shy to express their opinion in a public.

## **3.2. Practical participation and analysis**

### **3.2.1. Comparison between the theoretical conditions for the focus groups and practical implementation**

#### **The focus groups composition**

The theory suggests focus group consist of 8 to 12 people from the target consumer group (Witt, 1998). And in practice there were two groups of 8 people – students and 40-45 year-old adults, and one group of 6 people – younger adults. That means the conditions of the number of interviewees was optimal, because each of them had a chance to express his opinion and at the same time the diversity of answers was wide enough.

Exactly as the theory advices, group members had been selected on the basis of certain shared characteristics: age, stage of life, employment. This would provide the researchers with a homogeneous group composition. But unlike what I saw in the theoretical recommendations, there was one additional characteristic that divided the group into two parts – “the level of relationship with technology” that allowed the researchers to distinguish between “technology-friendly” and “followers”. Consequently, each group consisted in two sub-groups; and each sub-group was completely homogeneous. Hence I can say that the whole group was homogeneous with respect to 3 out of 4 shared features.

After the interviews I contacted the responsible for the focus group research, Giulio Cacciapuoti, about the reasons for not absolute homogeneity of the groups. He explained that there had been both practical and theoretical reasons. In practice, according the scope of the project, it was possible to invite only 3 groups. Having 3 classes of age the researchers decided to make the groups uniform in this, most important, dimension rather than to that of the relationship with technology. From the theoretical point of view, two categories (technology-friendly and followers) are not opposite, but are two neighboring classes along the classical curve of diffusion of technology. The curve starts with early adopter, then moves to techno-friendly, then to the follower and finishes with the most distant and “divorced” from technology. Taking into account individual differences and in some cases, it was possible to compare the differences in experiences within the group. However, the research was not interested in comparing the two different types, but to gather different ideas from both technology-friendly and followers.

Theoretically people invited for the focus group interview should not have any dominating interactions, like a boss with his employees. Indeed, in practice the interviewees did not even know each other before the focus group. This gave them confidence to communicate their opinion, free of prejudice unlike if they were surrounded by colleagues or people they familiar with. Certainly, some people are shy by nature, and some less; but the moderator was able to encourage everyone to express himself.

### **Location**

The interviews took place in an office located in the center of Milan, very close to one of the biggest metro stations. This gave the chance to the interviewees to arrive without any transportation problems. Moreover, as the theory says focus groups should be conducted in a location affording a maximum degree of privacy to participants, with the preference of a relaxed place with informal atmosphere. Actually, the office room created an impression of an ideal place for such interviews. Located on the upper floors of the building, it was quite noiseless, light, big enough to fit the participants but small enough to create a relaxing feeling that no strangers would appear. Also the participants were offered snacks and beverages.

From the researchers point of view, the room was well equipped because it not only provided the video recording (as it should according to the theory), but also had a hidden transparent wall, invisible for the

participants. This gave the researchers, like me, great overview on the room and opportunity to be “present” in the interview, take notes, see people’s emotions, but without disturbing the participants.

### **Topic**

Focus groups do not produce reliable data on the sensitive topics, as the theory suggests. But the topic of the focus group was the relationship with technology, which is not sensitive, and thus provides with reliable results.

### **During the interview**

According to the theory, **moderators** play an important role in the success of focus groups. As focus groups are very flexible and spontaneous, the moderator should lead the discussion according to the behavior of the participants, their enthusiasm, willingness, and interests, but still within the topic discussed. This focus within the frames of the topic is provided by the guideline – the list of predefined questions that has also another function: to discuss key issues in a similar fashion for each group so that to provide reasonable results.

In practice there were two professional moderators, whose behavior was similar to what the theory advises: communicative, polite, encouraging everyone to express his ideas, flexible, following the **guideline** but omitting some questions if needed. For example, University was one of the locations where the students use technology, whereas it is not applicable for the adults; shopping malls or single brand shops were not among the most popular situations when people use technology, so this context was skipped as well. The guideline also helped the moderator to stay within time limits.

Interestingly that the moderators were changing for different sessions. During the first interview only one moderator was present in the room and led the discussion, meanwhile the second one was taking notes, as me, behind the hidden wall. For the second focus group they change roles, and in the third one both of them were present in the room, one of them was taking notes and another one – interviewed the participants. But the theory suggests that both cases (with one or two moderators) are possible. After the interview, Giulio Cacciapuoti pointed me the reason for these changes: two points of view, especially among colleagues with similar skills, are better than one.

According to the theory, time duration of each session varies from 1 to 3 hours. But many sources suggest 90 minutes interviews. In practice, each interview lasted from 1 to 1.5 hours that perfectly matches with the theory.

## **3.2.2. Group 1 - Students**

### **Interview contents**

First the interviewer asked the students what they felt about technology. The followers said technology was a means to arrange vacations, check timetables of transport, support in study and in leisure time (as music and social networking that provides free of charge and fast contact with people). For technology-friendly it is something fundamental and necessary in everyday life, comfort, facilitation (e.g. GPS to find a location,

Facebook to find people, useful applications and software, order for a pizza from a website instead of going out), entertainment (video games), a means to save money (online offers), and enrichment of study process (projectors at the University).

Followers also underline that technology makes a negative impact on a person in terms of dependency and losing real contacts. Technology-friendly also agree with this point of view, and add other disadvantages of technology, such as insecurity when purchasing online and fear of using technology. They claim “not all people can take advantage of the technology, because first they need to learn how to use it. Elder people might have a fear or not being able to use them”.

For both subgroups technology represents future. Technology-friendly are sure that sooner or later everything around us will be based on the electronics and information systems.

The media devices that the students use in everyday life are cellphone and computer (netbook, laptop, desktop). Cellphone plays a role of an alarm clock, music player and means of communication; they use computer to check email in the morning and for study. In addition, technology-friendly also use these devices to find location or check information given by somebody else, because times to times they face wrong explanations, directions, etc.

Technology-friendly, unlike the followers, feel dependency and lack of technology, particularly dependency on the cellphone and lack of computer.

Evening at home the students spend watching TV in parallel with computer or cellphone. This means they show multitasking behavior. The followers send SMS on the phone while watching television. If instead the cellphone they are with the computer, they navigate Internet, instant messaging with friends. When the technology-friendly multitask they watch TV and at the same time on the PC they are on the Internet (check videos on YouTube or link to social networks) or watching a movie saved on the laptop, or read a paper book. In case the students need to concentrate on something, they do only one thing at a time, and do not multitask.

When asked about dissatisfaction with the technology in general, the followers claimed they were feeling nervous of always being online; instead, the technology-friendly complained about a high price of the iPad.

Another situation when students use technology is in the transport when going to the university. In this case they travel alone or with friends. When they travel alone it is technology that makes them a company: read slides for the lesson, listen to music on iPod or smartphone and read paper newspapers simultaneously, use applications to check transport timetables. The technology-friendly admitted they would like to use netbooks in metro, but still do not use them because of robberies and insecurity. Also, they feel dissatisfaction of the following: lack of Internet connection in trains, lack of netbook performance, their own usage 50% of functionality of a computer, impossibility to write with a stylus on the iPad and visualization of webpages on a smartphone. The biggest dissatisfaction of the followers was that they do not the purpose of many modern devices that they see in the techno shops.

At the university the follower students use iPod and cellphone for calling, texting SMS or playing games. On the contrary, the technology-friendly bring their netbooks to comment the slides, even though some professors do not like it, or also to play games.

Travel for pleasure is another place where the technology is used. Here again, the technology makes company when people travel alone, otherwise they prefer to talk. During these travels the followers use cellphone, play games and they are absolutely against taking netbook with them. On the contrary, netbook is among the devices that the technology-friendly take to trips (for watching films); also they take smartphone and photo camera. With the smartphone they find shops, discotheques, places of attraction – anything they need. When they travel in car, they listen to radio if they are alone, and otherwise music from iPod or someone else's cellphone. Nevertheless, all students agreed that smartphone is the only device they need in the trip. Music isolates, relaxes, make time pass faster, and gives the sensation of pleasure. One of the technology-friendly guy said "The only place I can have pleasure of listening to music is car".

Talking about future, the followers were worried that people in the future will "just seat" without any physical activity, as technology will substitute men's movements, up to cleaning the house. TF look more enthusiastically about the future. They dream of the unique device integrating features of a mobile phone, metro pass, TV remote, washing machine control, etc.

### **Conclusion.**

The difference between followers and technology-friendly in terms of the gap between the usage of the technology is not that big. The majority of the representatives of this group own a smartphone, a laptop, etc., have a Facebook account and use it for the personal purposes, like staying in touch with friends. However, technology-friendly are keener in using some features, like GPS navigation; or professionally involved in the technology area (one of the students was studying programming).

Both followers and technology-friendly are worried about the negative influence of media devices and technologies on interpersonal relationships, and losing real contacts. Nevertheless, followers are slightly more preoccupied about these problems. For both sub-groups technology represents future.

Common points between technology-friendly and followers:

- Both are technologically advanced, have smartphones
- Technology facilitates life, provides fast (almost instant) services, saves money, enriches study process
- Technology represents future
- Multitask using television and computer or cellphone simultaneously
- See disadvantage of technology as losing real relations between people

Differences:

- Technology-friendly use more devices and have more proficiency
- Technology-friendly feel more lack and dependency on the technology. Unlike followers, technology-Friendly feel dependent on cellphone and would feel lack of computer

- Technology-friendly would like to have netbooks with higher performance, and feel lack of Internet connection in trains
- Technology-friendly see a future device as an integrating many feature of today's devices
- Followers feel disappointed when they come to a techno shop and understand that they do not know what some device are used for.
- Followers feel more preoccupied of technology as threat to loose interpersonal relationships, real life experiences, environmental and pollution issues, dependency and future life without physical movements. Instead, technology-friendly see more enthusiastic future and expect to have a unique device integrating functionalities of today's variety of devices

### **3.2.3. Group 2 - Adults of 30-35 years old**

#### **Interview contents**

This age group, as well as students, says that technology is fundamental in their lives, for private life and work. Technology is useful – one can find a place using GPS navigation on his phone, people are connected and available. Cellphone and computer are the most important (“I like the last models of Apple, they are expensive but provide a great service” says one of the interviewee). Consequently, people are afraid to lose their cellphone. Also a home would be a disaster without technology.

Advantages of technology for these adults are easiness, practicality and comfort. Moreover, technology-friendly subgroup mentions entertainment as one of the advantages.

In comparison to advantages, disadvantages are not common for all the group, but is different for the followers and technology-friendly. For the followers it is obligation to react to the phone calls, instead for technology-friendly is battery life duration.

If technology was a person, it would be whether a woman who loves fashion or a young man, extravert, who works as a manager and travels a lot.

Life without technology would be slow, hard (but not impossible) and limited (would not be able to work from home).

In a typical day the adults wake up by an alarm set up on a cellphone. Then during the breakfast technology-friendly usually watch TV or sometimes music, meanwhile the followers generally prefer radio, computer or TV. On the way to work they listen to radio in the car or music from the cellphone if they are in metro. Everybody use computer at work, and in the evening at home the followers watch TV and do not use computers; instead technology-friendly turn on PC to play games, download a film, study. In this case they use PC alone or in parallel with watching TV.

More specifically, the evening at home the adults pass in the following way. The followers can listen to radio, watch TV (talk shows) or DVD, call or texting SMS on a cellphone, some of them use PC (email, FB, download photos from camera, Skype, film), and others feel too much tired of PC at work and do not use it at home. On the other side, the technology-friendly say they watch few TV, but they connect TV with PC to watch films; also

they play games on a fixed console, use feature cellphone or smartphone (Internet or email), turn on computer to watch a film or browse Internet. All adults say that they watch TV together with other people around, whereas using Internet is more personal activity and they do it alone.

An alternative to the devices at home would be a fixed phone, reading or other hobbies.

They use Facebook very rarely, some followers do not use it at all; and only the technology-friendly talk to their friends by msn.

Generally, talking about modern devices the adults tend to study new programs, they expressed that they needed somebody to teach them new functions. Thus the technology-friendly guy said "If my friend starts to use one, I will start too".

Situations where one cannot use the technology, according to them, are: to watch film or listen to music at work, watch TV in the metro, listen to music when swimming, using technology in the airplanes, listening to radio in metro.

In transport people use their cellphones for calls, SMS, games, music, reading, Facebook, email, YouTube. In the same way they use the phone in the airport. They also bring there a computer (for Internet and a movie), photo camera or watch a film from the screen in the airport. And they do not miss any technology there. Alternative to the technology would be talking to friends, read newspapers, visiting shops to see the offers, walking around or going to a bar.

It is worthwhile to point out that only technology-friendly own a smartphone. Cellphone has a central role in the habits of this age group, because it makes me closer to people, provides Internet and Facebook, gives opportunity to watch TV. "If you have no cellphone, you are out of society," one of them said. For some technology-friendly computer is even more important than cellphone, and for others the fixed console is the top priority.

To the question "Which device can you imagine in the next 5-10 years", the followers answered TV with Internet, a touch screen TV. They also said that PC will disappear in the future, as "everything can be done on TV". The technology-friendly said that future devices will little space, easy to carry, and integrate many functions. The technological wishes for this generation are cellphone "with TV and everything" and a reader of thoughts.

## **Conclusion**

The adults of 30-35 year old all agree technology is fundamental both for work and private purposes. Technology facilitates life: at home, GPS navigation, search any information in real time and gives possibility to work from home for technology-friendly adults.

Generally, the gap between technology consumption by followers and technology-friendly is much greater in this age group than for students. Technology-friendly here have more advanced skills in using the modern devices. They own smartphones and game consoles connect to mobile Internet (check), connect computer to TV to watch a film, more likely to have a Facebook account, multitask and use instant messengers.



Followers think that in the future computers will disappear, and all PC functions will be available on a touchscreen TV. Technological with for them would be a cellphone with TV and other features, and a thoughts reader. Technology-friendly also think that devices in the future will be small, smart, include all necessary functions and easy to carry.

Common things between technology-friendly and followers:

- Life would be hard without technology, some of technology-friendly members would not be able to work from home
- All group use cellphone as an alarm clock.
- Use cellphones when commuting: SMS, music, Internet
- Cellphone is the most important device for both. But for some technology-friendly adults PC is even on the 1<sup>st</sup> position and cellphone on the 2<sup>nd</sup>)
- Try to study the new technology, programs

Differences:

- As a technology disadvantage followers name social factors (e.g. obligation to react to the phone calls). Instead technology-friendly state the technological limitations (e.g. battery life)
- Unlike followers, technology-friendly also use technology for entertainment
- Only technology-friendly own a smartphone
- Followers use PC only at work, whereas technology-friendly use it also at home after work
- Technology-friendly connect TV and PC to watch films, and generally tend to watch less TV than followers
- Technology-friendly are more likely to multitask at home in the evening, TV with PC
- Followers are more likely to watch TV in the evening, whereas technology-friendly more likely do it in the morning during breakfast. Technology-friendly prefer to spend their evening with PC: navigating Internet, downloading, watching a film, listening to music or playing games.

### **3.2.4. Group 3 - Adults of 40-45 years old**

#### **Interview contents**

Technology for 40-45 year old adults increases quality of life, facilitates work (and allows to work from home) and helps in private life (free time, hobbies); it is available when needed. Generally this age group does not feel neither dependency nor passion about technology, but they tend to study how the things work.

The situation impossible without technology is travelling by any means of transportation.

If technology was a person it would be, according to this group, a person who is always under control, a man, a student.

The devices people said they used in their everyday life were the following: PC, cellphone, smartphone, iPod, photo camera, video camera, TV and fixed console (Play station 3).

The typical day passes like this. In the morning the adults watch TV news and use the cellphone. On the way to work followers can listen to music on iPod or sometimes navigate on GPS, whereas the technology-friendly use GPS navigator and smartphone for Internet, email, and Skype. At work they are with the mobile phone and computer (laptop or desktop) connected to Internet. Then in the evening they watch TV news, films, etc.; and technology-friendly also use computers to read something, work, online banking, etc.

On the way to work the adults always use their cellphones mainly to talk. Whereas some followers do not listen to the music on the way, other do listen radio and music on the iPod, as well as do the technology-friendly. Also those of them who own a smartphone, check email and navigate Internet to satisfy curiosity. None of the group said they used a computer on the way.

People of this generation care about their privacy and would like to have a device, like a computer, but so that the people in the public transport would not see what is on the screen. Other followers want something that they do not have: an iPod in the car and a smartphone with GPS. Instead, the technology-friendly want to have an iPad or a small portable printer.

On the question “For what, except from work, do you use each of the following devices”, the answers were the following. iPod or mp3 player – for music, GPS navigator for orientation, TV – get information in the morning and evening, documentary films, sport, films, entertainment, football, Play station 3/Wii – I use it because of my son/daughter.

In the evening at home adults use technology to relax, check email, communicate with friends. The trend suggests that the followers mono-task: only watching TV for pleasure or using PC in bed. “I am on TV, my wife on a PC, my daughter on another PC”. On the contrary, the technology-friendly multitask: television and computer at the same time, or they connect PC with TV to watch a film.

The followers say they use their devices only for 20%, and they generally miss an iPhone. Instead, technology-friendly miss a unique device, a single point of control, integrating other devices and occupying minimum space, which is important during travels. In the trips, on the other hand, people do not want to use any devices, only mental relax, playing with children or sleep. Others want an iPod (but “no PC, no Internet”), and iPad or netbook that weights little, allows to book a hotel or watch a film.

The future device the followers vision is a touchscreen, like an iPhone but able to control heating at home, washing machine and air conditioning; a 3D TV. The technology-friendly see a future device maximum compatible with old technology, with memory discs of enormous size, an integrated device (all-in-one) and the most important they think will be TV and smartphone with bigger size.

Finally, talking about their technological wishes, the followers named a long lasting battery (7-10days), smartphone (for watching films, photo, calling), and a remote control for the washing machine.

## **Conclusion**

Technology for 40-45 year olds facilitates everyday life, at work and free time. Followers admit that they are not passionate about technology, and they see technology in more negative way (being dependent, cutting one’s free time, wish to get rid of technology in the bedroom). Instead, technology-friendly adults see it as a

big help, giving opportunity to work from other places than office (home, boat, etc.), and they tend to study technology.

The situation when it would be impossible without technology according to technology-friendly, is travelling. Actually in the airplane the majority of adults said they did not want any technology, they wanted to relax. Some still wanted a netbook or iPad (because of light weight and opportunity to watch films on a good screen).

Technological wish for this generation depends on the level of technology adoption. So, followers wish to have an already existing device that they do not own, e.g. iPhone, or a long lasting battery. Instead, technology-friendly dream of a non-existing device integrating the functions of other devices. For both of them a future device is seen as integrating “all-in-one” with special accent on 3D TV.

Common things between technology-friendly and followers:

- This generation does not feel dependency on the technology.
- Both followers and technology-friendly wish to have an iPad and nobody of them has.
- Neither followers, nor technology-friendly use computers in the public transport.
- Future device is seen as an integrated “all-in-one”.
- Generally this age group does not have a Facebook account. Just 1 out of 8 people has one, he is technology-friendly.

Differences:

- Technology is seen by followers in more negative way (being dependent, eating one’s free time), whereas technology-friendly sees it as a helper, giving opportunity to work from home.
- Technology-friendly are more likely listen to music during commuting.
- Followers tend to get rid of the technology in the evening at home, some watch TV or use PC in bed. Whereas technology-friendly are more advanced users, tend to multitask and connect devices so that to take advantage (e.g. connect pc and TV so that to watch a film from the bigger screen).
- Followers wish to have a device already existing (iPhone). Instead technology-friendly dream of a non-existing device integrating the functions of other devices.

### **3.2.5. Comparison between three groups in terms of perception of technology**

Here I would like to make a comparison between three generations interviewed, regardless of who is a followers and who is a technology-friendly.

For all individuals interviewed it's really hard to imagine their lives without the presence and the use of technology. Constant presence of technology in daily life makes people psychologically dependent on it. Students, in comparison to other generations, are worried the most about loosing interpersonal relationships due to usage of the technology, and also energetic and environmental issues related to this usage. The younger adults (30-35 year old) say that “you are out of the society if you do not have a cellphone”. For students the fact of not having a Facebook account also means that you are out of the latest updates about social events,

invitations to parties, etc. This means that technology not only affects one's private life and personal choice, but also influences the social life.

With the age increase people are getting less and less "digitalized". Therefore, it is not surprising that students are the most into technology. They were grown up with the technology and it has become something fundamental in their lives. They understand that the wide-spreading technology affects them more and more, and feel preoccupied about their younger sisters and brothers, who were "born with technology" and are now completely immersed into "technological ocean". This fact together with environmental pollution caused by technology really worries the students. Technology-friendly part of students already feels personal dependency on mobile phone and computer, whereas the followers still neglect that. All student confirm that technology make a company when they are alone.

30-35 year old generation also feel that technology is fundamental in their lives. But they are trying to use technology in a more controlled way so that not to feel dependency. That is why the disadvantage of the technology for them is obligation to react (on phone calls, mails, chat, etc). As well as the students, a technology-friendly part of this age group is characterized by a very intense use of technological devices. Generally, according to the media consumption habits, the technology-friendly young adults are closer to students, and the followers – to mature (40-45 year old) adults.

40-45 year old adult do not say they are psychologically dependent on technology. Even though they use it a lot for the work purposes, on their free time they try to use it at minimum. And this makes sense. They have families and children, and at the same time they are hard workers spending all day in the office with the computer and cellphone. The only thing they tend to do in the evening is spending some time with their family members. They watch TV also, but they presume it as something that "cuts their free time", the time they would instead play with their children – and some technology-friendly parents involve technology in the play with the fixed game consoles. In the trips the main wished are sleeping, mentally relaxing, and spending time with children and "not obligated to respond a call". The presence of children appears to affect the purchase of equipment related with the entertainment (consoles, camcorders, cameras, DVD players, etc).

Talking about devices, it seems that the older the individual, less chance that he has a latest technological device, like smartphone or tablet. On average, all students own a smartphone; but among the adults only those from technology-friendly category own one. And only one person among three focus groups had a tablet. It is not a surprise that she was a student. In any case, all people regardless of their age and belonging to follower or technology-friendly parts wished to have a tablet. They feel influenced when see the behavior of other people who use them in the airports, public places, etc.

### **3.2.6. Comparison between all followers vs. all technology-friendly.**

Here I would like to compare the followers from age groups against all the technology-friendly, so that to see if there are some trends in the media consumption habits.

The gap between technology usage by technology-friendly and followers is the smallest among students, and getting bigger with age. Thus, 30-35 year old adults-followers use technology significantly less than technology-

friendly. The biggest gap is between the mature adults with families (40-45 year old). For example, all students have smartphones, but among the adults for both generations only technology-friendly own this device. The same happens when comparing their habits of the usage of the social networks, multitasking and the media consumption of the devices.

Generally, followers tend to use traditional devices (TV and radio) more intensely than modern devices (computer, tablet, mobile phone, game console) in their free time. And also they spend more time with the traditional devices than the technology friendly. This trend is particularly popular among adults. The followers of 30 and 40 years old say they get “too tired of spending all day with the computer”, so when they come home they watch TV or listening to radio. This is a very practical way of perceiving technology.

Instead, the technology-friendly continue to use computer even when they come back from work, and they introduce technology in their leisure time for entertainment: download music, films, play games, navigate Internet, chat to friends on social networking sites and on instant messaging. Moreover, they use the media devices in a more advanced way than the followers: connect TV with PC to watch a movie, use the mobile phone not only for calling, SMS, but also for GPS navigation, browsing the mobile Internet, playing games.

Multitasking with multiple devices is more popular among technology-friendly than the followers. The technology-friendly interviewees simultaneously use cellphone with TV or computer with TV at home; read newspapers and listened to the radio from iPod or cellphone in the public transport. On the contrary, the followers multitask only at the student age, and older generations do not multitask because they tend not to use computer at home after work. As I said in the previous paragraph, they get too tired of using PC in the office.

The probability of having a Facebook account is also much higher among technology-friendly. But Facebook account ownership also highly depends on age. All students said to have a Facebook account, in comparison to only a couple of adults of 30-35 years and just one of 40-45 years. The followers among adults with children have a very rational behavior towards the technology – they use it when they have to; and if they don't have to they don't want to use it.

The same attitude the followers show when they talk about the devices they take to trips for vacations. Followers prefer talking to people they travel with, instead of using technology. Nevertheless, all interviewees agreed that it is sufficient to take only a smartphone to this kind of trip.

Even though the followers feel nervous of “always being online” and consumption of too much media (“watching a movie in the train is too much”), they also progress and feel influenced by their more technologically advanced friends, relatives or just people they see around. They say “if a friend starts to use a new device/technology/innovation I start too” or “I need somebody to teach me the new technology”. That is why they want to have a tablet or a smartphone, for example. They see benefits other people gain of having such devices and start to want them too. Actually, the technology-friendly aware of this behavior of followers and say that “not everybody can take advantage of the technology, because first they need to learn how to use it.”

Therefore, as a disadvantage of technology the followers name social factors, like dependency, losing interpersonal contacts, need of training, always being online. On the other hand, the technology-friendly name more technological factors, such as lack of compatibility with old technology, volume of memory, performance,

Finally, all technology-friendly see the future device as the one integrating many features: easy to carry, something between a smartphone and connected TV, plus performing as a single point of remote control of many other device people own at home, starting from washing machine up to air conditioning.

### **3.3. Comparison of the theory and the practice in terms of technology consumption.**

#### **3.3.1. TV**

TV is not very popular device among **students**. Interestingly, that to the question “Which technology do you use in everyday life” nobody of them mentioned TV. Generally, consumption of TV is concerned to be an activity for older generations. And that has sense: according to the latest studies (Ofcom, 2011) that include research of what technology would people miss the most, only 23% of 16-24 year olds said they would miss watching TV, in comparison to almost half (49%) of 55-64 year olds. Also, as students are the age group between teenagers and adults, this means that their media consumption habits should be closer to the teenagers, because they recently were teenagers themselves. And as reported by the American study (Television Bureau of Advertising, 2011), teenagers are the generation who watch TV the least among other age groups. In fact, they watch almost as half as adults (3:30 hours per day vs. almost 5 hours respectively).

Nevertheless, students do watch TV in the evening at home. And that matches with the general trend: the peak popularity of television is “During the evening” for 84% of Europeans, according to European Interactive Advertisement Association (EIAA, Mediascope Europe , 2010).

In comparison to students, **adults of 30-35 years** watch TV in the morning during breakfast and in the evening. They watch news in the mornings, and in the evening after work they prefer films, talk shows and something interesting. Technology-friendly adults also connect TV with computer, so that to watch a film from the bigger screen.

The preference to watch TV in the evening corresponds with the general European trend: the peak time is “During the evening” for the majority of people (EIAA, Mediascope Europe , 2010). But the preference to watch it in the morning does not match with the trend, because only one in five Europeans watch television “When you wake up”. It is notable that generally technology-friendly adults watch TV in the morning, in comparison to the followers who more likely watch it in the evening.

A British study shows (PR Moment, 2011) that actually watching news on TV in the morning is only on the third place by popularity, after the first peak at 7 PM and the second – at 10-11 PM (see Figure 124 below).

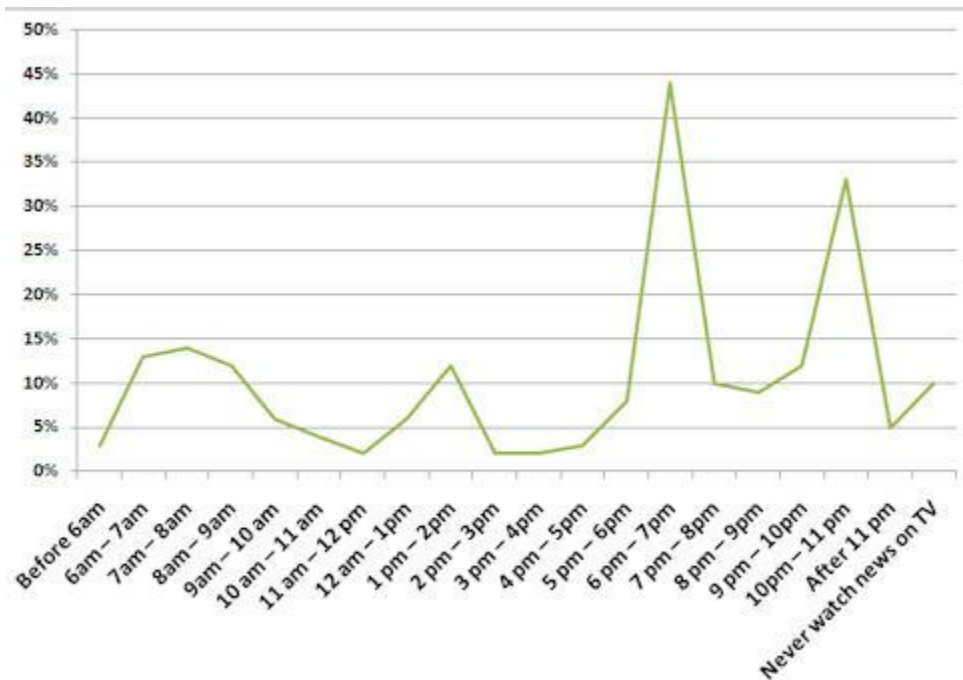


Figure 124. News watching time in UK, 2011<sup>1</sup>.

**Adults of 40-45** years watch TV mostly after work in the evening at home (news, films, football) and sometimes in the morning. Watching television relaxes them. Unlike the followers, technology-friendly connect computer to TV or multitask consuming TV and PC. This means that connected TV has a future. It will allow not only watch any on-demand and films available on Internet, but also doing other Internet activities from email to social networking and shopping.

Evening is evening is the most popular time for watching TV, according to European Interactive Advertisement Association (EIAA, Mediascope Europe , 2010). The peak time for watching news also in the evening, as the study from the United Kingdom suggests (PR Moment, 2011), see Figure 124 above.

### 3.3.2. Radio

Generally, “technology-friendly” **students** are using more different means of transportation than the “followers”, but both of them like to listen to music. And technology-friendly were the ones who commented they were listening to the radio. But they only were doing it when travelled alone by car. Otherwise they preferred music form iPod or cellphone. Music during the travel helped them to overcome boredom, relax and have pleasure, and get recharged and isolated.

This habit of radio consumption is not surprising. The trend of radio consumption in the UK shows that the average time spent listening to radio increases with age (Ofcom, 2011), peaking in the 55-64 age group Britons

<sup>1</sup> Opinium Research, 2011, <http://www.prmoment.com/569/most-british-consumers-turn-to-the-bbc-for-their-news-and-most-people-watch-the-news-in-the-evening.aspx>

(23.9 hours per week). And the minimal time of consumption is registered for the dominant student age group of 15-24 years (14.6 hours per week), and slightly higher for those of 25-34 year olds (17.5 hours).

**30-35 year old adults** show much bigger interest into radio, compared to the students. Technologically follower adults even name radio a technology hard to live without. They listen it in the morning when they wake up, in the evening after work, on the way to work (except the moments in metro where there is no coverage and they text SMS instead) and in the airport when they go travelling. Only one technology-friendly person said he listened to radio in the car during the way to work.

As mentioned above, the interest in radio grows with age, as well as the feeling for missing this listening to radio (Ofcom, 2011). And that is why adults say it would be hard to live without it and look more involved into radio than students, but not as much as elder population. Also, radio is the leader among any other technology to be used in the morning. But people usually prefer other media devices to the radio in the evening or during the night, when radio is on the 4<sup>th</sup> place out of 5 (EIAA, Mediascope Europe, 2010).

**Adults of 40-45** years do not show much interest in radio. Few of them said they were using it in during commuting in the public transport or in the car. They preferred listening to music from iPods, cellphones and iPhone instead of radio. Followers are less likely listen to music during commuting.

Unexpectedly, radio instead of being more popular among 40-45 year-olds than 30-35 year-olds, is less popular among the former. That contradicts with the UK trend (Ofcom, 2011), that shows as for Q1 2011, 35-44 year-olds listen to the radio 3.2 hours more than 25-34 year-olds, see.

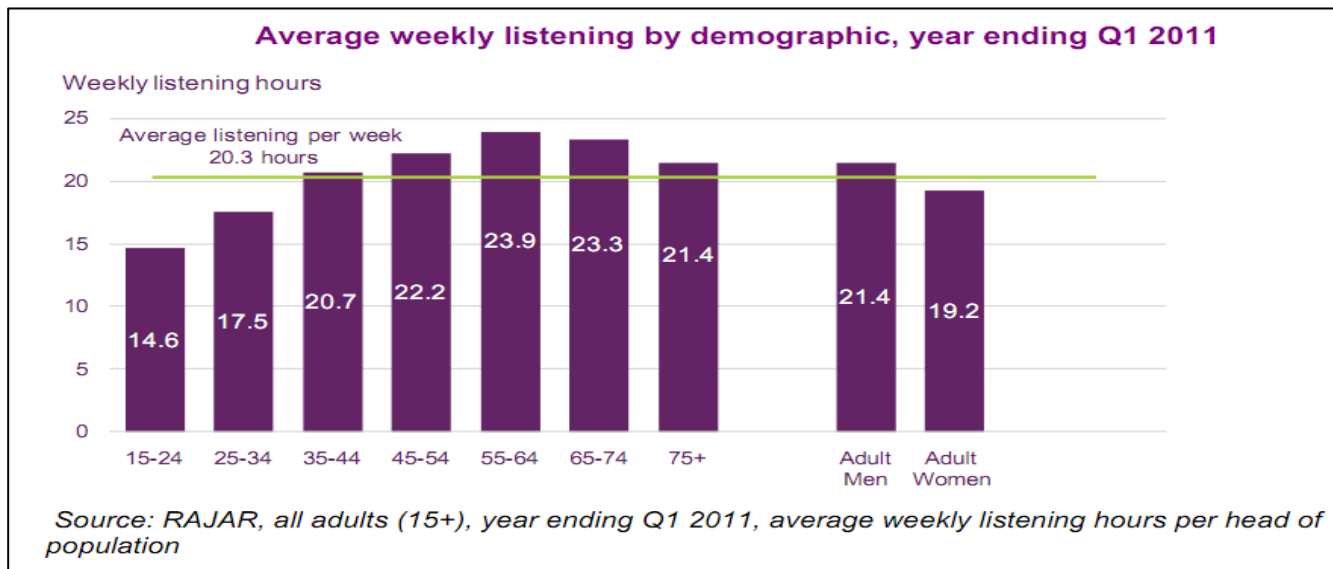


Figure 125. Digital radio monthly listening, by age group, UK, 2011<sup>1</sup>.

The studies also confirm the fact of popularity of the radio in the car. In vehicle listening is accounted for one fifth of all radio consumption in the first quarter of 2011 in the UK, according to RAJAR (Ofcom, 2011). Traditional broadcast radio is absolute audio leader in the car – in almost three quarters of the time Americans

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)



consume audio from the broadcast radio, according to The Nielsen Company (Study, 2009). Other more recent studies (Arbitron/Edison's Research, 2011) show a rising popularity of the online radio listened from a cellphone in the car (11% in 2011 vs. 6% in 2010).

Italians complained that there is no coverage of the traditional radio signals **in metro**. People usually listen to the radio through the cellphone, but once they enter underground, they switch to texting SMS, listening to their playlists or reading a newspaper.

### 3.3.2. Computer

Computer is the device that differ the most the consumption habits of technology-friendly students and the followers. Whereas all **students** confirmed they use PC at home (they check email in the morning, study, browse Internet), technology-friendly part of them also takes a notebook to the university to comment on the teachers slides or play games. Moreover, they take it in a travel, while the followers absolutely negate that.

The studies confirm that email is the most popular activity, sharing the first position with search, for the Americans. Pew Internet (Purcell, 2011) finds that 92% of online adults use email. Another study (Mashable, 2011), that surveyed American students, reports that for more than quarter of surveyed students laptop is the most important thing in their backpack (Kessler, How Students Use Technology [INFOGRAPHIC], 2011), and 38% could not even go more than 10 minutes without checking their laptop, smartphone, tablet or e-reader.

Generally, students appreciate using social networks, as it saves time to contact people. But this leads to loosing interpersonal contact, and followers are more worried about this than technology-friendly. The British study (Ofcom, 2011) also approves that Internet helps people to contact others. And the keenest on that are those of student age (16-24 years): 67% of them say that they use Internet for contact with other people, in comparison to 63% of all adults older than 16 years.

When the moderator asked about the lack of technology, the followers said they would not lack any device. Instead, technology-friendly said they would feel lack of computer, lack of performance of their netbooks and Internet connection in trains. They would like to use netbooks in metro, but do not do that because of insecurity reasons and possible robbery. The UK research (Ofcom, 2011) confirms the trend – the generation of 16-24 years old would miss using Internet on a PC more than other age groups (26% vs. 10% of 55-64 year-olds).

Both technology-friendly and follower **adults of 30-35** year old use computer, but the difference is that the followers mainly do not use it after work, because they feel too much tired after working with it all day. As alternative, they prefer to go out, listen to music or watch TV. Instead, technology-friendly continue using computer even after work: they connect PC to TV to watch movies, browse Internet, download films, music or study. Generally, all adults say that cellphone is the most important device for them, but some technology-friendly admit that computer is the most important.

The UK study (Ofcom, 2011) confirms that 25-44 year-olds are one of the most engaged with downloading music, movies and video clips, see Figure 126. They are on the second place after 16-24 year-olds (41% vs 31%).

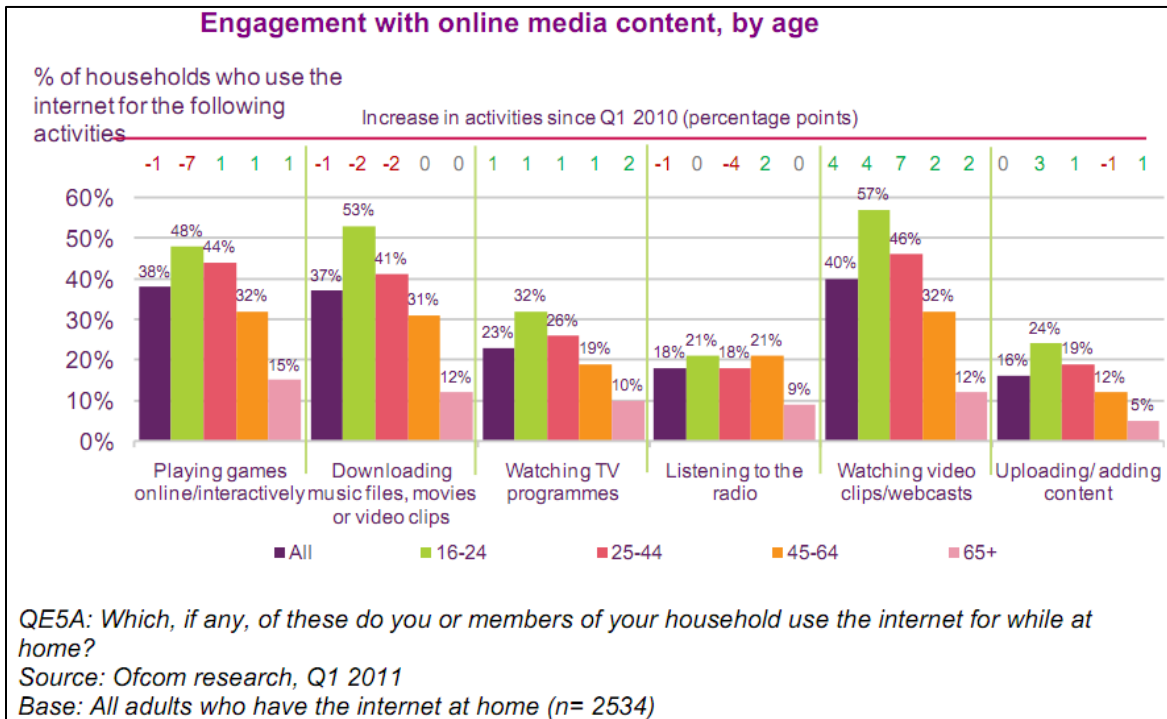


Figure 126. Engagement with online media content, by age, UK, 2011<sup>1</sup>.

Followers think that in the future computers will disappear, and all PC functions will be available on a touchscreen TV.

The majority of followers do not have a Facebook account, in comparison to technology-friendly that do have and use it to talk to friends and rarely to upload photos. Instant messenger is also a service popular among technology-friendly only. As of April 2011 the sources report (Burcher, 2011), Italy is ranked number 9 the Top 30 countries with highest number of Facebook users (1st Apr 2011 - data from Facebook), with 19,143,520 active users. That is approximately 30% of the total Italian population. Globally, 26-34 year-olds represent the biggest among other age groups. But after the focus group interviews I had a contradictory impression – that students were the leading users of Facebook, but not the 30-35 year olds.

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM11\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM11_FINAL.pdf)

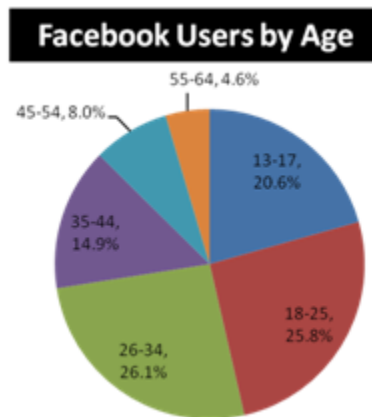


Figure 127. Facebook users by age, 1 March 2011<sup>1</sup>.

**Adults of 40-45** years own laptops and netbooks, and they work on the computer. After coming home in the evening the followers tend not to use computers anymore. On the contrary, technology-friendly continue working on a PC from home, check emails or online banking, connect TV and PC to watch a film. This is very similar to the behavior of 30-35 year old adults. Only one person from this age group said he would take a netbook or a tablet (if he had one) with him in a leisure trip. All others prefer not to do anything in the trip and be disconnected so that to spend more time with the relatives.

It is interesting that the adults did not name online shopping as one of the activities they do online. According to the recent US research (Anderson, 2010), age group of 31-44 is fueling e-commerce adoption: 68% of them are shopping online.

### 3.3.3. Tablet

There was the only **student** from the student group who had a tablet, and she was from technology-friendly part. No one of **30-35 and of 40-45 year old adults** had a tablet or e-reader, but they would like to have it. Italians interviewed in the focus groups didn't talk much about tablets because they don't have experience of using this device, the absolute majority simply don't have it.

Tablets are now in the phase active growth of penetration. 6% of UK mobile phone users claimed to own a tablet. In the USA percentage of tablet owners in 2011 increased twice since 2010 and the penetration reached 8% of population. The popularity of the device, as it is seen on Figure 128, among different age groups changes from year to year. It is still highest among 25-34 year old Americans even though they have lost 4% in comparison to the previous year. Instead, tablets are getting an increasing popularity among the generation of 45 years and older.

<sup>1</sup> Social Media Today, 2011, <http://socialmediatoday.com/kenburbarry/276356/facebook-demographics-revisited-2011-statistics>

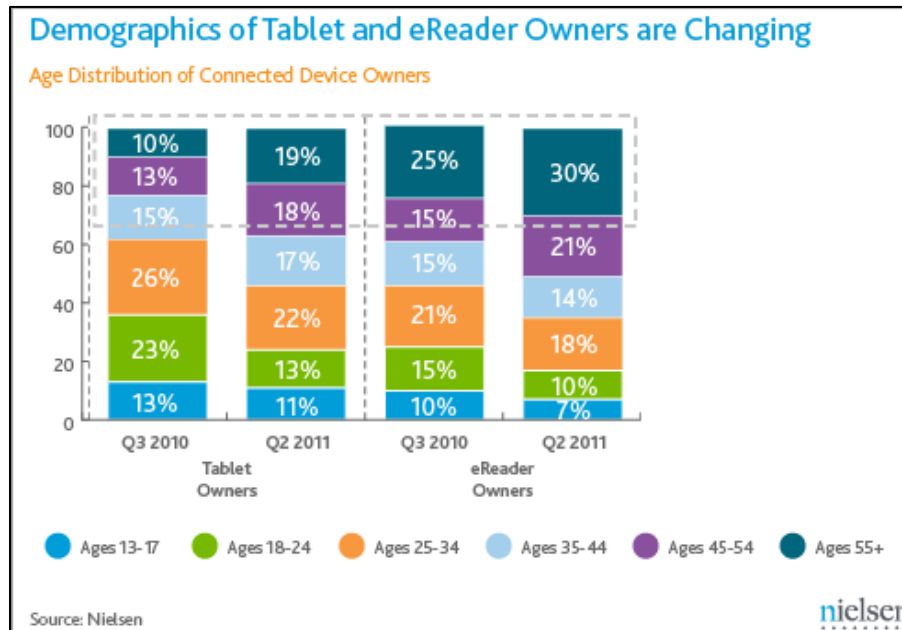


Figure 128. Comparison of demographics of Tablet and E-reader owners, US, 2010-2011<sup>1</sup>.

Number of tablets sold in 2011 is 3 times more, in comparison to 2010. BMO Capital Markets estimates that “15 to 16 million tablets were sold in 2010 and predicts that 45 million tablets will be sold in 2011” (Woyke, 2011). According to iSuppli market research, global amount of total tablet shipments will double in 2012 with respect to 2011. Moreover, global shipments of tablets are set to rise in 2015 up by a factor of more than 12 from 2010. So we can expect more opinions about tablets in the next focus groups.

The possible context of usage a tablet, that Italian adults imagine, would be “travelling for pleasure”, because of the light weight of the device and big enough screen. Consequently, the possible content they think about is watching a movie in the airport and booking a hotel at the destination place (which means being connected to Internet). A study by Analysis Mason shows that the time spent with tablet will increase significantly, especially in the next five years. It will go up from less than 1% in 2011 up to 4% in 2016.

Italian students showed a high interest in tablets, but complained about high prices of the device that gives no options than waiting for the prices to drop down, and no possibility of using a stylus to write with, otherwise they could be helpful to take to the University. Indeed, the Mashable reports (Mashable, 2011) that nearly 3 out of 4 American students who own tablets, prefer them to traditional textbooks. Nearly 90% of students think they help to study more efficiently. And almost half of all college students believe tablets will replace textbooks completely within 5 years. But the Italian students did not mention any of these perspectives, because of the lack of experience of tablet usage.

<sup>1</sup> Nielsen Wire, 2011, <http://blog.nielsen.com/nielsenwire/?p=28695>

### 3.3.4. Mobile phone

**Students**, regardless of being technology-friendly or followers, own smartphones and use it at home, university, in the transport and during the travels. In the morning they use a cellphone as an alarm clock, in the transport they use it to listen to music, checking timetables of buses, and of course a means of communications with friends and relatives. Unlike the followers, technology-friendly feel dependency on using the cellphone and use them for broader reason, like GPS orientation, search the nearest places of entertainment, etc. They complain about visualization problems when opening some websites that are not adjusted for the access from mobile.

The recent studies also report that the top three activities people do daily with their phones, are making calls, using them as an alarm clock and texting SMS (GSM Arena, 2011). And GPS navigation by means of the cellphone is not yet widely used globally.

All students agreed that taking a smartphone to a trip is enough, with respect to any other device. The followers preferred generally preferred not to take any device, and instead spend time talking with those they are travelling with. On the other hand, technology-friendly also take netbooks in the trips. Researchers at Gogo (Grove, 2011), in-flight Wi-Fi provider on the US airlines, report that the most common device people travel with is a laptop (42%), followed by netbook (26%) and tablet (23%). Smartphones are the least popular, with 9% of travellers bringing them, which contradict with the Italian students' behavior.

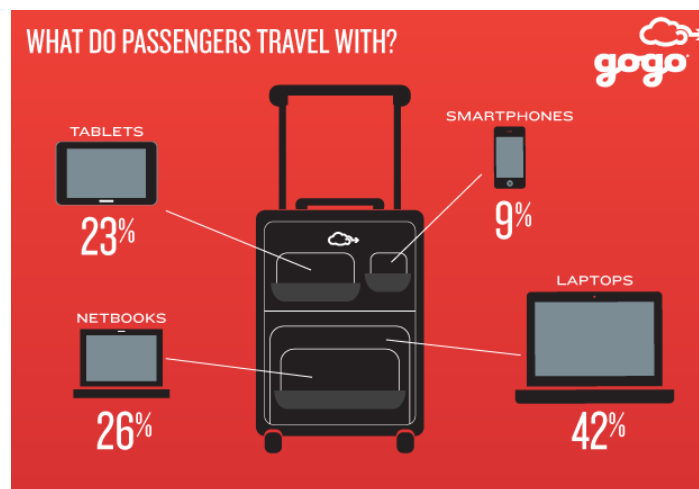


Figure 129. Devices that US passengers travel with, 2011<sup>1</sup>.

**30-35 year old adults** say cellphone is the most important device. They use cellphone throughout the day, since morning when it wakes them up as an alarm clock until evening at home when they make calls, send SMS, check email and browse Internet. Also they use cellphone to listen to the radio or music when they do sports or are on the way to or from work, and in metro they send SMS. They say “if you don’t have a cellphone, you are out of the society”. Adults appreciate cellphones that make them closer to other people, always available and connected, but also understand the disadvantages. As a disadvantage, followers name social factors, like obligation to react fast on the calls or disturbing other people with a ring tone in some situations, e.g.

<sup>1</sup> Mashable, 2011, <http://mashable.com/2011/08/31/inflight-wifi-infographic/>

restaurants when they switch to the vibration mode. Instead technology-friendly state the technological limitations (e.g. battery life).

Interestingly that only technology-friendly adults own smartphones (HTC and iPhone). They do not feel passionate about a cellphone, but it's something fundamental. According to them, cellphone and computer are the most important, they like the last models of Apple, even being expensive they provide a great service.

The fact that the cellphone is the most important device correlates with the evidence that Italy is the country with one of the highest penetration rates of mobile phone, according to Mobicity (Mobicity, 2010). In the list of the highest average number of cellphones per person in the world, Mobicity ranks Italy number 4, with 152% of penetration, after United Arab Emirates, Estonia and Hong Kong.

The Nilesen Company estimates the biggest consumers of smartphones are Americans of 25-34 year-olds – half of them own such device. 18-24 year-olds are on the second place with 45%. This contradicts with what I saw in the focus groups, because the highest smartphone penetration was among students, and only two adults out of six owned a smartphone. It seems that Italian smartphone statistics is closer to the British than the American one. As discovered by Ofcom, there is significantly higher level of take-up of smartphones among younger age groups than older (50% among 16-24s, 42 % among 25-34s), see Figure 130.

As 30-35 year old Italians said, browsing Internet and checking email were the two more often activities on the cellphone, apart from calls, SMS and alarm clock function. This makes sense, because according to the recent global research (GSM Arena, 2011), the most popular daily usage of the mobile phone is making calls, alarm clock and SMS service. Browsing Internet is ranked number 4, and sending/receiving email number 9.

**40-45 year old adults** use cellphone throughout a day, mainly at work and on the way to/from work (for making calls to the office or with family members). Only technology-friendly have a smartphone (iPhone), and use it during commuting for Internet, music, email and Skype. Followers say they would like to have an iPhone too – this is their technological wish.

Smartphone penetration among 40-45 year-olds is not as popular as among younger generations, as the UK data suggest (Ofcom, 2011). 29% of people of this age group own a smartphone, in comparison to 50% of age 16-24 and 42% of age 25-34 (as showed on Figure 130).

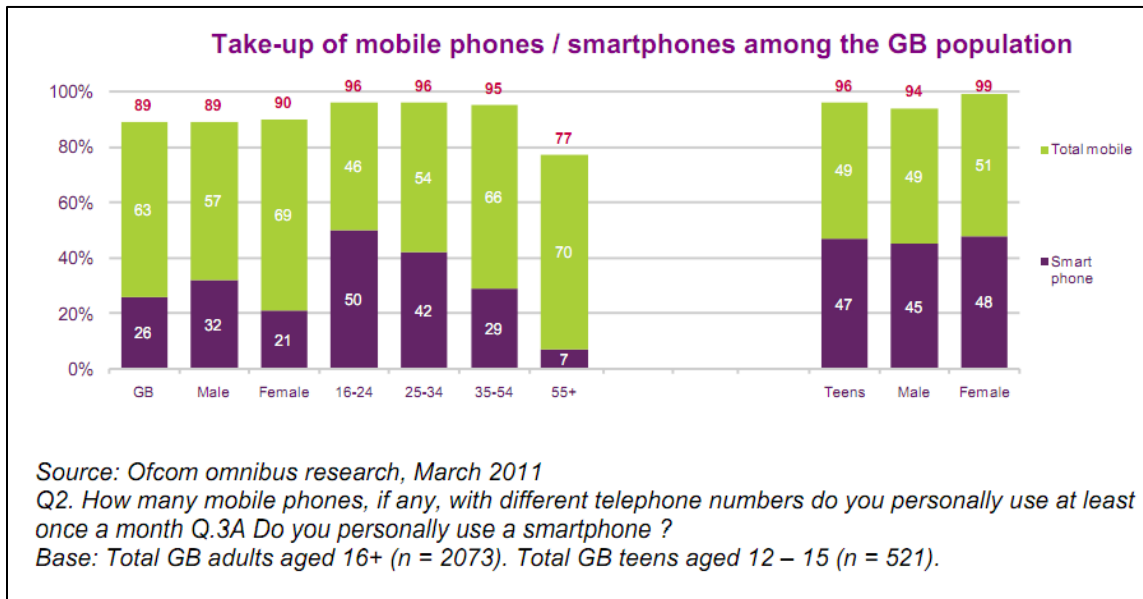


Figure 130. Smartphone penetration in the UK. 2011<sup>1</sup>.

40-45 year old generation believe that TV and smartphone with a bigger screen will be the most important devices in the future. The followers' technological wish is smartphone too.

### 3.3.5. Game console

Game console was not mentioned among the device **students** use. That looks surprising, because according to Pew Internet (Zickuhr, 2011), 18-46 year-olds are the biggest fans of fixed console, like Xbox or Play Station. On average 63% of people from age group 18-46 years in the US own one. In addition, 5% of 16-24 year old British respondents claim they would miss the most playing console.

In the next age group, **30-35 year olds**, one technology-friendly man owned a fixed console (Play Station). He said cellphone and Play Station were two most important devices for him. He used to play in the evening, especially when he could not play soccer in reality. If his girlfriend was in the same room, she would watch TV meanwhile he plays.

**40-45 year olds** play Wii and Play Station and they do that because of their children. That correlates with the theory. Generally, "adults with children living at home are nearly twice as likely as non-parents to own a game console - 64% of parents do so, compared with 33% of non-parents," (Zickuhr, 2011).

### 3.3.6. Multitasking

Emerging in the United States and Great Britain phenomenon of simultaneous consumption of different media channels – multitasking – approved with respect to the Italy too. Individuals from all age groups interviewed in

<sup>1</sup> Ofcom, 2011, [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CM\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf)

Milan during the focus groups claimed they were consuming media content from two and more devices in parallel. But people from different generations show different multitasking habits. Italian students are more likely to multitask than the adults, and do it more frequently and in broader locations than the adults.

During the focus groups the **students** were offered the following contexts for media multitasking: “morning at home”, “on the way to University”, “in the University”, “evening at home” and “during the travel for pleasure”. Among them the students named “evening at home” and “on the way to University”. They also added that when they need to concentrate, they prefer not to multitask, instead focusing on one screen which content seems more interesting.

I think the students did not name “in the University” as one of the situations for multitasking, because University classroom really represents the location where they concentrate, and the extra screen they are exposed to is not TV, but the projection of a teacher’s slides. “During the travel for pleasure” is not among the contexts for multitasking because the purpose of travelling for the Italians is to enjoy time with friends, family, interpersonal relations, but not to shrink time or accomplishing more tasks at a time. Another situation “morning at home” is generally not for media multitasking, because the time in the morning is too short and dedicated to breakfast and getting ready to go out to work or study. Instead it is “mono-tasking” when people prefer to listen to the radio, watch TV or check email on a PC or cellphone. The fact is that people probably do multitask in the morning, for example, with TV and cellphone or radio and cellphone, PC or newspaper; but people do it unconsciously, without realizing they are multitasking. Therefore they did not discuss this situation in detail. So, I think, morning media multitasking takes place, even though in a rush and shorter in time than in the evening.

In the transport technology makes people a company when they travel alone. Therefore, the students named “on the way to University” as one of two situations when they multitask with different media: here they listen to music on a cellphone and read a physical morning newspaper, teachers’ slides for an upcoming lecture, or use applications to check transport timetables. Students also say they wish to use netbooks in metro and other means of transportation, but do not because of insecurity, absence of Internet connection in trains, etc.

The second context of multitasking for Italian students’ is “in the evening at home” when they combine watching TV with using cellphone, computer or even reading a paper book. Actually evening is famous for simultaneous media consumption not only among students, but also among **adults**, even though adults involved in it much less than students. For example, during the focus groups only technology-friendly adults expressed interest in this activity. According to the studies, younger generations are more likely to multitask than older. A European study (EIAA, 2009) shows that more than half of TV and Internet multitaskers are 16-34 years old. Evening hours are generally spent on media multitasking not by chance: European studies show that the peak time for both watching TV and using Internet is “during the evening” (EIAA, Mediascope Europe , 2010).

Italians also multitask with television and computer, on the latter they browse Internet, check email, send instant messages, watch videos on YouTube and spend time on social networking websites. Interestingly, these activities are in top 5 most common web activities for Europeans multitaskers.



Another combination of the devices that Italians simultaneously use in the evening is television and cellphone, when they text messages, check email or navigate on Internet. American studies (The Nielsen Company, 2011) confirm the same trend: used 20% of total time with smartphone is spent in parallel with watching TV.

### **3.3.7. Hybridization**

The hybridization is strongly linked to the concept of convergence of media devices. The content natively designed to be enjoyed on a specific platform is now consumed from other media devices. Convergence of devices shapes the new habits of media consumption.

The focus groups discovered that Italians are already used to hybridization of computer and of smartphone, as shown in the Figure 131, whereas fixed console and TV hybridization have not yet influenced the Italian society. Italians watch TV, listen to Internet radio and read online newspapers on computer; on the mobile and smartphone they also listen to analog or digital radio, read the newspapers and e-books, use GPS navigation maps, watch videos and play games. As the smartphone has become a highly multifunction device, the Italian students believe it is the only media device they need in the trips.

In Italy, as well as in the USA and UK, the hybridization of the PC is already widespread. Mobile hybridization is also popular, even though less than computer. This probably happens because the penetration of smartphones is much reduced in comparison to the penetration of computers. But as the demand for smartphones is growing fast, it will positively influence the mobile hybridization as well.

Instead, the moments of consumption of Internet from TV or fixed console did not show up during the focus groups. Neither were people telling about watching films on DVD, Blu-ray disk, listening to music, or navigating Internet utilizing their game consoles. Consoles were used according to their main purpose – playing. Connected television is yet rarity for the Italian families. Nevertheless, they believe that the future is for the device that integrates television features, Internet, mobile phone, remote control feature for other devices, etc. In the UK Internet connected TV sales reached 10% of all TV sales in 2010, and I expect lower numbers for Italy.

In the UK and USA fixed console hybridization is in general more familiar. About a quarter of the fixed console owners use extra features of the consoles, apart from playing. About 10% of console owners in Britain use them to navigate Internet and watch IP TV, and 20% use them to watch DVD and Blu-ray.

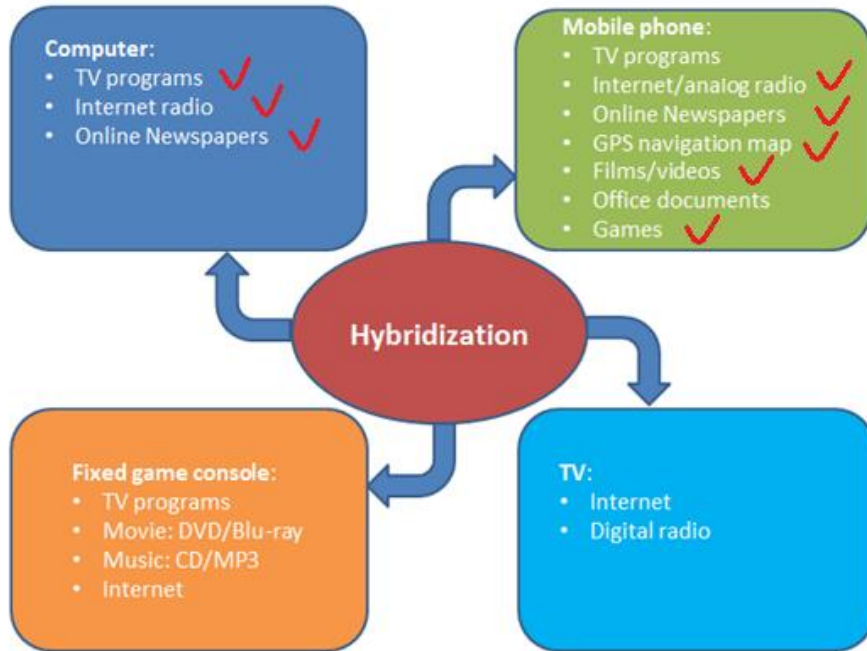


Figure 131. Hybridization in Italy.

## 4. Conclusions

As initially stated, the objectives of my thesis were to obtain the global view on the diffusion of the modern media devices; to understand the international and Italian market of the consumption of media technologies, preferences, habits, contexts of usage and phenomena; to analyze the trends of similarity and difference between the US/UK media consumer and the Italian consumer; and finally, based on the examined trends of the modern media consumption, to discover opportunities or ideas for the media production or service provider companies, that is to point the direction they should move so that to fulfill the consumer's media needs. My conclusions, therefore, are built with respect to these objectives. So, the first objective was:

### 1. To obtain a global view on the diffusion of the modern media devices.

And I started my research with **television** – the most popular and one of the oldest media devices. TV has evolved significantly starting from what can be called today a low-end “traditional TV” that can only broadcast television signals till high-end web-enabled platforms yet for the early adopters that allow to access TV shows and movies, news and information, social networks, music, casual games, shopping, etc. Historically, the real revolution of TV technology started with switching from analog to digital broadcasts. For the same amount of bandwidth, a lot more information can be transferred by a digital signal than an analog signal, and type of data the digital signal can carry is not limited only to audio and video. This provided consumers with not only much more number of TV channels available and stable quality of signal, but also opportunity to watch in 3D and interact.

After television I moved on with the research of **radio**. This technology also has progressed from the analog to digital signal transmission, like television. According to the type of the signal, radio varies from the traditional AM/FM radio to digital radio broadcasting, radio via digital terrestrial television, satellite radio and online radio. The range of the devices that provide radio content have amplified: at the beginning only dedicated radio sets transferred analog signals, later on radio became one of the features of cassette, CD and mp3 players, feature phones, digital audio broadcasting devices (DAB), and finally online radio is now available on any devices that support Internet connectivity – smartphones, tablets, TV, etc. Traditionally, automotive industry has integrated radio sets in cars. Initially offering built-in AM/FM receivers, modern cars give opportunity to listen to satellite and Internet radio.

**Computers** have experienced of the most tremendous evolution over the last 70 years. Created for the military and scientific purposes, they then spread on the business field and finally to the personal use. Since early PCs, computer performance, memory, user interface, features have revolutionarily improved. Personal computer physical size reduced from heavy desktops to portable laptops and netbooks. The latest trend suggests that desktop ownership drops down, whereas laptops or netbooks have gained in popularity. And this year, the first time in the history, the percentage of ownership has converged at the point of 56% in the USA.

Development of **Internet** affected evolution of all media devices. Computer was the traditional platform used for accessing the Internet, but as the time passed Internet spread on cellphones, game consoles, television sets, etc. According to the recent research, starting from 2013 the global shipments of the Internet-enabled (IE) devices will overrun PC shipments. And since then the gap between the amounts of production of these two categories will only increase, favoring IE apparatus that include televisions, Blu-ray players, game consoles, set-

top boxes, digital media adapters and media tablets, excluding smartphones, which are tracked separately as wireless communications equipment.

**Tablet** has had shorter history than radio, television and computer, but is currently one of the most demanding media devices. According to the recent research, global shipments of tablets in the next year will double in comparison to 2011. This growth might be reasoned by their appearance and functionality: light and small enough to carry, with big enough touch-screen, and powerful – tablet is nowadays a rival of the netbook. In fact, tablet is generally considered as an option for a purchase instead of a netbook. Tablets include media tablets and tablet PCs. The former utilize a mobile operating system their usage is largely concentrated on Web browsing, social networking, email, video, music, e-books/magazines and games. The latter can incorporate a full PC operating system such as Windows 7, Linux, or Mac OS. **E-reader** emerged in the last years and is also getting increasing popularity because of being light, comfortable to read from and, undoubtedly, because of the enormous library of e-books available on the web.

**Mobile phone** technology evolved from the feature phones, providing the basic services, to high-end smartphones offering not only mobile phone, but also personal digital assistant functionality. Mobile networks have consolidated from analog generations, 0G and 1G, up to the recent digital 4G. Here again the switch from analog to digital signal has made it possible to transmit data of different types: initially only SMSs in 2G networks. But with the growth of data transfer rates, other services, like MMS, mobile Internet, video calls, video conferencing, mobile TV, online gaming etc. have been launched. But so that to enjoy these services feature phone is not enough – one needs a smartphone, and they are conquering the mobile market now. Statistic reports of 2011 say that half of 25-34 year old Americans and 16-24 year old young British already own a smartphone. And prognosis of shipments for the next years shows only growing numbers. Globally, the biggest competitors in the market are Android-based smartphones and iPhones, with the dominance of the former.

Game console category is represented by the **fixed game consoles and handhelds**. The history of the fixed consoles shows different stages of the development, consolidating the functionality, mobility of game storage, spectacular of visual effects, and extra features. The games initially were stored in the built-in memory of the fixed console, then on the cartridges, DVD, flash drives, hard drives, Blu-ray Disc and finally, with supporting Internet connectivity, online. The highlights of the latest seventh generation consoles are: gamer's motion as an input, infrared tracking, and standard wireless controllers. On the other side, handheld evolution differs from the fixed console, because of its portability. The development was directed towards enlargement of the built-in screen, touch-screen features, optimization of battery consumption, multi-media capabilities, and connectivity with the fixed console and to the Internet. A number of multifunction consoles combined mobile phone, mp3 player, FM radio, PDA, radio and gaming device. Current generation both gaming devices are hitting maturity as statistics shows. Research companies claim that dedicated gaming devices "have attained market saturation". Fixed consoles and handhelds shipments are expected to be flat or down, in comparison to factory unit shipments of game-capable mobile phones that are about 20 times higher and enjoy the growth. However, the latest trend for both consoles is 3D. As by now, it was introduced in the handheld. But 3D fixed consoles are on the way as well. As more multimedia services become available online, consoles evolve into true entertainment centers, allowing media streaming and other video or picture content to be delivered directly to supported devices like televisions and computers.

The second objective:

**2. To understand and compare the trends of the international (US/UK) and Italian market of the consumption of media technologies, preferences, habits, contexts of usage and phenomena.**

Globally, **media consumption** has grown 7 times today since 1900 (from 10 hours per week up to 70 in 2011). Moreover it is predicted to grow even up to 9 times in 2020. As for today TV is the device with the highest percentage of time spent, about 40%, but in 2016 it will drop down to 35% of total time dedicated to media. Radio and traditional paper media (like paper newspapers) will also experience the decline in consumption time. Instead, the time spent with tablet, mobile phone and PC will increase significantly, especially for the first two. For the tablet it will go up more than 4 times from 2011 to 2016, and will double for the mobile for the same period.

As a task of my desk research I have studied media consumption, habits and contexts of usage in the international market on the example of the USA and UK. To study the media habits of the Italian market I participated in a marketing research based on the “Focus Group” method, that aim exactly at understanding consumers’ attitudes toward a product, usage habits, contexts, unfulfilled needs and so on.

According to statistics, **television** is the leader among the media devices in the US and UK, with the highest percentage of ownership and every day reach. The trend of TV watching duration is increasing for all generations except teens, and has reached almost 160 hours per month in the first quarter 2011. Traditionally, US women in TV households have spent the most time viewing TV (5.5 hours per day on average), they are followed by men (5 hours), teens and children (3.5 hours). UK youth does not show much engagement in television neither: less than quarter of 16-24 year olds said they would miss watching TV, in comparison to almost half of 55-64 year olds. TV is not very popular device among Italian students neither, even though they watch it in the evening and multitask watching TV and using cellphone or computer in parallel.

Italian adults watch TV news in the morning during breakfast, films, news, sport and talk shows in the evening. The preference to watch TV in the evening corresponds with the general European trend: the peak time is “During the evening” for the majority of people. But the preference to watch it in the morning does not match with the trend, because only one in five Europeans watch television “When you wake up”. Generally, technology-friendly Italian adults watch TV in the morning, in comparison to the followers who more likely watch it in the evening. Watching news on TV in the morning is only on the third place by popularity in the UK, after the first peak at 7 PM and the second – at 10-11 pm.

Simultaneous consumption of other media devices during watching TV is a modern phenomenon getting an increasing popularity, especially among younger age groups. Generally, simultaneous consumption of two and more devices is called “**multitasking**”. Using Internet on a PC and watching TV is the most popular combination – American youth spends 40% of PC Internet time together with TV. 30% of time spent with tablet and 20% of time spent with smartphone are in parallel with watching TV too. Europeans also deepen the engagement with Internet together with watching TV. 30% of those who watch TV, use Internet on PC at the same time; and 5% of TV viewers use Internet on mobile phone. Media multitasking in the UK now accounts for 20% of all media usage, rising to 29% within the 16 to 24 age group. Italians multitask in the evening at home, when they

combine watching TV with cellphone (sending SMS) or computer (navigating Internet); and again this behavior is more popular among the students than adults.

As a general trend, TV and Internet multitaskers are more engaged and entertained online. They are heavy communicators online, use instant messengers, watch films, TV or video clips online, listen to the radio online, download music. Regarding e-commerce, they are more likely to change their mind about a brand and make more purchases following web research. Multitaskers are more likely to own a laptop than a desktop that made it easier to use both computer and TV simultaneously. It is more likely that they connect to Internet via mobile phone or Wi-Fi.

Moving to other media devices, it is worthwhile to mention **radio**, still the second most popular media device in the United States and third in Europe (after TV and newspapers). Local AM/FM Radio is popular among 93% of Americans but its consumption has decreased for 15% for the last five years and reached 6 hours per week. Traditional broadcast radio is the leader among the audio sources, listened in the car, at home and work. Even though online radio is yet less popular than the traditional, with more than half of US population reached, its consumption increased 50% and is accounted almost 10 hours per week. The growing trend of these days is a rising popularity of the online radio listened from a cellphone in the car.

The number of weekly radio listeners in the UK reaches more than 90% of the adult population. Analogue radio accounted for a 65.5% share of all listener hours. Overall radio listening time increases with age, peaking in the 55-64 age group, and is higher among men than women. On the contrary, digital radio is the most spread among 16-24 year old Britons, with the trend decreasing with age. A big driver of online radio usage is its mobile accessibility. And the main reasons why people prefer the online radio are: to control or choose the music played, more music variety, fewer commercials, and clearer signal.

Listening to the radio is the most popular media consuming activity in the morning, when one wakes up. This trend was confirmed during the focus groups, especially among 30-35 year old adult Italians who expectedly show more interest in radio, compared to the students. Adults listen it in the morning when they wake up, in the evening after work, on the way and in the airport when they go travelling. They name radio a technology hard to live without. Strangely though that 40-45 year old generation was less enthusiastic about radio than younger adults, which contradict with the international trend.

Italians enjoy listening to radio in the car, in the morning when they wake up, in the evening after work, on the way, in transport (except metro) and in the airport. Indeed, in the US, radio is the most popular among other audio sources in the car, accounting three quarters of time. In Great Britain three most popular locations for radio listening are home, work and in-vehicle; in-vehicle listening is accounted for one fifth of all radio consumption. In Europe radio is the leader among any other media technology in the morning, but is listening to radio in the evening or is rather rare. Italians complained that there is no coverage of the traditional radio signals in metro. People usually listen to the radio through the cellphone, but once they enter underground, they switch to texting SMS, listening to their playlists or reading a newspaper.

The trend for **computer** ownership suggests that the older is the generation, more likely they own a desktop PC and less chance for a laptop/netbook. Moreover, all generations older than 35 years more probably have a desktop. The leaders among laptop owners in the US are 18-24 year-olds. Italian students claimed that they

have a laptop or netbook and emotionally engaged into computer and feel dependency on it. Technology-friendly Italian students take notebooks to the University for studying or playing games, and in travels. The UK's 16-24 years old also would miss using Internet on a PC more than other age groups. Quarter of American students say laptop is the most important thing in their backpack and almost 40% could not even go more than 10 minutes without checking their laptop, smartphone, tablet or e-reader. That means they also feel lack of computers, like Italians.

Students and working Italians use computers for the private purposes in the morning and in the evening. In the morning they check email and browse Internet. For Italians computer is the second most important, after cellphone. Discovered trend is that Italians tend not to use portable computers on the way and in transport, neither take it in vacations, because of insecurity or preference to spent time with people.

Generally, appreciate that Internet provides access to information, contacting people fast and free, keeping updated and entertained. Social networking is only popular among students and "technology-friendly" adults of 30-35 years. The British study approves that 67% of 16-24 year-olds also use Internet for contact with other people, in comparison to 63% of all adults.

In the evening Italians use PC and TV simultaneously, connect PC to TV to watch movies, browse Internet, download films, music or study. Similarly, 25-44 year old Britons are the second of the most engaged with downloading music, movies and video clips, after 16-24 year-olds. Italian adults are much less likely to have a Facebook account, in comparison to students. This contradicts with the global trend that says that 26-34 year-olds represent the biggest percentage of Facebook users. It is also interesting that the Italian adults did not name online shopping as one of the activities they do online. On the contrary, age group of 31-44 year old Americans is fueling e-commerce adoption. Online shopping is the second most popular (after email) among activities done at least once per month. Cloud computing is getting an increasing popularity. It allows customers to store, manage and share files, documents and other content on the web. Among most famous are Dropbox, Google Calendar and Google Docs.

Email and browsing Internet are the leading activities on a PC globally. Overall British Internet users spend on PC around 50 hours a month online at home, but this raises to 65 hours among 25-34 year-old men – the leaders in home Internet consumption. The top Internet activities in the USA ranked by time spent are: social networking and blogging (15% of time), online games (10%) and personal email (8.3%). The portals like Yahoo are the fourth heaviest activity (4.4%). Instant messaging, videos/movies, search, reading software information – all have almost equal online time share, amounting around 4%. Women are slightly more likely to use the Internet to contact other people, but are less likely to use the Internet to relax or "to keep up to date with news". Among Internet users, social networking sites are most popular with women and young adults under age 30; and more than 90% of social networking time is spent on Facebook. Facebook is the most popular website in terms of time spent on PCs in the UK, ahead of eBay, Google and YouTube. But search engine Google has the highest reach among population.

As the Internet has matured as a medium and as users have got more and more used to it, concerns about it have decreased among all age groups in the UK. The biggest single cause of concern among all age groups was

offensive/illegal content and the issues of security. Italians are worried that online relations, including social networking and instant messaging, lead to losing interpersonal contact.

On average 4% of Americans own a **tablet**, and 12% own an **e-reader**. Tablets are the most popular among 25-34 year old men in the US, and on the second place among people of 55 years of older. Actually, the latter age group is the leader among the e-reader owners, with the dominance of women. 90% of US consumers either already own a tablet or would consider buying one. In comparison, 6% of UK mobile phone users claimed to own a tablet, with a further 24% interested in owning one. On average the majority of tablet owners spend at least 1 hour per day with their tablets, and roughly 40% of owners spend more than 2 hours. The majority of respondents spend more time with the tablet than reading a paper book, more than half - more than listening to the radio; third – more than watching TV, and quarter – more than they spend with laptops, desktops or smartphone. Consumers prefer tablets to computer for using applications, listening to music, playing games, watching videos, social networking, browsing Internet. On the other hand, for using spreadsheets and word processors people prefer laptops or netbooks. Mostly tablets are used at home, and more often on the weekdays than on the weekends, and more at night than in the daytime. Tablet owners are heavy **multitaskers**: the majority of them (70%) use tablets in parallel with watching TV, in total it accounts to one third of time spent with tablets. 20% of owners use them whilst waiting for something. The top activities on tablet are playing games, searching information and email.

Interestingly, that some airlines introduced tablets to replace paper manuals on board. Rather than carry around 38 pounds of operating manuals and logbooks, pilots will use a pre-loaded tablet which weighs less than 1.5 pounds. This will save paper and fuel that would help the environment in terms of saved trees and reduce of gas emissions.

The tablet trend for Italy: not yet popular, but people would like to have one. This means they feel influenced by those who already have it. Adults admire the weight of the device; they say it would be useful in the trips to watch films, order hotels, etc. Students complained about high prices of the device that gives no options than waiting, another shortage, according to them, is no possibility to write with a stylus.

**Mobile phone** is indeed the most popular media device; in many countries people own more than one handset. Instead, penetration of **smartphones** stands at around 40% in Western Europe and the US, peaking at 50% for 16-24 year old Britons and 50% of 25-34 year old Americans. In the smartphone market the rivalry is between Android-based and iOS-based phones, with Android fans winning. Particularly in Britain, BlackBerry-based smartphones are the most popular choice among younger consumers. The evidence suggests that this preference is driven by the BlackBerry messenger service which offers a free alternative to SMS.

US smartphone owners, in comparison to feature owners, use phone functions more frequently. Globally, the most popular daily usage of the mobile phone is making calls, alarm clock is on the second place, followed by SMS service, mobile Internet, use Wi-Fi, listen to music and social networking. Smartphone represents a device with “**hybridization**” of content, allowing customers enjoy the media, initially created for other devices: TV, computer, radio set, etc.

In the UK and US people start to use the mobile features from about 6:30 AM, and starting 7 AM until 9 PM use them intensely, except for the dinner time at 7 PM. Location-based services and music peak at the



commuting time. No spike in mobile Internet usage and mobile social networking in the evening suggests that other platform, i.e. computers, tablets are preferred.

When consumers use their mobile phones to check information online, they often have a choice between the mobile web version and a specially-created mobile app. The new trend is that Americans spend more time with **mobile apps** than with web which was not the case just a year ago. Games and social networking deliver the most engaging experience on mobile today and capture the significant majority of consumers' time – almost 80% in total. Furthermore, consumers use these two categories more frequently, and for longer average session lengths, compared to other activities. Also, games typify the most popular kind of app played on the Facebook platform itself.

20% of time using smartphones happens together with watching TV, which suggests a high **multitasking** between these two devices. Other contexts of usage include waiting for something, attending a meeting/class, shopping and commuting. Shopping includes also compare prices, find the location of the nearest store, track the shopping list, and **mobile payment**. Twitter is becoming widely used from the mobile phones, especially on-the-move when people post even about emergencies “from tornadoes to terrorist attacks”. Talking by phone and texting SMS are two of the top 5 activities of Europeans while waiting for a transport. Also, having seen an advertisement in the street, they scan the bar codes using a camera, they browse information about a product.

Italy is the country with high penetration rates of mobile phone, about 150%. Italian students represent the age group with highest smartphone diffusion. They feel dependency on the smartphone. They use it at home, university, in the transport (listen to music, Internet, checking transport timetables, calls, GPS orientation, to find nearest places of entertainment, etc.) and during the travels. Italians agreed that taking a smartphone to a trip is enough, with respect to any other device. Instead, in the USA the most common device people travel with is a laptop, followed by netbook and tablet. Smartphones are the least popular.

Students multitask in the evening at home when they watch TV and use the cellphone in parallel. They complain about visualization of webpages that are not adjusted for the mobile. Italian adults think mobile phones are the most important device and appreciate that they make them closer to other people, always available and connected. Adults mainly own feature phones, but wish to have a smartphone. They less multitask in the evening. On the way or doing sports they listen to the radio or music, and in metro they send SMS. The disadvantages of cellphone are obligation to react fast on the calls, disturbing others in a restaurant, battery life duration. For 30-35 year old Italians browsing Internet and checking email were the two more popular activities on the cellphone, apart from calls, SMS and alarm clock function. 40-45 year old adults use their phone mainly for making calls.

**Game console** is more widespread among younger generations and adults with children, which means that children play the role of influencer for the console purchase. Users of 13 years and older spend almost 5 hours per week on the Xbox 360, 4 hours on the PlayStation 3 and 1.5 hours on the Wii. Males drive the usage with on average double time spent, in comparison to females. Americans play video games during the hour before going to sleep at least a few times a week. Gaming remains at the forefront of how users say they spend their time with a console, much of this is the result of the offline play, but nearly half of American fixed console

users say they play games online. Beyond pure gaming, consoles also are extending in media direction, which exemplifies **hybridization**. The second-most popular use of consoles is for watching DVDs/Blu-Rays. Roughly a quarter of users say they have used a variety of applications: video-on-demand, downloaded films, music, Internet, etc. Usually playing consoles is a social activity, that is why they are mainly located in a family-friendly space, like living room. Nevertheless, during the focus groups Italians did not say that they were using consoles for something more than pure playing.

The growing functionality of smartphones is affecting people's other activities. British say they play less console/PC games, since they have a smartphone. This is more than 4 times greater among teens than adults. 5% of 16-24 year-olds claim they would miss the most playing console.

The Italian **multitasking** trend is: TV with computer or cellphone is the most popular in the evening, and is more common among younger generations than among older and groups. These habits are similar to the American and British. Indeed, multitasking with TV and Internet is the most popular combination among US youth. And TV together with cellphone is on the second position. Moreover, the peak time for both watching TV and using Internet is during the evening. According to the studies, percentage of multitaskers is higher amongst younger age groups, than older, similarly to the Italian trend.

In Italy, as well as in the USA and UK, the **hybridization** of the PC is already widespread. Mobile hybridization is also popular, even though less than computer. This is probably due to the fact that penetration of smartphones is much reduced in comparison to the penetration of computers. But as the demand for smartphones is growing fast, it will positively influence the mobile hybridization as well. Instead, the moments of consumption of Internet from TV or fixed console did not show up during the focus groups. In the UK and USA fixed console hybridization is in general more familiar. Italian were not telling about watching films on DVD, Blu-ray disk, listening to music, or navigating Internet utilizing their game consoles. Consoles were used according to their main purpose – playing. Connected television is yet rarity for the Italian families but in the UK accounts for 10% of total TV sales. The forecasts show that the shipments of Internet connected TV will increase about 20 million units per year.

The last objective was:

- 3. Based on the examined trends of the modern media consumption, to discover opportunities or ideas for the media production or service provider companies (direction they should move so that to fulfill the consumer's media needs).**

Having seen the media trends consumption trends of a modern individual, I thought about the ideas for the companies that produce the content or those that provide services. I understood that the context (time, location and current activity) plays the central role for selection of the technology or media content for the user. Location based services are getting more and more popular. Context based services are something that catches my attention; therefore I want to suggest the following opportunities for the companies.

Thinking about multimedia convergence and hybridization, I suppose that different devices should be able to transfer the content from one device to another "on the fly" without disturbing the consumer. I would call it a "**continuous delivery of media content when switching between different devices**". I think about software

that allows making voice and video calls and chats via Internet. If one has started talking using this program on a PC and suddenly needs to go out, but wants to continue talking, he should be able to switch to the same program installed on the smartphone without interruption of the speech. For example, Skype application that Italian customers claimed to use both from computer or smartphone.

Media multitasking, an increasingly popular media consuming activity, can also bring new opportunities for the companies working in the technology field. In fact, watching TV and using cellphone simultaneously is one of the most popular combination during multitasking. **Recognition of the content displayed on one device and suggestion of related content on another** device would be interesting. For example, if a user is reading sport news on the smartphone, TV screen should **automatically** start to suggest watching a sport competition he was reading about. In this case the user does not even have to search the match in one of the hundreds TV channels available, not even using a search service.

Having seen the complaints of the Italian adults during the focus group interviews, I would recommend the service providers to **launch a radio network in metro**. This would save consumers from the interruption of the media content they were listening to before they had entered in metro, certainly, they would be happier about it. They companies would continue broadcasting the advertisements as they normally do, but now having the bigger audience, they would expect bigger benefits.

GPS navigation is getting more and more popularity as an application on a smartphone. Smartphones also enjoy the raising popularity. According to the focus group interviews, people use smartphones very intensely in the public transport, especially in metro. In some countries, like Russia and Ukraine, the applications that help to **navigate in the metro** have already been launched. Among the interesting features are automatically detection of the next station, and the shortest path to get to the specific station and in which part of the train it is better to enter so that the crossing passage to another station is shorter. I would suggest the companies to launch this service in Italy too. I remember that I was spending rather much time on discovering how to get to the station, which elevator to take, which direction. And sometimes other foreigners were asking me in Milan the same questions. This feature, certainly, is not for those who follow the same way every day from home to school or work, but would be a big help for tourists, foreign businessmen, especially in Milan which is known as a fashion capital, receiving millions of tourists coming for shopping. And Rome that is full of foreign tourists all over the year.

**Mobile payments in public transport** would be also a big help. This is what the students were suggesting as a future service – mobile pass in metro. As the global and Italian trend confirmed, people actively use their smartphones on the way. Personally, each time I travel here in Italy, I see queues in front of the ticket selling machines, and ticket offices. That disappoints the most during the rush hour. People wait in the queue are often miss their train to one of the suburbs (I saw many times in “Cadorna” train station in Milan). Therefore, mobile payments would be a big help, and I would suggest companies to launch such service in Italy. Electronic mobile payments for metro are already launched in the USA (New York, Detroit) in 2010.

Interestingly, that among the questions in the guide for the focus group was about the using technology in the shopping mall, supermarket or single-brand shop. The respondents were not enthusiastic about talking about this context, and the moderator skipped this topic. On the contrary to Italy, Britons and Americans use involve

their smartphones in the shopping process. Unlike the US and UK, in Italy the small shops are dominated over the shopping malls. All Italian centers of the cities are full of shops selling shoes, clothes, etc., that close at the same time as people finish working. People walk in the evening look and examine the shop windows. In case they like something they have to come back next day to ask if there is a size or color they need. Instead, I would suggest introducing a smartphone application that would scan the **QR (Quick Response) or NFC (Near Field Communication) code of a product in the shop window** and provide a potential buyer with all information about the product, including data about the sizes, colors, and numbers of units available. In case the needed size is absent, user should have an opportunity to order it even from the closed shop, leaving a note in the system with his contact information.

In a similar way, I would like to offer the shops to introduce a smartphone app that would allow a user to scan a **QR or NFC code** of the item he likes, when he is **inside the shop**, and to check if the size he needs is present, how many items are still available, etc. This would save the customer from searching, for example, a needed size among the huge amount of clothes exposed. Or knowing that there are still many items of the cloth and all the dressing rooms are closed, he can decide to come later on.

Italians did not talk about using technology in the **restaurant**. They only said that in this context they feel that the cellphone is disturbing, and they switch it in a silent mode. Americans, instead, started to use mobile payment services, like Pago, in bars to order a drink from the smartphone without waiting for the waitress. This means that the usage of the technology in the restaurant can be advantages. I would like to suggest an application that having scanned a **QR or NFC code** of a dish in menu, can give **information about the ingredients**, nutrition values, allergenic components, description of the taste, recommendation for drink to accompany, and certainly, ability to make an order.

Italian consumers wish to have a device, like tablet, that integrates functionality of other devices and operates as a remote control for the home appliances, including washing machines, heating systems, TV, etc. Its implementation would bring a success the Italian market.

## Bibliography

- Anderson, J. (2010, December). *Understanding The Changing Needs Of The US Online Consumer, 2010*. Retrieved from [http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer\\_2010.pdf](http://latimesblogs.latimes.com/files/understanding-the-changing-needs-of-the-us-online-consumer_2010.pdf)
- Arbitron/Edison's Research. (2010). *The Infinite Dial 2010: Digital Platforms and the Future of Radio*. Retrieved from [http://www.arbitron.com/downloads/infinite\\_dial\\_presentation\\_2010\\_reva.pdf](http://www.arbitron.com/downloads/infinite_dial_presentation_2010_reva.pdf)
- Arbitron/Edison's Research. (2011). *The Infinite Dial 2011: Navigating Digital Platforms*. (Arbitron/Edison's Research) Retrieved from [http://www.arbitron.com/downloads/infinite\\_dial\\_2011\\_presentation.pdf](http://www.arbitron.com/downloads/infinite_dial_2011_presentation.pdf)
- Aune, S. P. (2011, January 31). *Android Tablets Eat Away At iPad Market Share*. Retrieved from <http://www.technobuffalo.com/companies/google/android/android-tablets-eat-away-at-ipad-market-share/>
- Bachelet, C. (2010, September 3). *Ofcom highlights growth in mobile media usage as a key trend in the UK*. Retrieved from [http://www.analysismason.com/About-Us/News/Insight/Media\\_usage\\_Insight\\_Sep2010/](http://www.analysismason.com/About-Us/News/Insight/Media_usage_Insight_Sep2010/)
- Bellis, M. (n.d.). *The Invention of Television*. Retrieved from [http://inventors.about.com/od/tstartinventions/a/Television\\_Time.htm](http://inventors.about.com/od/tstartinventions/a/Television_Time.htm)
- Bianco, D. P. (2011). *Reference for Business, Focus Groups*. Retrieved from <http://www.referenceforbusiness.com/encyclopedia/Fa-For/Focus-Groups.html>
- Blandford, R. (2011, May 6). *IDC smartphone shipment figures for Q1 2011*. Retrieved from [http://www.allaboutsymbian.com/news/item/12858\\_IDC\\_smartphone\\_shipment\\_figure.php](http://www.allaboutsymbian.com/news/item/12858_IDC_smartphone_shipment_figure.php)
- Borland, S. (2008). *A mobile phone is the gizmo we can't live without...the best and worst gadgets of all time*. Retrieved from <http://www.dailymail.co.uk/news/article-1040340/The-mobile-phone-gizmo-live--best-worst-gadgets-time.html>
- Bucki, J. (2011). *Definition of Tablet Computer*. Retrieved from <http://operationstech.about.com/od/glossary/g/Definition-Of-Tablet-Computer.htm>
- Buckland, E. (2011, August 11). *Smartphones will outnumber other handsets by 2014 in Western Europe*. Retrieved from [http://www.analysismason.com/About-Us/News/Insight/Smartphone\\_penetration\\_Aug2011/?journey=117,55](http://www.analysismason.com/About-Us/News/Insight/Smartphone_penetration_Aug2011/?journey=117,55)
- Burcher, N. (2011, April 5). *Facebook usage statistics 1st April 2011 vs April 2010 vs April 2009*. Retrieved from <http://www.nickburcher.com/2011/04/facebook-usage-statistics-1st-april.html>
- Business Wire. (2011, June 7). *Power and Portability of Mobile Tablets Push New Popularity in the U.S.* Retrieved from <http://www.businesswire.com/news/home/20110607005557/en/Power-Portability-Mobile-Tablets-Push-Popularity-U.S.>

- CBS Outdoor. (2010). *Europe on the move*.
- Chakraborty, P. (2009, May 14). *Handheld video game player shipments to rise 4.9 percent in 2009*. Retrieved from <http://pcconsumerelectronics.blogspot.com/2009/05/handheld-video-game-player-shipments-to.html>
- Chakraborty, P. (2010, August 16). *Cell phone gaming soars as consoles and handhelds sputter*. Retrieved from <http://pctelecoms.blogspot.com/2010/08/cell-phone-gaming-soars-as-consoles-and.html>
- Chakraborty, P. (2011, August 20). *Automotive Internet radio market set to boom*. Retrieved from <http://pcconsumerelectronics.blogspot.com/search?updated-min=2011-01-01T00%3A00%3A00%2B05%3A30&updated-max=2012-01-01T00%3A00%3A00%2B05%3A30&max-results=50>
- comScore. (2011, June 23). *comScore Introduces Device Essentials™ for Measuring Digital Traffic from All Devices, Enabling Optimization of Marketing Strategies and Customer Experience*. Retrieved from [http://www.comscore.com/Press\\_Events/Press\\_Releases/2011/6/comScore\\_Introduces\\_Device\\_Essentials](http://www.comscore.com/Press_Events/Press_Releases/2011/6/comScore_Introduces_Device_Essentials)
- Daily Mail. (2010, April 23). *First 3D television sets go on sale in Britain... but is there anything to watch?* Retrieved from <http://www.dailymail.co.uk/sciencetech/article-1267942/First-3D-television-sets-sale-today.html>
- Deloitte. (2010). *Technology, Media and Telecommunication Predictions 2011*. Retrieved from [http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/TMT/Predictions%202011%20PDFs/8616A\\_TMT\\_Predictions\\_LRLKD.pdf](http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/TMT/Predictions%202011%20PDFs/8616A_TMT_Predictions_LRLKD.pdf)
- Digital Radio Tech. (2009). *Analogue Radio vs. Digital Radio*. Retrieved from <http://www.digitalradiotech.co.uk/index.htm>
- Duryee, T. (2011, August 9). *Another Mobile Payments Company Launches in Google's Backyard* . Retrieved from <http://allthingsd.com/20110809/another-mobile-payments-company-launches-in-googles-backyard/>
- Edwards, B. (2009, December 7). *30 Years of Handheld Game Systems*. Retrieved from [http://www.pcworld.com/article/183679/30\\_years\\_of\\_handheld\\_game\\_systems.html](http://www.pcworld.com/article/183679/30_years_of_handheld_game_systems.html)
- EIAA. (2009, June). *MEDIA MULTI-TASKERS: MORE ENGAGED & ENTERTAINED ONLINE*. Retrieved from <http://www.eiaa.net/news/eiaa-articles-details.asp?lang=1&id=203>
- EIAA, Mediascope Europe . (2010, December). *European Media Landscape Report, Summary*. Retrieved from [http://www.eiaa.net/Ftp/casestudiesppt/EIAA\\_European\\_Media\\_Landscape\\_Report\\_SUMMARY.pdf](http://www.eiaa.net/Ftp/casestudiesppt/EIAA_European_Media_Landscape_Report_SUMMARY.pdf)

- Elliott, A.-M. (2011, August 13). *Personal Computers: A History of the Hardware That Changed the World*. Retrieved from [http://mashable.com/2011/08/12/ibm-pc-history/#view\\_as\\_one\\_page-gallery\\_box2093](http://mashable.com/2011/08/12/ibm-pc-history/#view_as_one_page-gallery_box2093)
- Evans, D. (2011, January 31). *10 memorable milestones in tablet history*. Retrieved from <http://www.techradar.com/news/mobile-computing/10-memorable-milestones-in-tablet-history-924916>
- Frank N. Magid Associates, Inc. (2011). *A Portrait of Today's Tablet User*. Retrieved from [http://onlinepubs.ehclients.com/images/pdf/MMF-OPA\\_--\\_Portait\\_of\\_Todays\\_Tablet\\_User\\_--\\_Jun11\\_%28Final-Public%291.pdf](http://onlinepubs.ehclients.com/images/pdf/MMF-OPA_--_Portait_of_Todays_Tablet_User_--_Jun11_%28Final-Public%291.pdf)
- funSMS. (2010). *Mobile Phone Generations*. Retrieved from [http://www.funsms.net/mobile\\_phone\\_generations.htm](http://www.funsms.net/mobile_phone_generations.htm)
- Gahran, A. (2011, July 21). *Mobile devices save lives in emergencies*. Retrieved from <http://edition.cnn.com/2011/TECH/mobile/07/21/mobile.emergency.response.gahran/index.html>
- Gartner. (2011, August 11). *Gartner Says Sales of Mobile Devices in Second Quarter of 2011 Grew 16.5 Percent Year-on-Year; Smartphone Sales Grew 74 Percent*. Retrieved from <http://www.gartner.com/it/page.jsp?id=1764714>
- Gode, Y. (2010, November 3). *History of Video Game Consoles*. Retrieved from <http://www.buzzle.com/articles/history-of-video-game-consoles.html>
- Golden Ink. (n.d.). *A Brief History of Computers and Networks*. Retrieved from <http://goldenink.com/computersandnetworks.shtml>
- Goldman, D. (2011, February 7). *Smartphones have conquered PCs*. Retrieved from [http://money.cnn.com/2011/02/09/technology/smartphones\\_eclipse\\_pcs/index.htm](http://money.cnn.com/2011/02/09/technology/smartphones_eclipse_pcs/index.htm)
- Google Admob. (2011). *Tablet Survey*. Retrieved from <http://services.google.com/fh/files/blogs/AdMob%20-%20Tablet%20Survey.pdf>
- Greystripe. (2011, April). *Mobile Auto Insights, Avertiser insights report*. Retrieved from <http://www.greystripe.com/wp-content/uploads/2011/04/Greystripe-AIR-0411-14.pdf>
- Greystripe. (2011, May). *Smartphone Moms Insights, Advertiser insights report*. Retrieved from <http://www.greystripe.com/wp-content/uploads/2011/05/Greystripe-AIR-Moms-0511-4.pdf>
- Grove, J. V. (2011, September). *How Travelers Use In-Flight Wi-Fi [INFOGRAPHIC]*. Retrieved from <http://mashable.com/2011/08/31/inflight-wifi-infographic/>
- GSM Arena. (2011, May 2). *Mobile phone usage report 2011: The things you do*. Retrieved from [http://www.gsmarena.com/mobile\\_phone\\_usage\\_survey-review-592p3.php](http://www.gsmarena.com/mobile_phone_usage_survey-review-592p3.php)

- IDC. (2011, August 4). *Apple Rises to the Top as Worldwide Smartphone Market Grows 65.4% in the Second Quarter of 2011, IDC Finds* . Retrieved from <http://www.idc.com/getdoc.jsp?containerId=prUS22974611>
- IDC. (2011, May 5). *Smartphone Market Grows 79.7% Year Over Year in First Quarter of 2011, According to IDC*. Retrieved from <http://www.businesswire.com/news/home/20110505007011/en/Smartphone-Market-Grows-79.7-Year-Year-Quarter>
- Indvik, L. (2010). *Americans Now Spend As Much Time Using Internet as TV*. Retrieved from <http://mashable.com/2010/12/13/internet-tv-forrester/>
- Internet World Stats. (2011). *INTERNET USAGE STATISTICS*. Retrieved from <http://www.internetworldstats.com/>
- Kellogg, D. (August, 18). *2011*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/](http://blog.nielsen.com/nielsenwire/online_mobile/mobile-apps-beat-the-mobile-web-among-us-android-smartphone-users/) Mobile Apps Beat the Mobile Web Among US Android Smartphone Users
- Kessler, S. (2011, August). *How Students Use Technology [INFOGRAPHIC]*. Retrieved from <http://mashable.com/2011/08/10/students-technology-infographic/>
- Kishore. (2007, February 7). *Classification of Computer*. Retrieved from [http://kish.in/classification\\_of\\_computer/](http://kish.in/classification_of_computer/)
- Kyrnin, M. (2011). *Guide To Tablet PC Networking Features*. Retrieved from <http://compreviews.about.com/od/buyers/a/Tablet-PC-Connectivity-Guide.htm>
- Lai, E. (2011, February 12). *How Many Tablets On the Market Today? North of 100 (Charts)*. Retrieved from <http://www.zdnet.com/blog/sybase/how-many-tablets-on-the-market-today-north-of-100-charts/895>
- Lytle, J. M. (2008, April 11). *World's first 3D TV on sale tomorrow*. Retrieved from <http://www.techradar.com/news/television/hdtv/world-s-first-3d-tv-on-sale-tomorrow-315379>
- M. Madden, K. Z. (2011, August 26). *65% of online adults use social networking sites*. Retrieved from <http://www.pewinternet.org/Reports/2011/Social-Networking-Sites.aspx>
- Mahony, B. (2008). *DVR vs. Time-Shifted TV*. Retrieved from <http://blog.tmcnet.com/iptv/iptv-technology/dvr-vs-timeshifted-tv.asp>
- Mashable. (2011, May 31). *38% of College Students Can't Go 10 Minutes Without Tech [STATS]*. Retrieved from <http://mashable.com/2011/05/31/college-tech-device-stats/>
- Melton, J. (2011). *IPG Lab Marketing Director, 2011 media and technology trends forecast*. Retrieved from <http://blog.ipglab.com/?p=2749>



- Mobcity. (2010). *Statistics About Mobile Phone Usage*. Retrieved from [http://www.mobcity.com.au/marketing/Infographic/mobile\\_phone\\_usage.html](http://www.mobcity.com.au/marketing/Infographic/mobile_phone_usage.html)
- Morpace Omnibus. (2010, September). *Where is the mobile device sweet spot?*
- Natasha Mack, C. W. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. Retrieved from Family Health International
- Newark-French, C. (2011, June 20). *Mobile Apps Put the Web in Their Rear-view Mirror*. Retrieved from <http://blog.flurry.com/bid/63907/Mobile-Apps-Put-the-Web-in-Their-Rear-view-Mirror>
- Ofcom. (2011, August 4). *Communications Market Report: UK*. Retrieved from [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK\\_CMV\\_2011\\_FINAL.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CMV_2011_FINAL.pdf)
- PBS. (2005). *Digital vs. Analog*. Retrieved from [http://www.pbs.org/opb/crashcourse/digital\\_v\\_analog/](http://www.pbs.org/opb/crashcourse/digital_v_analog/)
- PHOENIX. (2011, March 16). *Mobile Generations – 1G to 4G*. Retrieved from <http://www.coolpctips.com/2011/03/mobile-generations-1g-to-4g/>
- PR Moment. (2011, February 16). *Fifty percent of British consumers watch the BBC for their news and most people watch the news in the evening*. Retrieved from <http://www.prmoment.com/569/most-british-consumers-turn-to-the-bbc-for-their-news-and-most-people-watch-the-news-in-the-evening.aspx>
- Purcell, K. (2011, August 9). *Search and email still top the list of most popular online activities*. Retrieved from <http://www.pewinternet.org/Reports/2011/Search-and-email/Report.aspx?src=prc-headline>
- Quilty, S. (2008). *Average amount of time Americans spend watching TV*. Retrieved from <http://www.helium.com/items/954928-average-amount-of-time-americans-spend-watching-tv>
- Reitsma, R. (2010, December). *The Data Digest: What Are People Using Their PC For While Watching TV?* . Retrieved from [http://blogs.forrester.com/category/media\\_consumption](http://blogs.forrester.com/category/media_consumption)
- Rhoda, A. (2011, February 4). *Global Tablet Shipments to Rise by Factor of 12 by 2015*. Retrieved from <http://www.isuppli.com/display-materials-and-systems/news/pages/global-tablet-shipments-to-rise-by-factor-of-12-by-2015.aspx>
- Rhoda, A. (2011, May 18). *iPad-Style Media Tablets to Outship PC Tablets by Factor of 10 from 2010 to 2015*. Retrieved from <http://www.isuppli.com/Display-Materials-and-Systems/News/Pages/iPad-Style-Media-Tablets-to-Outship-PC-Tablets-by-Factor-of-10-from-2010-to-2015.aspx>
- Roberts, J. (2009, June 10). *Trends: Media multitaskers*. Retrieved from <http://www.marketingweek.co.uk/trends-media-multitaskers/3001242.article>
- Romanian Association of Audience Measurement. (2010, March 23). *Time spent watching TV increased globally*. Retrieved from <http://www.arma.org.ro/en/news/time-spent-watching-tv-increased-globally>

- Rosenberg, R. (2011). *Widespread Communication Technology Use Before Sleep*. Retrieved from <http://www.doctorslounge.com/index.php/news/pb/18376>
- S. Adam Brasel, J. G. (2011). *Media Multitasking Behavior: Concurrent Television and Computer Usage*. Retrieved from <http://www.liebertonline.com/doi/pdfplus/10.1089/cyber.2010.0350>
- Satellite Radio USA. (2009). *The History of Satellite Radio*. Retrieved from [http://satelliteradioua.com/satellite\\_radio\\_history.html](http://satelliteradioua.com/satellite_radio_history.html)
- Schroeder, S. (2011, August 26). *Google TV Coming to the UK in 6 Months [REPORT]*. Retrieved from <http://mashable.com/2011/08/26/google-tv-uk/>
- Scott, M. (2011, June 23). *What consumers really want: industry players still playing catch-up with consumer behaviour*. Retrieved from [http://www.analysismason.com/About-Us/News/Insight/Consumer\\_behaviour\\_Jun2011/?journey=117,55](http://www.analysismason.com/About-Us/News/Insight/Consumer_behaviour_Jun2011/?journey=117,55)
- Selburn, J. (2011, August 9). *Shipments of Internet-Enabled Consumer Devices to Exceed PCs in 2013*. Retrieved from <http://www.isuppli.com/Home-and-Consumer-Electronics/News/Pages/Shipments-of-Internet-Enabled-Consumer-Devices-to-Exceed-PCs-in-2013.aspx>
- Shields, M. (2010). *Simultaneous Viewing and Surfing Commonplace*. Retrieved from <http://www.adweek.com/news/television/simultaneous-viewing-and-surfing-commonplace-102771>
- Shields, M. (2011). *America's Media Thirst Unquenchable*. Retrieved from <http://www.adweek.com/news/technology/america-s-media-thirst-unquenchable-claims-study-126199>
- Simon, M. (2010, July 2). *From 2-Way to 4G: The Complete History of Cell Phones*. Retrieved from [http://www.maclife.com/article/feature/2way\\_4g\\_complete\\_history\\_cell\\_phones](http://www.maclife.com/article/feature/2way_4g_complete_history_cell_phones)
- SiriusXM Radio. (2011, August 10). *Studio 54 Reopens...on Radio: SiriusXM Launches Studio 54 Music Channel*. Retrieved from <http://investor.sirius.com/releasedetail.cfm?ReleaseID=598354>
- Sonderman, J. (2011). *How people use smartphones and tablets and what it means for your mobile strategy*. Retrieved from <http://www.poynter.org/latest-news/media-lab/mobile-media/138137/how-people-use-smartphones-and-tablets-and-what-it-means-for-your-mobile-strategy/>
- Steele, C. (2011, August 7). *History of the Tablet*. Retrieved from <http://www.pcmag.com/slideshow/story/285757/history-of-the-tablet/1>
- Strategy Analytics. (2011, August 9). *Two-thirds of 3DTV Owners Watch 3D Shows at Least Once per Week*. Retrieved from <http://www.strategyanalytics.com/default.aspx?mod=pressreleaseviewer&a0=5088>
- Study, T. N. (2009, November). *Within Ad Supported Media, Broadcast Radio Reach is Second Only to Live Television*. Retrieved from [http://blog.nielsen.com/nielsenwire/media\\_entertainment/within-ad-supported-media-broadcast-radio-reach-is-second-only-to-live-television-study-finds/](http://blog.nielsen.com/nielsenwire/media_entertainment/within-ad-supported-media-broadcast-radio-reach-is-second-only-to-live-television-study-finds/)

- Talbot, B. (2010, November 17). *80% of Brits watch on-demand catch-up TV*. Retrieved from <http://www.digitalchoices.co.uk/80-percent-of-brits-watch-on-demand-catch-up-tv-171120102.html>
- Television Bureau of Advertising, A. (2011, April 18). *Time Spent Watching TV*. Retrieved from <http://adage.com/article/mediaworks/time-spent-watching-tv/227022/>
- The European Audiovisual Observatory. (2010). *Growth of the number of television channels and multi-channel platforms in Europe continues despite the crisis*. Retrieved from [http://www.obs.coe.int/about/oea/pr/mavise\\_end2009.html](http://www.obs.coe.int/about/oea/pr/mavise_end2009.html)
- The Nielsen Company. (2010). *DVR Use in the US*. Retrieved from <http://blog.nielsen.com/nielsenwire/wp-content/uploads/2010/12/DVR-State-of-the-Media-Report.pdf>
- The Nielsen Company. (2010, December 15). *Game Consoles Edge Closer to Serving as Entertainment Hubs*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/](http://blog.nielsen.com/nielsenwire/online_mobile/game-consoles-edge-closer-to-serving-as-entertainment-hubs/)
- The Nielsen Company. (2010). *Report: Bigger TVs, DVR and Wi-Fi among Hot U.S. Home Technology Trends*. Retrieved from <http://blog.nielsen.com/nielsenwire/consumer/report-bigger-tvs-dvr-and-wi-fi-among-hot-u-s-home-technology-trends/>
- The Nielsen Company. (2010, August 2). *What Americans Do Online: Social Media And Games Dominate Activity*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/what-americans-do-online-social-media-and-games-dominate-activity/](http://blog.nielsen.com/nielsenwire/online_mobile/what-americans-do-online-social-media-and-games-dominate-activity/)
- The Nielsen Company. (2011). *In the U.S., Tablets are TV Buddies while eReaders Make Great Bedfellows*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-the-u-s-tablets-are-tv-buddies-while-ereaders-make-great-bedfellows/](http://blog.nielsen.com/nielsenwire/online_mobile/in-the-u-s-tablets-are-tv-buddies-while-ereaders-make-great-bedfellows/)
- The Nielsen Company. (2011, August 25). *Changing Demographics of Tablet and eReader Owners in the US*. Retrieved from <http://blog.nielsen.com/nielsenwire/?p=28695>
- The Nielsen Company. (2011, June 28). *In U.S. Smartphone Market, Android is Top Operating System, Apple is Top Manufacturer*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-u-s-smartphone-market-android-is-top-operating-system-apple-is-top-manufacturer/](http://blog.nielsen.com/nielsenwire/online_mobile/in-u-s-smartphone-market-android-is-top-operating-system-apple-is-top-manufacturer/)
- The Nielsen Company. (2011, June 30). *In US, Smartphones Now Majority of New Cellphone Purchases*. Retrieved from [http://blog.nielsen.com/nielsenwire/online\\_mobile/in-us-smartphones-now-majority-of-new-cellphone-purchases/](http://blog.nielsen.com/nielsenwire/online_mobile/in-us-smartphones-now-majority-of-new-cellphone-purchases/)
- The Nielsen Company. (2011, July 12). *Smartphone Penetration in Asia Set to Boom*. Retrieved from <http://blog.nielsen.com/nielsenwire/global/smartphone-penetration-in-asia-set-to-boom/>
- The Nielsen Company. (2011, March 23). *U.S. Console Gaming: The Living Room & Beyond*. Retrieved from <http://blog.nielsen.com/nielsenwire/consumer/u-s-console-gaming-the-living-room-beyond/>

- The Nielsen Company, Connexia and the Milan Polytechnic School of Management. (2011). *Italy's Growing Multi-Media Influence Impacts Purchase Decisions*. Retrieved from <http://blog.nielsen.com/nielsenwire/consumer/italys-growing-multi-media-influence-impacts-purchase-decis>
- Thinkbox. (2011). *Half Year TV Report: January - June 2011*. Retrieved from <http://www.thinkbox.tv/server/show/nav.1263>
- Warren, C. (2011, August 23). *United & Continental Replace Flight Manuals With iPads*. Retrieved from <http://mashable.com/2011/08/23/united-continental-pilots-ipad/>
- Wikipedia. (2011). *3GPP Long Term Evolution*. Retrieved from [http://en.wikipedia.org/wiki/3GPP\\_Long\\_Term\\_Evolution](http://en.wikipedia.org/wiki/3GPP_Long_Term_Evolution)
- WiseGeek. (2009). *What is Digital Television Radio?* Retrieved from <http://www.wisegeek.com/what-is-digital-television-radio.htm>
- Witt, G. (1998). *Using Consumer Research to Improve Sales*. Retrieved from <http://www.marketingpsychology.com/research1.htm>
- World DMB. (2010, September). *Global Broadcasting Update DAB/DAB+/DMB*. Retrieved from [http://www.worlddab.org/rsc\\_brochure/lowres/12/rsc\\_brochure\\_lowres\\_20100910.pdf](http://www.worlddab.org/rsc_brochure/lowres/12/rsc_brochure_lowres_20100910.pdf)
- Woyke, E. (2011, January 10). *Analyst: Android Tablet Shipments Will Match iPad In Second Half Of 2011*. Retrieved from <http://www.forbes.com/sites/elizabethwoyke/2011/01/10/analyst-android-tablet-shipments-will-match-ipad-in-second-half-of-2011/>
- Yin, S. (2011, June 24). *Apple iPad Accounts for 97% of Tablet Traffic on the Web*. Retrieved from <http://www.pcmag.com/article2/0,2817,2387530,00.asp>
- Zickuhr, K. (2011). *Generations and their gadgets*. Retrieved from <http://www.pewinternet.org/Reports/2011/Generations-and-gadgets/Report/eBook-Readers-and-Tablet-Computers.aspx>