

CHALMERS



Need for speed

A descriptive analysis of socio-economic and usage factors characterizing users with different levels of broadband speed

Bachelor Thesis in Industrial Engineering and Management

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Abstract

Many previous studies concerning broadband technology have investigated different perspectives, such as deployment, penetration and accessibility. Still, few studies conducted concern speed. However, in 2010, ADL and Chalmers found, based on a survey conducted by Ericsson Consumer Labs, that broadband speed is an important factor for driving economic growth, both on micro and macro level. To better understand the reason for this, it is necessary to identify and describe which kind of user that has chosen to adopt a certain level of speed, and how they use the Internet. Since increased broadband speed have economic benefits it is interesting to investigate which kind of users that are willing to upgrade their broadband speed.

The purpose of this report is to describe and analyse the socio-economic and usage characteristics of broadband users in developed and emerging countries, with focus on identifying trends and correlations related to the users' broadband speed. In addition, the report intends to describe the socio-economic and usage characteristics of those willing to upgrade their broadband speed. This is achieved by analysing survey data provided by Ericsson Consumer Labs on usage and socio-economic factors for Internet users from both developed and emerging countries.

The results indicate that city size, level of income, level of education and degree of employment all have a positive relation with broadband speed for users in developed countries. Gender and age seem to be of importance for both emerging and developed countries.

In terms of usage, the results indicate that emerging countries in general have higher usage frequencies than developed countries. For emerging countries the high speed group has the highest usage frequencies. The opposite is true for developed countries. Furthermore, in the developed countries, people with lower levels of broadband speed are more willing to upgrade their speed. In emerging countries, the willingness to upgrade is not dependent on current level of speed. In developed countries it is found that men are more willing to upgrade than females.

This report has identified factors that are of interest for subscribers Internet speed. These have been reformulated to possible hypothesis for future research.

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1. Introduction

In this introductory chapter, the background of this paper is presented, which provides a framework for the purpose of the thesis. Furthermore, the purpose is presented, followed by a number of research questions, which are posed to facilitate achieving the purpose. The chapter is concluded by the presentation of the delimitations applicable for this study.

1.1 Background

In today's society, accessibility to the Internet, with all its possibilities, is a highly important part of people's everyday life. This holds true seen anywhere from an individual's perspective all the way up to large organizations on a macro scale. In order to use common Internet services, a fast connection is essential (Koutroumpis 2009). Broadband, which is the topic of this thesis, is a collection of high-speed techniques for Internet connection, which is under constant development. A common classification of broadband technology is a high-speed Internet connection, which is always available and has a minimum speed of 256 kbit/s (kilobit per second) (OECD 2009).

The development of broadband started with the expansion of the Internet. The Internet was available to the public in the 1980s but with no real means for "regular people" to access it. The initial connections were slow and the maximum speed capacity of 56 kbit/s (using dial-up connection) was not enough to really enable the demanded services. In the late 1990s broadband connections entered the market and brought the evolution of the Internet and its related services to a new level (Jakob 2010).

Today, an increasing number of people all over the world are gaining broadband access and the average broadband speed is increasing (Broadband Commission 2012b). This development is possible due to global initiatives and decreasing subscribing costs. The improved usability of Internet services has created a global demand for higher broadband speed. The broadband market is growing and governments are willing to support the progress (European Commission 2010b). The rising number of Internet subscribers worldwide makes broadband studies of particular interest.

Like most new technologies, broadband was extremely expensive when first launched, and not nearly as fast as it is today. As the technology improved and the competition grew, the prices went down and the market expanded. As the demand increased, the Internet service providers began to compete with each other to offer faster broadband to affordable prices. In order to support the growing demand, new technologies such as ADSL, cable and satellite were developed (Jakob 2010). This has led to a present maximum speed that is thousands times faster compared to the first broadband connection (1024 Mbit/s vs. 0,256 Mbit/s), and the available connection speeds continue to rise (OECD 2011b). The progress of broadband has tremendously enhanced the growth of the World Wide Web. Today the public has access to a countless number of Internet applications, scripts and enterprise software that are enabled by high-speed connectivity (Shekher 2012).

The present developed society is more or less depending on the ability to communicate information quickly (Trkman 2008). In less than 20 years, broadband has become an established technology in a wide range of key sectors, such as, politics, transportation, construction, education, health and agriculture (Broadband Commission 2012a). In these parts of the world, Internet services are used on a daily basis, often several hours a day. Today, high speed Internet is accessible on PCs, cell phones and other devices. People use it at work, at home, when travelling and during other activities. Broadband has visibly contributed to the modern society (Jakob 2010).

Much of the world still lacks basic Internet access and several nations are lacking behind in the broadband movement for various reasons (Broadband Commission 2010b). Some of them are considered as emerging countries since they are growing economies that are already affecting the global market (O'Neill 2001). By learning from the development in the more developed countries, and by obtaining strategic input, the emerging countries may benefit of the advantages that the broadband technology provide (Mourad & Yardley 2012).

Broadband speed upgrades facilitate the usability of Internet services. This progress in technology generates new possibilities to benefit from the Internet. Expanding the availability of high-speed broadband could have several positive social, economic and environmental effects. Some of the achievable effects are: improved communication, increased innovation and productivity, new jobs and reduced environmental impact (ADL & Chalmers 2012).

Broadband technology also has the potential to support sustainable development. For sustainable development, the progress of technology is essential, but the technological development alone is not sufficient to ensure a sustainable future. In order to overcome the different global challenges, such as rising population, poverty, epidemics, climate changes and simultaneously maintain the economic growth, the world need powerful tools (Budde 2011). Cooperation and communication are essential to unite nations and to engage people on all levels of society (European Commission 2010b). Broadband is rare in that respect that it has the potential to address many sustainability challenges, while simultaneously increasing socio-economic development (Broadband Commission 2012a). From a political strategy perspective, there are therefore strong incentives to invest in both broadband penetration and upgrades of the average broadband speed.

As for many technologies, the importance of broadband development can be investigated from many perspectives. Whilst many previous studies observed accessibility, penetration, deployment and adoption to broadband technology, few studies concern broadband speed. However, Rohman and Bohlin (2012) recently found that not only the availability of broadband, but also the speed of the broadband drives economic growth on a macro level. One of the main findings was that doubling the broadband speed for an economy increases GDP growth by 0,3 percent. In addition, Ericsson AB, together with Arthur D. Little and Chalmers University of Technology (2012) found that broadband speed upgrades have positive effects on micro levels. For example, an increase from 4 to 8 Mbit/s added 120 USD to the household's monthly income in OECD countries.

The results accomplished by the previously mentioned reports may contribute to the making of future policies. However, these studies do not examine the mechanisms causing the relationship between broadband speed upgrades and increased GDP / household income. They do not investigate how and why broadband speed upgrades lead to economic growth, thus there is still considerable uncertainty about the relation between cause and effect. These studies have identified an unexplored area, a "black box", where the links between broadband speed and economic growth is yet to be explained.

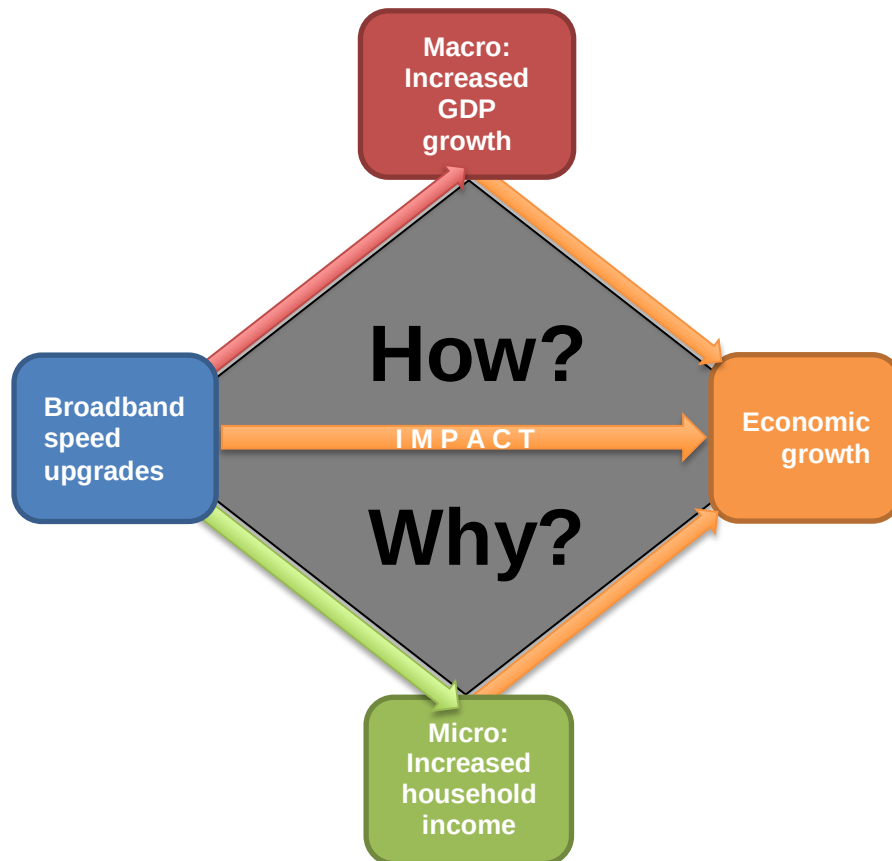


Figure 1 An illustration of the unexplored links and causes in the relationship between broadband speed upgrades and economic growth on both micro and macro level

This study intends to unlock this black box and explain some of the links and mechanisms between broadband speed upgrades and increased GDP / household income, and why there is a *need for speed*.

1.2 Purpose

Since previous studies have statistically found that a higher broadband speed will increase the income at macro economic level (measured by GDP) and micro level measured by household income, the study intends to investigate which factors affect adoption to higher broadband speed.

The purpose of this report is divided into three parts.

- To identify key factors to why upgrades in broadband speed drive economic growth on both micro and macro level, by describing and comparing socio-economic and usage factors characterizing groups of Internet users with different levels of broadband speed.
- To identify which users are willing to upgrade their level of broadband speed, by describing which socio-economic and usage factors that distinguishes these users from the general users. Since increased broadband speed result in economic benefits it is interesting to identify the users with willingness to upgrade.
- To provide for future research by reformulating the findings of this study into hypothesis for future studies.

1.3 Research questions

To be able to achieve the purpose of this thesis, a number of research questions have been formulated, which this report intends to answer:

- Which socio-economic factors characterize the users with a certain level of broadband speed?
- What does the usage look like for users with certain levels of broadband speed?
- How do these characteristics differ between developed and emerging countries?
- Which socio-economic factors characterize the users willing to upgrade their broadband speed?
- What does the usage look like for the different groups with a willingness to upgrade their broadband speed?
- Which similarities and differences can be found when comparing general users with users willing to upgrade their broadband speed?
- How can these findings be reformulated into hypothesis for further research?

1.4 Delimitations

As mentioned earlier, this report will solely focus on broadband speed, which means the capacity subscribed by the users. The focus of the study is to investigate which socio-economic and usage factors that characterize groups of users with different levels of speed, why no respondents without an Internet connection are investigated in the study. We only focus on the speed level, and not on the broadband technique supporting the speed. Therefore, the techniques available are a less investigated area in this thesis. However, they are more thoroughly described in Appendix I.

A number of factors available have been disregarded in this study. To maintain a stringent report, the study has focused on the 12 socio-economic factors and 23 usage factors presented in the method chapter below. The decision of which factors that have been observed is based upon the range of data available, together with conclusions and findings from previous studies, that are presented in the literature study in chapter 4.

The report focuses solely on data from 9 out of 14 countries available. These are: Italy, the UK, Germany, Spain, Sweden, France, India, Brazil and urban China. Furthermore, these are divided into two groups. Five countries (the U.S., Japan, Mexico, Russia and South Africa) have been excluded from the study, due to the divergent characteristics of their markets, and for some countries: the poor quality of the data available. The countries chosen are representative for their respective markets; the data is considered to be fairly homogenous and not too broad.

2. Methodology and data analysis

In the following chapter, the methodology and data analysis of the study is presented. The first part describes the selection and handling of the data, such as the choices of socio-economic and usage variables, and the groupings and segmentation of the countries, speed levels and willingness to upgrade. This is followed by the methodology of the literature study and the primary and secondary analysis. Last, but not least, the chapter ends with an evaluation of the data selection, data handling, and methodology.

The descriptive analysis provided in this thesis is based on a survey carried out in 2010 by Ericsson Consumer Labs. The scope of the survey was 22 274 households from 14 countries: UK, France, Germany, Italy, Spain, Sweden, China (Urban), Japan, Brazil, US, India, Russia, Mexico and South Africa. The study conducted is a quantitative descriptive analysis of socio-economic and usage factors characterizing groups of users with different broadband speed, and different willingness to upgrade.

The report follow the structure presented in the flow chart below (figure 2). All parts of the flow chart is described closer in this methodology chapter.

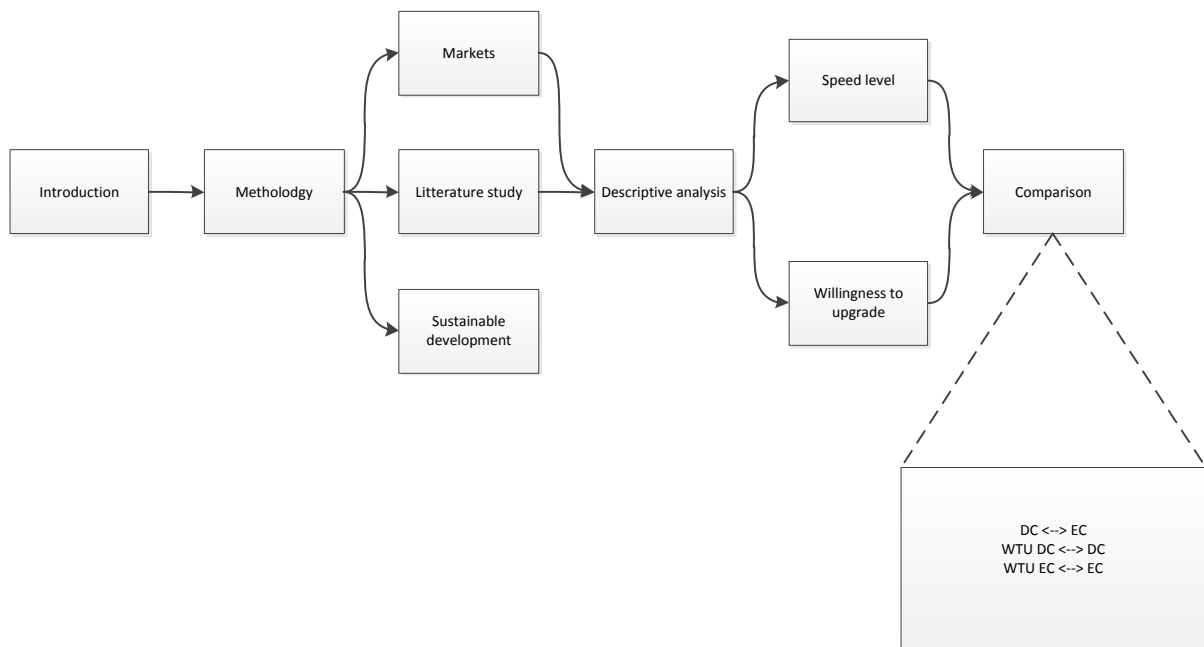


Figure 2 Flow chart for the structure of the report

2.1 Data selection

The questionnaire designed and used by Ericsson Consumer Labs to gather the data consists of 109 questions, and the objective of the questionnaire was to “collect information about peoples’ attitudes to and usage of communications”. The questionnaire was therefore not designed for the purpose of this study. But from this data, the information needed for this study was collected: speed of the fixed Internet connection at home, willingness to upgrade the speed of the Internet connection in the household within the next 12 months, socio-economic factors and usage of internet services. These parts of the questionnaire are presented in Appendix II.

The decision of which socio-economic factors to observe was based on conclusions presented in the literature study found in chapter 4, as well as the range of socio-economic data available from the survey. The chosen socio-economic factors are presented in table 1.

Table 1 Socio-economic variables of Interest

Socio-economic variables
Gender
Age
Marital status
Town size
Number of people with income in household
Working status
Management role
Level of Education
Household Size
Level of Income
Living Situation
Current type of Residence

When regarding the usage variables, nine variables available were excluded from the study: *visiting web communities, reading web versions of printed newspapers, window shopping, sharing personal photos, uploading and store content for personal use or sharing with others, reading and writing blogs*. This since the information provided from these variables were not consider to add any value that could not be obtained by observing other factors.

To facilitate the handling and presenting of the usage data, the factors were segmented. The segmentation was done by identifying different similarities of the certain usage factors, with respect to characteristics and how demanding the usage is, with respect to capacity. The reason for this is to easier be able to describe the usage patterns, since the factors in the same segment are expected to show similar behaviour. The 23 usage variables and their corresponding segmentation are presented in table 2.

Table 2 Usage variables and their corresponding segmentation

Usage variables	
Personal usage	Personal e-mails
	Instant messaging/chat for personal reasons
	Browsing the Internet for personal reasons
Work usage	Work/Business related e-mails
	Instant messaging/chat for work related reasons
	Browsing the Internet for work related reasons
	Apply and look for job opportunities
Information	Search for health or medical related information
	Search for educational information
	Access news or other up-to-the minute information
	Search for information
Services	Internet banking
	Purchasing physical objects over the Internet
	Using IP-telephony
Entertainment	Play online games
	View, listen or subscribe to podcasts
	Stream music from the Internet
	Stream movies from the Internet
	Listen to online radio
Downloading	Purchasing music
	Purchasing movies
	Downloading (for free) music
	Downloading (for free) movies

When answering the questions regarding usage of Internet services, the respondents had ten (10) possible ways of responding, depending on how often they used different Internet services. The data from the respondents who had chosen the alternative “Don’t know” was excluded from the handling of the data, since the information given from this category not contained any valuable information. To facilitate the handling of the data, the nine (9) remaining response options were bundled together according to table 3.

Table 3 Bundling of different response options regarding usage of Internet services

Daily	More than 3 hours per day
	1-3 hours per day
	Less than 1 hour per day, but daily
Weekly	Several times a week
	Once a week
Monthly	Several times a month
	Once a month
Less often	Less often
	Never
Excluded	<i>Don't know</i>

2.2 Group formation of countries

From the countries that are represented in the Ericsson Consumer Lab survey, two groupings were formed; (1) developed countries and (2) emerging countries. Group one (1) was made out of United Kingdom (UK), France, Germany, Italy, Spain and Sweden, whilst group two (2) contains of Brazil, India, and China (Urban). The results from the US, Japan, Mexico, Russia and South Africa were excluded, due to the specific characteristics of these markets, which significantly differs from the others regions observed. An important factor to consider is that the group of developed countries only consist of European countries. The two different groups of countries and the corresponding frequency of responses are presented in table 4.

Table 4 Country groupings

Group	Country	Number of respondents
Developed countries	United Kingdom (UK)	2 001
	France	2 026
	Germany	2 019
	Italy	2 040
	Spain	2 026
	Sweden	2 003
	Total	12 115
Emerging countries	Brazil	1 018
	India	1 000
	China (Urban)	1 014
	Total	3 032
Total: included countries	9 countries	15 147
Excluded	US	2 013
	Japan	2 046
	Mexico	1 007
	Russia	1 058
	South Africa	1 003
Total: excluded countries	5 countries	7 127
Total	14 countries	22 274

2.3 Group formation of levels of speed

When answering the questions regarding which speed the respondents had on their fixed Internet connection at home, the respondents were given eleven (11) possible options. The data from the respondents who had chosen the alternative “Don’t know” was excluded from the handling of the data, since the information given from that category not contained any valuable information. To facilitate the handling of the data, the ten (10) remaining response options were divided into four (4) different groups of level of speed. The purpose of this division was to form four approximately equally large groups, whilst also maintaining similar speed characteristics. The groupings are presented in table 5.

Table 5 Groupings of speed levels

Group	Level of speed	Number of respondents
Low (<1024 kbit/s)	Up to 256 Kbit/s	582
	Up to 512 Kbit/s	819
	Up to 1024 Kbit/s	816
	Total	2217
Medium-Low (1024 kbit/s <= 4 Mbit/s)	Up to 2 Mbit/s	1528
	Up to 4 Mbit/s	1184
	Total	2712
Medium-High (4 Mbit/s <= 12 Mbit/s)	Up to 8 Mbit/s	2392
	Up to 12 Mbit/s	911
	Total	2712
High (>12 Mbit/s)	Up to 24 Mbit/s	889
	Up to 50 Mbit/s	212
	50 Mbit/s or higher	596
	Total	1697
Excluded	<i>Don't know</i>	-
Total	X countries	9930

2.4 Data selection of the willingness to upgrade (WTU)

When answering the questions regarding the respondent’s “*willingness to upgrade the speed of their Internet connection within the next 12 months*”, the respondents had seven (7) options, depending on which level of interest they had to upgrade their speed. The options are presented in table 6.

Table 6 Selectable option of Willingness to Upgrade

1. Not interested at all
2.
3.
4. May or may not be interested
5.
6.
7. Very interested

This report only intends to describe and analyse those respondents who have a willingness to upgrade. Therefore, only responses from those who have chosen option 5 or higher (5, 6 or 7) have been included in the analysis of the willingness to upgrade. The willingness to upgrade will sometimes be referred to as “WTU”.

2.5 Methodology for the literature study

The first step of the methodology was to conduct a literature study, in which previous studies concerning ICT and broadband were systematically mapped. The literature reviewed was divided into two groups: macro and micro, based on the perspective of the paper. The purpose of the mapping is to identify certain variables of interest, while also identifying a gap among the previous studies, which this thesis intends to fill. The result from the literature review was summarized in a table found in the end of chapter 4, where the level of analysis, thesis framework, variable of interests and findings are mapped in a systematic way for the literature reviewed. The literature review was supplemented with the market development section in chapter 3 and the sustainable development section in chapter 5. These chapters intend to give the reader a deeper understanding for the broadband development the different countries have gone through, and how the broadband technology is a potential part of the solution to the challenges they face today.

2.6 Methodology for the descriptive analysis

To be able to quantitatively describe the different groupings of speed with respect to the socio-economic and usage factors, a primary analysis was conducted, where the data was processed according to the following model (figure 1):

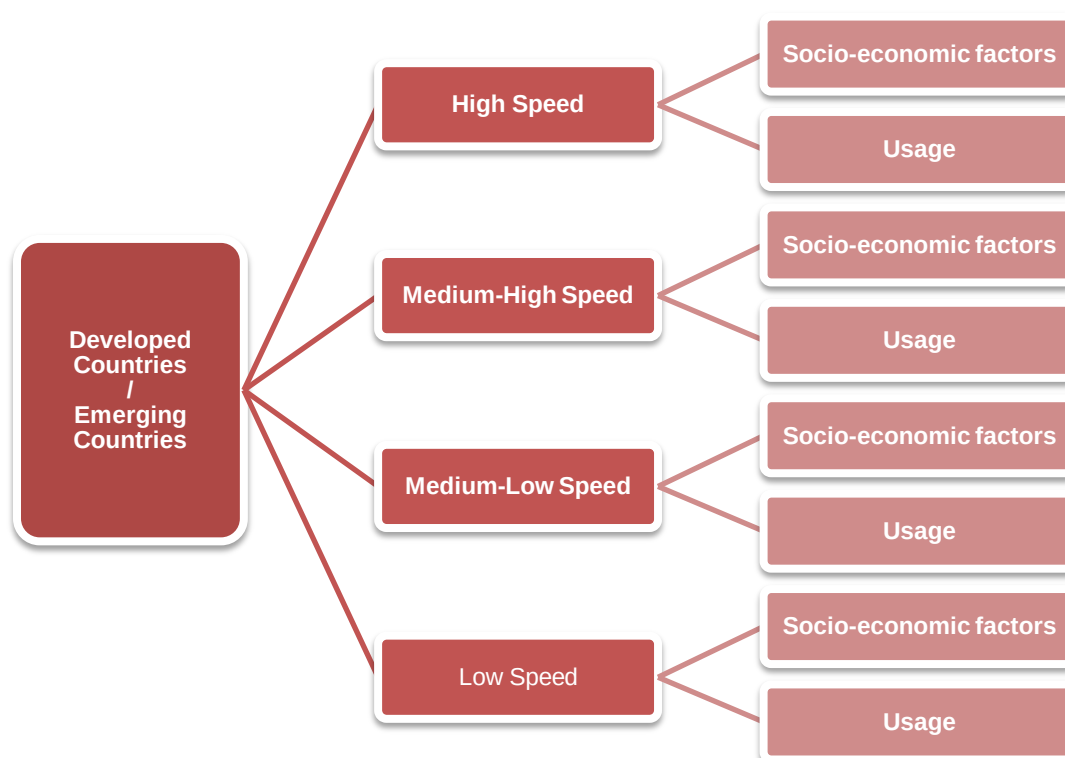


Figure 3 Process of the primary descriptive analysis

All data was first sorted by country, then by level of speed, creating the selection desired. Then, this selection was described by socio-economic factors and how the group uses the Internet. The results were produced using SPSS and Excel, and are presented in chapter 6. The result is presented in chapters by category of country (developed/emerging), by type of factor (socio-economic/usage) and finally factor-by-factor. The observations made of the differences and similarities of the results between the different levels of speed are discussed next to the factor observed. The conclusions for the different categories of countries and type of factors were summarized, and can be found in the end of each section.

In the secondary analysis, the groups with a willingness to upgrade (WTU) are described. This is done in the same fashion as the primary analysis (see figure 2). All data was first sorted by country, then by level of speed, and then the responses with a willingness to upgrade that was 4 or lower were sorted out and removed, to be able to create the desired selection.

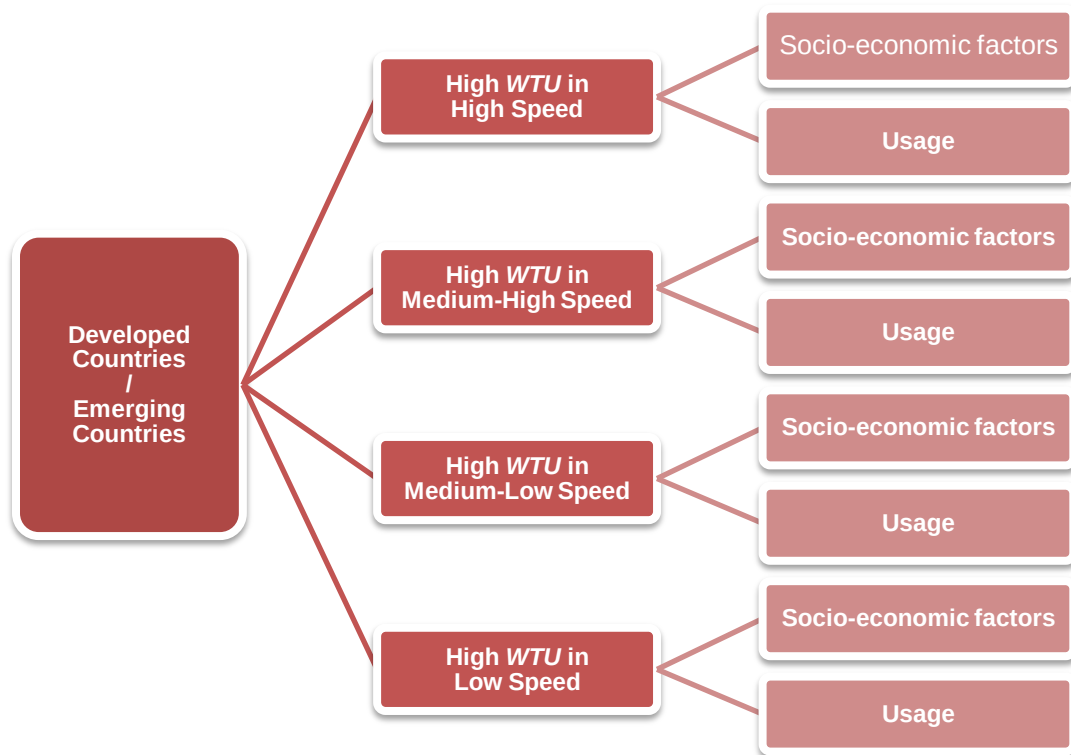


Figure 4 Process of the secondary descriptive analysis

As in the primary analysis, the chosen selection of data was described by socio-economic factors and by how the group uses the Internet. The result is presented in the same way as the primary analysis, but the comparisons made are between the users with willingness to the corresponding selection from the primary analysis is thus used as a reference group. From here on, we will refer to this reference group as the general users. Comparing these two groups makes it possible to identify important factors that affect the willingness to upgrade. As for the primary analysis were the conclusions for the different categories of countries and type of factors summarized, and can be found in the end of each section.

The results from the primary and secondary analysis are compared, discussed and analysed in chapter 8. First, the results from the primary analysis of the developed and emerging countries are compared, in order to find similarities and differences characterizing the different kind of markets. These results are followed by a section in which the general users are compared with the users willing to upgrade their broadband speed. This is done for both the emerging and developed countries, in order to identify factors that affect a users willingness to upgrade. The comparisons are presented in tables in chapter 8, together with brief discussions regarding the observations and findings.

Finally, a section in which the conclusions are presented concludes the thesis.

2.7 Evaluation of data collection and methodology

There are two ways of determining a sample size. The choice of target variable is either the margin of error or the sample size. If the target variable is the margin of error, the sample size is based upon the confidence level (90, 95, 99%), the probability and the desired margin of error. Thus, given the margin of error, the sample size is determined (Cochrane 1977).

$$n = \left(n - \frac{n}{N} \right) \times \frac{t^2(p \times q)}{d^2}$$

n = sample size

t = Z-value

p = probability

$q = 1-p$

d = margin of error

The alternative is to have the sample size as a target variable. In this case, the sample size is determined from start, and the size of the margin of error is the result of the equation (Cochrane 1977). In this study, the choice of target variable was the sample size. Therefore, the margin of error is determined by the sample size.

The representativeness for the data in this study was calculated by Ericsson Consumer Labs from the probability in the formula above. The result below presents, country by country, the quantity of inhabitants with Internet access for which this study's result is applicable.

Table 7 Number of inhabitants with Internet access regarded to be represented by the data (Ericsson Consumer Labs)

Country	Representativeness
1 UK	Online panel population 15-69 years old - 29 million
2 France	Online panel population 15-69 years old - 18 million
3 Germany	Online panel population 15-69 years old - 30 million
4 Italy	Online panel population 15-69 years old - 18 million
5 Spain	Online panel population 15-69 years old - 15 million
6 Sweden	Online panel population 15-69 years old - 5 million
7 Brazil	Online panel population 15-69 years old - 22 million
8 India	Online panel population 15-69 years old - 18 million
9 China - Urban	Online panel population 15-69 years old - 83 million
10 US	Online panel population 15-69 years old - 153 million
11 Japan	Online panel population 15-69 years old - 65 million
12 Mexico	Online panel population 15-69 years old - 6 million
13 Russia	Online panel population 15-69 years old - 19 million
14 South Africa	Online panel population 15-69 years old - 1 million

Since the countries 10-14, (US, Japan, Mexico, Russia and South Africa) are excluded from this study, the representativeness for these countries will not be evaluated. As for the remaining countries, the total amount of individuals (15-69 years old) with Internet access that are considered to be represented in the developed countries adds up to 115 million people, whilst the corresponding number in the emerging countries is 123 million people. The margin of error is below three (3) percent.

However, we consider that the use of an online survey might not well represent the whole population of the study. The choice of survey method might result in a bias of sample towards the respondents who have been familiar with the Internet as the survey was designed as a voluntary self-report survey. This could particularly be a problem for emerging countries, but a less harmful fact for the developed ones, as the penetration rate of broadband has been fairly high.

It is also important to acknowledge that there is a possible discrepancy between a persons stated¹ and revealed² preferences. Since the survey carried out by Ericsson Consumer Labs

¹ Stated preference: i.e. data based on behavioural intentions and responses to hypothetical choice situations (Ben-Akiva 1994)

² Revealed preference: i.e. data describing actual behaviour (Ben-Akiva 1994)

only collects information about the stated preference, there is reason to interpret the results with care.

As for the methodology, there are some aspects to consider. First and foremost, many groupings and segmentations have been conducted in order to facilitate the handling of the data and the presentation of the result. E.g., the countries have been divided into two groups of emerging and developed countries, and the expectation is that the data in each group are fairly homogenous. However, there is a risk that valuable information is lost due to this grouping. The same applies for the groupings of speed levels and the response options for the questions regarding usage of Internet services.

It is important to bear in mind that the respondents that did not know their broadband speed were excluded from the study. This could affect the result, and the conclusions and findings are in fact only applicable when describing broadband users who are aware of their current broadband speed. It seems however reasonable to suppose that these conclusions may be applicable also for the broadband users not aware of their broadband speed.

There are also different ways of approaching the research questions concerning willingness to upgrade. Either, as presented previously in this chapter, or by first describing the different levels of willingness to upgrade by socio-economic and usage factors, and use speed level as an additional variable to consider.

However, when considering the different approaches, the final decision was to conduct the study in the way presented in the methodology, since this allows for a comparison between the data of the ones with willingness to upgrade and the general case.

3. Market

The survey that gathered the broadband data for this study was conducted in 14 countries. In this report these countries are divided into two groups: developed and emerging countries. This chapter aims to describe these two groups in terms of broadband development. Characteristics of each market, how the development is progressing and why developed countries have higher broadband penetration rates and speed levels than emerging countries are described. This is important for understanding the results for each group presented in the descriptive analysis found in chapter 6 and 7.

There is no unified, established definition of which countries and areas that are considered “developed”, “emerging” and “developing” (Investopedia 2013a, United Nations Statistics Division 2012). However the degree of development is usually associated with the level of economic growth and security (Investopedia 2013a). Emerging countries differ from developing in the respect that their economy is progressing faster toward becoming advanced (Investopedia 2013b). When evaluating the level of development, the most common criteria are income per capita or GDP, level of industrialization, general standard of living and the amount of widespread infrastructure. There are also other non-economic factors that are gaining more attention in the evaluation of development, such as education, literacy, health, (Investopedia 2013a) and of course, broadband (OECD 2013b).

3.1 Developed countries

Countries with a high developed economy and advanced economic infrastructure have been able to participate in the development of broadband for a long time. By investing in faster broadband, these nations have gained possibilities to benefit from the Internet and its related services, and consequently achieved a contribution to their social and economic growth (Budde 2011).

Broadband was commercially introduced in the late 1990s. During that time it was primarily the business side of the market that could afford fast Internet services, and it was mainly those who pushed the broadband development forward. Like today, big businesses demanded fast ways of communication and they also had the financial strength to invest in their technological needs. As the advantages of broadband were revealed, it became obvious that consumer markets also could benefit from high speed internet connections, assuming the price was affordable (BT Group 2003). At first, the expenses were too high for most consumers. However, the prices went down as the technology improved and the competition grew among the Internet service providers (Jakob 2010).

Since its introduction, the broadband penetration rate and the average broadband speed level has increased considerably in the developed countries (OECD 2012b). In some areas the development slowed down slightly in 2001 because of the burst of the Internet bubble (Ferguson 2004), but the overall trend has been steadily progressing. In June 2012 the number of broadband subscriptions in OECD, per 100 inhabitants, were 82,6 (26,0 fixed and 56,6 wireless) (OECD 2012d). That is almost four times as many as in the developing countries (Budde 2011).

According to Trkman (2008) there are three underlying factors that drive broadband growth and that can explain differences in broadband development within the European countries of OECD:

- Enablers and means
- Usage of information services
- The ICT sector environment

The variation in progress may largely be influenced by strategic actions, such as economic policies and social activities. Both supply- and demand-side can be influenced. In order to improve the supply, providers of broadband and related services are influenced either with incentives or legislative-/regulative acts. Such actions are:

- Support for development of technological solutions, such as new services, products and infrastructure.
- Economic support, price caps or tax-reductions.
- Legislations and regulations in support of internet businesses and telework.

In order to stimulate the demand-side and speed up the consumer market, customers are influenced by increasing the value of broadband. Either by actions increasing the available, affordable services and products or by improving and encouraging the usage of Internet services (Trkman 2008). Such actions are:

- Technological improvements of internet-supporting devices and equipment with better specifications and lower purchasing costs.
- Innovative concepts for new internet applications and services, such as interactive websites, that require fast internet.
- Improved infrastructure, increased broadband speed levels and decreased subscription costs.
- Increased awareness about how to use the Internet and the benefits that it enables (BT Group 2013).

As mentioned previously in this report, broadband boosts national growth on several areas. Since the genesis of broadband, governments around the world have invested to obtain the coveted benefits. Global and national initiatives can stimulate all factors that drive broadband growth. The developed countries have better opportunities to achieve quick results. In these countries, there are plenty of broadband suppliers and the prices are relatively low. The market is mature and the customers can easily upgrade to a higher broadband speed. The developed countries have functioning infrastructures and a stable access to electricity, which is almost a qualification to establish broadband connections. Almost every household has a telephone line where it is easy to install DSL, which can provide transmission speeds of up to 1 Mbit/s (Shekher 2012).

Today, new fast technologies and generations of broadband are becoming more common (OECD 2013a). Several developed countries have penetration rates above 80 percent (OECD 2010c) and an average advertised download speed of above 50 Mbit/s (OECD 2011a). More than three quarters of OECD-households have access to computer at home (OECD 2012a) and less than 15 percent of companies do not use broadband (OECD 2012b).

Even though the developed countries are ahead of the emerging countries in terms of broadband development, there are a lot of people that still lack broadband connection (Broadband Commission 2010b, OECD 2010c). . There are large groups of people that lack Internet connection or whose speed is very limiting and who therefore cannot utilize the benefits of the Internet. The average speed levels over entire populations are often very low and there is considerable variation between countries (Broadband Commission 2010b, Budde 2011).

The overall expansion of broadband infrastructure in the developed countries is positive but in some countries it has begun to slow down. During the latest years, broadband penetration rates have decreased in a few countries, for example Poland and Iceland in 2012

(OECD 2013a, OECD 2012c). This change may indicate that the market is fully exploited, but it can also be a consequence of other events in the economy (Ferguson 2004). In order to continue the progress of broadband, governments may influence by forming policies and regulations (Budde 2011).

Most developed nations have a national broadband plan, as well as a common plan for the whole OECD, including goals and policies for future broadband development (OECD 2011c). Broadband has become a means of competition, it is a tool to stay economically competitive in the global market (Budde 2011). Since the developed countries of this study are based on a number of European countries, the following paragraphs will investigate the recent progress of Europe.

The European Union considers the mutual benefit of spreading access and upgrading broadband speed across the union, both to raise the standard of living and to keep up with the accelerating global economy (European Commission 2013). In the European Commission there is a ten-year plan called "The Digital Agenda for Europe" (DAE), this agenda can exemplify a deliberate broadband plan. The DAE is a part of a strategy to deliver smart sustainable and inclusive growth; it intends to drive the economy forward and by supporting Europe's citizens and businesses to get the most out of digital technologies. The first key area in this agenda, among several that touch upon broadband speed upgrades, is to create a new and stable broadband regulatory environment (European Commission 2010a, 2012). Some of the DAE goals are to:

- Bring basic broadband to all Europeans by 2013.
- Ensure that all Europeans have access to high internet speeds of above 30 Mbit/s by 2020.
- Make 50 percent or more of European households subscribe to Internet connections above 100 Mbit/s by 2020 (European Commission 2010c).

The European Commission wants to speed up the deployment of high-speed Internet and utilize the benefits of a digital single market for households and businesses (European Commission 2012).

Another organization that has come to drive the broadband market is the Broadband Commission for Digital Development (Broadband Commission 2010a). This organization support new technical choices and strategies for extending broadband networks within the reach of all (Budde 2011). Their aim is similar to the DAE; to accomplish considerable economic and social benefits provided by broadband technology, but the Broadband Commission does this all over the world, at every stage of development (Broadband Commission 2010a). They do not solely investigate the developed countries; they are also making studies of developing countries (Budde 2011). The Broadband Commission were established to promote the deployment of high-speed, high-capacity broadband connections as an essential part of modern infrastructure (Broadband Commission 2010a). They are providing governments and industries with material in order to encourage and inform them about why broadband is important in today's society, ultimately leading to growth in the broadband market (Budde 2011).

This broader approach leads to a different, less developed, part of the world, the emerging countries.

3.2 Emerging countries

Emerging countries, that is, countries with social or business activity in the process of rapid growth and industrialization governments, are realizing that there is a great need for access to high-speed broadband services in order to be economically competitive in the global market.

One of the top priorities in such countries should consequently be the development of broadband infrastructure and services (Mourad & Yardley 2012). The variety of nations that can be seen as emerging countries is wide - from established and wealthy economies like Russia to lower GDP³ economies such as Nigeria (Freidrich 2007). Emerging nations are neither developed nor least developed (Farid-Badran 2007).

In these emerging countries, there are huge opportunities to reach out to and serve one, or maybe even two billion potential users. But it is also a great challenge since most of these people have low incomes and lives in isolated rural areas (Ovum 2012). Providing services to these users will require a different approach and business model compared to deployed users in urban areas. Emerging markets will meet different challenges compared to European markets hence they cannot be completely compared with each other. These very different markets need different broadband plans, setting of targets and technologies. Even the role of governments to support supply and demand will vary in different markets, so it's important to keep in mind that what works in Europe for example might not work for other markets (Mourad & Yardley 2012).

When creating a national broadband plan it is crucial to be aware of factors which hold back the development of the Internet. Some of these factors are low average incomes, which stand in the way for private investments, especially when combined with high prices of computers and broadband offers (Mourad & Yardley 2012). Emerging consumers are paying far more on average than the rest of the world for their broadband connection. In some emerging nations the cost of broadband is three times as high as in mature markets (Ovum 2010). Because of high prices, broadband is beyond the reach for the vast majority of emerging market consumers and remains available only to the highest socioeconomic groups (Ovum 2010). Therefore, suppliers must be able to deliver cost effective services. The government might even, by dramatically lowering prices, stimulate the demand (Freidrich 2007). Other factors that hinder the development of the Internet are the absence of reliable electricity which clearly constrains computer usage, low level of IT literacy, low level of fixed line penetration and lack of political stability (Mourad & Yardley 2012).

It is vital that governments in emerging countries carefully consider which broadband technologies to focus on (Mourad & Yardley 2012). In the emerging countries, wireless technologies will probably remain the key platform for connecting the billions of users to the Internet (Ovum 2012). This is likely because of the limited footprint of the existing copper network and poor quality of services provided over this network, not to mention the high cost of rolling out fixed broadband in rural and isolated areas (Mourad & Yardley 2012).

³ Gross domestic product

4. Literature study

The following chapter is devoted to present some of the findings from previous studies on broadband, from two different perspectives: macro and micro. These findings are used as frame of reference in the comparisons chapter.

Many previous studies on broadband cover penetration, deployment, diffusion, availability and adoption of broadband services from both macro and micro perspectives. Still, few studies conducted explicitly regard speed as a key factor. However, these previous studies list a number of driving factors that could be considered as important factors also for adoption to different levels of broadband speed. In this chapter, these factors are presented from both a macro and a micro perspective. The macro perspective refers to the potential economic gains of broadband to the overall country whereas the micro perspective refers to the different socio-economic and usage factors that help distinguish the adopter from the non-adopter of broadband.

4.1 Macro perspective

The availability of broadband in countries is highly diversified, as many studies have shown. Marcus (2005) finds that among OECD countries the number of inhabitants per 100 with Internet access varies from 15 or more (Korea, Canada, Iceland) to one (1) or below (New Zealand, Ireland, Poland, Czech Republic, Mexico, Slovak Republic, Greece, Turkey). More recent studies by Wallsten (2009) shows, as one could expect, higher penetration level (actual subscribership) for all countries. The interrelationships among the countries are practically the same as before as well. Korea is still in lead with a broadband penetration level of 80 out of 100 inhabitants whilst Greece is still lagging behind, but now at a level of 14 out of 100 inhabitants. The committee for information, computer and communications policy (2011) shows that the coverage, hence the deployment of broadband, is higher. Average across all OECD countries DSL coverage is self-reach 88 out of 100 inhabitants. On average, cable reach 59 percent of the population.

As discussed above there are two different perspectives on broadband; availability (coverage), and actual usage (penetration). Availability is determined by a number of factors since there are many technologies of deploying broadband (DSL, fibre, cable or satellite). US, for example has a widely spread cable network reaching 90 % the population compared to Europe where DSL is more widespread (OECD 2009). Since DSL and cable technology is deployed through existing infrastructure, investments done a long time ago are still visible and noticeable when it comes to broadband availability.

There are studies on the topic why some countries lag while other thrives in penetration rate. According to Brown (2007) political factors are a strong factor in high broadband penetration (actual subscribership). Such political factors may be strong regulation and direct government intervention. The U.S. and Europe markets have lacked intense competition in large because of incumbency and regulation. The U.S. lacks the disruptive competition that helped boost broadband roll-out in Japan and Korea (Brown 2007).

The methods of encouraging development, hence the availability, of broadband differs among OECD countries. South Korea government promotes broadband on both the supply- and demand-side by the establishment of high-speed network (supply) and promotion of demand through public programs (demand). The US broadband market is characterized by strong emphasis of competition aspect of regulation. Even though they invest in universal service, public good characteristics of broadband don't play an important role in the national policies. The underlying characteristics for broadband adoption in Europe are difficult to define due to differences between countries. Overall conclusions are drawn that governmental

strategies should consider both, public good and competition-related, aspects of broadband. (Picot & Wernick 2007)

The benefits of broadband on a macro scale are a widely discussed subject with multiple articles pointing out the benefits of investments. Koutroumpis (2009) finds significant causal positive link between economic growth and broadband penetration. The positive link between broadband and economic growth is confirmed by Badran (2011), Fransman (2006) and Atapatuu (2011) as well. Marcus (2005) goes even further and states that the availability and adoption of high-speed broadband access is a key driver of information and communications technologies capabilities and the overall prosperity and wellbeing of the economy of a developed country. For emerging countries broadband infrastructure is not only important for the economic growth, it is vital for these economies to transform them to knowledge-based economies (Badran 2011).

4.2 Micro perspective

The first studies concerning *the digital divide* of ICT adoption, as the ones in the U.S conducted by the Department of Commerce's National Telecommunications and Information Administration (NTIA) (1995), present different socio-economic factors that affect the access to computers and modem connection. The conclusions in these studies concerning the influence of socio-economic and demographic factors, such as geographical differences, age, income, education and marital status, have served as a basis for further studies of specific ICTs, such as broadband (Stanton 2004). This since it seems reasonable to suppose that these factors would affect broadband subscription decision in the same direction (Rappaport, Kridel, Taylor 2003).

Socio-economic characteristics such as level of education, income and current employment status have a positive correlation with Internet penetration and access rates, whilst age has a negative correlation (Horrigan 2010, Alleman 2003). The same factors play a critical role when comparing factors for adoption and non-adoption (Dwivedi 2007). Penetration rate is also found to be increasing with household size (Alleman 2003).

Demographic matters also affect accessibility to broadband, and there is a stark contrast primarily between urban and suburban households with their rural counterparts (Chaudhuri & Flamm 2007).

There is however obvious difficulties in deciding upon whether a factor has an impact or not, and it is important to bear in mind that differences such as cultural aspects have an impact on the outcome. For example, whilst Dwivedi (2007) claims gender not to be an important factor, Horrigan (2010) does. In the meantime, Horrigan (2010) claims that ethnicity to affect the outcome of broadband adoption, while Weiner (2012) claim broadband adoption to be colour-blind.

Although socio-economic and demographic factors are important, they are not the only once. Internet end-use factors are also found to be important determinants of broadband Internet demand (Rappaport, Kridel, Taylor 2003).

4.3 Speed

As described above there are multiple studies on broadband penetration, deployment, diffusion, availability and adoption. But the importance of broadband can also be investigated by speed. Therefore a new project was initiated and two studies were conducted, on what different levels of broadband speed, hence the capacity subscribed by the user, results in. The first study, *Does broadband speed really matter as a driver of economic growth? Investigating OECD countries*, made by Rohman and Bohlin (2012), focused on the macro perspective: the impact of broadband speed upgrades on economic growth. The second study, *Socioeconomic effects of broadband speed*, made by Ericsson, ADL and Chalmers University

of Technology (2012), adds findings for the micro perspective: the impact of broadband speed upgrades on household income.

The studies are based upon an extensive survey made by Ericsson Consumer Labs. Large quantities of data have been collected during a five-year period. Both studies are carried out by statistical research; they are investigating causality by testing and analysing the collected data with statistical methods.

- On a macro level, data has been collected in 33 OECD countries, and the impact of speed on the GDP growth rate has been studied.
- From a micro perspective, the impact of broadband speed on income level has been investigated, based on data collected from more than 22 000 respondents in 14 OECD and BRIC countries.

This research scientifically confirms that high broadband speed is an important factor to spur economic growth; both for the overall economy and for the individual. To start with, it can be shown that doubling of the broadband speed for an economy increases GDP growth by 0,3 percent (Rohman & Bohlin 2012). The research also confirms that the benefits from broadband are nonlinear and stepwise. For a broadband speed upgrade from 4 to 8 Mbit/s the average increase in household income is 120 USD per month in OECD countries. In BRIC households upgrading from 0,5 to 4 Mbit/s increased the income with 46 USD per month. It can be shown that households in advanced economies assimilate more of the benefits derived from broadband upgrades, then developing economies (ADL & Chalmers 2012).

Some of the drivers of household income, believed to be linked to high broadband speed, are that high broadband speed allows for higher personal productivity and more flexible work arrangements. According to this study, upgrading the speed also makes people more well-educated and socially and culturally enriched, which eventually could lead to a faster career path (ADL & Chalmers 2012).

The results of the studies have been confirmed by statistical methods. However, these studies do not examine the mechanisms causing the relationship between broadband speed upgrades and increased GDP/household income. They do not investigate how and why broadband speed upgrades lead to economic growth, thus there is still considerable uncertainty about the relation between cause and effect. The later of the two studies identifies a need to further investigate the comparison of broadband usage and type of contents the users experience with. They point out that the full interplay between broadband coverage, broadband speed, benefits and the value of externalities has yet to be modelled (ADL & Chalmers 2012).

4.4 Summary of literature

As previous studies have shown, broadband deployment is under constant development. This is fortunate since studies also have, as seen above, clearly shown the benefits of broadband access on the economic well-being and growth.

Research has also been done on the different socio-economic characteristics of an adopter and a non-adopter of broadband. Age is the only factor that all studies agrees on and unanimously considers to affect ones likelihood to subscribe the same way. The older you are the less likely you are to subscribe. On all the other factors the result differs on which factors that determines subscription and which does not. The data in the studies are sampled from different countries and varies in aspects such as rural or urban and therefore makes the mixed results expected.

Since not only subscription, but also the specific speed makes an impact on both the overall economy and the households incomes, it is interesting to examine what socio-

economic and usage factors that determines different users' broadband speed. This is the aim of this paper.

In the two tables below some of the existing literature on broadband is listed. It is divided into two parts; macro level and micro level literature. The table with the articles and papers concerning macro summarizes the positive effects of broadband on the overall economy of a nation. The table with studies on a micro level summarizes the literature concerning socio-economic and usage factors for broadband subscription.

Table 8 Summary of literature on macro level

#	Title	Author	Level of analysis	Framework	Variable of interest	Findings	Summary
1	The economic impact of broadband on growth: A simultaneous approach.	Koutroumpis, P. (2009)	Multicountry, 22 OECD countries. Macro level	Econometric model	- Broadband penetration - Economic growth	Significant causal positive link between growth and penetration	How broadband infrastructure investments effects economic growth.
2	Understanding international broadband comparison.	Wallsten, Scott (2009)	Multicountry. Focus on US compared to OECD. Macro and micro level.	Analysis of broadband data.	- Macro - Broadband Penetration - Speed - Micro (usage) - Downloading of movies - Online TV - Prices	B-B adoption and speeds continues to increase in all OECD. US is far better than many claim. US download far more than UK, FRA, GER, ITA, CAN, JAP.	Does US lack behind in broadband penetration?
3	Channel Tracking Algorithms for Highly Efficient Wireless Broadband Communications in Rural Areas.	Atapattu, L. (2010)	Australia, rural. Macro level.		Technologies for broadband deployment	Providing internet to the last 10 % is both an engineering and economic challenge.	Rural and large Australia makes delivery of internet difficult. MIMO antenna solves the problem?
4	Measuring broadband's economic impact.	Lehr W-H. et. Al. (2005)	US. Macro level.	Analysis of broadband data.	- Employment - Number of businesses	Broadband positively affects economic activity such as: Employment, the number of businesses overall and businesses in It-sector	Comparing communities with mass-market broadband to those without.
5	Building a 21st Century Broadband Superhighway.	Lennett, B. and Meinrath, S. (2009)	US. Macro level.		- Infrastructure investments - Fibre networks	The broadband and telecom infrastructures that facilitate high-speed connectivity can no longer be seen as a luxury but as a critical element.	Reasons for and how to expand the US broadband infrastructure.

#	Title	Author	Level of analysis	Framework	• Variable of interest	Findings	Summary
6	Broadband adoption in Europe.	Marcus, J.S (2005)	Europe. Macro level.		- Broadband availability and adoption - Regulator and policy issues	Availability. and adoption of B-B is a key driver of ICT capabilities and the overall prosperity and wellbeing of the economy of a developed nation	Describes the broadband adoption in Europe.
7	The need for speed: impact of internet connectivity on firm productivity.	Grimes, A, et. Al. (2011)	Firm-level.	Micro-survey of firms linked to longitudinal firm financial data	- Broadband adoption - Productivity	Broadband adoption boosts firm productivity by 7-10%.	Determines the impact broadband access has on firm productivity
8	Promoting Economic Growth by broadband development in emerging countries: An empirical study.	Badran, F. (2011)	22 emerging countries. Macro level.	Empirical study.	- Broadband adoption - Economic growth	Positive link between broadband and economic growth.	Examines the impact of broadband infrastructure on economic growth.
9	Review of: Global broadband battles: why the U.S and Europe lag while Asia leads.	Brown, J. (2007)	U.S, Europe, Asia.	Review of paper written by Fransman, F. (2006)	- Economic growth - Policies and regulations - Infrastructures investments	Broadband positively affects the economic wellbeing of a country.	Describes why U.S and Europe lags behind Asia in terms of broadband penetration and access and the effects of that.
10	Does broadband speed really matter as a driver of economic growth? Investigating OECD countries.	Rohman, I-K. and Bohlin, E. (2012)	33 OECD countries. Macro level.	Analysis of data from OECD databases.	- Broadband speed - Economic growth	Doubling the broadband speed for an economy increases GDP growth by 0,3%.	Measures the impact of broadband speed on economic growth.
11	The role of government in broadband access.	Picot, A., Wernick, C. (2007)	US, asia, europe		Macro - Diffusion - Regulation	Governmental strategies should consider both public good and competition related aspects of broadband.	Discuss the role of government in broadband.

Table 9 Summary of literature on micro level

#	Title	Author	Level of analysis	Framework	Variable of interest	Findings	Summary
11	An analysis of the determinants of broadband access.	Flamm, K. and Chaudhuri, A. (2007)	US. Micro level.	Analysis of data on the determinants of Internet access.	- Broadband demand - Price - Civil status - Gender - Metropolitan location	Evidence is found that broadband price is indeed a statistically significant driver of broadband demand.	Determines whether price is an important factor for broadband demand.
12	Socio-economic determinants of broadband adoptions.	Dwivedi, Y-K (2007)	UK. Micro level.	Empirical data, survey research.	Socio-economic factors: - Age - education, - occupation, - gender	Socio economic factors that matters: Age, education, occupation Factors that doesn't matter: Gender	Examines socio-economic variables to explain differences between adopters and non-adopters of broadband
13	Investigating Factors Influencing adoption of broadband in the households.	Choudrie, J. and Dwivedi, Y.K. (2006)	UK. Micro level.	Empirical investigation. Mail survey. 172 households.	- Speed - Usage - Costs - Household	Adoption is driven by faster access, utility outcomes, such as the uses of broadband for work, and hedonic outcomes such as entertainment.	Investigation of the attitudinal and control factors influencing broadcast adoption in households.
14	A comparative study to examine the socio-economic characteristics of broadband adopters and non-adopters.	Choudrie, J. and Dwivedi, Y.K. (2006)	UK. Micro level.	Comparative study	Socio-economic factors: Age, Gender, Education, Income, occupation	Socio-economic characteristics have and imperative role in explaining the adoption of broadband in the household.	Examines the socio-economic characteristics of broadband adopters and non-adopters
15	Broadband adoption and use in America.	Horriban, J-B. (2010)	US. Micro level.		Socio-economic factors - Age, education, ethnicity, gender, home location Usage (what is important to them) - Communication, news, file sharing, E-shopping, streaming, E-games.	Education, income level, ethnicity, age, home location and gender matters. Non-adopters are almost 50 % more likely than adopters to say they believe it is too easy for personal info to be stolen online.	Lists plenty of statistics of data about broadband users and what they use internet for. Who uses, who doesn't? Online behaviour. Non-adopters barriers

#	Title	Author	Level of analysis	Framework	• Variable of interest	Findings	Summary
16	Consider the non-adopter: Developing a prediction model for the adoption of household-level broadband access.	Weiner, M-D. et. Al (2012)	US, New Jersey. Micro level (household).	MATH, extended with a moderating control variable.	- Demographics factors - Behavioural factors (lack of inclination, lack of resources, lack of training or skill, fear of technology)	Demographically, colour-blind. Behaviourally, computer use by the household decision-maker matter. Structurally, largest barrier is lack of resources.	Explore the decision process for the household-level adoption of broadband Internet access. What characterises the non-adopter.
17	Measuring sustainable broadband adoption:	Larose, R. et. Al. (2012)	US. Micro level (inner-city residents).		Socio-economic factors - Age - Gender - Income - Education	Only age had a significant negative relationship to broadband adoption.	Explains broadband Internet adoption among inner-city residents.
18	Understanding broadband adoption in rural Australia	Hill, S. and Burgan, B. (2011)	Australia, rural. Micro level.	Analysis of telephone survey	- Adoption behaviour - Consumer behaviour	To make adoption decisions consumers must: See benefits Recognize a need Be able to afford it	Examine broadband adoption in a rural setting.
19	What consumers really do with flat-rate, always on and fast Internet access	Andersson, B. (2002)	Europe. Micro level (household).	Analysis of surveys, interviews and usage-log data.	Socio-economic factors - Age, occupation, income, education - Usage - Time online, internet application usage	Broadband users do not differ in age, occupation, income or education. They make more use of FTP, the web, spend more time online and stream media more.	Investigates the differences between PSTN and broadband internet users.
20	Residential Demand for Broadband Telecommunications and Consumer Access to Unaffiliated Internet Content Providers	Hausman, J., Sidak, J and Singer, H. (2001)	Micro level (household)	Economic analysis and demographic surveys	Socio-economic and demographic factors - Gender, age, income - More time online	Narrowband Internet users interested in broadband are more likely to be male, younger, less wealthy, and spend more time online than those who are not.	Examine the open access debate in the context of cable services and broadband Internet services from an antitrust framework.

#	Title	Author	Level of analysis	Framework	Variable of interest	Findings	Summary
21	The Demand for Broadband: Access, Content and the Value of Time	Rappoport, P., Kridel, D., Taylor, L. (2003)	Ten cities across the U.S. Micro level (household).		Factors distinguishing broadband users from narrowband users • Income • Education • Usage	High-speed access is positively related to income and education, and households with high-speed access are on average heavier users, visit more sites, and spend less time per site on average. Demographic variables such as income and level of education appear to be more correlated with Internet access as such than with type of access. Both socio-economic, demographic and Internet end-use factors are important.	To provide a first step in identifying the factors that cause some households to choose low-speed access to the Internet and other households to choose high-speed access.
22	Residential demand for access to the Internet	Alleman <i>et al.</i> (2003)	20 000 households in 2000	Comparative analysis with NTIA report from 2000 Survey analysis	Broadband penetration rate increases with: • Household size • Income • Education •		
23	Socioeconomic effects of broadband speed	ADL and Chalmers. (2012)	Multi country, 14 OECD and BRIC countries. Micro level (household).	Method based on empirical data from OECD and BRIC.	• Speed • Household income effects	4 to 8 Mbps generates 120 USD per month per household (OECD). 0,5 to 4 Mbps generates 46 USD (BRIC).	Effects of speed upgrades for the household.

5. Sustainable development

The following chapter intends to describe the potential of broadband technology when handling the global challenges of sustainable development. The issue is presented from three different perspectives: social, ecological and economical sustainability.

Improving living standards and livelihoods of people worldwide is one of the greatest challenges humanity is facing today. Meanwhile, there is a need to manage the earth's resources in a way that enables a sustainable society (Bruntland 1987). The role of ICT has been described as "key enablers in every facet of human activity"; going from healthcare and education to energy, transportation, government, entertainment, innovation and enterprise. Perceiving that broadband remains out of reach in many countries; two thirds of the world population are still offline and can't take advantage of possibilities provided by broadband access and high broadband speed (ITU 2008). The development is slow in Africa, much of southern Asia and Latin America. Countries that fail investing in broadband technology are at high risk of being excluded from today's online economy plus next stage of the digital revolution and future internet (Broadband Commission 2012b).

Broadband technology is today a critical element in the growing global economy and has the potential to improve development outcomes around the world (Broadband Commission 2012b). Aside from economic aspects, broadband also allows for a more efficient social development and has the potential to address environmental sustainability challenges (ITU 2012a). Broadband and high broadband speed can in many ways contribute to sustainable development, which is an interaction in three dimensions, namely: social, ecological and economic sustainability. The report will touch upon all these three dimensions since they can all be covered and seems relevant to discuss and analyse.

5.1 Social sustainability

Broadband and high-speed broadband facilitates the flow of information without time differences and provides the ability to communicate and share experiences in real time. Effective communication between people from scattered parts of the world is required in today's global society (ITU 2012a). It is a critical element that can rescue relationships that would otherwise be lost; it also opens up for new acquaintances, as well as better understanding of other cultures.

Communication and cooperation are essential to ensure global sustainable development. Broadband can facilitate communication with developing countries, thus providing a greater opportunity for these countries to influence. The use of mobile broadband has grown rapidly in recent years, as a result of continuous upgrades of broadband speed. This development provides exciting opportunities to inform and educate people around the world, especially in developing countries (ITU 2012a).

Without communication people have a tendency to see to things only from their point of view, instead of seeing the whole system and how different elements interact. Without cooperation there is a risk to fall into the "prisoner's dilemma", which means that individuals only look to their own interests. A narrow approach to life may eventually lead to an unsustainable society. Making a good contribution to maintain a sustainable society requires good knowledge of how the planet works and how people affect their environment. High broadband speed that allows for an efficient flow of information facilitates international cooperation. By working together nations can plan and exploit the planet's resources in a resource-efficient way.

5.2 Ecological sustainability

In recent decades, the environment has received more attention and people have gained a deeper understanding of sustainable development. Sustainability is also becoming more accepted in business and is today more than just a facade. Services connected to broadband can help companies maintaining a sustainable profile (ISSD 2002). These services create incentives for governments and companies to be transparent and take responsibility for their actions, which can prevent future environmental crises (ITU 2012a). A sustainable approach can give companies a competitive advantage, market share and increased shareholder value. New markets are emerging as a result of consumers and large organizations become more environmentally aware. Increased broadband speed is part of this development. New innovations are emerging with the support of well-developed broadband technology (ISSD 2002).

It takes a great deal of commitment from companies to take advantage of new markets. It is not enough to meet the industry standards and environmental regulations (minimum) to obtain commercial advantage; it requires a dedicated environmental focus. Broadband opens up opportunities for companies to understand their customers, which is important in order to be successful at the green consumer market. It is very important to demonstrate credibility to customers, there is otherwise a risk of scepticism if they do not know the reliability of the product / service and company. Consumption is largely governed by emotions and is closely linked to identity. By convincing consumers of the benefits of sustainable options, companies can gain market share and improve margins, leading to increased yields (ISSD 2002).

Investments in broadband infrastructure and broadband-enabled applications and services can help to protect the environment and promote a more efficient use of natural resources (ITU 2012b). New systems built on comprehensive information to help farmers and others to plan and make the most of existing assets. Simple but valuable information can help people managing risks, which in the farmer's case can contribute to a more secure supply of food and water. Increased broadband speed can also contribute to security in the form of simple but effective warning systems. These systems can for example provide information about upcoming storms (Lynn 2012).

5.3 Economic sustainability

Studies show that that increased broadband speed has a positive impact on the economy. Broadband enables more flexible work arrangements and help people to save time. Higher broadband speed leads to increased household incomes and GDP growth, both in OECD and BRIC countries (ADL 2012).

A main reason for poverty is isolation from the rest of the global community. In order to help developing countries out of poverty, it is necessary to invest in broadband, both in availability and speed. If this fails, developing countries risk missing out on the economic and social benefits associated with broadband. Examples of significant opportunities are quick and free health advice and education. These types of services are closely connected to social justice (Lynn 2012).

To maximize the impact of ICTs, policy- makers must come together and formulate common strategies on a converged ICT policy aligned with other policy areas such as energy, health and education. A national broadband strategy can consequently facilitate for cross – sector collaboration. Today a growing number of countries have a national broadband plan, policy or strategy in place; this is crucial when it comes to extend the benefits of broadband. The big task is to leverage broadband in a way that helps accelerate development in areas where it is most needed. The possibilities to take advantage of ICTs for development have never been greater though. Thanks to new mobile apps, innovative usage of the Internet and

the expansion of broadband connectivity to more developing countries, extraordinary opportunities are created for enterprises to link to both national and international value chains, knowledge networks, and markets (Broadband Commission 2012b).

6. Descriptive analysis of the socio-economic and usage factors

The following chapter aims to describe the socio-economic and usage factors that characterises users of different speed levels. It is divided into two sub-chapters namely socio-economic factors and usage factors. Each of these groups are then divided into two additional sub-groups, developed and emerging countries.

This chapter is based on the 2010 years data from the survey carried out by Ericsson Consumer Labs. The graphs and tables presented are derived from the data acquired by them.

The aim of the analysis is to describe the socio-economic characteristics of users of the different broadband categories as well as the usage factors of that specific speed. First, the social aspects will be analysed, followed by the usage. Every speed group will also be summarized in the end of each section. For both the socio-economic section and the usage section there will be two subsections consisting of developed countries and emerging countries.

The different broadband speeds were divided into four groups with about one quarter of the total amount of users from both the emerging and developed markets. Below the four speed-levels are presented.

- Low – Up to 1024kbit/s
- Medium-low – More than 1024kbit/s, up to 4Mbit/s
- Medium-high – More than 4Mbit/s, up to 12Mbit/s
- High – More than 12Mbit/s

For gender and age, the result is presented together with a reference with the result of all respondents. The purpose of this is to facilitate the observations and conclusions.

6.1 Socio-economic factors

The following socio-economic factors are being described in the following next section.

- Gender
- Age groups
- Marital status
- City/town size
- Current type of residence
- Household size
- Level of income
- Working status
- Level of education

6.1.1 Developed countries

Six different countries have been chosen to represent the developed countries: France, Germany, UK, Italy, Spain and Sweden. The frequencies for the different speed groups are presented in table 10 below.

Table 10 Users speed-level distribution for the developed countries

Low	Medium-Low	Medium-High	High
1008	1697	3178	1566

The speed-level group *Medium-high*, with broadband speeds of up to 12 Mbit/s, is the most common in developed countries with about twice the user base compared with the other groups.

6.1.1.1 Gender

Low speed broadband has an almost equal gender distribution with the other being fairly male dominant. When looking at the reference column in figure 5 it is clear that males are overrepresented in the survey. With the lowest speed-level almost being equal it is probable that the gender distribution would be in favour of women had the surveyed population been more equal. The other speed-levels are all slightly more male dominant than the total surveyed population with medium-high broadband speed being the most male dominant.

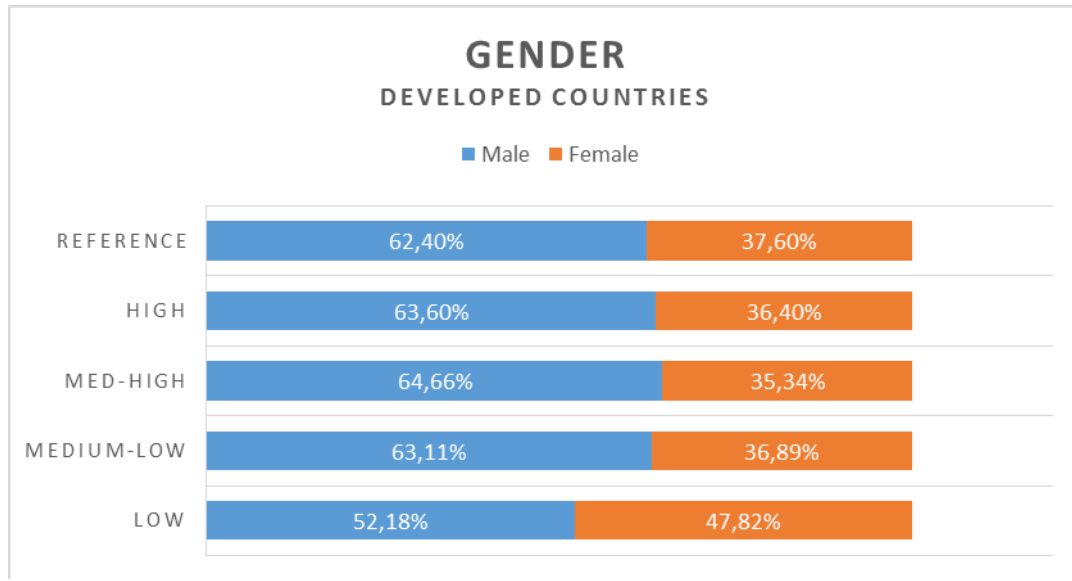


Figure 5 Gender distribution for developed countries

6.1.1.2 Age groups

As seen in figure 6 the different speed levels are all more common in different age-spans when compared to the other speed-levels. Low broadband speed is dominant among the youngest users with age between 15 and 19 as well as slightly more frequent among elderly users. Medium-low broadband speed is more frequently used among people of age 20 to 39 and especially between 22 and 34 years old while being less used among people of age 40 to 54 and the youngest age groups. Users with medium-high broadband speed seem to follow the whole surveyed population's age distribution with slight variations in the different age groups. The fastest speed-level seem to be more common in the age span 35 to 54 while being less used by the oldest and youngest users.

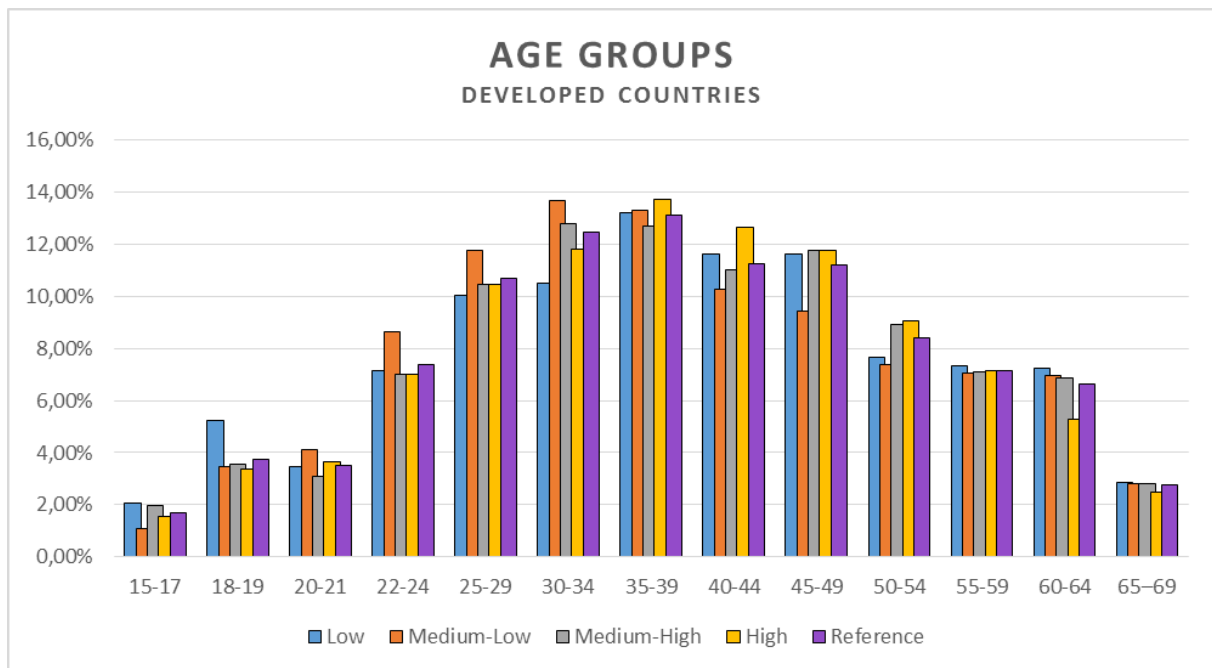


Figure 6 Distribution of age groups in developed countries

6.1.1.3 Marital status

As seen in figure 7, the marital status seems to have little effect on broadband speed. The share of users that are married are of fairly equal size for all speed groups. For the group with middle-low broadband speed the share of users that are single is larger compared to the all other speed levels while high broadband speed has a larger portion of its user base living together with a partner or significant other.

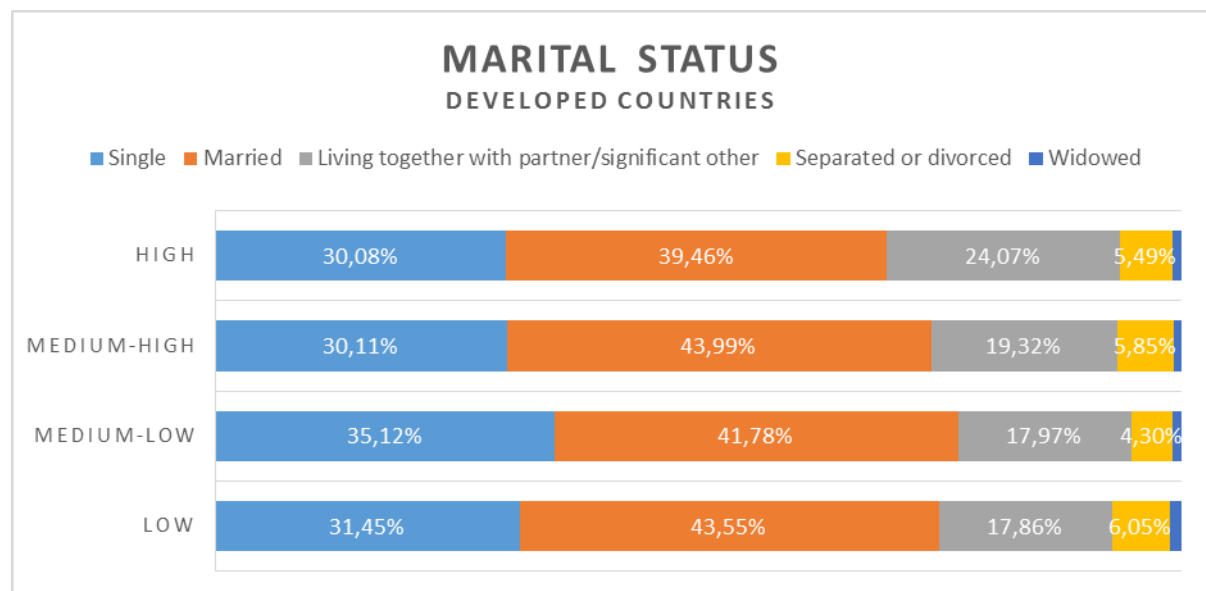


Figure 7 Distribution of marital status in developed countries

6.1.1.4 City/town size

The group with medium-low speed seems to be most common in the medium sized cities. As seen in the diagram in figure 8 the group with high broadband speed is more common in metropolitans or bigger cities whilst the group with low broadband speed being more common in villages and rural areas. Overall the tendency seem to be that the higher speed the user has, the bigger city he or she lives in.

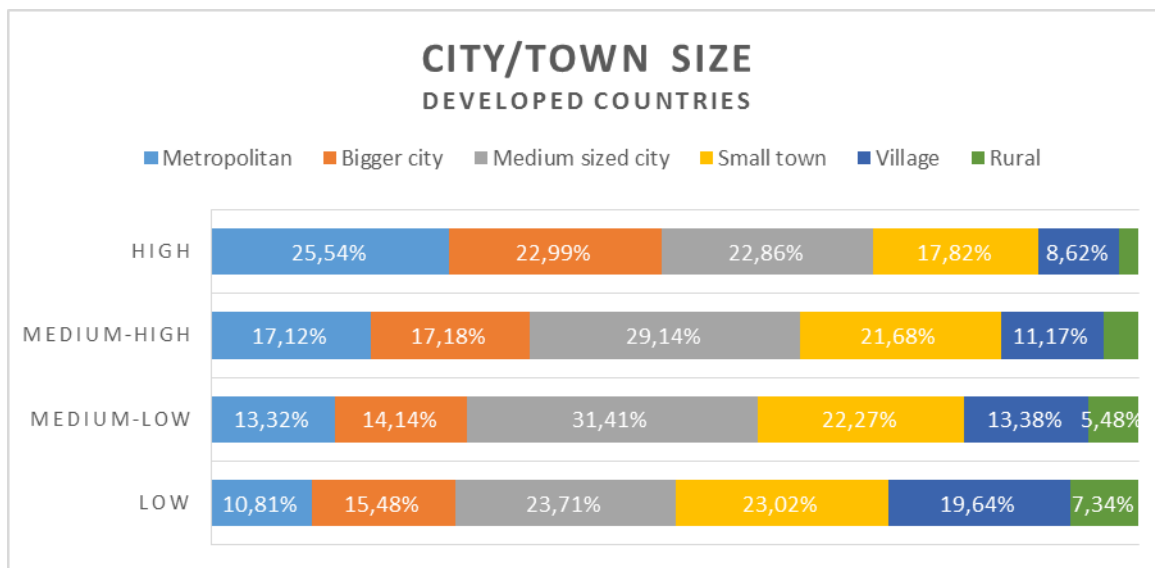


Figure 8 Distribution of city/town size for developed countries

6.1.1.5 Current type of residence

When looking at the users current type of residence presented in figure 9, the group of medium-low and medium-high speed show similar behaviour. For the group with high broadband speed, rented flat is most common, whilst owned house is the most common residence in the low speed group.

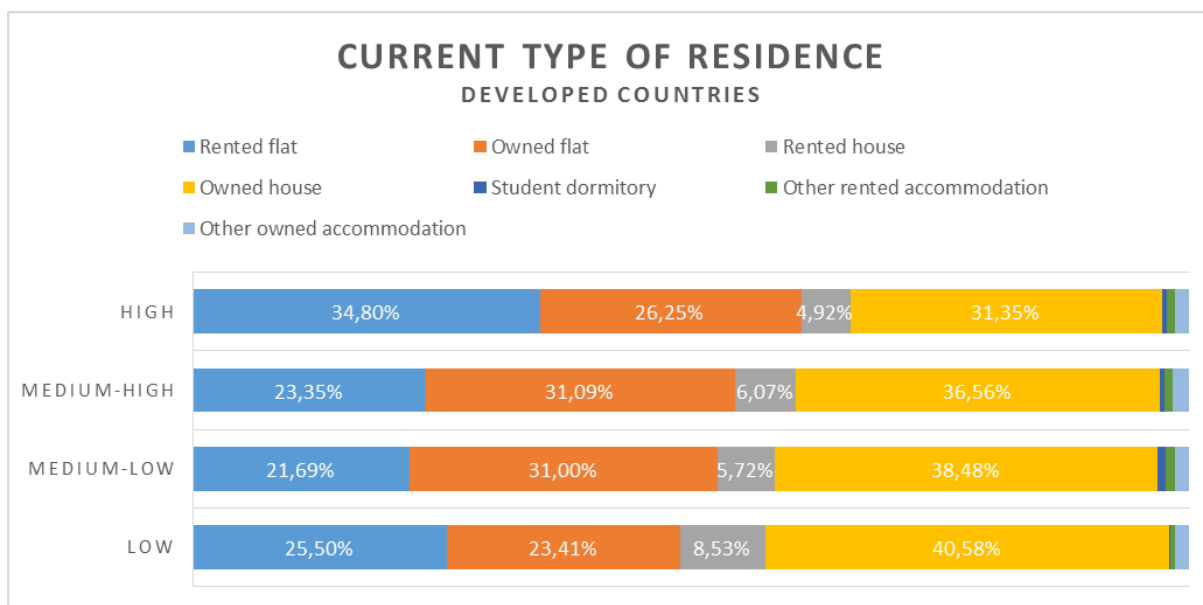


Figure 9 Distribution of current type of residence for developed countries

6.1.1.6 Household size

As seen in the chart presented in figure 10 below, the household size for broadband users with high speed is most common for single-person household as well as being slightly more used in households with two people when compared to the reference column. Medium-low and medium-high broadband speed seem to be most frequent in households with three to four people while being slightly underrepresented in single-person households. The lowest speed-

level is more commonly used in households with two people and households with five to six people.

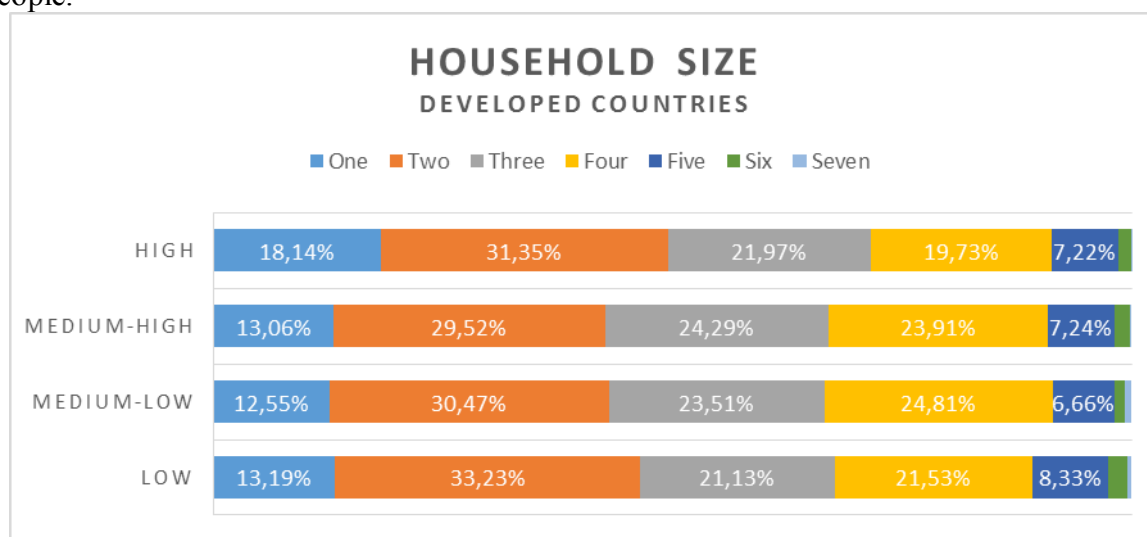


Figure 10 Distribution of household size in developed countries

6.1.1.7 Working status

As seen in figure 12, the degree of employment seems to increase with broadband speed. The users with the highest level of speed are more often being full-time employees while users with low broadband speed more commonly are part-time employees, students, unemployed or retired.

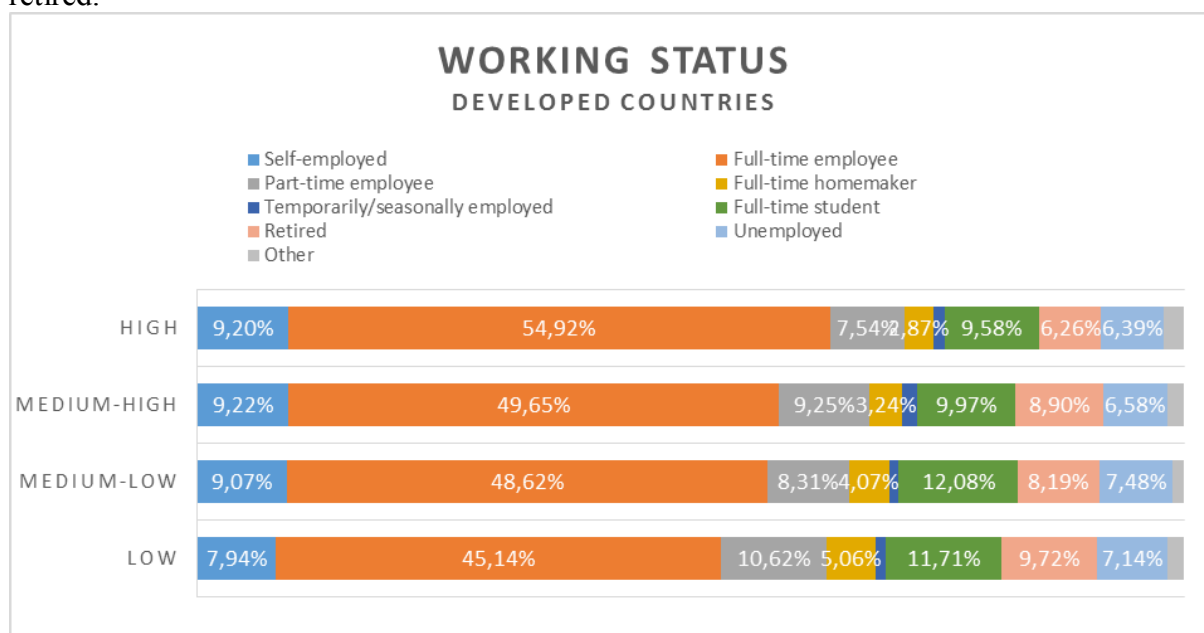


Figure 11 Distribution of working status for developed countries

6.1.1.8 Level of education

As seen in figure 13, the users with low broadband speed generally have a lower level of education than the rest of the speed-levels with fewer users having a high school or college degree. The other speed groups have a fairly similar distribution, with the majority having some form of high school degree as the highest level of education.

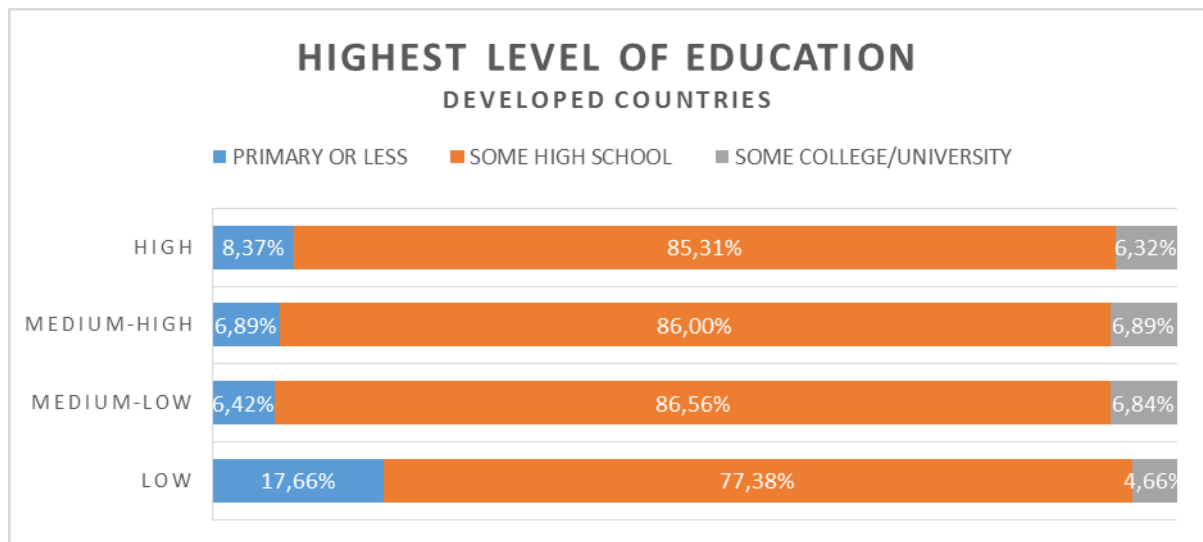


Figure 12 Distribution of highest level of education in developed countries

6.1.1.9 Level of income

As seen in figure 11, income levels in developed countries seem to follow the speed-level, with low and medium-low speed households being overrepresented in the low and medium low income levels while the two higher broadband speed groups more commonly have a higher income level. The difference is most noticeable between the lowest and highest speed-levels where the portion of households with a high level of income and a high broadband speed is more than double that of the low speed broadband. The opposite is true for low level of income.

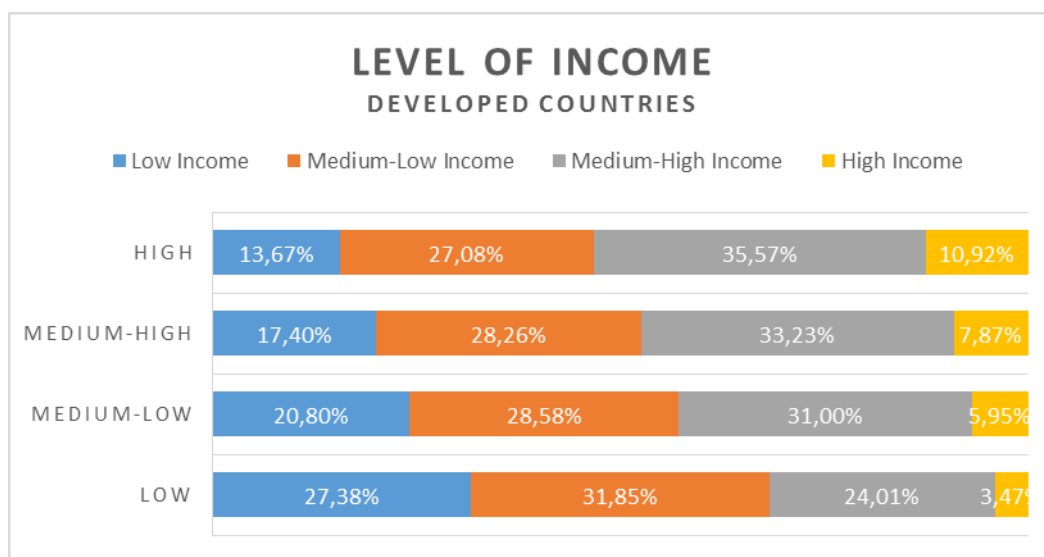


Figure 13 Distribution of level of income for developed countries

6.1.1.10 Summary of speed groups for socio-economic factors in developed countries

In this section, the socio-economic factors for the general users in the developed countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

Low broadband speed is more common among women than the other speed groups and has a higher degree of young users of age 19 or less. The users are more often married compared with the other speed groups as well as being divorced or widowed. At the same time users are less often single or living with a significant other.

The users of low speed broadband are more often living in towns and rural areas while being less common in the cities. The most common type of residence is owned house, in which low speed broadband has the highest degree of users, while being less frequent in flats. The household size is most often two where low speed broadband is more common than the other groups. Low speed broadband is also more common in households with five or more people.

Generally low speed broadband users have a lower level of income when compared with the other speed groups. They are also less often full-time employees or self-employed. The users of low speed broadband have a generally lower level education compared to the other speed levels.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

The group with medium-low broadband speed has almost the same gender distribution as the average of the survey. The group has the highest percentage of users that are between 20 and 34 years old, compared with all other levels of speed. Medium-low broadband speed is more common among singles and has a lower percentage users in other marital statuses compared with other speed levels.

Most medium-low speed users live either in a medium-sized city or a small town. The most common residence type is either an owned flat or an owned house with the most common household size being between two and four.

Most users of medium-low broadband speed have either a medium-low or medium-high level of income with a fairly large portion having low level of income as well. Medium-low broadband users have a lower percentage of users being full-time employees or self-employed compared with higher speed levels, whilst having a biggest share of users who are either students or unemployed. Medium-low broadband speed have the highest level of education with the most users having a high school degree or higher.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

The group with medium-high broadband speed has the most male dominated user base. The user age follows that of the average with small differences in the different age groups, with most surveyed users being 25-49. Users of medium-high speed broadband are more frequently married and separated than other users with different speed levels while having a smaller share users who are single or live with a partner.

Medium-high broadband speed has a higher percentage users living in medium-sized cities and small towns compared to other speed levels. A higher portion of the user base lives in owned flat compared with the other speed levels. Users more usually lives in households with size three to four.

Medium-low broadband speed generally has a higher income level and more users that are full-time employees compared to the lower speed levels while having a lower one when compared to high speed broadband user. Medium-high broadband has the largest portion of its users with a college or university degree.

High broadband speed: More than 12 Mbit/s

Users with high speed broadband are more often male. The speed level has the highest percentage of users between 35 and 54 years old, compared with the other speed levels. Compared to the other speed levels the share of users being either single or married is lower, while a bigger portion is living with a partner.

The group with a high broadband speed has the highest percentage of users who lives in metropolitans and bigger cities. Most users live in rented flats where high speed broadband

has the biggest share of users compared to other speed levels. High speed broadband more commonly lives in single-person households compared to other speed levels.

The group with high broadband speed has the highest percentage of user with medium-high or high level of income, and also the biggest portion being either self- or full-time employed. The group with high broadband speed has a slightly lower percentage of users with high school degree compared to the groups with medium-low and medium-high speed.

6.1.1.11 Summary of socio-economic factors for developed countries

In the table below, the findings of the different socio-economic factors for developed countries are summarized by level of speed.

Table 11 Summary of socio-economic factors, developed countries

Developed Countries	Low	Medium-low	Medium-high	High
Gender	-Most male dominated speed-level	-Male dominated	-Male dominated	-Female dominated
Age groups	-Larger share of users in age span 18-24. -Smaller share of users in age span 25-59.	-Slightly smaller share of users in age span 15-24. -Slightly larger share of users over 24.	- Smaller share of users in age span 15-24. -Larger share of users in age span 25-39, especially in age span 25- 29.	-Larger share of users in age span 25-49, especially in age span 25-29 years old. -Less young and old users.
City/town size	-Largest share of users that are single. -Smallest share of users that are married.	-Large share of users that are single.	-More users that are married than single. -Largest share of users that are living together with partner/significant other.	-Almost as many users that are married as single. -Largest share of users that are married.
Current type of residence	-Largest share of users living in metropolitans -Smaller share of users in other city sizes.	-Slightly larger share of users living in bigger cities, medium cities and small town.	-Largest share of users in villages. -Slightly smaller share of users in most other city/town sizes.	-Largest share of users in bigger cities and small towns. -Smaller share of users in most other city sizes.
Marital Status	-Largest share of users living in rented flats. -Smallest share of users living in owned flats.	-Smallest share of users living in rented flats. -Largest share of users living in owned houses.	-Largest share of users living in owned flats. -Smallest share of users living in owned houses	-Large share of users living in owned flats. -Largest share of users living in student dormitorys.
Household size	-Largest share of users living in households with size four. -Smallest share of users living in households with size three	-Largest share of users living in households with size three. -Smallest share of users living in households with size two. -Smaller share of users living in households with size four.	-Largest share of users living in households with size two. -Larger share of users living in in household with size three. -Smaller share of users living in households with size four.	-Largest share of users that lives in households with size five or greater.
Highest level of education	-Large share of users with high income level. -Large share of users with low income level. -Smallest share of users with medium-high income level.	-Smallest share of users with high income level. -Largest share of users with medium-high income level. -Large share of users with low income level.	-Smaller share of users with low income level compared to lower levels of speed.	-Largest share of users with high income level. -Smallest share of users with low income level.
Working status / Occupation	-Smallest share of users that are full-time employees. -Largest share of users that are full-time students.	-Largest share of users that are full-time employees	-Largest share of users that are self-employed. -Large share of users that are full-time employees.	-Largest share of users that are part-time employees.
Level of income	-Large share of users with college/university as highest level of education.	-Large share of users with high school as highest level of education.	-Large share of users with high school as highest level of education.	-Largest share of users with college/university as highest level of education.

6.1.2 Emerging countries

Three different countries have been chosen to represent the emerging countries: Brazil, India and China (Urban). The frequencies for the different speed groups are presented in table 12 below.

Table 12 Distribution of users in the different speed groups

Low	Medium-Low	Medium-High	High
1209	1015	126	131

The groups with low and medium-low broadband speed is clearly overrepresented for this section, with a frequency almost ten times that of the groups with medium-high and high broadband speed.

6.1.2.1 Gender

The gender distribution between the different speed groups seems to get less male dominated with higher broadband speed. This can be seen in figure 14, where all speed categories are male dominated except the high speed group which, even though the surveyed population being about two thirds male, has higher percentage female users.

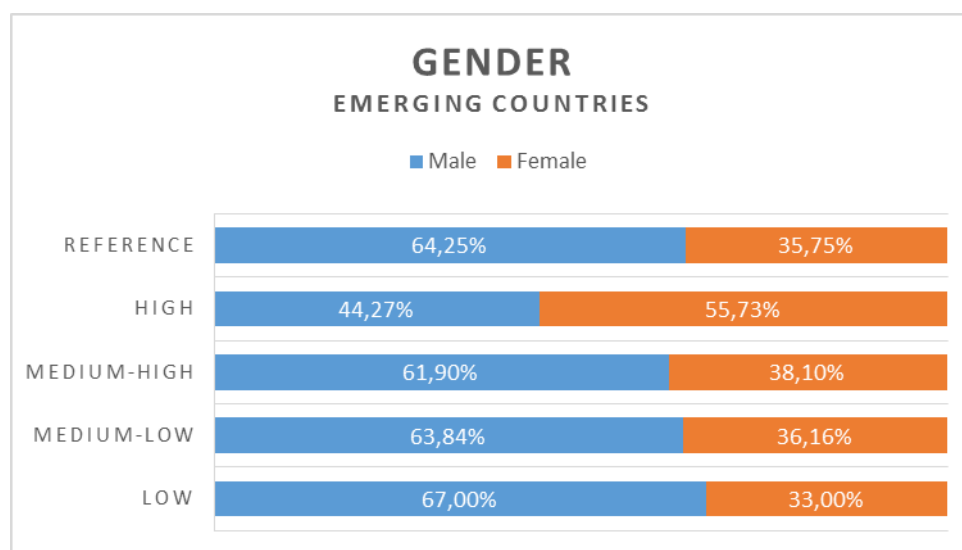


Figure 14 Gender distributions for emerging countries

6.1.2.2 Age

In figure 15 below, the age distribution for emerging countries is presented. Most of the surveyed users in the developing markets are of age 22-29. Low speed broadband has comparably a higher share of young users in the age span of 18 to 24, while having comparably less users of age 30 or higher. The group with medium-low speed have a fairly similar distribution to that of the whole surveyed population, with a slightly smaller user base of age 18 to 24, and marginally more users of age 25 to 54. The group with medium high speed have comparably more users of age 25 to 39 and especially in the age span of 25 to 29. Broadband of medium high speed has slightly more users of age 45 to 59 as well. At the same time the speed level has less young users of age 15 to 24. This is easiest observable for the youngest users of age 15 to 19. High speed broadband has more users of age 25 to 49 with the age span 25-29 having the biggest difference when compared to the distribution for the whole population.

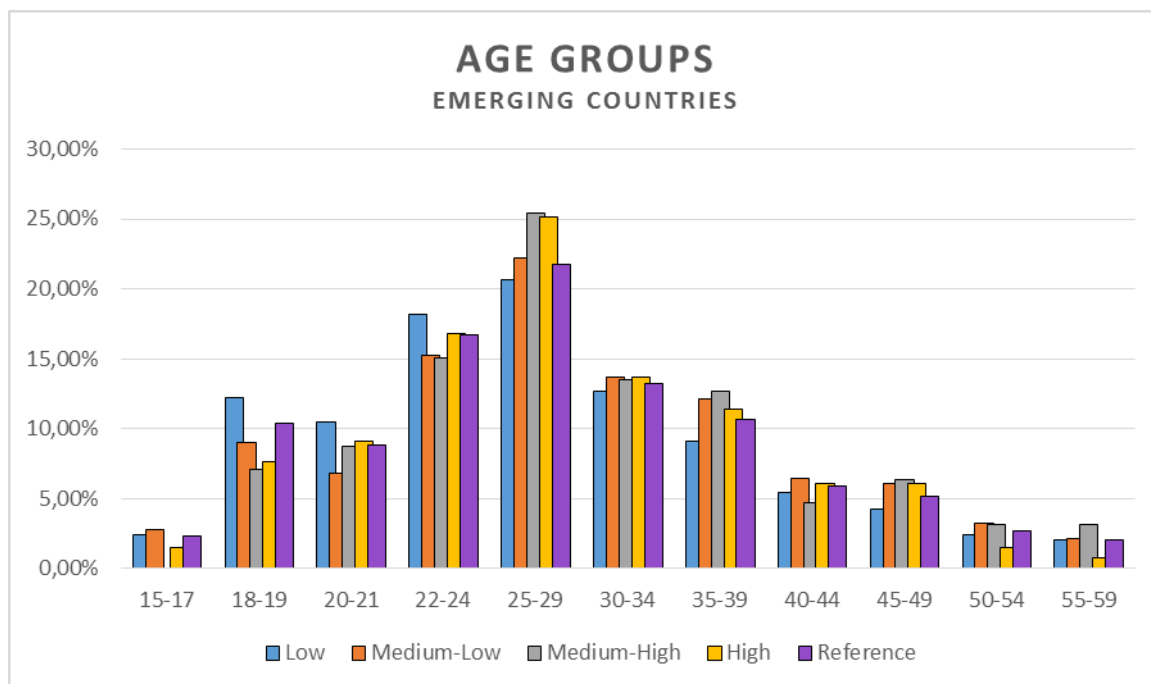


Figure 15 Age group distribution for emerging countries

6.1.2.3 Marital status

Marital status seem to have some association with speed level where the share of users whom are married seem to increase with broadband speed while the share of singles decreases. This holds true for all speed levels except the group with high broadband speed. The group with medium-high broadband speed has the largest share of its user base that lives with a partner or significant other.

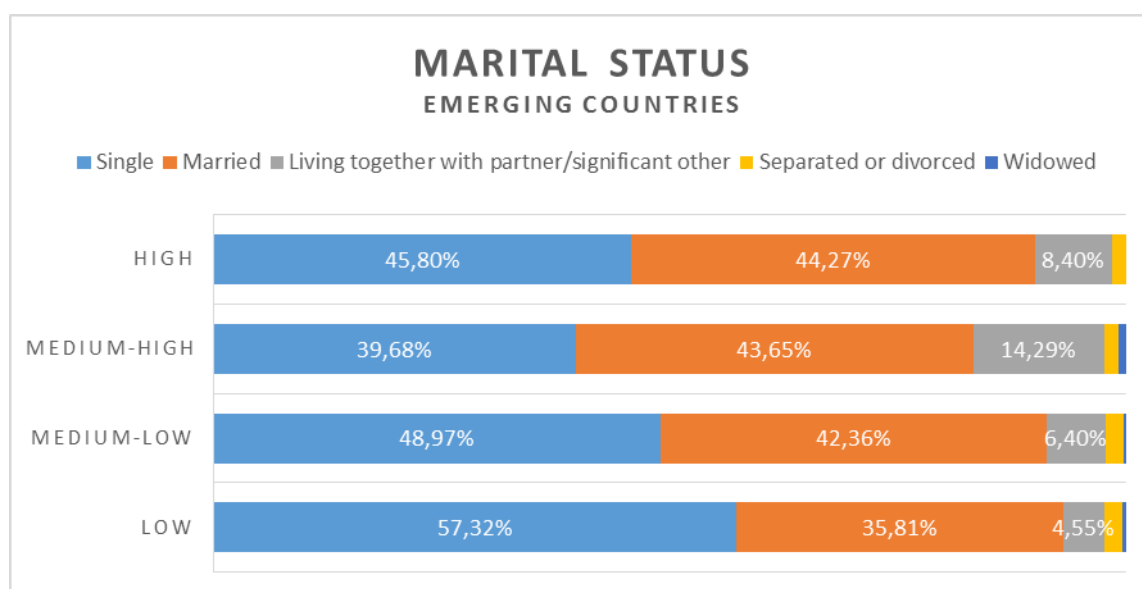


Figure 16 Distribution of marital status for emerging countries

6.1.2.4 Size of city/town

When it comes to city/town size in emerging countries, no real pattern could be associated with broadband speed, as seen in figure 17. The group with low broadband speed has comparably the highest share of users living in metropolitan, whilst the users with high

broadband speed comparably have the highest share living in bigger cities. Overall, the distributions are fairly similar.

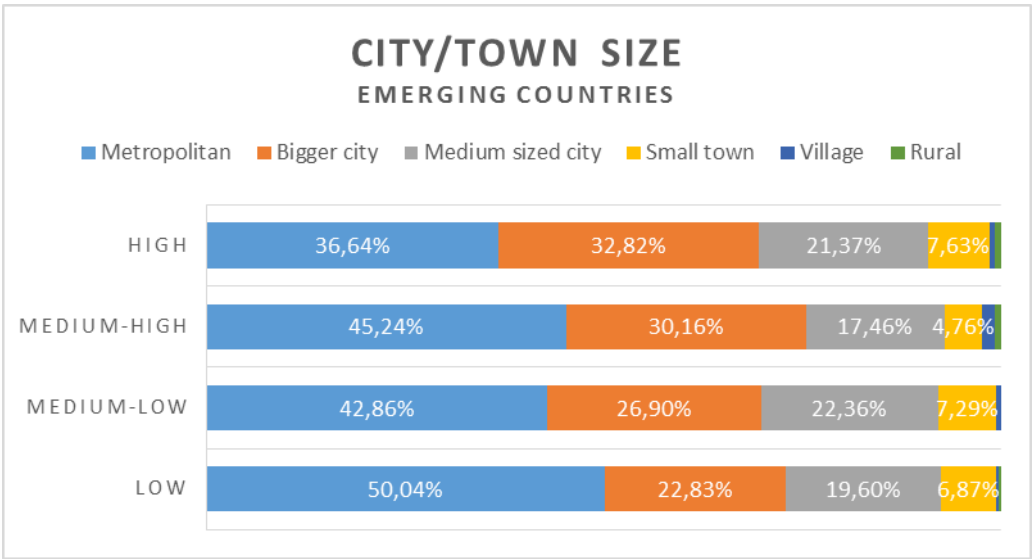


Figure 17 Distribution of city/town size for emerging countries

6.1.2.5 Current type of residence

When looking at the distributions for different type of residences, no real pattern could be associated with broadband speed, as seen in figure 18. The low speed broadband sees the highest percentage user in rented flats. For medium-low broadband speed, it is comparably more common to live in owned houses while being less common to live in rented flats and houses. Users with broadband with medium-high speed are more common in owned flats and rented houses while being less frequently used in other types of residence. High speed broadband is slightly more used in rented flats and student dormitories.

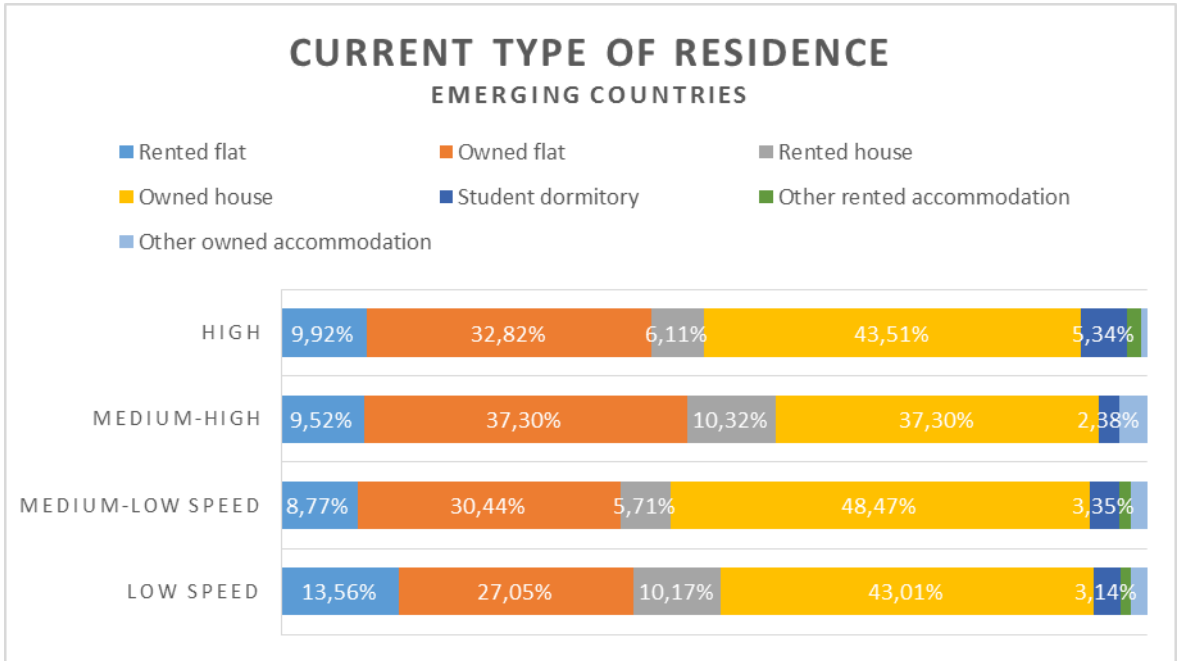


Figure 18 Distribution of current type of residence in emerging countries

6.1.2.6 Household size

As for city/town size and current type of residence, household size in emerging countries show no real pattern associated with speed. This is presented in figure 19 below. A household size of three to four people is the most common in the developing market. The most significant result is that users with medium-high broadband speed have a larger share of users with a household size of two people. It also appears to be more common to have a lower level of speed when living in a single household.

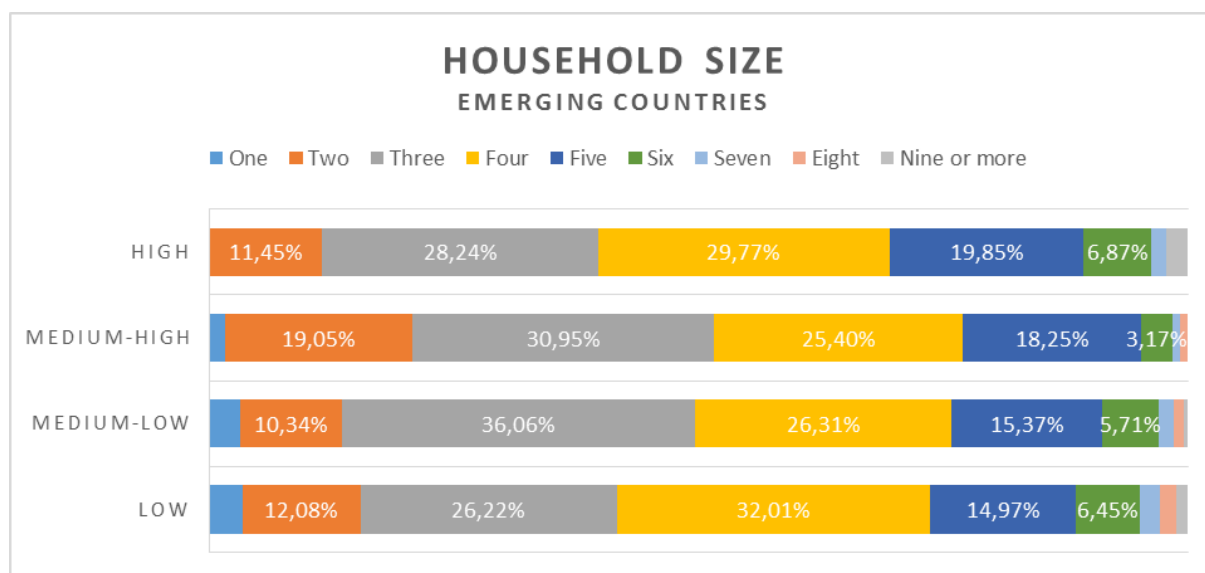


Figure 19 Distribution of household size for emerging countries

6.1.2.7 Level of Income

A high level of income is the most common in the surveyed population. It appears as if the share of users with low income decreases with speed. Users with high speed broadband have the highest proportion of users with medium-low and high income, whilst having the lowest share of users with low income. It seems as if the group of users with medium-low broadband speed has the lowest accumulated level of income. This can be seen in figure 20.

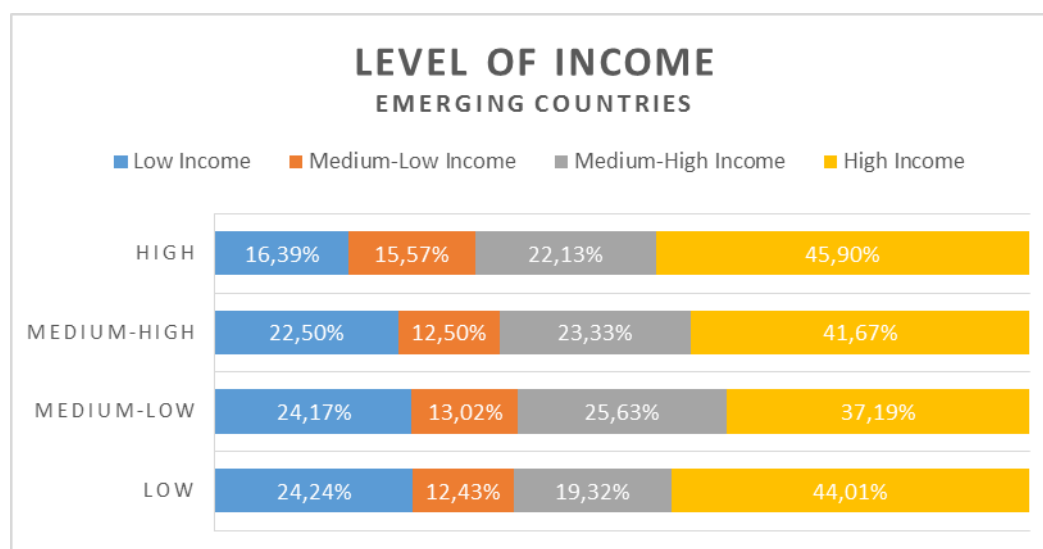


Figure 20 Distribution of level of income for emerging countries

6.1.2.8 Working status

As seen in figure 21, being a full-time employee is the most common in the surveyed population, and is especially common among the users with medium-low broadband speed. Users with low broadband speed have comparably the highest share of students. The group of users with medium-high broadband speed has the highest share of people being self-employed. For the groups with low, medium-low and medium-high speed it seems as if the degree of employment increases with speed.

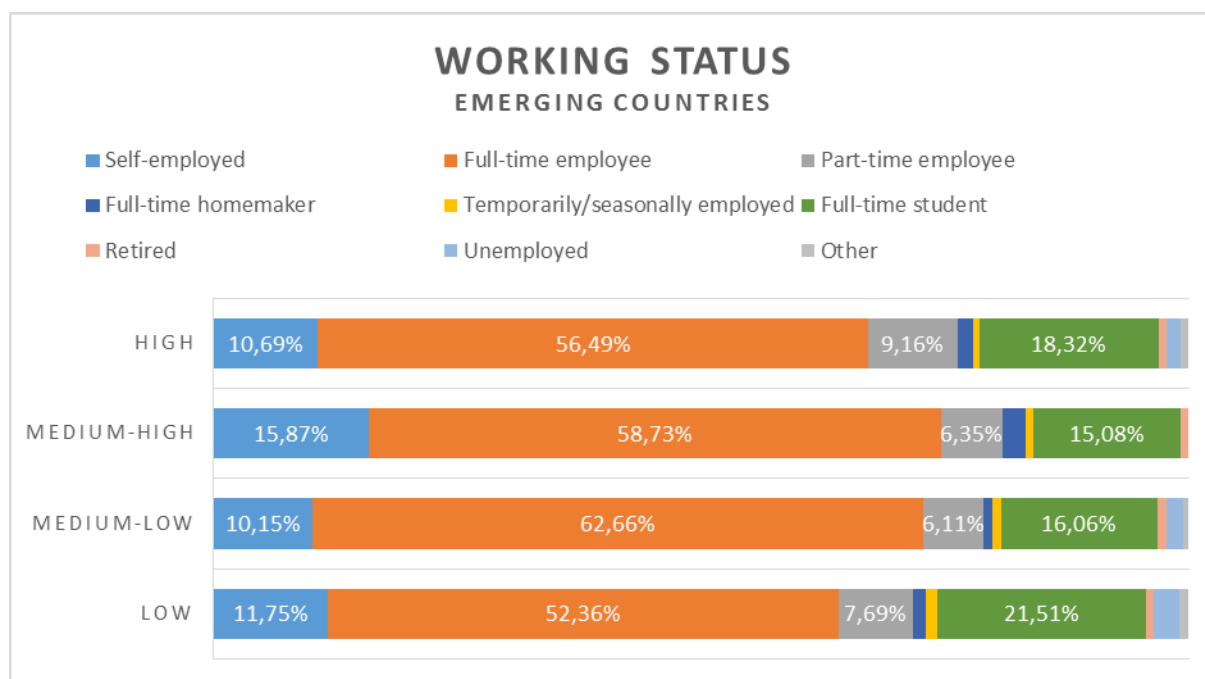


Figure 21 Distribution of working status for emerging countries

6.1.2.9 Level of education

Very few broadband users in the developing markets have a degree of primary or less. The most common level of education is some form of high school degree. Users with high broadband speed have a higher percentage of users with a college/university degree compared to the other speed levels. Medium-low and medium-high broadband speed have about the same distribution with a higher percentage users with a high school degree and lower with a college or university degree. The group of users with low speed broadband has a higher percentage of users with a college or university degree compared to the groups with medium-low or medium-high speed. This is presented in figure 22 below.

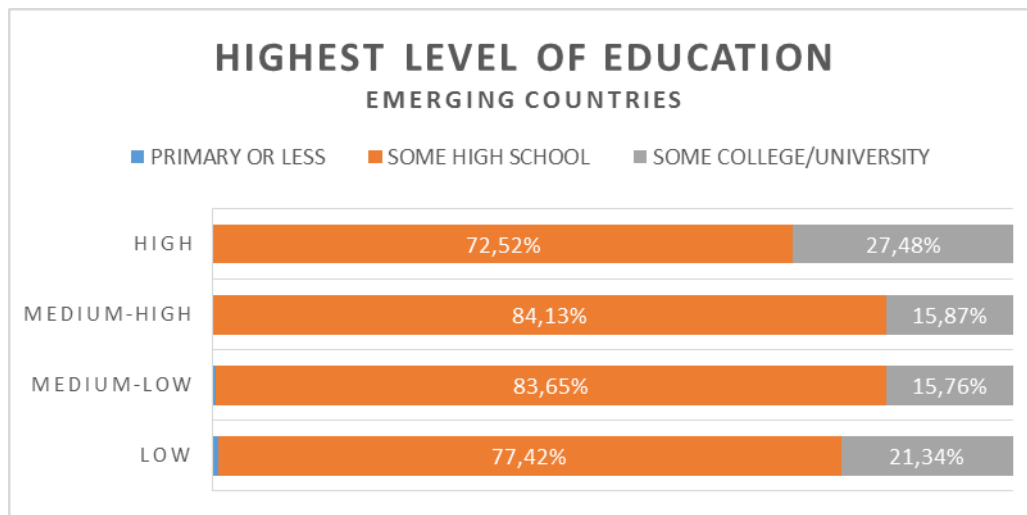


Figure 22 Distribution of highest level of education for emerging countries

6.1.2.10 Summary of speed groups for socio-economic factors in emerging countries

In this section, the socio-economic factors for the general users in the emerging countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

The group of users with low broadband speed is the most male dominated group in the emerging countries. Users with low broadband speed are more commonly of age 18 to 24 and are more often singles compared with the other speed levels.

The group of users with low broadband speed has the largest share of users living in metropolitans compared with the other groups while being less common in smaller city/town sizes. The users in this group live comparably more often in rented flats and rented houses. The group with low broadband speed has the biggest portion out of all speed levels living in households with four people, and is more used in single-person households compared to the two highest speed levels.

Comparably this group has the highest percentage of users with low level of income. The users with low speed has the highest share of users that are students and a comparably high percentage users that are self-employed while it has the smallest part of the users that are full-time employees. A comparably large portion of the users has a college or university degree although it is smaller than for high speed broadband.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

Users with medium-low broadband speed have the same gender distribution as the average for the survey. The broadband speed has comparably more young users of age 17 and lower and between 35 and 54. The share of singles is approximately as large as the ones married or living with significant other.

The group with medium-low broadband speed has a bigger portion of its user base in medium-sized cities and small towns compared with other speed levels. The users more commonly lives in owned houses compared to the other speed levels. The most common household size is three.

Medium-low broadband speed has the biggest portion of users with a medium-high level of income and the smallest with high level of income. The users have the highest percentage of the user base that are full-time employees. A comparably small share of the users has a university or college degree.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

The group of medium-high speed users is small, with a frequency of only 126 respondents. The group is quite equal when considering gender, and there are comparably more users in this group with an age between 25 and 39 and between 45 and 49, when compared with the average. Medium-high speed users more commonly live with a partner while the group has the lowest percentage of users who are single.

It is more common than for the average case to live in bigger cities and in villages, and is comparably less represented in medium-sized and small towns. A bigger portion of the users lives in owned flats and rented houses compared to the average. The group has a bigger share of its user base with a household size of two compared to the other speed levels and also higher percentage of households with five people compared to lower speed levels.

The speed level has a slightly higher portion of its user base with either a medium-high or high level of income when compared to the lower speed levels. Users are more commonly self-employed compared to the other speed levels and also has a bigger portion of users that are full-time employees than low and high broadband speed levels. Medium-high broadband speed has low percentage of users with a college or university degree.

High broadband speed: More than 12 Mbit/s

The group consisting of users with a high speed in emerging countries is small, with a frequency of only 131 respondents. It is dominated by females, and the most common users are between 25 and 49 years old, with a particular high proportion of users between the age of 25 and 29. It is less represented amongst young and old users. The users with high speed broadband are slightly more commonly married.

The users in this group are more commonly living in bigger cities, medium-sized cities and small towns compared with other speed levels. Of the users with a high speed, a slightly higher number of respondents live in rented flats and student dormitories than in other accommodations. High speed broadband is relatively more common in student dormitories and owned flats compared to the average for the speed levels. A comparably big portion of the users lives in households with four to six people.

High speed broadband has the largest portion of users with a high level of income and the smallest with a low level of income while it has a lower percentage of users that are full-time employees compared to most other speed levels. High speed broadband has the highest percentage of users with a college or university degree.

6.1.2.11 Summary of socio-economic factors for emerging countries

In the table below, the findings of the different socio-economic factors for emerging countries are summarized by level of speed.

Table 13 Summary of socio-economic factors for emerging countries

Developing countries	Low	Medium low	Medium high	High
Gender	-Most male dominated speed-level	-Male dominated	-Male dominated	-Female dominated
Age groups	-Larger share of users in age span 18-24. -Smaller share of users in age span 25-59.	-Slightly smaller share of users in age span 15-24. -Slightly larger share of users over 24.	- Smaller share of users in age span 15-24. -Larger share of users in age span 25-39, especially in age span 25-29.	-Larger share of users in age span 25-49, especially in age span 25-29 years old. -Less young and old users.
Marital status	-Largest share of users that are single. -Smallest share of users that are married.	-Large share of users that are single.	-More users that are married than single. -Largest share of users that are living together with partner/significant other.	-Almost as many users that are married as single. -Largest share of users that are married.
City/town size	-Largest share of users living in metropolitans -Smaller share of users in other city sizes.	-Slightly larger share of users living in bigger cities, medium cities and small town.	-Largest share of users in villages. -Slightly smaller share of users in most other city/town sizes.	-Largest share of users in bigger cities and small towns. -Smaller share of users in most other city sizes.
Current type of residence	-Largest share of users living in rented flats. -Smallest share of users living in owned flats.	-Smallest share of users living in rented flats. -Largest share of users living in owned houses.	-Largest share of users living in owned flats. -Smallest share of users living in owned houses	-Large share of users living in owned flats. -Largest share of users living in student dormitories.
Household size	-Largest share of users living in households with size four. -Smallest share of users living in households with size three	-Largest share of users living in households with size three. -Smallest share of users living in households with size two. -Smaller share of users living in households with size four.	-Largest share of users living in households with size two. -Larger share of users living in in household with size three. -Smaller share of users living in households with size four.	-Largest share of users that lives in households with size five or greater.
Level of income	-Large share of users with high income level. -Large share of users with low income level. -Smallest share of users with medium-high income level.	-Smallest share of users with high income level. -Largest share of users with medium-high income level. -Large share of users with low income level.	-Smaller share of users with low income level compared to lower levels of speed.	-Largest share of users with high income level. -Smallest share of users with low income level.
Working status / Occupation	-Smallest share of users that are full-time employees. -Largest share of users that are full-time students.	-Largest share of users that are full-time employees	-Largest share of users that are self-employed. -Large share of users that are full-time employees.	-Largest share of users that are part-time employees.
Highest level of education	-Large share of users with college/university as highest level of education	-Large share of users with high school as highest level of education.	-Large share of users with high school as highest level of education.	-Largest share of users with college/university as highest level of education.

6.2 Usage factors

From the survey data, answers from 23 questions about the Internet usage have been summarized for both the developed and the emerging countries. These questions have been segmented into six different segments, where each and every one of the different speed groups will be described and presented.

- Personal usage
 - E-mail
 - Instant messaging or chat
 - Browsing the internet
- Work usage
 - E-mail
 - Instant messaging or chat
 - Browsing the internet
 - Apply and look for job opportunities
- Information use
 - Medical or health related searches
 - Search for educational information
 - Access news or other up-to-the-minute information
 - Search for information, without content specification
- Services
 - Internet banking
 - Purchasing physical objects
 - Using IP-telephony
- Entertainment
 - Stream film or TV-shows
 - Stream music
 - Play online games
 - Listen to streaming Internet radio
 - View, listen or subscribe to podcasts
- Download
 - File share movies
 - File share music
 - Purchase and download movies
 - Purchase and download music

The findings will also be presented in a larger table with a short summary for each speed for all questions. The survey questions all have the same answer scale where the participant filled in one of ten alternatives. The participants who chose the answer alternative “don’t know” have not been included in this study.

The nine frequencies of usage alternatives have been divided into four larger segments. The reason for the segmentation is to simplify the analysis by only focusing on the frequency of the usage instead of both frequency and time aspect of usage. How the options were grouped is illustrated in the figure below.



Figure 23 Segmentation of the usage frequencies

6.2.1 Developed countries

This section covers the usage factors for developed countries. As presented in chapter 6.1.1, the group with a medium-high speed is the most common in developed countries with about twice the user base compared with the other groups.

6.2.1.1 Personal usage

The following three factors are used to describe *usage of the Internet for personal reasons*:

- Personal e-mail
- Instant message or chat (for personal reasons)
- Browsing the Internet (for personal reasons)

In the usage graphs it can be seen that the differences between the speed groups are quite small for personal use. It is however possible to make some interesting observations. There is overall a high level of usage for *browsing the Internet for personal use* with over 83 percentages using it daily (see figure 26). The daily usage also increases slightly with speed. As seen in figure 24, the same pattern also applies for the usage of personal e-mail where the daily usage is around 78 percent. The increase associated with speed for personal e-mail is mostly compensated by a decrease in weekly usage while the monthly and less often use are fairly consistent and low for all speeds. For *instant message or chat*, presented in figure 25, there are only small variations between the three higher speed groups but a quite distinctive change for the group with low speed. This group has a higher level of daily usage of *instant messages* and a lower degree using the service less often, while the weekly and monthly usage is more similar to other speed groups.

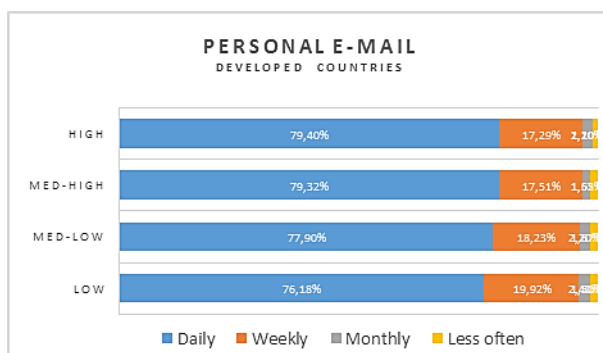


Figure 24 Usage distribution of personal e-mail for developed countries

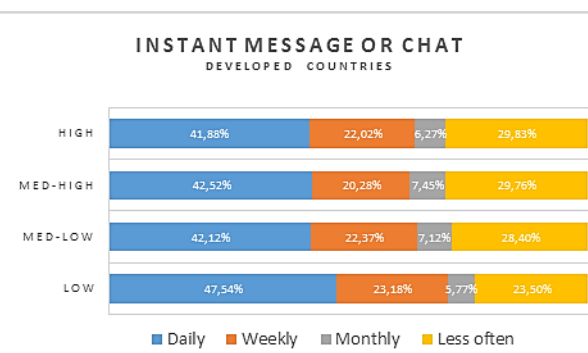


Figure 25 Usage distribution of instant message or chat for developed countries

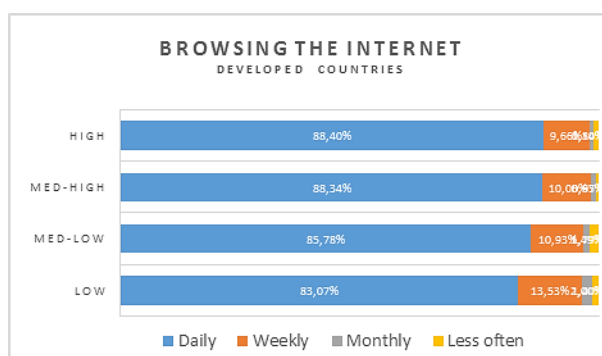


Figure 26 Usage distribution of browsing the Internet for developed countries

6.2.1.2 Work related usage

The following four factors are used to describe *usage of the Internet for work related reasons*:

- Instant message/chat (for work related reasons)
- Work/business related e-mail
- Browsing the Internet (for work related reasons)
- Apply and look for job

Instant messaging is most popular among the users with low speed, where almost 30 percent uses it for work purposes daily, which is seen in figure 27. The differences between the speed levels are small, but the usage of instant messaging decreases with increasing level of speed.

Users with high broadband speed uses work/business related e-mailing the most (63 percent daily). The number of daily users is declining for each speed level down to 53 percent among those in the lowest speed group. This is presented in figure 28.

Applying and looking for jobs is done most often by the group with low broadband speed, with one fifth doing it daily. There is a slight but consistent decrease for each higher speed level. For the users in the group with high speed, only 15 percent does it daily, as can be seen in figure 30.

The graph found in figure 29 shows the frequencies for browsing the Internet. The majority of all respondents browse the Internet for work related purposes daily. Users with high broadband speed are more frequent in browsing the Internet than users with low speed.

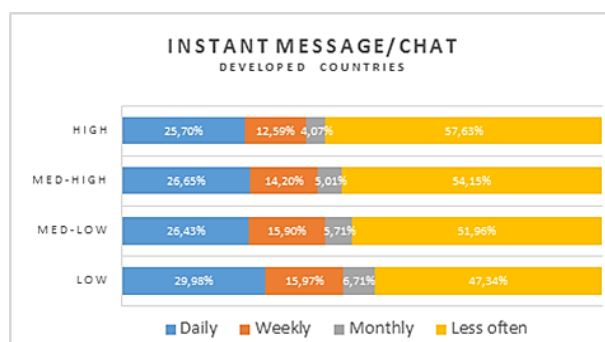


Figure 27 Usage distributions for instant message/chat in developed countries

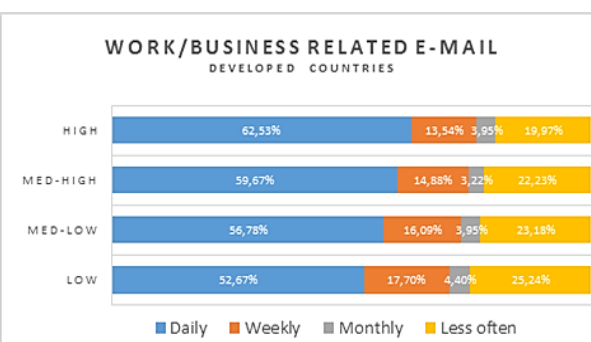


Figure 28 Usage distributions for work/business related e-mails in developed countries

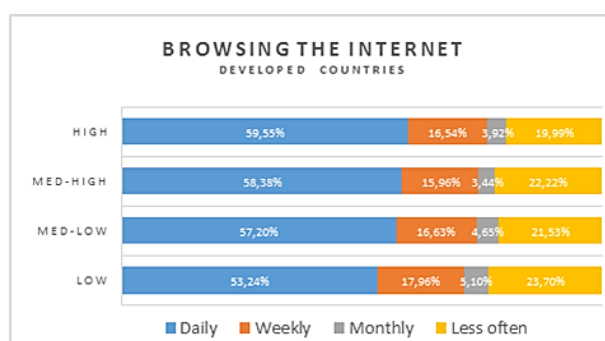


Figure 29 Usage distributions for browsing the Internet in developed countries

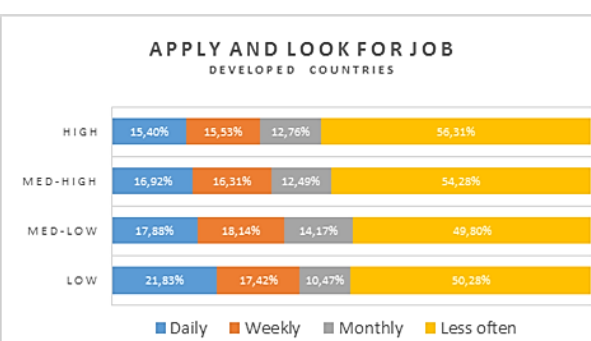


Figure 30 Usage distribution for applying and looking for jobs in developed countries

6.2.1.3 Information usage

The following four factors are used to describe *usage of information services*:

- Search for health or medical related information
- Access news or other up-to-the minute information
- Search for information (no specification of the content)
- Search for educational information

The respondents of all speed groups search for health and medical information with similar frequencies, as can be seen in figure 31. For health and medical related information, the respondents search relatively rarely. The chart also indicates that the frequency seem to decrease with level of broadband speed.

Educational information is searched for rarely. Among users with high speed, more than every second respondent search for this kind of information less than once a month. The frequency of educational searches decrease with increasing levels of speed. For the users with low speed, one fifth searches for educational information daily. For users with high broadband speed this number is only 13 percent. This is shown in figure 32.

News on the other hand is searched for far more often. Within all speed segments, the vast majority searches for news or other up-to-the-minute information daily. The chart indicates that the frequency for searching for news seems to increase with level of broadband speed, as can be seen in figure 33. Search for news or other up-to-the-minute information is one of the most used Internet services in developed countries, regardless of the users broadband speed.

Searching for information without any content specifications, which is presented in figure 34, is done daily for a fifth of the respondents. In addition, 39 percent (low speed group) to 44 percent (high speed group) search for information at least once a week.

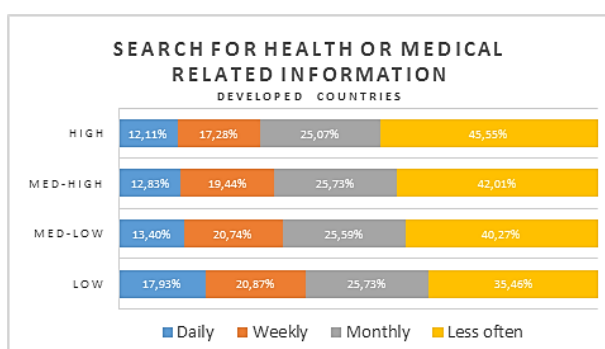


Figure 31 Usage distributions for search of health or medical related information in developed countries

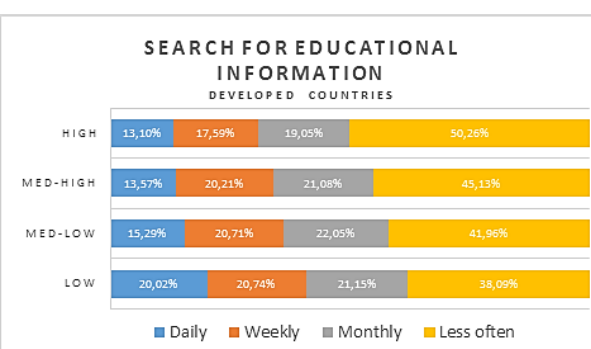


Figure 32 Usage distributions for search for educational information in developed countries

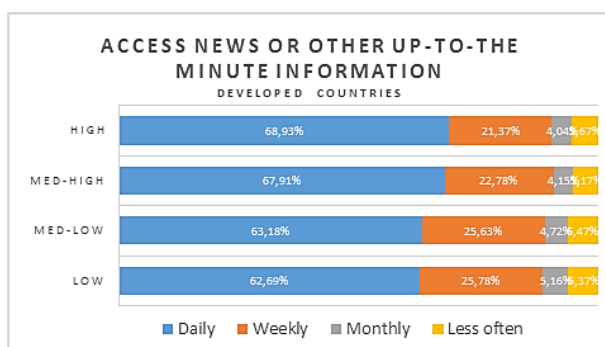


Figure 33 Usage distributions for accessing news or other up-to-the-minute information in developed countries

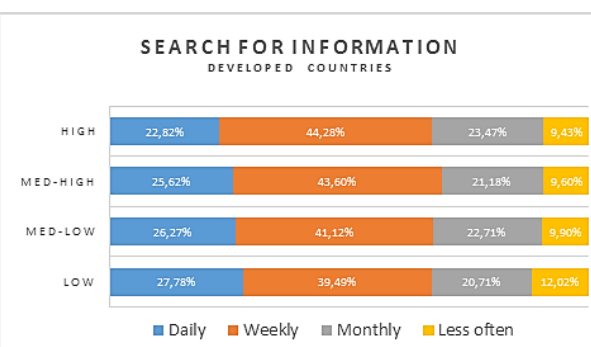


Figure 34 Usage distributions for search of information in developed countries

6.2.1.4 Usage of entertainment related services

The following five factors are used to describe *usage of entertainment related services*:

- Listen to streaming Internet radio
- View, listen or subscribe to podcasts
- Play online games
- Stream music
- Stream film or TV-shows

In the survey the respondents were asked about their usage of entertainment services. The usage of these different entertainment services is almost the same for all broadband speeds. Listening to Internet radio is most popular followed by online gaming, music streaming, listening to podcast and lastly and least popular, streaming film or TV. For all factors, the users with low speed seem to have the biggest share of users utilizing the services daily. For all factors, the largest share of users utilizes the services less often, regardless of speed. This information is presented in figure 35 to 39 below.

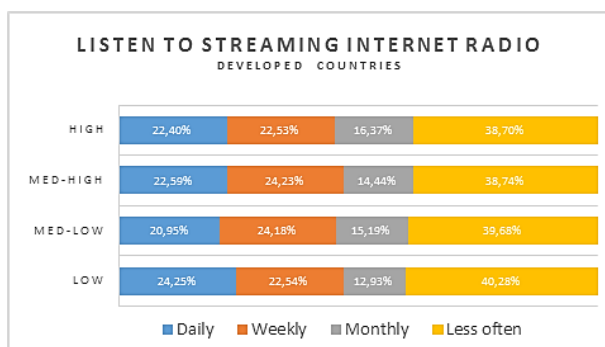


Figure 35 Usage distributions for listening to streaming Internet radio in developed countries

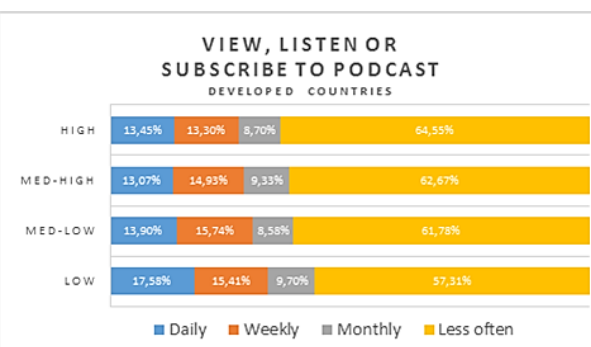


Figure 36 Usage distribution for viewing, listening or subscribing to podcast in developed countries

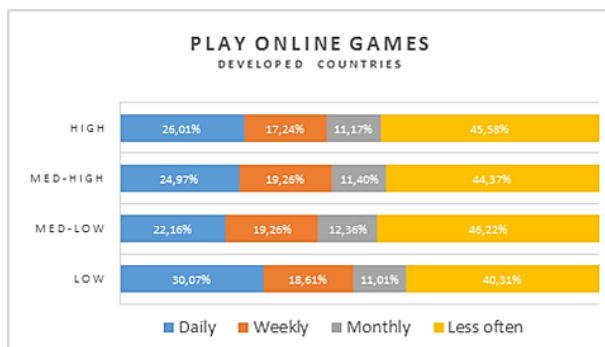


Figure 37 Usage distribution for playing online games in developed countries

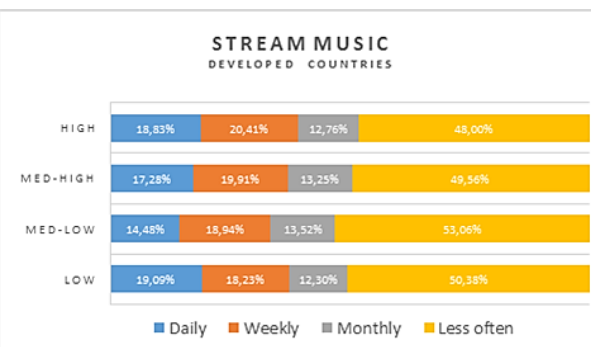


Figure 38 Usage distribution for streaming music in developed countries

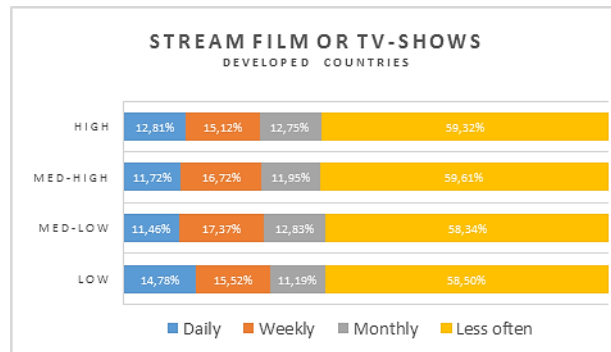


Figure 39 Usage distribution for streaming or TV-shows in developed countries

6.2.1.5 Usage of Internet services

The following three factors are used to describe *usage of Internet services*:

- Internet banking
- Purchasing physical objects
- Using IP-telephony

In the graph found in figure 40, describing the usage of Internet banking it can be seen that the percentage of people who uses Internet banking daily is decreasing with higher level of broadband speed. Both groups represented by people who use Internet banking weekly or monthly are increasing with level of broadband speed. The higher the broadband speed, the lower the share of people using the service less often.

The diagram found in figure 41 shows how frequently people with different broadband speed purchase physical objects. The distributions are fairly similar for the groups with medium-low, medium-high and high level of speed. The share of users that purchases physical objects daily seems to be higher within the group with low speed. The higher the broadband speed the larger the share of people who purchases physical objects at least once a month (daily, weekly or monthly), and the smaller the group of people that purchases physical objects less often.

The graph found in figure 42 demonstrates how often the IP-telephony service is used in segments with different broadband speed. The higher the broadband speed the larger the share of people who uses IP-telephony less often. The segment with people with the lowest broadband speed contains the largest share of people who uses IP-telephony daily, compared with the other speed segments.

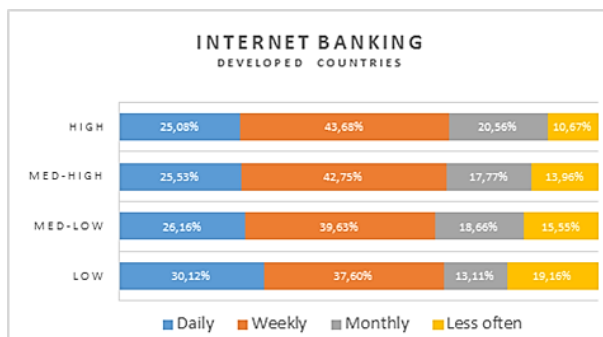


Figure 40 Usage distributions for Internet banking in developed countries

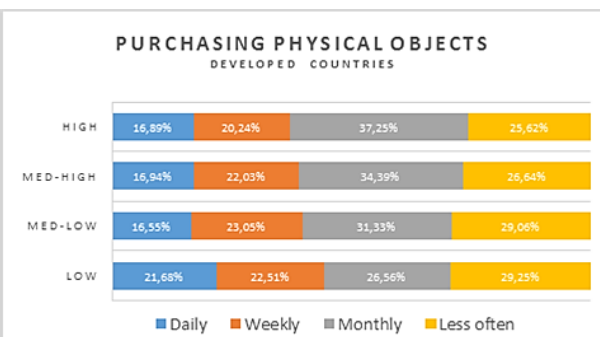


Figure 41 Usage distributions for purchasing physical objects on the Internet in developed countries

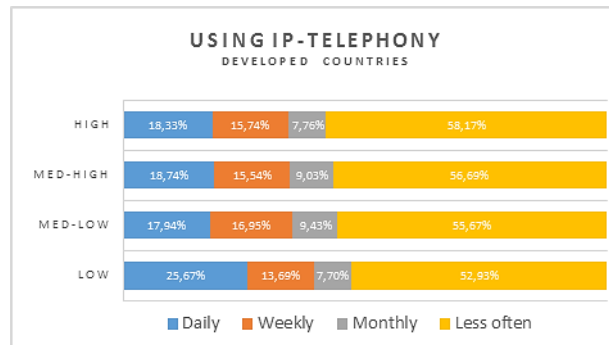


Figure 42 Usage distribution for using IP-telephony in developed countries

6.2.1.6 Downloading

The following four factors are used to describe *downloading*:

- Purchasing and downloading music
- File sharing (for free) of music
- Purchasing and downloading movies
- File sharing (for free) of movies

As can be seen in the following graphs the usage patterns for purchasing and downloading music and purchasing and downloading movies show the same behaviour. The same applies to file sharing (for free) of music and file sharing (for free) of movies. E.g., the difference between the speed levels for file sharing (music and movies) are less than two percent, as can be seen in figure 44 and 45.

The vast majority of all respondents purchase and download music or movies less often. The tendency also seem to be that the higher the speed level, the less often the users purchase and download music or movies. This is presented in figure 43 and 45.

For file sharing (for free) of music or movies, the distributions between the speed levels are fairly similar. The users with low speed seem to have a slightly larger share of users file sharing daily.

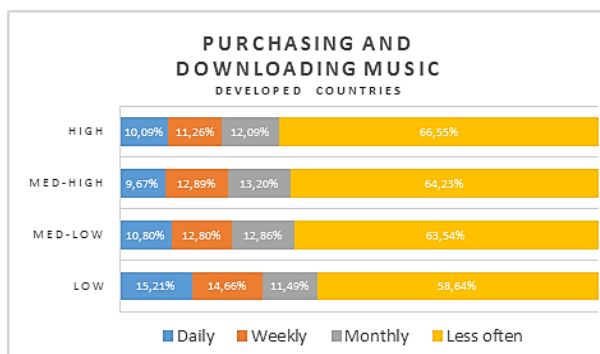


Figure 43 Usage distributions for purchasing and downloading music in developed countries

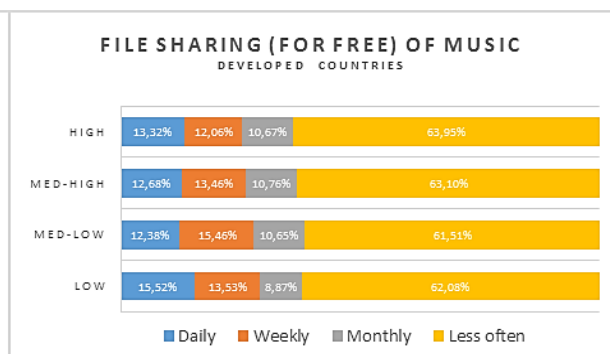


Figure 44 Usage distribution for free file sharing of music in developed countries

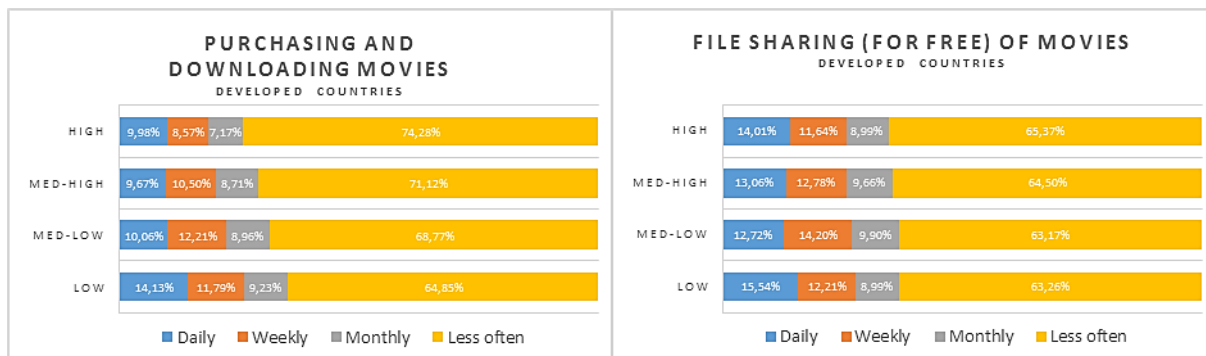


Figure 45 Usage distributions for purchasing and downloading movies

Figure 46 Usage distributions for free file sharing of movies in developed countries

6.2.1.7 Summary of speed groups for usage factors in developed countries

In this section, the usage factors for the general users in the emerging countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

Noticeable about the lowest speed group is the frequent usage. Out of the total of 23 factors, this group has the highest usage among the four speed groups for 14 factors. For five factors it has the lowest usage. Therefore, usage does not seem to increase, but rather decrease, with higher speed since this groups uses various Internet services often.

For both personal and work relate reasons, low speed users chat the most but uses e-mail the least. This can partly be explained by these services being complementary. If you use instant messages often you may not have to use e-mail as much. Information searching is done most frequently by the low speed group for all three factors except news and other up-to-the-minute information, which is done most rarely by the low speed group.

In addition the lowest speed group uses all entertainment and downloading services the most. This is interesting since many of these services require and benefit from higher broadband speed and one may believe low speed users should use it less often. Gaming, streaming and downloading flows better, enables higher resolutions and equals faster downloading rates with higher broadband speed. Still, that does not seem to matter since this group uses it the most.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

This group is similar to the medium-high speed group since both groups have usage frequencies for most factors in between the highest and the lowest speed groups. For the medium-low speed group, this hold true for fifteen factors (out of the total of 23 factors). This is also what characterises the medium-low group the most.

These fifteen factors are; work related e-mail, work related instant messages, work related browsing, personal e-mail, personal browsing, apply and look for jobs, podcasts, internet banking, accessing news, the four information searching categories and purchasing and downloading (both music and movies).

In addition there are six usage factors where this speed group have similar usage frequencies as the two higher speed levels. These factors; instant messaging, Internet radio, streaming film, IP-telephony, purchasing physical objects and file sharing music are used for personal purposes.

Finally, two noticeable factors are online games and music streaming where this group have the lowest usage frequencies. This speed group uses no factor the most among the four speed groups.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

This speed group is similar to the medium-low speed group since both groups have usage frequencies for most factors in between the lowest and highest speed groups. Just like medium-low, this speed group have fifteen factors where this holds true.

These fifteen factors where the usage frequencies are in between the lowest and highest are; personal related internet browsing, personal related e-mail, all four work related factors, online gaming, podcasts, internet banking, all four searching for information factors and purchasing and downloading (both music and movies).

In addition there are six usage factors where this speed group have similar usage frequencies as medium-low and high speed levels. These factors are: instant messaging, Internet radio, streaming film, IP-telephony, purchasing physical objects and file sharing music for personal purposes.

Finally there are no usage factors where the medium-high speed group has the lowest usage frequency.

High broadband speed: More than 12 Mbit/s

This speed group has some characteristic usage behaviours. To begin with it has the highest usage frequency among the speed groups for five factors and the lowest for seven factors.

The highest usage frequencies are e-mailing and Internet browsing (both for personal and work related purposes) and accessing news and other up-to-the-minute-information. Instant message though, is used the least. This is the opposite for the lowest speed group's usage pattern. E-mail and instant messaging are complementary services, which means that if one factor has high usage, the other is probably low.

In addition to instant messaging, this speed group has the lowest usage among the speed groups in the following seven factors; applying and looking for jobs, podcasts, searching for health or medical related information, searching for educational information and purchasing and downloading movies.

Just like the medium-high and medium-low speed groups there are six factors where the usage frequencies are the same for these three speed groups. The factors are personal related instant messaging, Internet radio, streaming film, IP-telephony, purchasing physical objects and file sharing movies.

6.2.1.8 Summary of usage factors in developed countries

In the table below, the findings of the different usage factors for the developed countries are summarized by level of speed.

Table 14 Summary of the usage factors for the developed countries

Usage in Developed Countries		Low	Medium-low	Medium-high	High
Personal	E-mail	Lowest usage of the speed groups.	High daily or weekly usage >95%.	High daily or weekly usage >95%.	Highest usage of the speed groups >95% daily or weekly usage.
	Instant message/chat	About 5 % higher daily usage compared to other speeds.	Similar to both higher speed groups. 42% daily usage.	Similar to medium-low and medium-high speed groups. 43% daily usage.	Similar to medium-low and medium-high speed group. 42% daily usage.
	Browsing the internet	Lowest usage of the speed groups.	In between low and high speed groups. High daily or weekly usage. >95%.	In between low and high speed groups. High daily or weekly usage. >95%.	Highest usage of the speed groups.
Work	E-mail	Lowest usage of the speed groups. 70% daily or weekly usage.	Second lowest usage.	Second highest usage.	Highest usage of the speed groups. 75% daily or weekly usage. Lower than personal usage.
	Instant message/chat	Highest usage of the speed groups. >45% daily or weekly usage. Lower than personal usage.	Second highest usage.	Second lowest usage.	Lowest usage of the speed groups. 38 % daily or weekly users.
	Browsing the internet	Lowest usage of the speed groups 70% daily or weekly users.	Second lowest usage.	Second lowest usage.	Highest usage of the speed groups. 76% daily or weekly users.
	Apply and look for job	Highest usage of the speed groups. 39% daily or weekly usage.	Second highest usage.	Second lowest usage.	Lowest usage. 31% daily or weekly usage.
Entertainment	Play online games	Highest usage of the speed groups. 49% daily or weekly usage.	Lowest usage. 41% daily or weekly usage.	Similar to highest speed group. 45% daily or weekly usage.	Similar to medium-high speed group. 45% daily or weekly usage.
	Listen to steaming Internet radio	Highest percentage of daily users (24%). Similar to the other speed groups for monthly and weekly usage.	Similar to medium-high and highest speed group. 45% daily or weekly usage.	Similar to medium-low and highest speed group. 45% daily or weekly usage.	Similar to medium-low and medium-high speed group. 45 % daily or weekly usage.
	View, listen or subscribe to pod casts	Highest usage of speed groups. 33% daily or weekly usage.	Second lowest usage.	Second highest usage.	Lowest usage of speed groups. 27% daily or weekly usage.
	Stream music from the Internet	Similar to the two highest speed groups. 37% daily or weekly usage.	Lowest usage. 33% daily or weekly usage.	Similar to lowest and highest speed group. 37% daily or weekly usage.	Similar to lowest and medium-high speed group. 37% daily or weekly usage.

cont' of table		Low	Medium-low	Medium-high	High
	Stream film or TV shows from the internet	Highest percentage of daily users (17%). Similar to the other speed levels for the other time intervals.	Similar to the two highest speed groups. 29 % daily or weekly usage.	Similar to medium-low and the highest speed group. 29% daily or weekly usage.	Similar to medium high and medium-low speed groups. 29% daily or weekly users.
Services	Using IP-telephony	Highest usage of speed groups. 39% daily or weekly users.	Similar to the two highest speed groups. 35% daily or weekly usage.	Similar to medium-low and highest speed group. 35% daily or weekly usage.	Similar to medium-high and medium-low speed group. 35% weekly usage.
	Internet banking	Highest percentage of daily (30%) and "less often" (19%) usage	Similar to medium-high and in between highest and lowest speed group.	Similar to medium-low and in between highest and lowest speed group.	Lowest share of daily (25%) and "less often" (11%) usage. Largest share of weekly users (44%).
	Purchasing physical objects over the Internet	Highest percentage of daily (22%) and "less often" (29%) usage.	Similar to the two highest speed groups. 28% daily or weekly usage.	Similar to medium-low and high-speed group. 28% daily or weekly usage.	Similar to medium-high and medium-low speed group. 27% daily or weekly usage.
Information	Access news or other up-to-the minute information	Lowest usage among speed groups. 63% daily usage.	Second lowest usage.	Second highest usage.	Highest usage among speed groups. 69% daily usage.
	Search for information	Highest daily (28%) and "less often" (12%) usage.	Similar to medium-highs speed group and in between the other two.	Similar to medium-low speed group and in between the other two.	Lowest daily (23%) and "less often" (9%) usage.
	Search for health or medical related information	Highest usage of speed groups. 39% daily or weekly usage.	Second highest usage of speed groups.	Second lowest usage of speed groups.	Lowest usage of speed groups. 29% daily or weekly usage.
	Search for educational information	Highest usage of speed groups. 40% daily or weekly usage.	Second highest usage of speed groups.	Second lowest usage of speed groups.	Lowest usage of speed groups. 30% daily or weekly usage.
Downloading	Purchasing and downloading music	Highest usage of speed groups. 30% daily or weekly usage.	Second highest usage.	Second lowest usage.	Lowest usage of speed groups. 67% "less often" usage.
	Purchasing and downloading movies (full movies)	Highest usage of speed groups. 25% daily or weekly usage.	Second highest usage of speed groups.	Second lowest usage of speed groups.	Lowest usage of speed groups. 19% daily or weekly usage.
	File sharing (for free) of music	Largest percentage of daily users 16%. Rest is similar to the other speed groups.	Similar to medium-high and highest speed group. 28% daily or weekly usage.	Similar to medium-low and highest speed group. 27% daily or weekly usage.	Similar to medium-high and medium-low speed group. 27% daily or weekly usage.
	File sharing (for free) of movies	Similar to the other speed groups and similar to file sharing of music. 28% Daily or weekly usage.	Similar to the other speed groups. 28% daily or weekly usage.	Similar to the other speed groups. 28% daily or weekly usage.	Similar to the other speed groups. 28% daily or weekly usage.

6.2.2 Emerging countries

This section will describe and present data for three emerging countries, Brazil, India and urban China. As presented in chapter 6.2.1, the groups with low and medium-low broadband speed is clearly overrepresented for this section, with a frequency almost ten times that of the groups with medium-high and high broadband speed.

6.2.2.1 Personal usage

The following three factors are used to describe *usage of the Internet for personal reasons*:

- Personal e-mail
- Instant messages/chat (for personal reasons)
- Browsing the Internet (for personal reasons)

As seen in the charts below, the daily usage is very high for all levels of speed and for all factors.

For personal e-mail, the usage pattern is similar for all speed groups with only small alterations between them, such as a slightly higher share of daily usage for the speed groups with low speed and high speed. This can be seen in figure 47.

For instant message/chat for personal reasons, presented in figure 48, the daily usage is around 90 percent for all speed levels. In emerging countries, no other factor has an equally high proportion of daily users. The highest shares of daily users are found in the groups with medium-low and medium-high speed.

The graph on *browsing the Internet*, found in figure 49, shows that the group with the highest subscribed broadband speed has the highest share of users browsing the Internet daily. The two groups with low and medium-high speed have the same share of daily users but the low speed group has a higher share of weekly users.

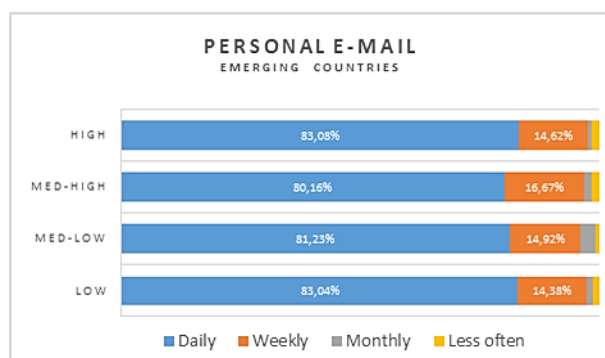


Figure 47 Usage distributions for personal e-mails in emerging countries

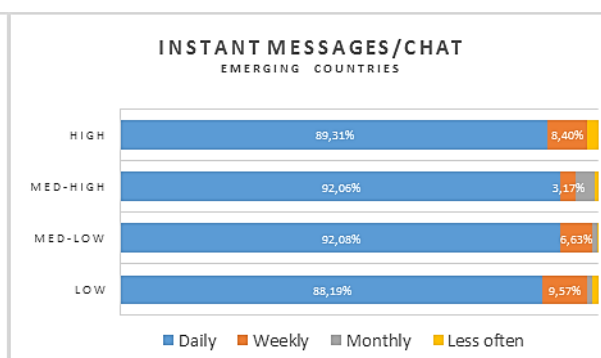


Figure 48 Usage distributions for instant messages/chat in emerging countries

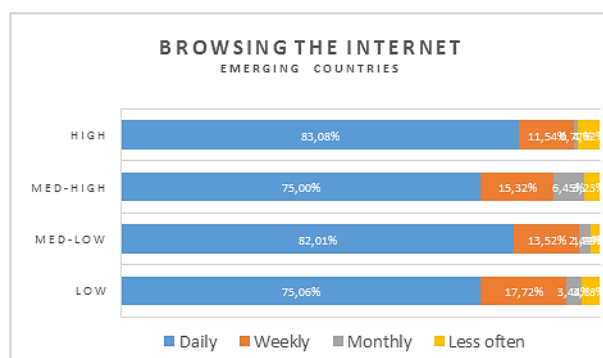


Figure 49 Usage distributions for browsing the Internet in emerging countries

6.2.2.2 Work related usage

The following four factors are used to describe *usage of the Internet for work related reasons*:

- Personal e-mail
- Instant messages/chat (for work related reasons)
- Browsing the Internet (for work related reasons)
- Apply and look for job

Among the users with high speed, 75 percent uses instant messaging/chat daily, as can be seen in figure 50. The lower speed groups use it slightly more rarely. The usage does not seem to increase with higher speed since the medium-low speed group uses it more often than the medium-high speed group.

When observing the factor *apply and look for job*, no pattern associated with speed can be identified. The highest and lowest speed group have higher percentages of daily users than the two speed groups in between, which instead have the highest shares of users applying and looking for jobs less often.

Work related e-mailing and Internet browsing usage show similar patterns, having very high percentage of daily users, regardless of level of speed. For work/business related e-mail, there is a tendency that the higher the broadband speed, the larger the share of daily users.

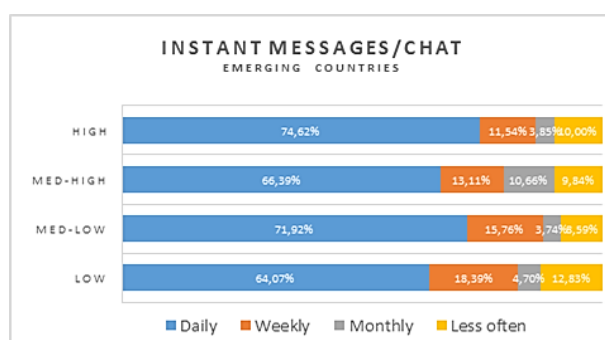


Figure 50 Usage distributions for instant messaging/chat in emerging countries

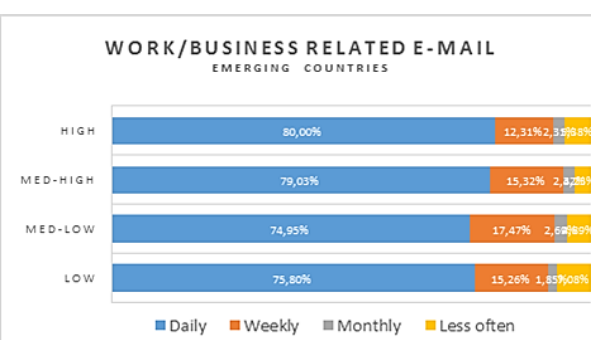


Figure 51 Usage distributions for work/business related e-mail in emerging countries

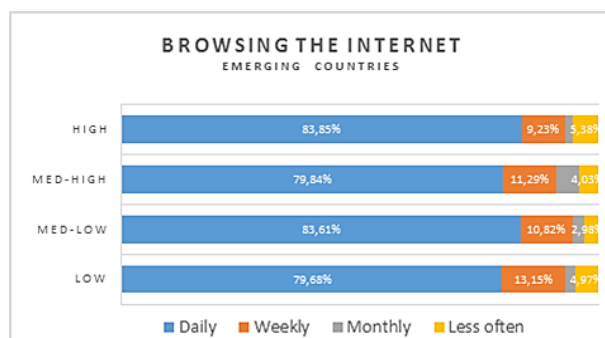


Figure 52 Usage distributions for browsing the Internet for work related reasons in emerging countries

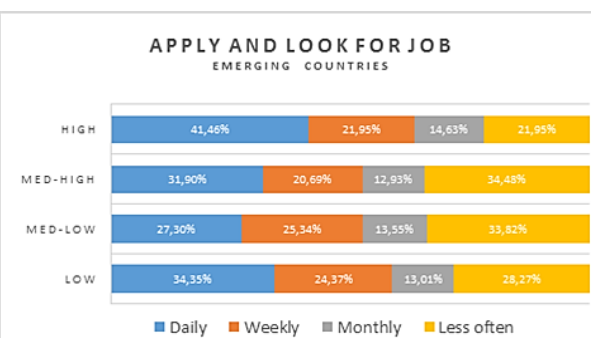


Figure 53 Usage distributions for applying and looking for jobs in emerging countries

6.2.2.3 Information usage

The following four factors are used to describe *usage of information services*:

- Search for health or medical related information
- Search for educational information
- Access news or up-to-the-minute information
- Search for information (no specification of the content)

More than 60 percent searches for health or medical related information once a week or more often. Here the group with high broadband speed has the highest frequency, having 70 percent performing these services at least once a week (daily or weekly).

The majority of all respondents access news or other up-to-the-minute information daily. Except for the users with low speed, more than 80 percent access this information daily. The lowest speed group can be seen accessing this slightly more seldom.

Searching for information (regardless of the content) is done for about half of the respondent on a daily basis, and about 35 percent do this weekly. There are some, but no significant, differences between the different speed levels.

Finally, the group with high broadband speed search for educational information most frequently. 43 percent searches for this information daily, compared to the two medium speed groups having 30 percent (medium-high speed) and 32 percent (medium-low speed). The group with low speed is in-between the highest and the two middle groups, having a percentage of daily users of 37 percent.

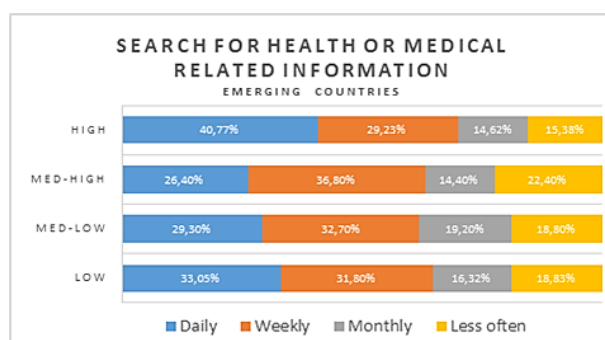


Figure 54 Usage distributions for searching for health or medical related information in emerging countries

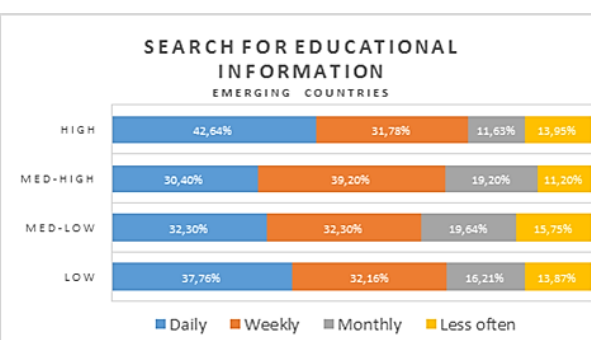


Figure 55 Usage distributions for searching for educational information in emerging countries

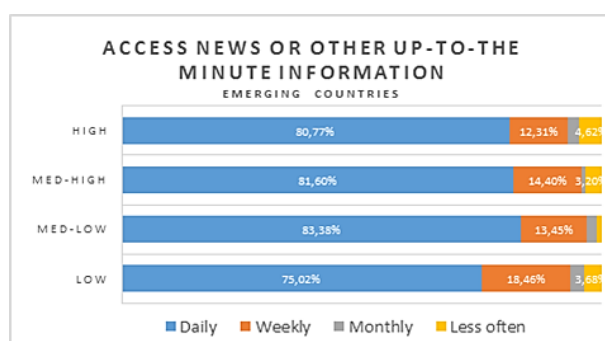


Figure 56 Usage distributions for accessing news or other up-to-the minute information in emerging countries

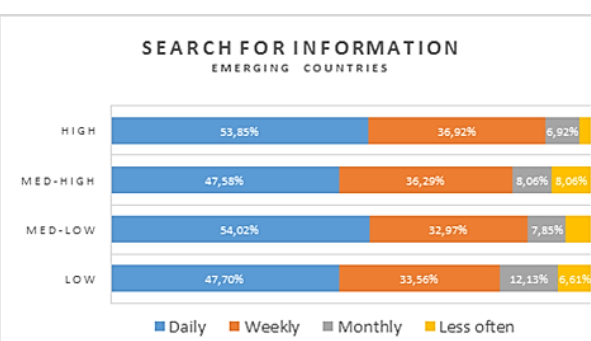


Figure 57 Usage distributions for searching for information in emerging countries

6.2.2.4 Usage of entertainment related services

The following five factors are used to describe *entertainment services*:

- Listen to streaming Internet radio
- View, listen or subscribe to podcasts
- Play online games
- Stream music
- Stream film or TV-shows

The graph found in figure 61 illustrates how often people with different broadband speed listens to streaming Internet radio. The largest share of the respondents uses listens to streaming Internet radio daily, regardless of broadband speed. There are some tendencies that

the higher the broadband speed, the higher the share of users who listen to streaming Internet radio at least once a month (monthly, weekly or daily). The largest share of users listening to streaming Internet radio daily can be found within the group with high broadband speed.

The graph found in figure 62 that describes the distributions of viewing, listening or subscribing to podcast, show that the share of users viewing, listening or subscribing to podcasts daily seem to increase with increasing broadband speed. The largest share of those who listen less often than once a month (monthly or less often) can be found in the group with low broadband speed, followed by users with medium-high speed.

The graph of playing online games, found in figure 63, shows a tendency that the higher the level of speed, the higher the share of users playing online games at least once a week (weekly or daily). The shares of users playing online games less often are roughly equal for every level of speed.

The graph found in figure 64 present how often people with different broadband speed stream music. The higher the broadband speed the larger the share of people who stream music daily. The group with high broadband speed contains the smallest share of people who streams music less often. The users with low broadband speed has the highest share of users streaming music less often or less often than once a month (monthly or less often).

The graph in figure 65 presents the usage distributions for streaming film or TV-shows. The graph shows that the higher the level of speed, the larger the share of users streaming film or TV-shows daily. The group with low speed has the largest share of users streaming film or TV-shows less often.

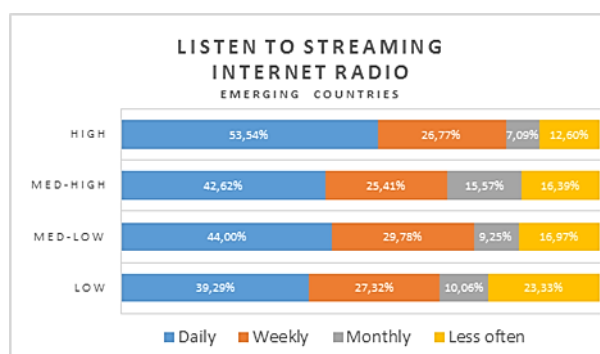


Figure 58 Usage distributions for listening to streaming Internet radio in emerging countries

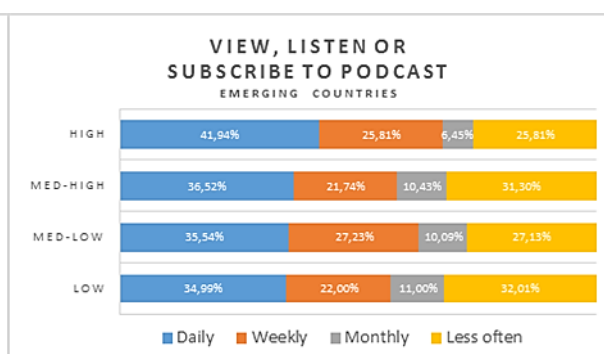


Figure 59 Usage distributions for viewing, listening or subscribing to podcasts in emerging countries

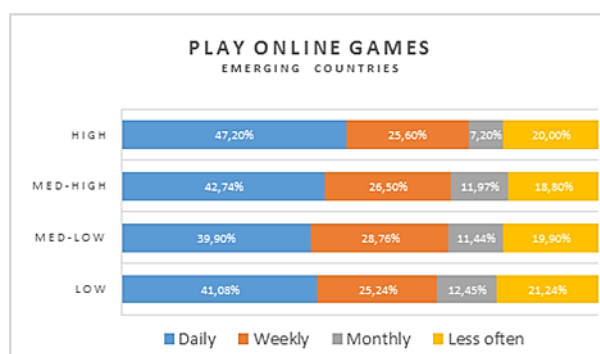


Figure 60 Usage distributions for playing online games in emerging countries

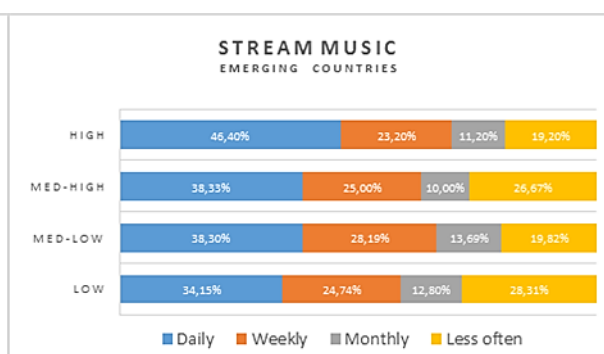


Figure 61 Usage distributions for streaming music in emerging countries

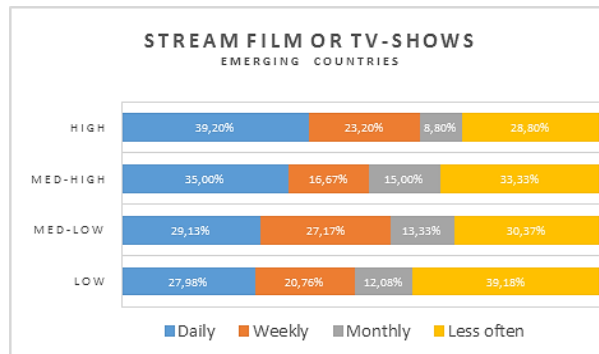


Figure 62 Usage distributions for streaming film or TV-shows in emerging countries

6.2.2.5 Usage of Internet services

The following three factors are used to describe *usage of Internet services*:

- Internet banking
- Purchasing physical objects
- Using IP-telephony

The graph found in figure 58 illustrates how frequently Internet banking is used in segments with different broadband speed. The graph shows that the share of respondents using Internet banking weekly or daily seem to be increasing with level of broadband speed. The largest share of people that uses Internet banking daily is found in the fragment with the highest broadband speed. The largest share of people who uses Internet banking less than once a week is found in the group with low broadband speed.

When observing how people in emerging countries purchase physical objects on Internet, it can be shown that the higher the broadband speed is, the larger the share of people that purchases physical objects on Internet daily or weekly. The group with low broadband speed contains the biggest share of people that purchases physical objects online less often. This can be seen in figure 59.

How frequently IP-telephony is used in different broadband speed segments is observed in the graph found in figure 60. The largest share of the respondents uses IP-telephony daily, regardless of speed. The graph also shows that the higher the level of speed, the larger the share of people that uses the services daily. The biggest share of people that uses the service less often can be found in the lowest speed segment.

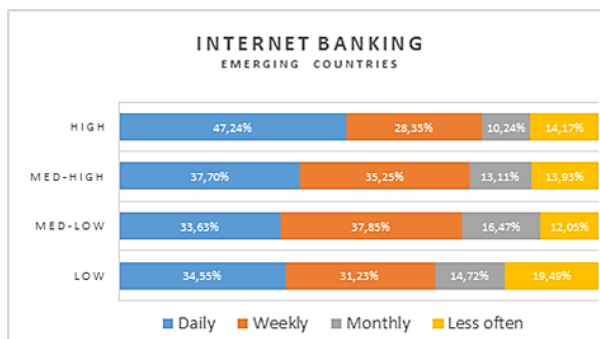


Figure 63 Usage distributions for Internet banking in emerging countries

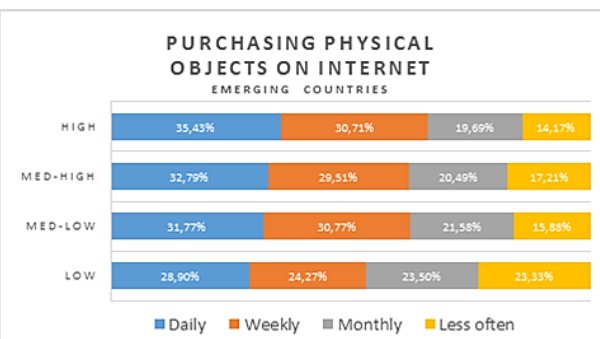


Figure 64 Usage distributions for purchasing objects on the Internet in emerging countries

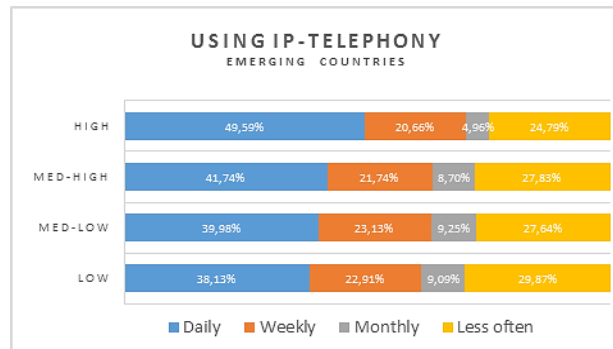


Figure 65 Usage distributions for using IP-telephony in emerging countries

6.2.2.6 Downloading

The following four factors are used to describe *downloading*:

- Purchasing and downloading music
- File sharing (for free) of music
- Purchasing and downloading movies
- File sharing (for free) of movies

In general, the graphs presented below show a quite high share of people downloading or sharing files (for free). The pattern is very similar between purchasing and downloading music and purchasing and downloading movies, as can be seen in figure 66 and 68. The same applies for file sharing (for free) of music and file sharing (for free) of movies (see figure 67 and 69).

The general pattern, with some exceptions, show that the higher the broadband speed, the more frequent downloading or file sharing seem be. For purchasing and downloading music and movies, approximately one third download or share files less often. The corresponding numbers for free file sharing of movies and music are around 15 to 25 percent.

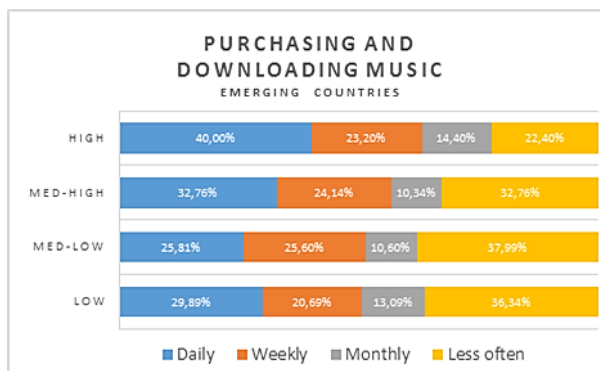


Figure 66 Usage distributions for purchasing and downloading music in emerging countries

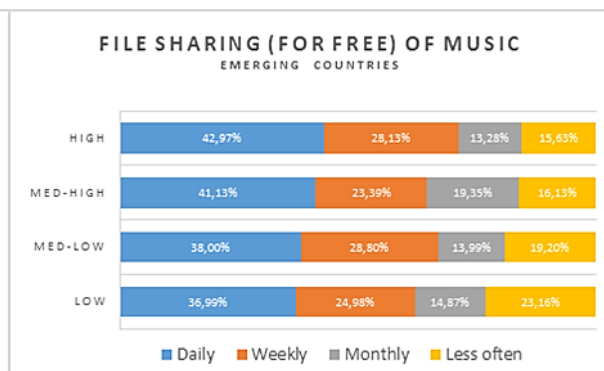


Figure 67 Usage distributions for free file sharing of music in emerging countries

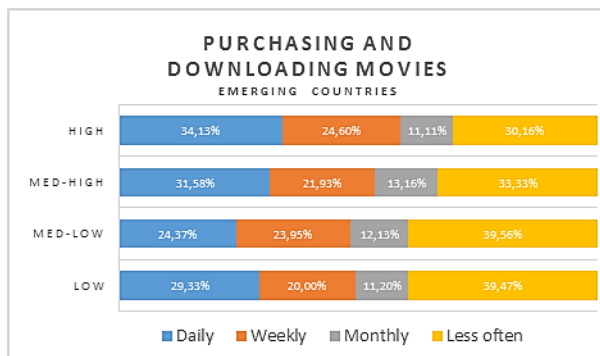


Figure 68 Usage distributions for purchasing and downloading movies in emerging countries

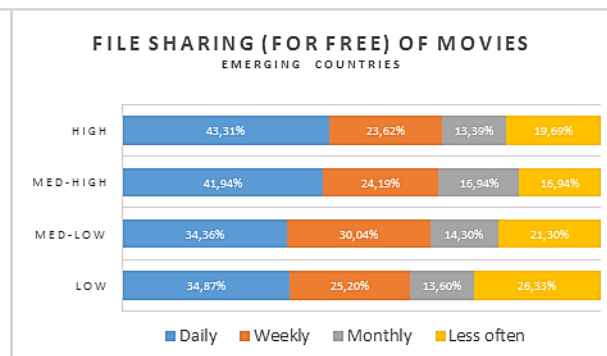


Figure 69 Usage distributions for free file sharing of movies in emerging countries

6.2.2.7 Summary of speed groups for user factors for emerging countries

In this section, the usage factors for the general users in the emerging countries are summarized speed group by speed group.

A general observation is that usage factors for emerging countries are characterised by higher usage frequencies for most factors among all speed groups.

Low broadband speed: Up to 1024 kbit/s

The low speed group among emerging countries is, unlike the same speed group for developed countries, the speed group with the lowest usage frequencies. Nine factors are used the least by this speed level. None of the 23 factors is used the most, among the four speed groups, by this speed level.

The usage of personal Internet services is high among the emerging countries. This is the case for all speed levels and the differences between the speed levels are small. For these three factors daily usage range between 75 to 92 percentages. E-mail is used most often by this and the highest speed level. On the contrary, these two groups use instant messages the least. That the usage frequency for one of these factors is high and the other is low may be explained by these services being complementary.

Usage frequencies for work related Internet services compared to personal related Internet services are lower for all speed levels. For the instant messages, e-mail and browsing, the usage ranges from 66 to 84 percentages of daily users. Work related instant messages are one of the total of nine factors where this speed group have the lowest usage among the four speed groups.

The other eight factors are: online gaming, listening to internet radio, streaming of music and films, IP-telephony, internet banking, purchasing physical objects, and file sharing music and movies.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

This group is similar to the medium-high group since both groups have usage frequencies for most factors in between the highest and the lowest speed groups. This hold true for thirteen usage factors.

Apart from these thirteen there are some other noteworthy usage factors. This speed group access news and other up-to-the-minute information most often. It uses instant messaging as often as the medium-high speed group, but more often than both the low and the high speed group. For personal related internet browsing, work related internet browsing and searching for information this speed group uses these three services as often as the high speed group but more often than the other two.

Peoples with medium-low broadband speed apply and look for jobs, purchase and download music and movies the least among the different speed levels.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

This speed group is similar to medium-low speed group since both have usage frequencies in between the lowest and the highest speed groups. This holds true for fifteen usage factors.

It has the lowest usage frequencies for health and medical related searches and educational searches. But this speed group, the medium-high, does not have the highest usage frequency among the speed groups for any usage factor.

For personal related instant messaging it does however have similar usage percentages as the medium-low speed group and higher usage percentages than the other two speed groups. For work related e-mail this speed group has similar usage percentages as the highest speed group and higher usage percentages than the other two.

High broadband speed: More than 12 Mbit/s

This speed group clearly uses the investigated Internet services the most. Among the four speed groups the highest speed group have the highest usage percentages for fifteen usage factors. In addition, for six factors it has the same usage frequencies as another speed group but higher usage frequencies than the other two speed groups. Therefore one can say that this, the highest speed group, does only have a lower usage frequency for two usage factors. These two are accessing news and other up-to-the-minute information and personal related instant messaging.

This result, where the usage seems to increase with higher speed, differs from the usage among the developed countries where the lowest speed level had the highest usage frequency.

6.2.2.8 Summary of usage factors in emerging countries

In the following chart the findings from the usage factors in emerging countries are summarized.

Table 15 Summary of the usage factors in emerging countries

Usage in Emerging Countries		Low	Medium-low	Medium-high	High
Personal	E-mail	Similar to high speed group. Very high daily usage (83%).	Slightly less daily users than the lowest and highest speed groups (81%).	Slightly less daily users than the lowest and highest speed groups (80%).	Similar to low speed group. Very high daily usage (83%).
	Instant message/chat	Slightly less daily usage (88%)	Very high daily usage (92%)	Very high daily usage (92%)	Slightly less daily usage (89%)
	Browsing the internet	75% daily usage. Similar to medium high speed group.	Highest usage among speed groups. 82% daily usage. Similar to highest speed group.	75% daily usage. Similar to lowest speed group.	Highest usage among speed groups. 83% daily usage. Similar to medium low speed group.
Work	E-mail	Lowest usage among speed groups. Similar to lowest speed group. 76% daily usage.	Lowest usage among speed groups. Similar to lowest speed group. 75% daily usage.	Highest usage among speed group. Similar to highest speed group. 79% daily usage.	Highest usage among speed group. Similar to medium-high speed group. 79% daily usage.
	Instant message/chat	Lowest usage among speed groups. 64% daily usage.	Second highest usage among speed groups. 72% daily usage.	Second lowest usage 66% daily usage.	Highest usage among speed groups. 75% daily usage.
	Browsing the internet	80% daily usage. Similar to medium high speed group.	Highest usage among speed group. 84% daily usage. Similar to highest speed group.	80% daily usage. Similar to lowest speed group.	Highest usage among speed group. 84% daily usage. Similar to medium-high speed group.
	Apply and look for job	Second highest usage. 59% daily or weekly usage.	Lowest usage among speed groups. 53% daily or weekly usage. Slightly lower daily usage than medium-high speed group	Second lowest usage among speed groups. 53% daily or weekly usage. Slightly higher daily usage than the medium-low speed group.	Highest usage among speed groups. 63% daily or weekly usage.
Entertainment	Play online games	Lowest usage among speed groups. 41% daily usage.	Second lowest usage.	Second highest usage.	Highest usage among speed groups. 47% daily usage.
	Listen to steaming Internet radio	Lowest usage among speed groups. 39% daily usage.	Second highest usage among speed groups. 44% daily usage.	Second lowest usage among speed groups. 43% daily usage.	Highest usage among speed groups. 54% daily usage.
	View, listen or subscribe to pod casts	Similar to medium-low and medium-high speed groups. 35% daily usage.	Similar to lowest and medium-high speed groups. 35% daily usage.	Similar to the two lowest speed groups. 35% daily usage.	Highest usage among speed groups. 42% daily usage.
	Stream music from the Internet	Lowest usage among speed groups. 34% daily usage.	Second highest usage among speed groups. 38% daily usage.	Second lowest usage among speed groups. 38% daily usage.	Highest usage among speed groups. 47% daily usage.
	Stream film or TV shows from the internet	Lowest usage among speed groups. 28% daily usage.	Second lowest usage among speed groups. 29% daily usage.	Second highest usage among speed groups. 35% daily usage.	Highest usage among speed groups. 39% daily usage.
Services	Using IP-telephony	Lowest usage among speed groups. 38% daily usage.	Second lowest usage among speed groups. 40% daily usage.	Second highest usage among speed groups. 42% daily usage.	Highest usage among speed groups. 50% daily usage.
	Internet banking	Lowest usage among speed groups. 35% daily and 31% weekly usage.	Second lowest usage among speed groups. 34% daily and 38% weekly usage.	Second highest usage among speed groups. 38% daily usage.	Highest usage among speed groups. 47% daily usage.

cont' of table		Low	Medium-low	Medium-high	High
	Purchasing physical objects over the Internet	Lowest usage among speed groups. 29% daily usage.	Similar to medium-high speed group. Usage in between lowest and highest speed group. 32% daily usage.	Similar to medium-low speed group. Usage in between lowest and highest speed group. 32% daily usage.	Highest usage among speed groups. 36% daily usage.
Information	Access news or other up-to-the minute information	Lowest usage among speed groups. 75% daily usage.	Highest usage among speed groups. 84% daily usage.	Similar to highest speed group. In between lowest and medium-low speed group. 82% daily usage	Similar to medium-high speed group. In between lowest and medium-low speed group. 81% daily usage.
	Search for information	Similar to medium-high speed group. 48% daily usage	Similar to highest speed group. 54% daily usage.	Similar to lowest speed group. 48% daily usage	Similar to medium-low speed group. 54% daily usage
	Search for health or medical related information	Second highest usage among speed groups. 33% daily usage.	Second lowest usage among speed groups. 29% daily usage.	Lowest usage among speed groups. 26% daily usage.	Highest usage among speed groups. 41% daily usage.
	Search for educational information	Second highest usage among speed groups. 38% daily usage.	Second lowest usage among speed groups. 32% daily usage.	Lowest usage among speed groups. 30% daily usage.	Highest usage among speed groups. 41% daily usage.
Downloading	Purchasing and downloading music	Second lowest usage among speed groups. 30% daily usage.	Lowest usage among speed groups. 26% daily usage.	Second highest usage among speed groups. 33% daily usage.	Highest usage among speed groups. 40% daily usage.
	Purchasing and downloading movies (full movies)	Second lowest usage among speed groups. 30% daily usage.	Lowest usage among speed groups. 24% daily usage.	Second highest usage among speed groups. 32% daily usage.	Highest usage among speed groups. 34% daily usage.
	File sharing (for free) of music	Lowest usage among speed groups. 37% daily usage.	Second lowest usage among speed groups. 38% daily usage.	Second highest usage among speed groups. 41% daily usage.	Highest usage among speed groups. 43% daily usage.
	File sharing (for free) of movies	Similar to medium-low speed group. 35% daily usage.	Similar to lowest speed group. 34% daily usage.	Similar to highest speed group. 42% daily usage.	Similar to medium-high speed group. 43% daily usage.

7. Descriptive analysis of the socio-economic and usage factors for users with willingness to upgrade

The following section will describe the socio-economic factors and the Internet usage for the survey participants who are interested in upgrading their Internet subscription speed within the next 12 months. Only data from the participants who answered 5,6 or 7 on a scale one to seven where one represented “not interested” and seven represented “very interested” will be presented. First the socio-economic factors will be presented for the developed and the emerging countries, followed by the usage factors. Both sections will be summarized with a table of summary to allow for easy comparison.

This chapter is based upon the same survey data as in chapter 6. From this data, the users with willingness to upgrade have been selected and are used as the base from which the graphs and tables presented are derived. When talking about “the users” or “the people” in this section, the data population concerned is the ones with a willingness to upgrade.

The aim of the analysis is to describe the socio-economic and usage characteristics of users with willingness to upgrade with different levels of broadband speed. First, the socio-economic aspects will be analysed, followed by the factors describing the usage. Every speed group will also be summarized in the end of each section. For both the socio-economic section and the usage section there will be two subsections consisting of developed countries and emerging countries.

The different groups of broadband speed (low, medium-low, medium-high and high) used in chapter 6 are also used in this chapter.

For gender and age, the result is presented together with a reference with the result of all respondents. The purpose of this is to facilitate the observations and conclusions.

7.1 Socio-economic factors

The factors used to describe the socio-economic characteristics of the people with willingness to upgrade are the same as presented in chapter 6.1. They are also presented in the same way and same order.

7.1.1 Developed countries

The same six countries mentioned in chapter 6 are also representing the developed countries in this chapter. The population observed is the ones with a willingness to upgrade that is higher than five (5) on a 7-point scale. The number of respondents with willingness to upgrade is presented per country in table 16 and per speed group in table 17.

Table 16 Number of users willing to upgrade in the different countries

Country	Users
UK	562
France	971
Germany	688
Italy	854
Spain	765
Sweden	366

Table 17 Number of users willing to upgrade in the different speed groups

Low	Medium-Low	Medium-High	High
523	782	1412	585

The group with medium-high speed, with broadband speeds of up to 12 Mbit/s, is the most common among users with willingness to upgrade in developed countries with about twice the user base compared with the other group.

7.1.1.1 Gender

As seen in the chart presented in figure 70, males are more likely than females to want to upgrade their broadband speed. In general the lower the speed the bigger the share of females who want to upgrade, with the opposite being true for high speed broadband.

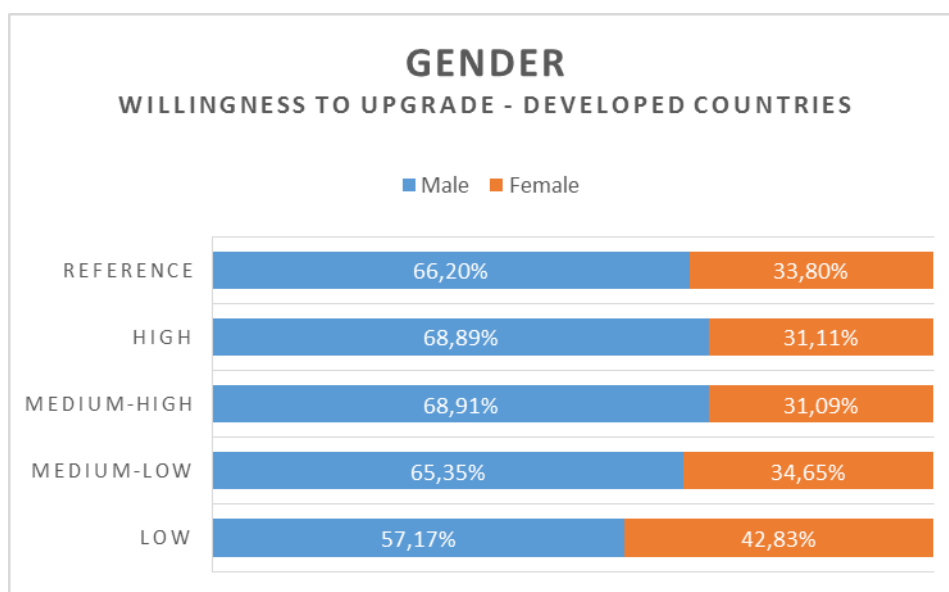


Figure 70 Gender distributions for users with willingness to upgrade in developed countries

7.1.1.2 Age

As can be seen in figure 71, all speed levels are almost equally spread between the different age groups with small differences between them. Most users wanting to upgrade are around 30 years old. The group with low broadband speed have a bigger share of people of age 18 to 19 wanting to upgrade their speed as well as slightly more users between 40 and 69. Users of medium-low broadband speed have a higher percentage users of age 20 to 39 wanting to upgrade their speed compared to the other speed levels with a smaller share of users of age 40 to 54. The age distribution for the group with medium-high speed age is very similar to that of the total population with single biggest difference in the age group 15-17 where the group with medium-high broadband has the biggest share of people wanting to upgrade their broadband speed. The group of users of high broadband speed have the largest share of users being between 40 and 49 years old and slightly more users of age 22 to 24 and additionally a higher percentage users of age 30-39.

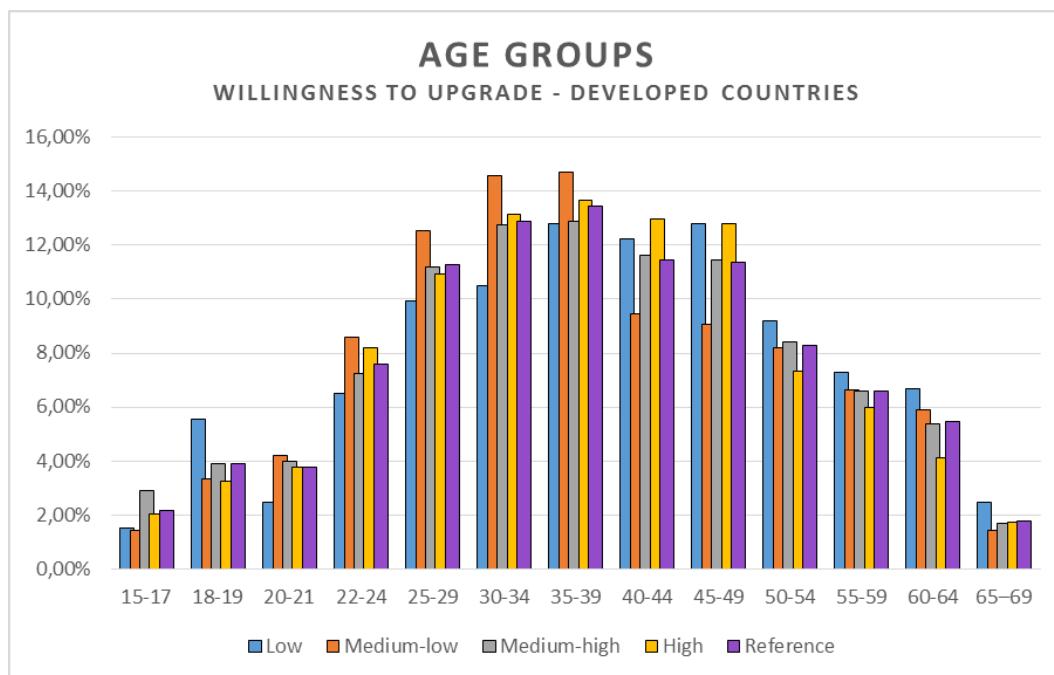


Figure 71 Distribution of age groups for users with willingness to upgrade in developed countries

7.1.1.3 Marital status

As seen in figure 72, the marital status seems to have little effect on broadband speed. The share of users that are married are of fairly equal size for all speed groups. For the group with middle-low broadband speed the share of users that are single is larger compared to the all other speed levels while the group with high broadband speed has a larger portion of its user base living together with a partner or significant other.

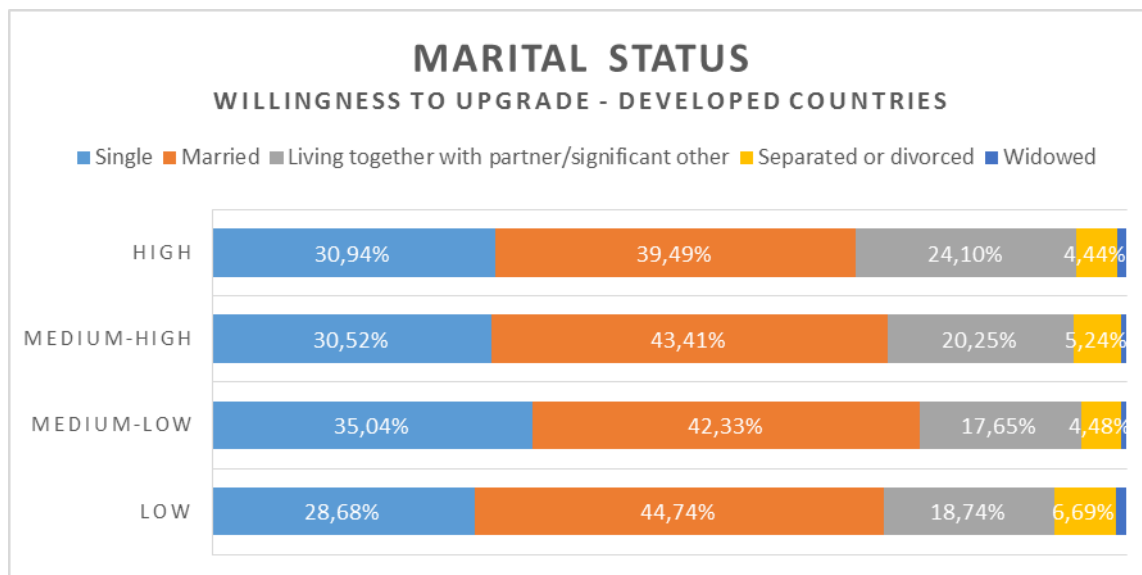


Figure 72 Distributions for marital status for users with willingness to upgrade in developed countries

7.1.1.4 City/town size

As seen in figure 73, the share of users living in metropolitans or bigger cities seems to increase with broadband speed, with the group with high broadband speed having the largest and low the smallest. The group with low broadband speed sees a bigger share of users wanting to upgrade their speed who lives in towns and smaller city. The group with medium-low broadband speed has the highest percentage of users wanting to upgrade their speed in medium sized cities.

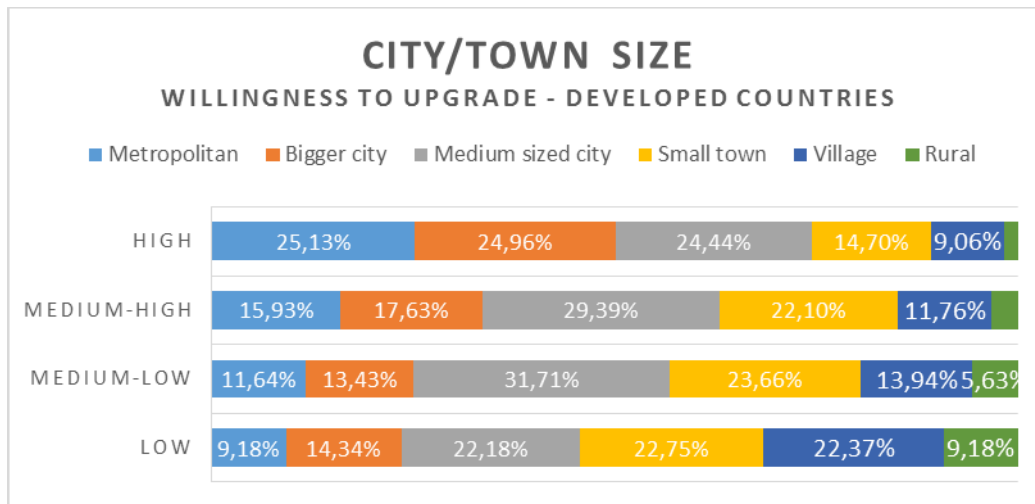


Figure 73 City/town size distributions for users with willingness to upgrade in developed countries

7.1.1.5 Current type of residence

The distribution for type of residence for users that are willing to upgrade is presented in figure 74. The share of users who lives in a student dormitory and the other type of residence categories is too small to analyse. There seem to be a tendency that the share of users living in flats increases with broadband speed, with the group with low broadband speed having a larger share of its user base living in owned and rented houses compared to the other speed levels.

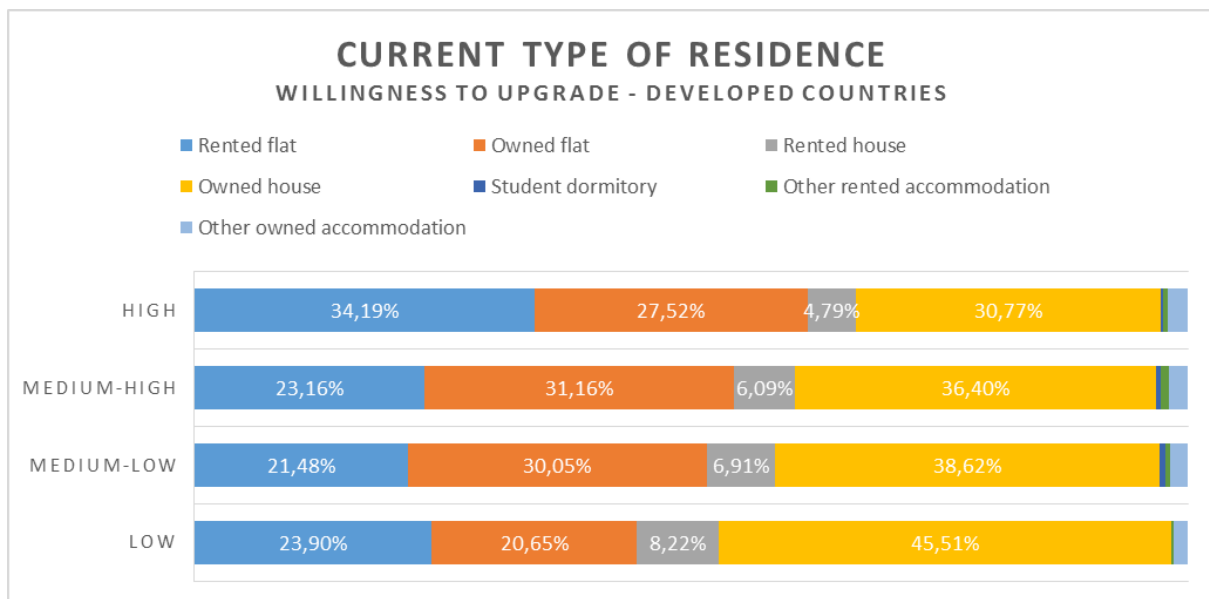


Figure 74 Distribution of current type of residence for users with willingness to upgrade in developed countries

7.1.1.6 Household size

Households with six or more people, as seen in figure 75, had a too low share of users to be analysed. The share of users living in households of size two seem to decrease with speed while households with size three increases. The group with medium-low and medium-high broadband speed are fairly similarly distributed among the different household sizes with a bigger share of users living in households with four people. The group with high broadband speed has the highest percentage of the users living in single-person households willing to upgrade of all the speed levels.

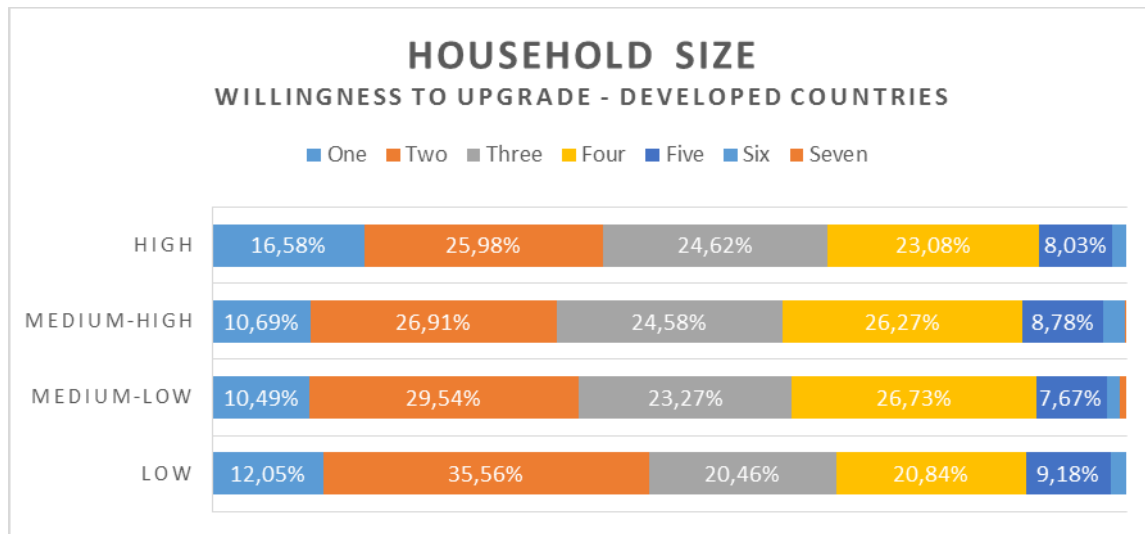


Figure 75 Distribution of household size for users with willingness to upgrade in developed countries

7.1.1.7 Level of education

The by far largest share of users that are willing to upgrade have high school as their highest level of education. The group with low broadband speed has the biggest share of users wanting to upgrade their broadband speed with a lower level of education. The group with high broadband speed has the largest share of users with a college degree.

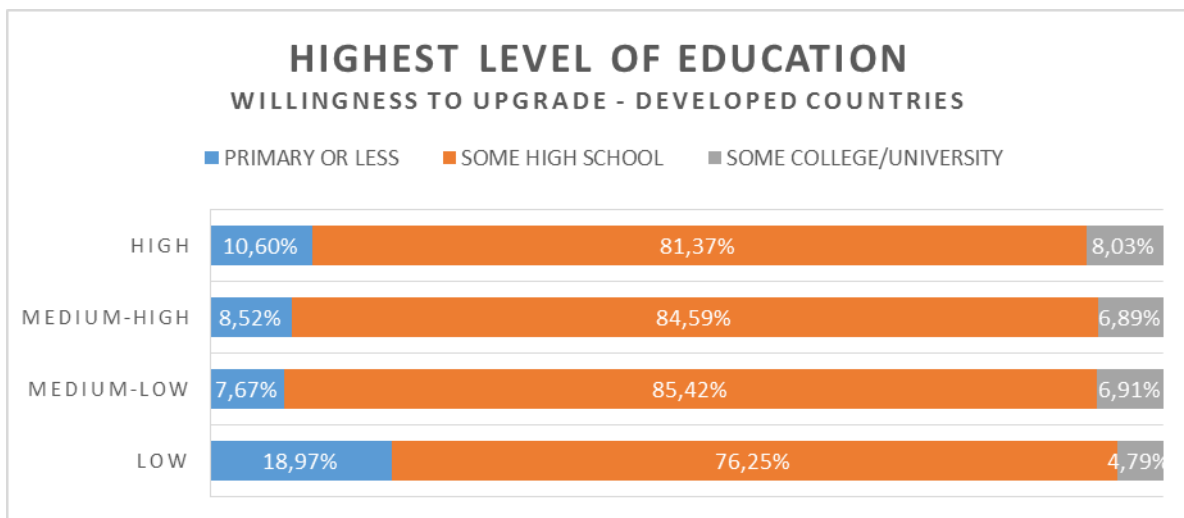


Figure 76 Distribution of education level for users with willingness to upgrade in developed countries

7.1.1.8 Current working status

Most users wanting to upgrade, as seen in figure 77, are full-time employees. Users with low and high broadband speed have the biggest share of users willing to upgrade that are full-time employees. The group with medium-low broadband speed has the biggest share of users that are full-time students while the group with medium-high broadband speed has the highest percentage of users that are self-employed.

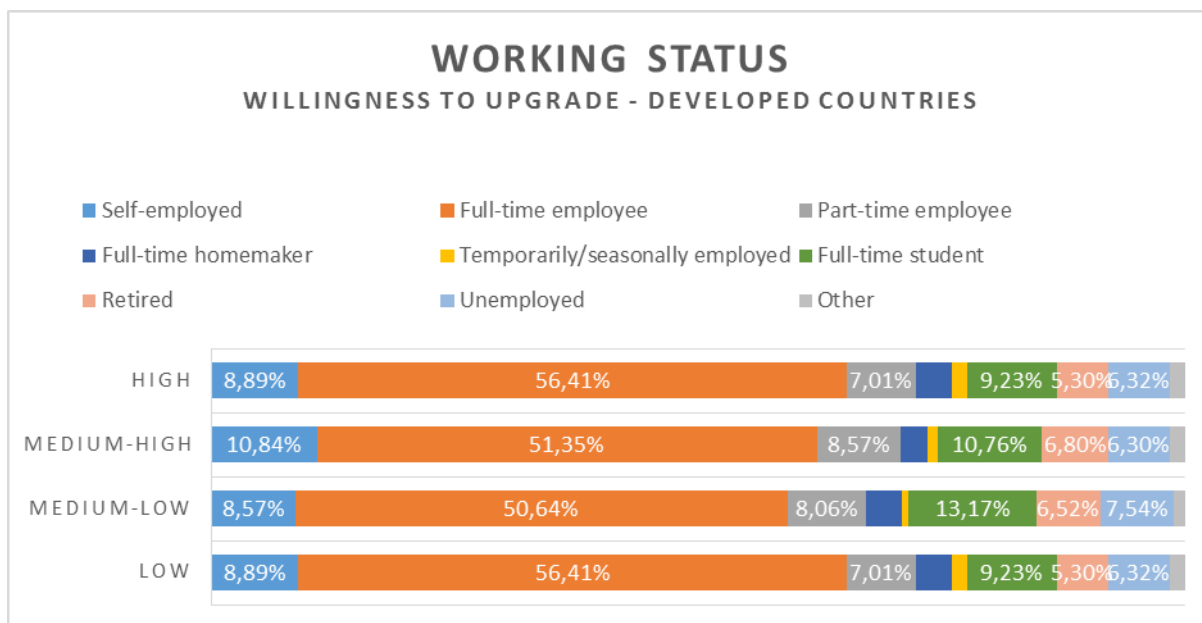


Figure 77 Distribution of working status for users with willingness to upgrade in developed countries

7.1.1.9 Level of income

As seen in figure 78, level of income seems to have an association with broadband speed for users that are willing to upgrade. The share of users with high levels of income increases with speed, while the share of low income decreases. This holds true for all income- and speed levels.

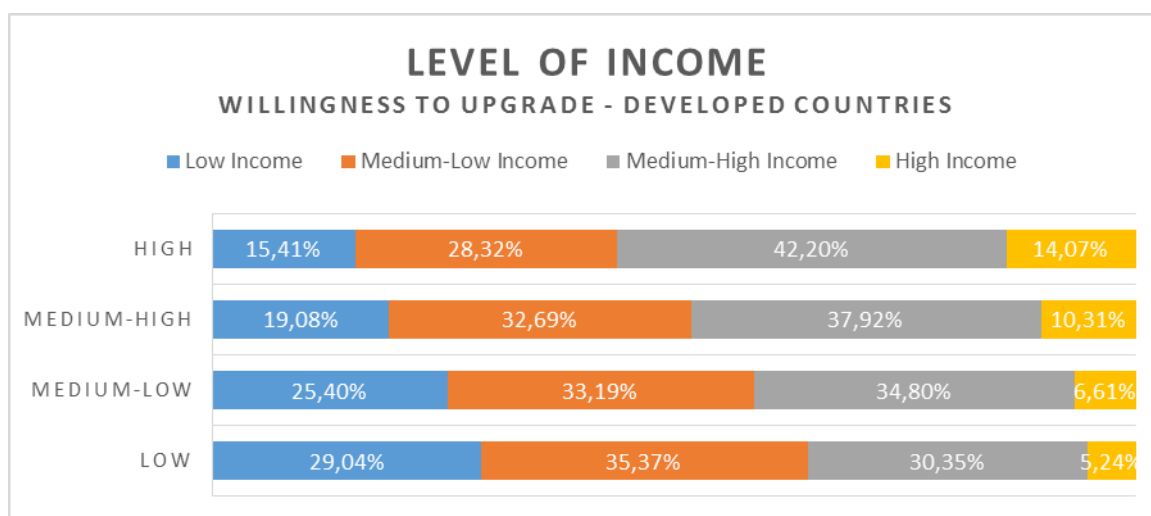


Figure 78 Distribution of level of income for users with willingness to upgrade in developed countries

7.1.1.10 Summary of speed groups for socio-economic factors for developed countries

In this section, the socio-economic factors for the users willing to upgrade their broadband speed in the developed countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

The number of low-speed subscribing males that are willing to upgrade their broadband speed is considerably higher, compared to the corresponding females. However, the share of males that are willing to upgrade their speed is lower compared to the higher levels of speed. The willingness increases up to the age of 35-49, and then decreases in the older age groups. An exception is the age group of 20-21 where the willingness drops from a considerably high level. The low-speed subscribers' willingness to upgrade decreases from the highest among

married people, to singles-status people, people living together with partner/significant other, separated or divorced people and the lowest among widowed people.

The rate of willingness to upgrade among low-speed subscribers increases from rural- to village size, but then decreases with city/town size bigger than medium-size cities. The willingness is far higher among the full-time employees and relatively low among the other working statuses. People with “some high school”-education are the most willing to upgrade. Also, the willingness among people with “primary or less”-level of highest education is considerably high compared to people with “some collage/university”-education. When looking at household size, the rate of willingness to upgrade increases a lot from one to two people, and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade increases from low to medium-low income but then decreases steadily. Compared to the other speed levels, the rate is relatively high in the lower income groups and low in the higher income groups. There is a big difference in willingness between owned (high WTU) and rented (low WTU) houses, whereas the willingness for people living in flats is fairly high independent of ownership.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

The number of medium-low-speed subscribing males that are willing to upgrade is considerably higher, compared to the corresponding females. The medium-low-speed subscribers express about the same rate of willingness as the total average for all speeds. The willingness increases up to the age of 30-39, and then decreases in the older age groups. The medium-low-speed subscribers’ willingness to upgrade decreases from the highest among married people, to singles-status people, people living together with partner/significant other, separated or divorced people and the lowest among widowed people.

The rate of willingness to upgrade among low-speed subscribers first increases with city/town size up to medium-size cities, but then decreases as the cities grow bigger. The willingness is far higher among the full-time employees and relatively low among the other working statuses. People with “some high school”-level of highest education are the most willing to upgrade, the other rates are considerably low. When looking at household size, the rate of willingness to upgrade increases a lot from one to two people, it then flattens out for three and four people, and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade increases slowly to the level of medium-high income but then drops for high income. There is a correlation between large ownership and high willingness to upgrade, especially when looking at houses where people living in rented residences are considerably less willing to upgrade.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

The number of medium-high-speed subscribing males that are willing to upgrade is considerably higher, compared to the corresponding females. Also, the rate of males that are willing to upgrade is higher compared to the lower levels of speed. The willingness quickly increases up to the age of 30-39, and then decreases in the older age groups. The medium-high-speed subscribers’ willingness to upgrade decreases from the highest among married people, to singles-status people, people living together with partner/significant other, separated or divorced people and the lowest among widowed people.

The rate of willingness to upgrade among low-speed subscribers first increases with city/town size up to medium-size cities, but then decreases as the cities grow bigger. The willingness is far higher among the full-time employees and relatively low among the other working statuses. People with “some high school”-level of highest education are the most willing to upgrade, the other rates are considerably low. When looking at household size, the

rate of willingness to upgrade increases substantially from one to two people, it then flattens out for three and four people, and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade increases to the level of medium-high income but then drops for high income. There is a correlation between large ownership and high willingness to upgrade, especially when looking at houses where people living in rented houses are considerably less willing to upgrade. The willingness for people living in flats is fairly high, both for owned and rented flats.

High broadband speed: More than 12 Mbit/s

The number of medium-high-speed subscribing males that are willing to upgrade is noticeably higher, compared to the corresponding females. Also, the rate of males that are willing to upgrade is higher compared to the low-speed levels. The willingness quickly increases up to the age of 30-49, and then decreases in the older age groups. Similar the lower speed groups, the high-speed subscribers' willingness to upgrade decreases from the highest among married people, to singles-status people, people living together with partner/significant other, separated or divorced people and the lowest among widowed people.

The rate of willingness to upgrade among low-speed subscribers increases quickly initially with city/town size, up to medium-size cities where it flattens out on a high rate of willingness. The willingness is far higher among the full-time employees and relatively low among the other working statuses. People with "some high school"-level of highest education are the most willing to upgrade, the other rates are considerably low. The rate of willingness to upgrade is relatively high for household sizes of one compared to the lower speed levels. The rate increases substantially from one to two people, it then flattens out and decreases slowly for three and four people. The rate then drops as household size increases.

As the level of income gets higher, the rate of willingness to upgrade increases steadily to the level of medium-high income but then drops for high income. Compared to the other speed levels, the rate is relatively low in the lower income groups and high in the higher income groups. Compared to the other speed levels, the rate of willingness to upgrade is relatively low for people living in houses. The rate willingness is still high among people living in owned houses, but in this group the rate is about the same as for people living in flats (independent of ownership). The rate of willingness to upgrade is especially high for people living in rented flats, even higher than in owned flats, this reverse ratio differs from the lower speed groups.

7.1.1.11 Summary of socio-economic factors for users with willingness to upgrade

In the following chart the findings from the socio-economic factors for users with willingness to upgrade in developed countries are summarized.

Table 18 Summary of socio-economic factors for WTU, developed countries

Developed markets	Low	Medium-low	Medium-high	High
Gender	-Largest share of females. Still male dominated.	Male dominated.	Largest share of males.	Male dominated.
Age groups	-Large share of people in age span 40 to 69 -Largest share of users in age span 18 to 19.	-Large share of users in age span 20-39. -Smallest share of users in age span 40 to 49.	-Largest share of users in age group 15-17.	-Largest share of users in age span 40-49. -Slightly larger share of users in age group 30-34.
Marital Status	-Largest share of users that are married. -Smallest share of users that are single. -Small share of users that are living with a partner/significant other.	-Largest share of users that are single. -Smallest share of users that are living with a partner/significant other.	-Slightly larger share of users that are married compared to medium-low and high speed. -Large share of users that are living with a partner/significant other.	-Smallest share of users that are married. -Largest share of users that lives with a partner/significant other.
City/Town size	-Largest share of users living in villages or rural areas. -Smallest share of users that lives in medium-sized cities or larger city sizes.	-Largest share of users in medium sized cities. -Small share of users that lives in metropolitans and bigger cities.	-Large share of users living in metropolitans, bigger cities and medium sized cities. -Small share of users that lives in villages and rural areas.	-Largest share of users that lives in metropolitans and bigger cities. -Smallest share that lives in villages and rural areas.
Type of residence	-Largest share of users that lives in owned houses. -Smallest share that lives in any type of flat.	-Large share of users that lives in owned flats. -Smallest share of users that lives in rented flats.	-Largest share of users that lives in owned flats. -Comparably share of users that lives in owned houses and rented flats.	-Largest share of users living in rented flats. -Smallest share of users that lives in owned houses.
Household size	-Largest share of users that lives in households with two people. -Smallest share of users that lives in households with size three or greater.	-Large share of users that lives in households with two people. -Largest share of users that lives in households with size four.	-Smallest share of users that lives in households with size one or two. -Large share of users that lives in households with size three and four.	-Largest share of users that lives in single-person households as well as households with size three.
Level of income	-Highest share of users with low and medium-low level of income. -Smallest share of users that have high or medium-high level of income.	-Higher level of income in general compared to low broadband speed.	-Higher level of income in general compared to low and medium-low broadband speed.	-Highest share of users with high and medium-high level of income. -Smallest share of users that have low or medium-low level of income.
Working status	-Large share of users that are full-time employees.	-Largest share of users that are not either self-employed or full-time employee.	-Largest share of users that are self-employed. -Smaller share of users that are full-time employees compared to high and low broadband speed.	-Large share of users that are full-time employees.
Highest level of education	-Largest share of users that have primary or less as highest level of	-Largest share of users with high school as highest level of education.	-Very similarly distributed to medium-low	-Largest share of users that have college/university as highest level of

Developed markets	Low	Medium-low	Medium-high	High
	education. -Smallest share of users that have high school or college/university as highest level of education.			education. -Larger share of users that have primary or less as highest level of education compared to medium-high and medium-low.

7.1.2 Emerging countries

The same three countries are representing the emerging countries as in chapter 6. The population observed is the ones with a willingness to upgrade that is higher than five (5) on a 7-point scale. The number of respondents with willingness to upgrade is presented per country in table 19 and per speed group in table 20.

Table 19 Number of respondents with a willingness to upgrade for each emerging country

Country	Users
China (Urban)	603
Brazil	671
India	540

Table 20 Number of respondents with willingness to upgrade in each speed group

Speed level	Low	Medium-low	Medium-high	High
Users	823	665	83	91

7.1.2.1 Gender

The portion of the user base that are males and willing to upgrade their speed decreases with broadband speed. This tendency can be observed in figure 79 when comparing the distribution of males with females between levels of speed. In the groups with low-, medium-low and medium high speed male subscribers are overrepresented, while females are overrepresented for the high-speed.

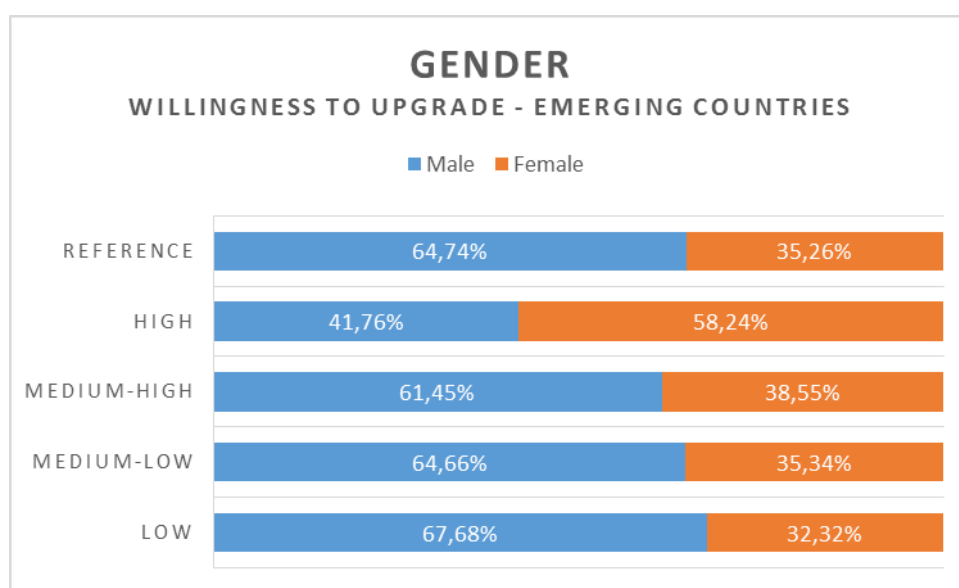


Figure 79 Gender distributions for users with willingness to upgrade in emerging countries

7.1.2.2 Age groups

Most users willing to upgrade in emerging markets are of age 22 to 30. As seen in figure 80 there are no obvious tendencies between willingness to upgrade, speed level and age. The group with low-speed broadband has a higher percentage of its users in the younger population, compared with other speed levels, while having a lower share of users that are over 30. The group with high and medium-high broadband speed has a bigger portion of their user bases in age groups 25 to 29 and 45 to 49 years old compared with lower speed levels

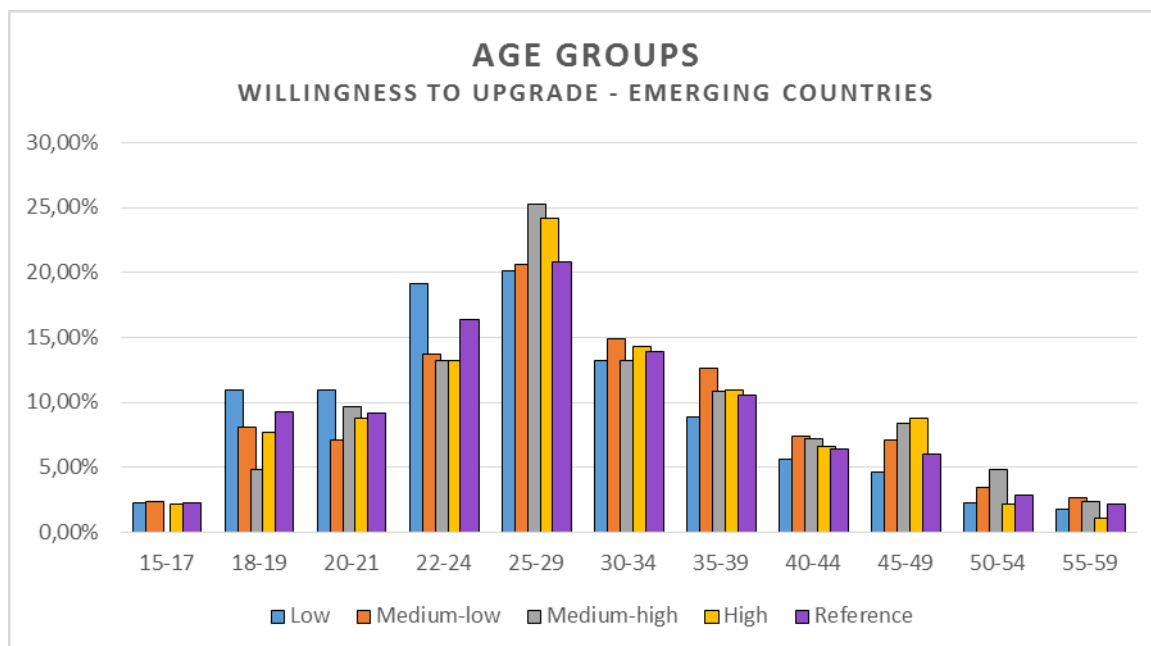


Figure 80 Distribution of age groups for users with willingness to upgrade in emerging countries

7.1.2.3 Marital status

As seen in figure 81, marital status seem to have some association with speed level where the share of users whom are married seem to increase with broadband speed while the share of singles decreases. This holds true for all speed levels except the group with high broadband speed. The group with medium-high broadband speed has the largest share of its user base that lives with a partner or significant other.

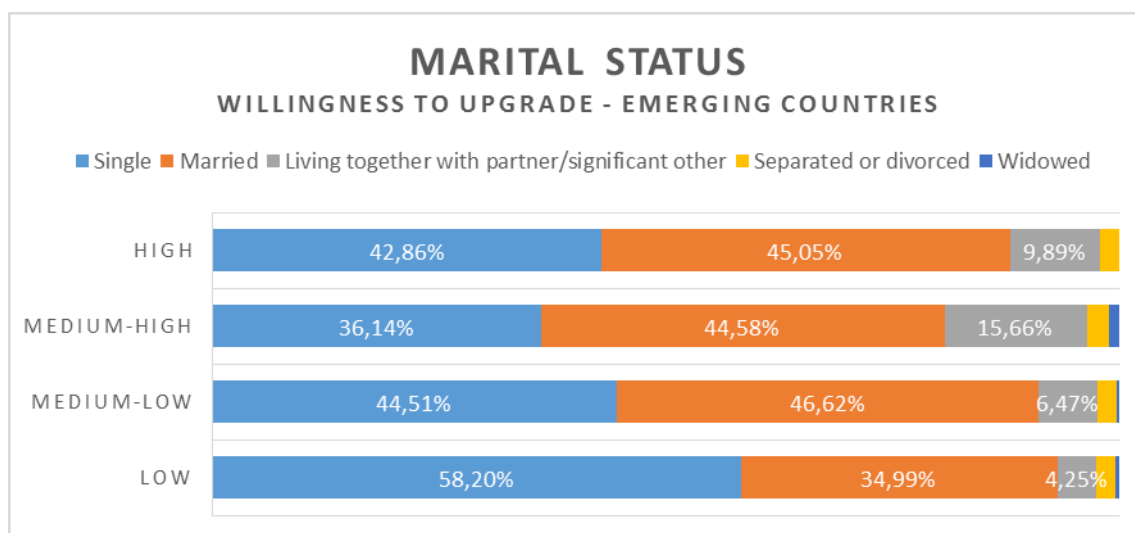


Figure 81 Distribution of marital status for users with willingness to upgrade in emerging countries

7.1.2.4 City/town size

As illustrated in figure 82 the share of respondents with a willingness to upgrade is largest for metropolitan cities and decreases steadily with decreasing city/town size for all speed levels. The group with medium-high broadband speed has a comparably large share of users living in either metropolitans or bigger cities. It can also be noted that the group with low broadband speed has the largest portion of users living in metropolitans.

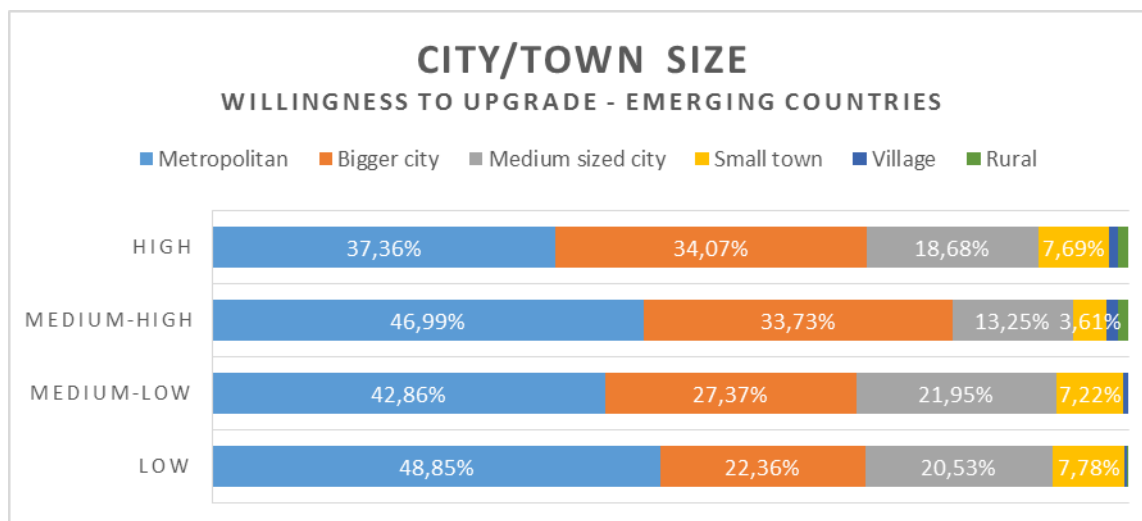


Figure 82 City/town size distribution for users with willingness to upgrade in emerging countries

7.1.2.5 Type of residence

The distribution of type of residence and present speed level of the subscribers is illustrated in figure 83. In this comparison, there is no obvious tendency in the willingness to upgrade and what level of subscription that is associated to which type of residence. The group with low speed broadband has a comparably larger share of users who lives in rented flats or rented houses. Users with medium-low broadband speed has the largest share of users who lives in owned houses while the users with high and medium-high speed has the highest percentage of their users who lives in owned flats.

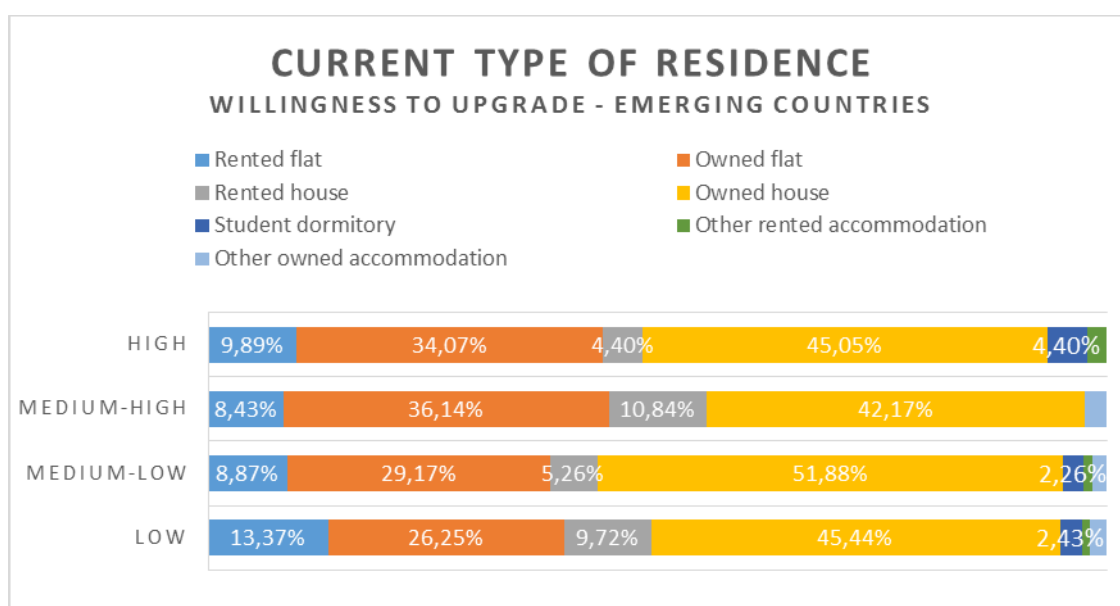


Figure 83 Distribution of current type of residence for users with willingness to upgrade in emerging countries

7.1.2.6 Household size

As illustrated in figure 84, the household size seems to not have any association with the users' level of speed. The only tendency that can be observed is that the share of users that lives in single-person households decreases with broadband speed. The share of users that live in single-person households is however relatively small compared to other household sizes. The group with medium-high broadband speed has a comparably larger share of users who lives in households with two people. The users with medium-low broadband speed more commonly lives in households with three people compared with the other speed levels. The

two highest speed levels seem to have a bigger share of its users living in households with five people compared to the lower speed levels.

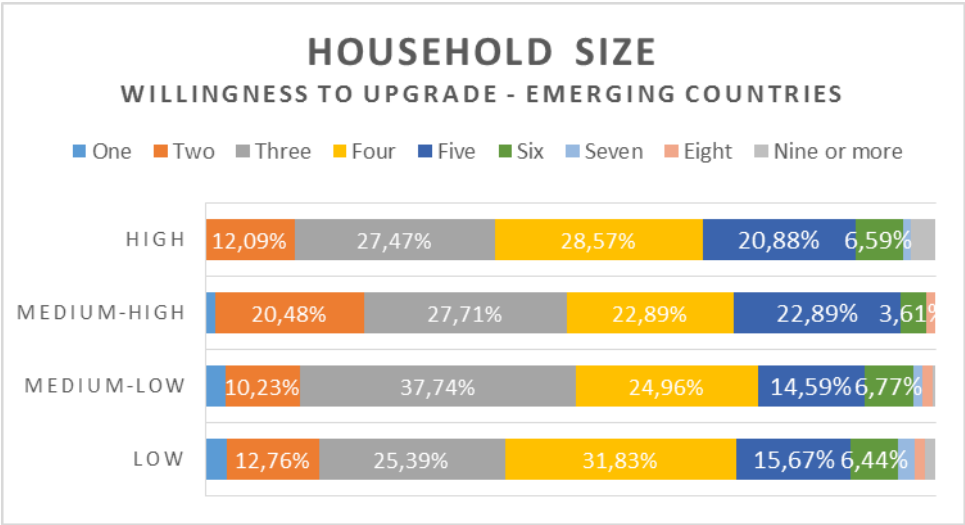


Figure 84 Distribution of household size for users with willingness to upgrade in emerging countries

7.1.2.7 Highest level of education

The distribution of highest level of education is presented in figure 85. There is no obvious tendency for how the level of speed is associated with level of education. The share of respondents is far higher among the subscribers with high school as highest level of education, regardless of level of speed. The share of users with a college/university degree decreases with speed for all speed groups except high broadband speed. The share of subscribers with *primary or less* as highest level of education is almost absent. It is thus difficult to observe any tendencies for that group.

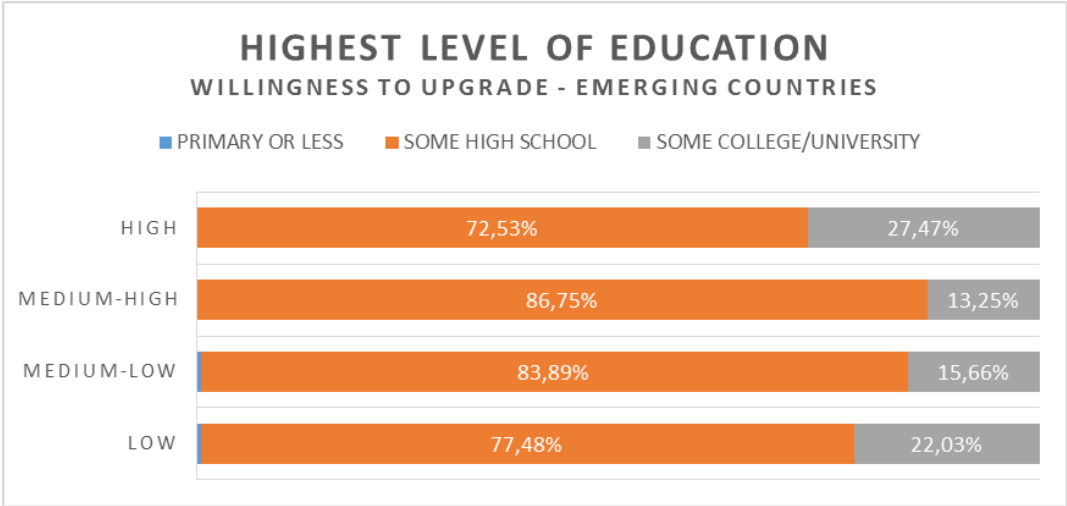


Figure 85 Distribution of level of education for users with willingness to upgrade in emerging countries

7.1.2.8 Working status

As illustrated in figure 86, the results of the survey shows no association between working status, willingness to upgrade and speed level. The share of users that are willing to upgrade is bigger for full-time employees than any other working status. The group with medium-high broadband speed has a higher percentage of its users that are self-employed compared to the other levels of speed while the users with medium-low broadband speed more commonly are full-time employees. The groups with high and low broadband speed both have a smaller

share of users that are either self-employed or full-time employees than the users with medium-high or medium-low speed.

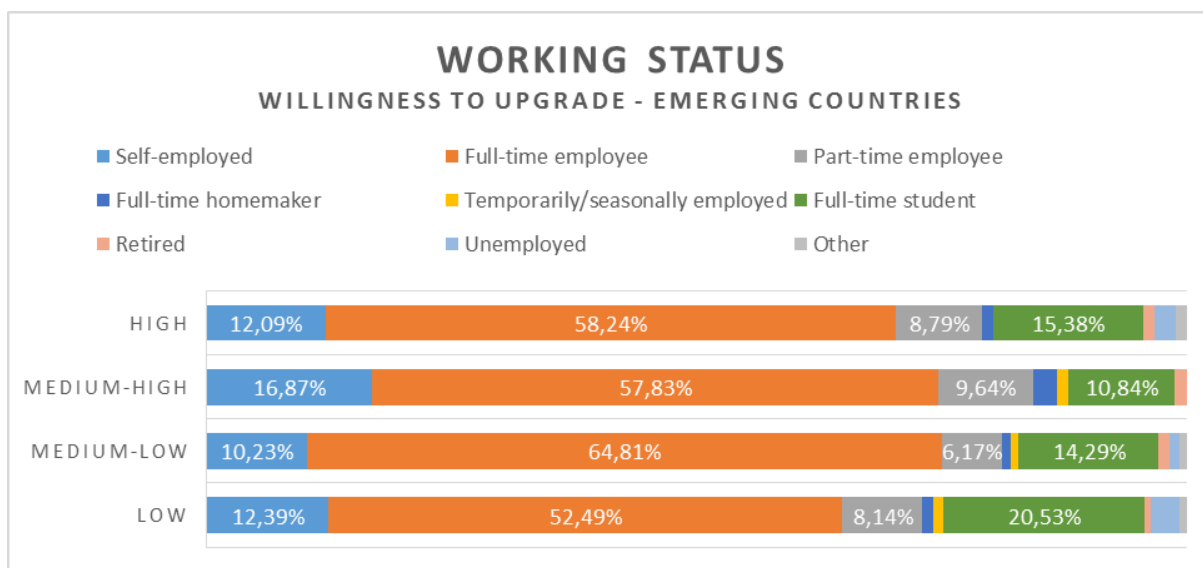


Figure 86 Distribution of working status for users with willingness to upgrade in emerging countries

7.1.2.9 Level of income

The distribution of income and present speed level of the people with willingness to upgrade is illustrated in figure 87. The high-income subscribers are slightly overrepresented for low and high speed. The relative share of users who are willing to upgrade, with high or medium-high level of income, increases with higher level of speed.

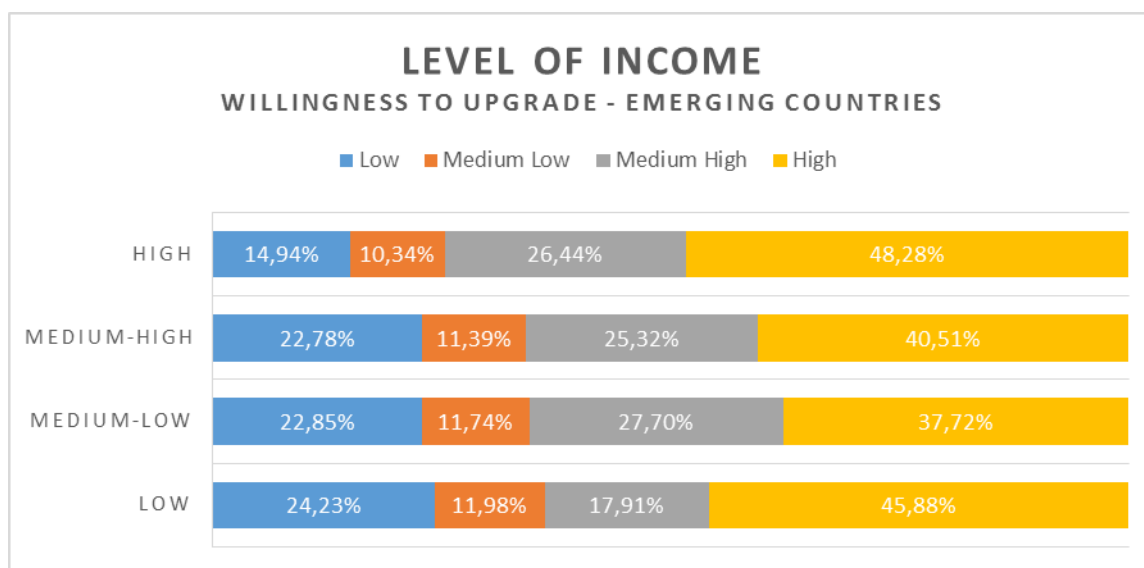


Figure 87 Distribution of level of income for users with willingness to upgrade in emerging countries

7.1.2.10 Summary of speed groups for socio-economic factors for emerging countries

In this section, the socio-economic factors for the users willing to upgrade their broadband speed in the emerging countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

The number of low-speed subscribing males that are willing to upgrade is almost twice as high compared to the corresponding females. Relatively speaking, they are the dominant speed-group among males but the smallest group among females. The willingness increases

up to the age of 25-29, and then decreases in the older age groups. Low-speed subscribers are particularly high represented among people in age 18-24. They express a high willingness to upgrade among singles-status people, fairly high among married people and considerably low among other marital statuses

The rate of willingness to upgrade is highest in metropolitan cities and decreases with decreasing city/town size. Notable is that the rate is relatively high in metropolitan and relatively low in bigger cities. When comparing working statuses, the rate of willingness is far higher among the full-time employees. Full-time students, self-employed and part-time employees, in decreasing order, also have a significant willingness to upgrade. Many people with “some high school”-education are willing to upgrade. It is also visible that the rate of willingness to upgrade among people with “primary or less”-education is almost absent. There is a clear tendency in that the rate increases up to household size of four people and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade first decreases but then increases steadily. There is a strong correlation between large ownership and high willingness to upgrade. Relatively speaking, people living in rented residences are considerably less willing to upgrade.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

The number of medium-low-speed subscribing males that are willing to upgrade is considerably higher compared to the corresponding females. The medium-low-speed subscribers express about the same rate of willingness as the total average for all speeds. The willingness increases up to the age of 25-29, and then decreases in the older age groups. Medium-low-speed subscribers express a high rate of willingness to upgrade among married and singles-status people, and considerably low rate among other marital statuses.

The rate of willingness to upgrade is highest in metropolitan cities and decreases with decreasing city/town size. When comparing working statuses, the rate of willingness is far higher among the full-time employees. Full-time students, self-employed and part-time employees, in decreasing order, also have a significant rate of willingness to upgrade. Many people with “some high school”-education are willing to upgrade. It is also notable that the rate of willingness to upgrade among people with “primary or less”-education is almost absent. The rate of willingness quickly increases with household size from one to three people, which is the most willing group in this comparison. The rate then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade first decreases but then increases steadily. There is a strong correlation between large ownership and high willingness to upgrade. People living in rented residences are considerably less willing to upgrade.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

The number of medium-high-speed subscribing males that are willing to upgrade is noticeably higher, compared to the corresponding females. The rate of willingness quickly increases up to the age of 25-29, and then decreases in the older age groups. Medium-high-speed subscribers express a high rate of willingness to upgrade among married and singles-status people. Compared to the other speed groups, they also have a relatively high rate of willingness among people living together with partner/significant other. The rate among other marital statuses is considerably low.

The rate of willingness to upgrade is highest in metropolitan cities and decreases with decreasing city/town size. Notable is that the rate is relatively low in medium size cities and smaller towns compared to other speeds. When comparing working statuses, the rate of

willingness is far higher among the full-time employees. Self-employed, full-time students and part-time employees, in decreasing order, also have a significant willingness to upgrade. Many people with “some high school”-education are willing to upgrade. It is also visible that the rate of willingness to upgrade among people with “primary or less”-education is almost absent. There is a clear tendency in that the rate increases up to household size of three people and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade first decreases but then increases steadily. There is a strong correlation between large ownership and high willingness to upgrade. People living in rented residences are considerably less willing to upgrade.

High broadband speed: More than 12 Mbit/s

Unlike the other speed groups, the number of high-speed subscribing males that are willing to upgrade is lower compared to the corresponding females. The willingness quickly increases up to the age of 25-29, and then decreases in the older age groups. High-speed subscribers express a high rate of willingness to upgrade among married and singles-status people, and considerably low among other marital statuses.

The rate of willingness to upgrade is highest in metropolitan cities and decreases slowly with decreasing city/town size. Notable is that the rate is relatively low in metropolitan cities and high in bigger cities towns, compared to lower speed levels. When comparing working statuses, the rate of willingness is far higher among the full-time employees. Full-time students, self-employed and part-time employees, in decreasing order, also have a significant willingness to upgrade. Many people with “some high school”-education are willing to upgrade. It is also visible that the rate of willingness to upgrade among people with “primary or less”-education is almost absent. There is a clear tendency in that the rate increases up to household size of four people and then decreases with increasing household size.

As the level of income gets higher, the rate of willingness to upgrade first decreases but then increases steadily. Notable is that the rate is relatively low in the lower income-groups and high in high-income groups, compared to lower speeds. There is a strong correlation between large ownership and high willingness to upgrade. People living in rented residences are considerably less willing to upgrade.

7.1.2.11 Summary of socio-economic factors for users with willingness to upgrade for emerging countries

In the following chart the findings from the socio-economic factors for users with willingness to upgrade in emerging countries are summarized.

Table 21 Summary of socio-economic factors for users with willingness to upgrade in emerging countries

WTU in Emerging Countries	Low	Medium-low	Medium-high	High
Gender	Most male dominated speed level	Male dominated	Male dominated	Female dominated
Age	- Largest share of users in age span 18 to 24. -Lower share of users in age span 30 to 59.	-Slightly higher share of users in age span 30 to 40.	-Large share of users in age spans 25 to 29 and 45 to 54. -Smallest share of users in age span 15 to 19.	-Large share of users in age spans 25 to 29 and 45 to 49.
Marital status	-Largest share of users that are singles.	-Most users are either single or married with an almost equal divide between the two.	-Smallest share of users that are single. -Largest share that are living with a partner/significant other.	-Most users are either single or married with an almost equal divide between the two.
Town size	-Large share of users living in metropolitans.	-Slightly larger share of users who lives in medium sized cities or smaller city/town sizes.	-Large share of users living in metropolitans or bigger cities. -Smallest share of users who lives in medium sized cities or smaller city/town sizes.	-Large share of users living in bigger cities -Smallest share of users living in metropolitans
Current type of Residence	-Largest share of users that live in rented flats. -Smallest share of users living in owned flats.	-Largest share of users living in owned houses. -Small share of users living in owned flats.	-Largest share of users living in owned flats. -Largest share of users living in rented houses, still a small group.	-Large share of users living in owned flats.
Household Size	-Largest share of users living in households with size two -Large share of users living in households with size larger than three	-Largest share of users living in household with size three -Smallest share living in households larger than three.	-Largest share of users living in households with size two. -Largest share of users living in households with size five. -Smallest share of users living in households with size three.	-Large share of users living in households with size four. -Largest share of users living in households with size four or greater.
Level of Income	-Largest share of users with low level of income. -Large share of users with high level of income. -Smallest share of users with medium-high level of income.	-Largest share of users with medium-high level of income -Smallest share of users with high level of income.	-Large share of users with medium-high level of income. -Small share of users with high income level.	-Largest share of users with high level of income. -Large share of users with medium-high level of income. -Smallest share of users with low level of income

WTU in Emerging Countries	Low	Medium-low	Medium-high	High
Working status	-Small share of users that are full-time employees. -Largest share of users that are full-time employees.	-Largest share of users that are full-time employees. -Smallest share that are self-employed	-Largest share of users that are self-employed. -Large share of users that are full-time employees. -Smallest share of users that are full-time students.	-Largest share of users that are full-time employees.
Level of Education	-Large share of users with college/university as highest level of education	-Small share of users with highest level of education being college/university	-Smallest share of users with highest level of education being college/university	-Largest share of users with highest level of education being college/university

7.2 Usage factors

The factors used to describe the usage of the people with willingness to upgrade are the same as presented in chapter 6.2. They also have the same segmentation and are presented in the same order.

7.2.1 Developed countries

This section covers the usage factors for users with willingness to upgrade in developed countries. As presented in chapter 7.1.1, the group with a medium-high speed is the most common among users with willingness to upgrade in developed countries with about twice the user base compared with the other group.

7.2.1.1 Personal usage

The following three factors are used to describe *usage of the Internet for personal reasons*:

- Personal e-mails
- Browsing the Internet (for personal reasons)
- Instant messaging/chat (for personal reasons)

There is an overall high level of usage of the Internet for personal use. For personal e-mails, more than 80 percent of all respondents use it daily, regardless of level of speed (see figure 88). As seen in figure 89, the corresponding number for browsing the Internet is around 90 percent. For both personal e-mails and browsing the Internet, the shares of users using the services more seldom than monthly (monthly or less often) are very small. For both personal e-mails and browsing the Internet, the distributions are fairly similar. However, for both the group with low speed has the smallest shares of daily users compared with the other speed levels, both for personal e-mails and browsing the Internet.

Compared with personal e-mails and browsing the Internet for personal use, the level of usage of instant messaging/chat is lower, as seen in figure 90. However, approximately one half of the respondents uses instant messaging or chat daily. When observing the share of users that use instant messaging/chat daily, weekly or monthly, this share seems to increase with increasing levels of speed.

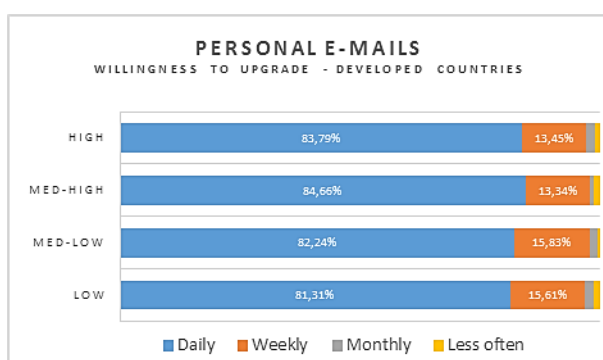


Figure 88 Usage distributions for personal e-mails for users with willingness to upgrade in developed countries

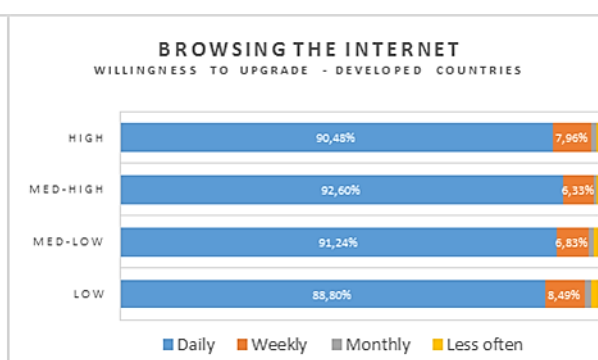


Figure 89 Usage distributions for browsing the Internet for personal reasons for users with willingness to upgrade in developed countries

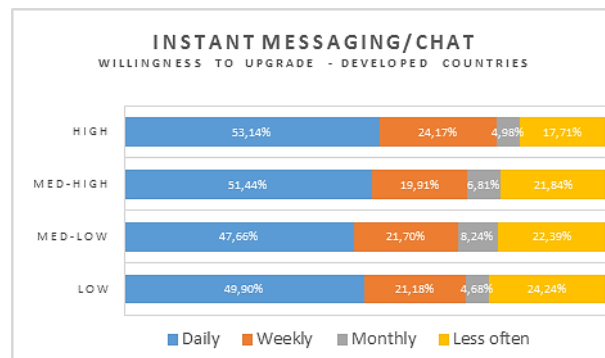


Figure 90 Usage distributions for instant messaging/chat for work related reasons for users with willingness to upgrade in developed countries

7.2.1.2 Work related usage

The following four factors are used to describe *usage of the Internet for work related reasons*:

- Work related e-mails
- Browsing the Internet (for work related reasons)
- Instant messaging/chat (for work related reasons)
- Apply and look for job

The graph for work related e-mails, found in figure 91, show that the higher level of broadband speed, the bigger the share of people that uses the business e-mail daily. It also shows that the higher the broadband speed is, the smaller the share of people that uses the work e-mail less often.

The same applies for browsing the Internet for work related reasons: the higher the broadband speed, the bigger the share of people that browses for work purposes daily. In the graph it can also be seen that the higher the broadband speed, the smaller the share of people that browses for work reasons monthly or less often. This can be seen in figure 92.

The graph in figure 93 demonstrates how often people with different broadband speed uses chat or messaging services for work related reasons. It shows that the higher the broadband speed, the higher the share of people that uses instant messaging daily, and smaller the share of people that uses the service monthly.

Figure 94 illustrates how often people with varying broadband speed look for job opportunities. There is no evident pattern to observe for these distributions, but the largest share of daily users is found in the group with high speed. The largest share of people that look for job opportunities weekly is found in the group with medium-low speed.

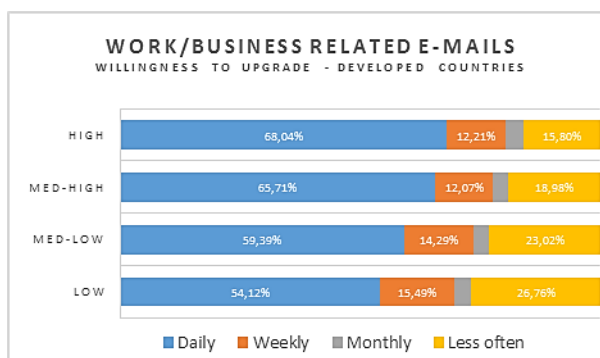


Figure 91 Usage distributions for work/business related e-mails for users with willingness to upgrade in developed countries

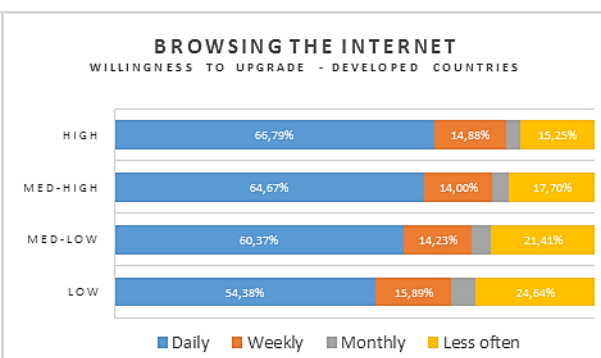


Figure 92 Usage distribution for browsing the Internet for work related reasons for users with willingness to upgrade in developed countries

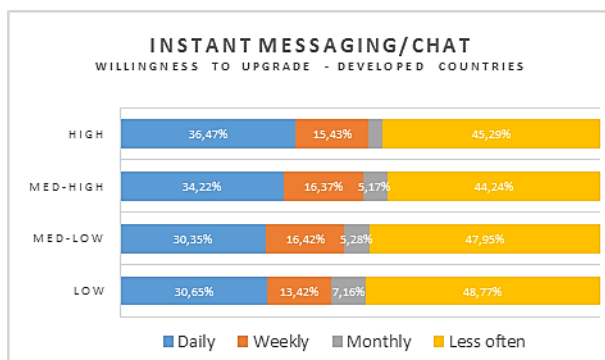


Figure 93 Usage distributions for instant messaging/chat for users with willingness to upgrade in developed countries

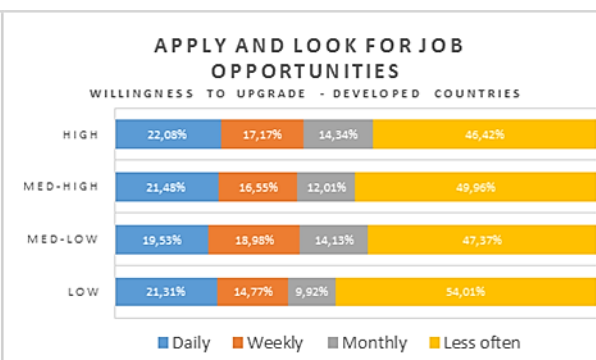


Figure 94 Usage distributions for applying and looking for job opportunities for users with willingness to upgrade in developed countries

7.2.1.3 Information usage

The following four factors are used to describe *Internet based services*:

- Search for health or medical related information
- Search for educational information
- Access news or other up-to-the minute information
- Search for information (no specification of the content)

Figure 99 show that the group of users with high broadband speed have the highest share of both “daily” and “less often” users who search for educational information online. The medium-high speed group do however have the highest share of users who search for educational information daily or weekly.

Figure 100 show the distribution of accessing news or other-up-to-the-minute information. In general, the daily usage is high with over two thirds doing this daily, regardless of speed. The tendency also seems to be that the level of usage increases with increasing level of speed.

The group with medium-high speed also have the highest share of both daily and weekly users who search for information in general, as can be seen in figure 101. When it comes to searching for health or medical related information, which is presented in figure 98, around two thirds of the respondents search for this kind of information at least once a month (monthly, weekly or daily). There is a fairly even distribution over the different speed groups with a slightly higher share of daily users for the group with high broadband speed, and a lower share for the group with medium-low speed.

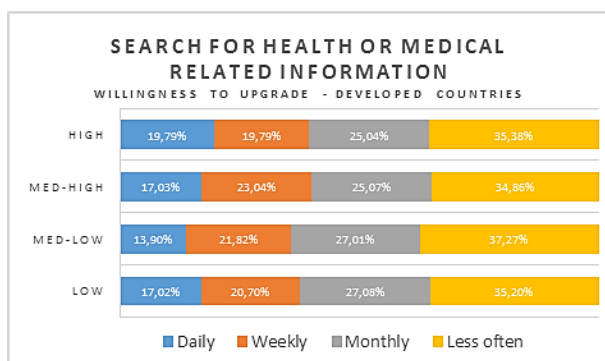


Figure 95 Usage distributions for searching for health or medical related information for users with willingness to upgrade in developed countries

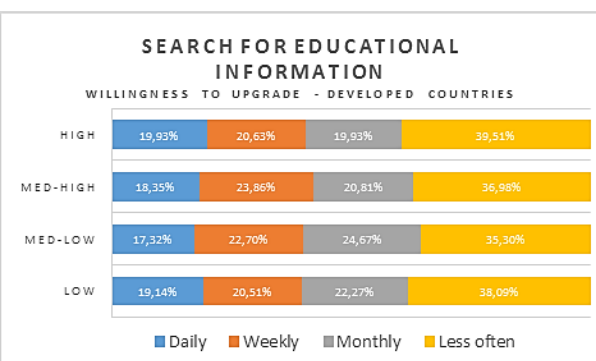


Figure 96 Usage distribution for searching for educational information for users with willingness to upgrade in developed countries

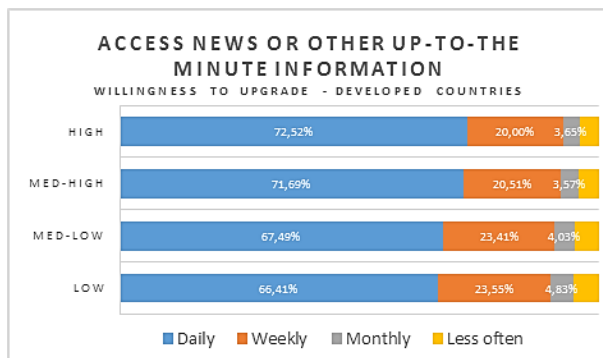


Figure 97 Usage distributions for accessing news or other up-to-the minute information for users with willingness to upgrade in developed countries

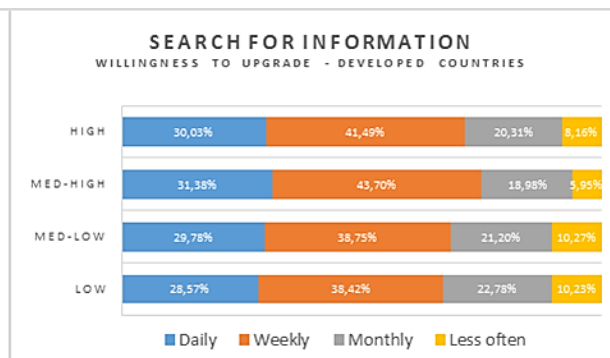


Figure 98 Usage distributions for searching for information for users with willingness to upgrade in developed countries

7.2.1.4 Usage of entertainment related services

The following five factors are used to describe *usage of entertainment related services*:

- Listen to streaming Internet radio
- View, listen or subscribe to podcast
- Play online games
- Stream music from the Internet

The graph found in figure 102 describes the usage distribution of listen to streaming Internet radio. The graph shows that the share of users listening to streaming Internet radio more than once a month (monthly, weekly or daily) seem to increase with the level of speed. This is compensated by a decrease of the share of people that uses the service less often.

The figure 103 shows that less than 50 percent listen to podcasts more than once a month (monthly, weekly or daily). The highest share of daily usage is found in the group with high speed and the lowest share is found in the medium-low speed group.

The graph found in figure 106, presenting the usage distributions for streaming film or TV-shows from the Internet, shows that the share of people streaming film or TV-shows online seem to increase with increasing levels of broadband speed.

For the user distribution for playing online games no evident usage pattern could be identified. The graph found in figure 104 shows that approximately one third of all respondents play online games less often. The users with low and high speed have a fairly similar distribution, while the groups with medium-high and medium-low speed have lower shares of daily users, and higher shares of monthly users.

The graph describing the user distribution for streaming music from the Internet shows that the groups with medium-high and high speed has fairly the same distribution, with approximately two thirds streaming music from the Internet more than once a month (monthly, weekly or daily) whilst the corresponding proportion for the users in the groups with medium-low or low speed is approximately 50 percent. This can be seen in figure 105.

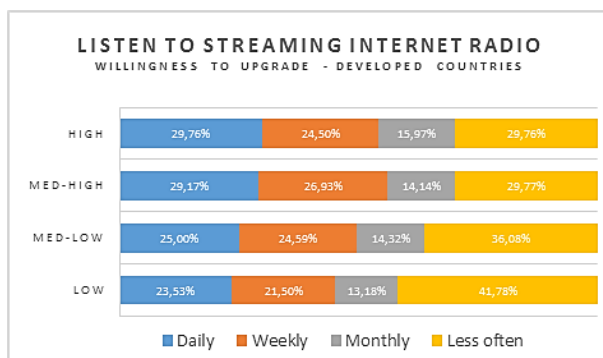


Figure 99 Usage distributions for listening to streaming Internet radio for users with willingness to upgrade in developed countries

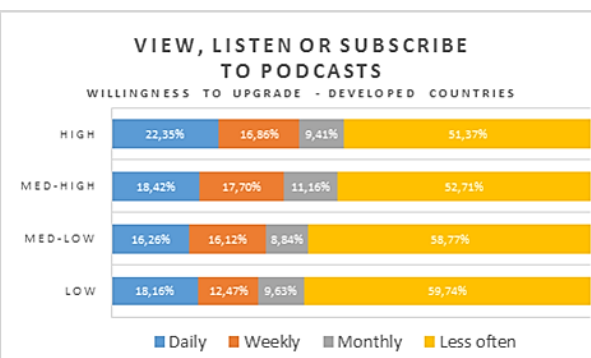


Figure 100 Usage distribution for viewing, listening or subscribing to podcasts for users with willingness to upgrade in developed countries

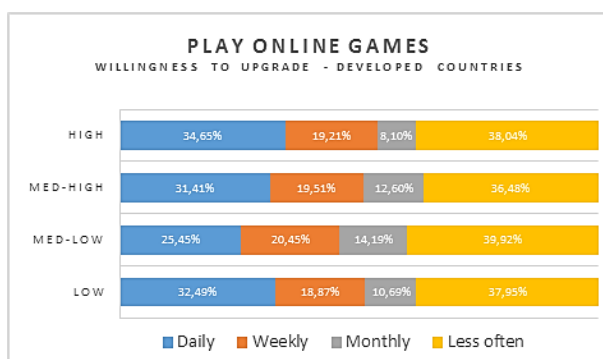


Figure 101 Usage distributions for playing online games for users with willingness to upgrade in developed countries

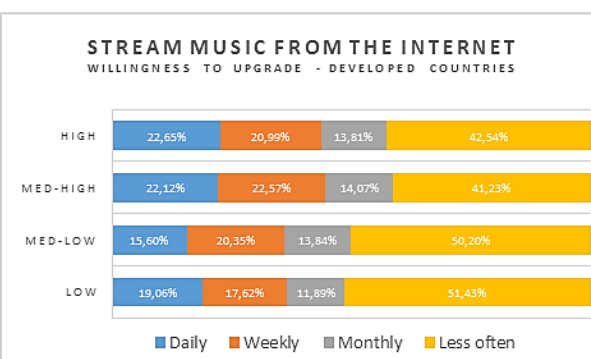


Figure 102 User distribution for streaming music from the Internet for users with willingness to upgrade in developed countries

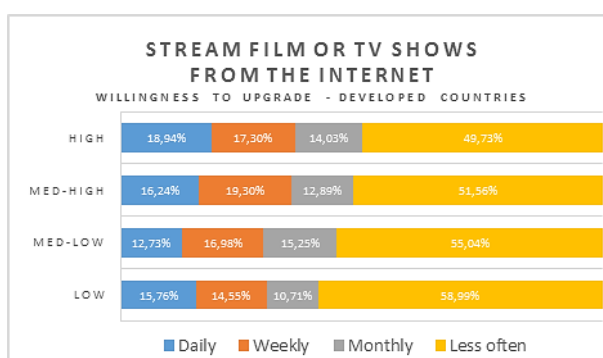


Figure 103 Usage distributions for streaming film or TV shows from the Internet for users with willingness to upgrade in developed countries

7.2.1.5 Usage of Internet based services

The following three factors are used to describe *usage of Internet based services*:

- Using IP-telephony
- Internet banking
- Purchasing physical objects over the Internet

When observing the graph describing the usage distributions for using IP-telephony, the share of people using the service at least once a month (monthly, weekly or daily) seem to increase with level of speed. This can be seen by observing figure 95.

The same pattern applies for both Internet banking and for purchasing physical objects online, as can be seen in figure 96 and 97. For all three charts, the group with high speed consistently have the highest share of daily users, while the group with low speed have the

highest share of people using the services less often. This group also have the second highest share of daily users.

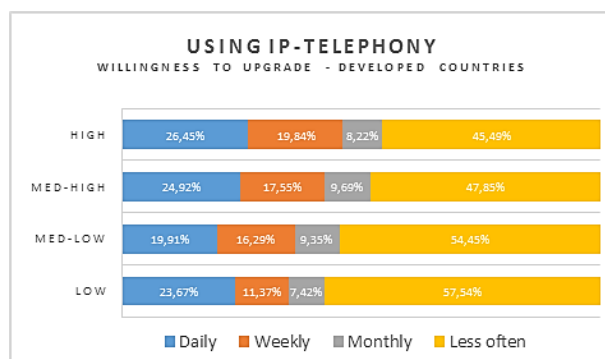


Figure 104 Usage distributions for using IP-telephony for users with willingness to upgrade in developed countries

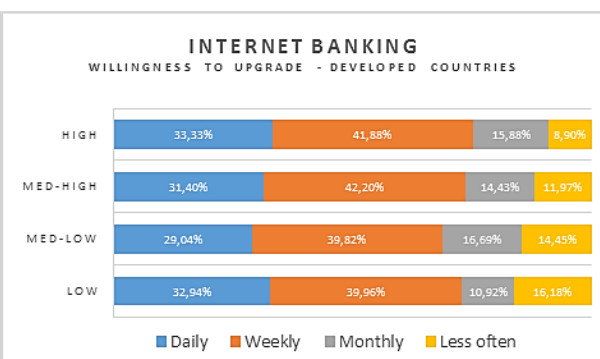


Figure 105 Usage distributions for Internet banking for users with willingness to upgrade in developed countries

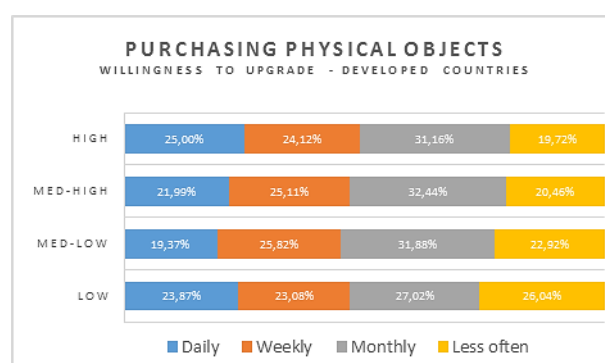


Figure 106 Usage distributions for purchasing physical objects on the Internet for users with willingness to upgrade in developed countries

7.2.1.6 Downloading

The following four factors are used to describe *downloading*:

- Purchasing and downloading music
- Purchasing and downloading movies
- File sharing (for free) of music
- File sharing (for free) of movies

The distributions for purchasing and downloading music and purchasing and downloading movies are very similar (see figure 107 and 108). The same applies for file sharing (for free) of music and file sharing (for free) of movies (see figure 109 and 110)

For downloading music and movies, the distributions of the groups with high and medium-high speed are fairly similar, and show a higher share of people downloading more than once a month (monthly, weekly or daily) than for the groups with medium-low or low speed.

The graphs of free file sharing of movies and music show that the share of people file sharing more than once a month (monthly, weekly and daily) seem to increase with increasing levels of speed.

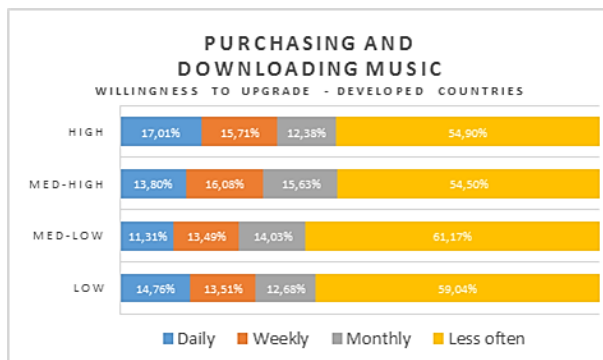


Figure 107 Usage distributions for purchasing and downloading music for users with willingness to upgrade in developed countries

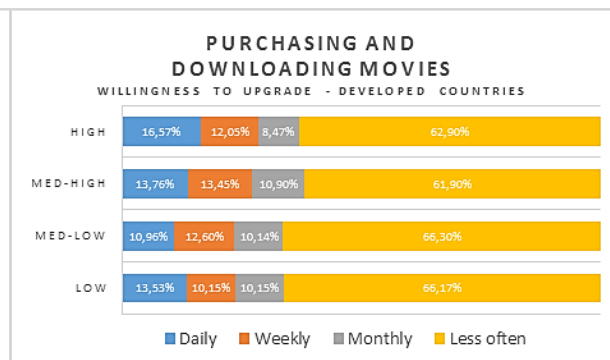


Figure 108 Usage distributions for purchasing and downloading movies for users with willingness to upgrade in developed countries

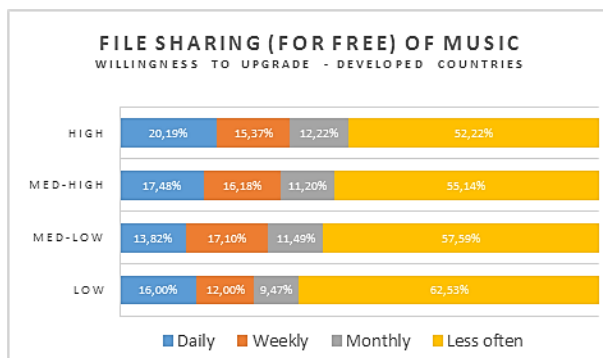


Figure 109 Usage distributions for (free) file sharing of music for users with willingness to upgrade in developed countries

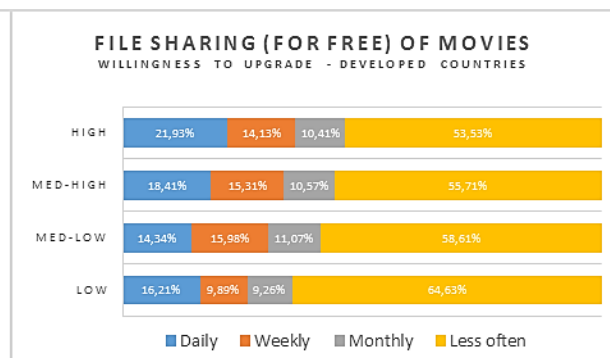


Figure 110 Usage distributions for (free) file sharing of movies for users with willingness to upgrade in developed countries

7.2.1.7 Summary of speed groups for usage factors for users with willingness to upgrade in developed countries

In this section, the usage factors for the users willing to upgrade their broadband speed in the developed are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

For the survey participants who were interested in upgrading their speed is there an overall low frequency of usage for the low speed group compared to the other speed groups. In all usage factors but five does the low speed group have the largest share of users who do it less often than once a month and/or the smallest share of daily users. The five factors, which are not underrepresented for the low speed group, are:

- Search for educational information
- Search for health or medical information
- Play online games
- Purchasing and downloading music
- Purchasing and downloading movies

It should however be noted that these five factors as well as a many of the other is quite similar between the speed groups with often only one or two percentages differing from the lowest frequency usage to the second lowest. Another pattern for the low speed group is for the factors where they have a larger share of daily users they generally have the largest share of “less often” users as well. This indicates a sort of usage pattern where either the users have adopted the usage function or they have not. This statement holds true for functions like

stream music or movies from the internet, purchasing physical object, internet banking and IP- telephony to name some.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

While the notion that the low speed group has the lowest frequent usage holds true for most of the described usage functions there are a few exceptions and these are most commonly made out of the medium-low speed group. For example in the category Entertainment, the medium-low speed group has the smallest share of daily users for all factors except listen to streaming Internet radio. This is however compensated with a larger share of weekly and monthly users than the low speed group, making the low speed group still having the largest share of users that utilize the service less often. This can be interpreted as that the medium-low speed group contains less “heavy” users than the low speed group but still have a larger share of consistent regular users.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

The medium high speed group is quite similar to and follows the high speed group but with a slightly lower frequency for many usage functions. It does also generally have a higher usage frequency than the medium-low speed group and does therefor generally place in between those two speed groups in usage frequency. The group does however, like the medium-low speed group to low speed group relation, sometimes have a smaller share of “less often” users as well as a smaller share of daily users than the high speed group. This indicates, as with the medium-low speed group, that this speed group have a smaller share of the high-frequent users than the high-speed group but a larger share of regular but not as high frequent users.

High broadband speed: More than 12 Mbit/s

The high speed group generally has the highest frequency of usage and besides a few exceptions it can be said that, for the ones willing to upgrade their Internet speed, users with higher speed tends to use the Internet more frequently. For 14 of 23 usage factor does this group have both the highest daily usage and the smallest share of less than once a month users and only in three out of 23 does it not have the highest daily usage. These three factors are, search for information, personal e-mails and Browsing the Internet for personal reasons. For all those three factors does the medium-high speed group have the highest daily usage but the difference is smaller than three percent in all cases. It should be said thou that many factors are fairly similar between the speed groups and the differences have not been statistically proven.

7.2.1.8 Summary of usage factors for users with willingness to upgrade in developed countries

In the following chart the findings from the usage factors for users with willingness to upgrade in developed countries are summarized.

Table 22 Summary of usage factors for users with willingness to upgrade in developed countries

WTU - Usage in Developed Countries		Low	Medium-Low	Medium-High	High
Personal	E-mail	Lowest share of daily users but very low “less often” users.	Highest share of weekly users	Highest daily usage of the speed groups.	Second highest daily usage.
	Instant message/chat	Largest share of “less often usage” ~24 %, second highest of daily + weekly users.	Lowest share of daily users, as well as daily + weekly users.	Second highest share of daily users	Highest share of daily users as well as weekly users, smallest share of “less often” users.
	Browsing the internet	Smallest share of daily users.	Second highest daily users but similar to other speeds	Highest share of daily users, but only with a small amount.	Second smallest daily usage, but small share of “less often” users.
Work	E-mail	The smallest share of daily usage with just over half of the users. One forth uses it less than once a month.	Second smallest daily usage at just under 60 percent. Weekly and monthly usage similar to the other speed groups.	In between medium-low and high speed groups in daily usage. Similar weekly and monthly usage as the other speed groups.	Highest daily usage with over 66 percent as well as smallest share of “less often” usage
	Instant message/chat	Just under one third use it daily. Similar to the medium-low speed group.	Similar to low speed group. Slightly less than half do it less often than once a month	Second highest daily usage but the smallest share of “less often” users. Overall similar to the high speed group.	Highest daily usage and very similar to medium-high speed group.
	Browsing the internet	Lowest daily usage of the speed groups with just over half of the participants.	Second smallest daily usage and second largest “less often” usage. Weekly and monthly is similar to other speed groups.	Second largest daily usage and second smallest “less often” usage. Weekly and monthly is similar to other speed groups.	Have the highest daily usage and lowest “less often” usage. Weekly and monthly is similar to other speeds.
	Apply and look for job	Over half of the users do it less often than once a month. Just over 20 percent do it daily. Similar to the other speed groups.	Smallest share of daily users, under 20 percent. Fairly similar to other speed groups.	Just about half of the users do it once a month or more which is the second lowest share. Fairly similar to the others	Smallest share of “less often” users. Highest share of daily usage but only slight, similar to other speed groups.
Entertainment	Play online games	Similar to high speed group. About one third do it daily and slightly more (37 %) do it less than once a month.	Have the smallest share of daily users but still over one fourth of all do it daily. Similar amount of users who do it less often as the other speed groups.	Similar to the low speed group with almost one third of daily users with slightly more of non-regular users (less often)	Highest share of daily users but overall similar to the other speed groups.
	Listen to steaming Internet radio	Smallest share of daily, weekly and monthly users.	Similar to the low speed group.	Just under 30 percent daily usage. Very similar to the high speed group	Similar to the medium-high speed group.
	View, listen or subscribe to pod casts	Almost 60 percent do it less often than once a month. Similar result for all groups.	Smallest share of daily users but similar to other speed groups.	Just over 50 percent do not do it at least once a month. Similar to low speed group.	Largest share of daily usage with 22 percent. Similar to other speed groups.

cont' of table		Low	Medium-Low	Medium-High	High
	Stream music from the Internet	Just under one fifth do it daily. Slightly over half use it less than once a month.	Smallest share of daily users with just above 15 percent. Similar to low speed group in terms of "less often" users.	Very similar to the high speed group. Just over 40 percent do it less often than once a month.	Similar to medium-high speed group. Just above 22 percent do it daily.
	Stream film or TV shows from the internet	Have the largest share of "less often" users with 59 percent.	Smallest share of daily users, under 13 percent.	Similar to the high speed group, just over 50 percent do it less often than once a month.	Largest share of daily users as well as smallest share of "less often" users. Otherwise fairly similar to the medium
Services	Using IP-telephony	Largest share of users (57.5 %) who use it less often than once a month.	Smallest share of daily users and second largest share of "less often" users	Second largest share of daily users and second largest share of "less often" users.	Highest frequency of daily and weekly users.
	Internet banking	One third uses it daily and almost 40 percent use it weekly.	Have the smallest share of daily users	Similar to high speed group	Largest share of daily users and smallest share of users who do not use it at least once a month.
	Purchasing physical objects over the Internet	Fairly even distribution between daily, weekly, monthly and less often usage.	Smallest share of daily usage.	Similar to the high speed group but with slightly lower share of daily users and a slightly higher share of weekly.	One fourth of the users do this daily which is the largest share of the speed groups.
Information	Access news or other up-to-the minute information	Lowest share of daily users as well as daily or weekly users.	Slightly higher share of daily or weekly users than 1024 Kbit/s but still second lowest one.	Some four percentages higher daily users than the two lower speed groups. Over 90 percentage of regular usage.	Highest share of daily usage but only slightly higher than the medium-high speed group.
	Search for information	Lowest share of daily and weekly users. Ten percentages do it less often than once a month.	Similar to the low speed group, with ten percentage who search less often than once a month and just under 30 percentages of daily users.	Have the smallest share of users who search for information less often than once a month as well as the largest share for both daily and weekly usage.	The second largest share after the medium-high group. Just under three fourths search at least weekly for information.
	Search for health or medical related information	Over 35 percentages do it less often than once a month. Less than 40 percentages do it regular, at least once a week.	Contains the smallest share of daily users, 13 percentages, as well as the highest share that use it less often than once a month, 37 percentages.	About 40 percentages does it at least once a week. 25 percentages monthly and just under 35 percentages less often than so.	Have the highest share of daily users at almost 20 percentages.
	Search for educational information	Have the second highest share of daily users as well as the second highest share of users doing it less often than once a month.	The lowest share of daily users at 17.3 percentages but the smallest share of users doing it less often than once a month.	Second lowest share of daily users but with the largest share of weekly users which makes it the largest group for using at least once a week.	Largest share of daily users, at almost 20 percentages, as well as largest share of users who does it less often than once a month.

cont' of table		Low	Medium-Low	Medium-High	High
Downloading	Purchasing and downloading music	About 60 percent do it more seldom than once a month. Just fewer than 15 percent do it daily which is the second highest.	Lowest share of daily users and highest share of "less often" users.	Second smallest share of daily users but largest weekly and monthly. Only slightly larger but enough to make it the smallest share of "less often" users.	Similar to medium-high speed but with a larger share of daily users.
	Purchasing and downloading movies (full movies)	Two thirds do it less often than once a month. Similar to other speed groups.	Lowest share of daily users and highest share of "less often" users. Only slightly though, otherwise similar to other speed groups.	Similar to low speed group but with a slightly lower share of users doing it less than once a month	Largest share of daily users. Otherwise fairly similar to medium-low speed.
	File sharing (for free) of music	Two thirds do it less than once a month which is the largest share of the speed groups.	Smallest share of daily users and second largest share of users who does it less often than once a month.	Second largest share of daily users with over 17 percent. About 55 percent still does it more seldom than once a month.	Largest share of daily users with over one fifth. Just over half does it more seldom than once a month.
	File sharing (for free) of movies	Largest share of non-frequent users, almost 65 percent does it less than once a month.	Have the smallest share of daily users but a slight higher share of frequent users than the low speed group.	Second largest share of daily users and second smallest share of non-frequent users.	Have the highest frequency of usage for all the speed groups. Over one fifth of the users do it more than daily and only just over half does it more seldom than once a month.

7.2.2 Emerging Countries

The following graphs contain information about people in emerging countries with the willingness to upgrade their speed.

7.2.2.1 Personal usage

The following three factors are used to describe *usage of the Internet for personal reasons*:

- Personal e-mail
- Browsing the Internet
- Instant message/chat

Figure 111 show the user distributions for personal e-mails for users with willingness to upgrade in emerging countries. This shows a very high share of daily users, regardless of broadband speed. The same applies for browsing the Internet, which has an even higher share of daily users. A very low share uses the services less often than every month (monthly or less often)

The graph found in figure 113 describing instant messaging/chat, also show a high level of usage for all levels of speed. No evident pattern could be identified associated with speed, but the group with low speed also has the lowest share of daily users.

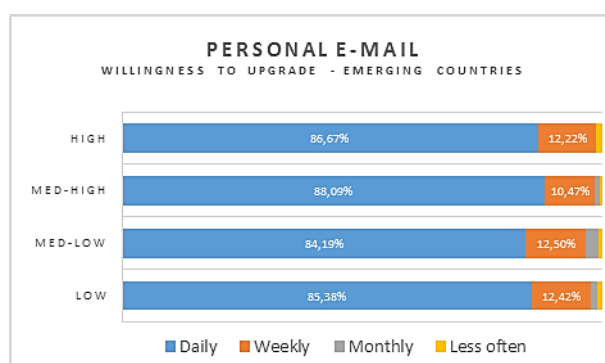


Figure 111 Usage distributions for personal e-mails for users with willingness to upgrade in emerging countries

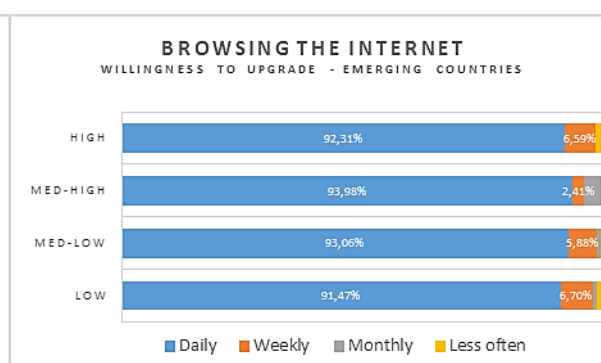


Figure 112 Usage distributions for browsing the Internet for users with willingness to upgrade in emerging countries

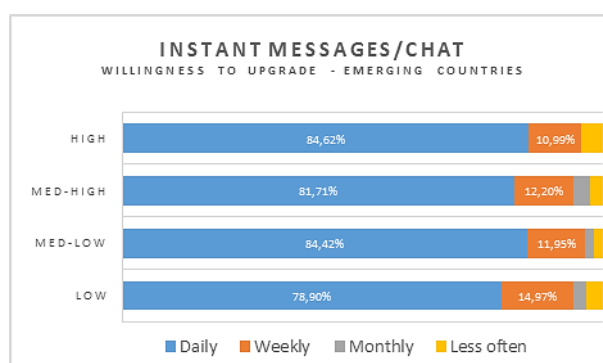


Figure 113 User distributions for instant messages/chat for personal reasons for users with willingness to upgrade in emerging countries

7.2.2.2 Work related usage

The following four factors are used to describe *usage of the Internet for work related reasons*:

- Work/business related e-mail
- Browsing the Internet (for work related reasons)
- Instant messaging/chat (for work related reasons)
- Apply and look for job

Figure 114 demonstrates how frequently people with different broadband speed uses business related e-mail. It is a clear majority that uses the service daily, with up to at least 77 percent, no matter the speed. More than 90 percent of all respondents use the service at least once a week (weekly or daily).

In figure 115, the graph shows the distribution of how the respondents are browsing the Internet. A vast majority of the respondents do this daily, with a share of at least 90 percent browsing the Internet for work related reasons at least once a week (weekly or daily).

Graph 116 demonstrates how often people with different broadband speed are using messaging services. Regardless of the broadband speed there is at least two thirds of the people observed that uses the service daily. The share of daily users seems to increase with increasing level of broadband speed.

The graph found in figure 117 illustrates how often people with varying broadband speed apply and look for jobs. The largest share of people doing this daily is found among the group with high broadband speed. Overall, approximately one third of the users apply and look for jobs less often, regardless of broadband speed.

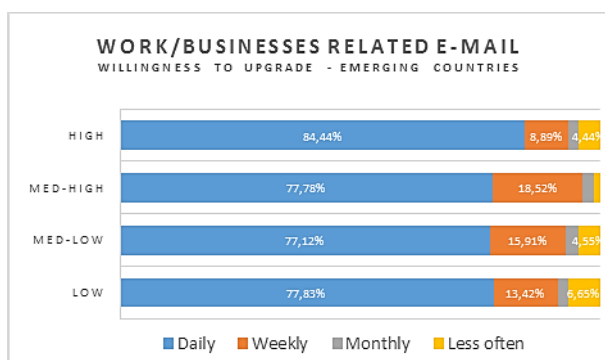


Figure 114 User distributions for work/business related e-mail for users with willingness to upgrade in emerging countries

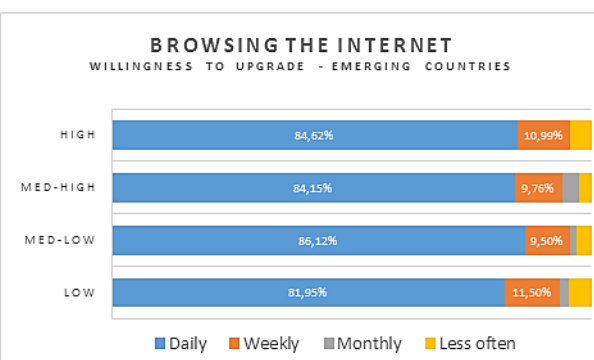


Figure 115 User distribution for browsing the Internet for users with willingness to upgrade in emerging countries

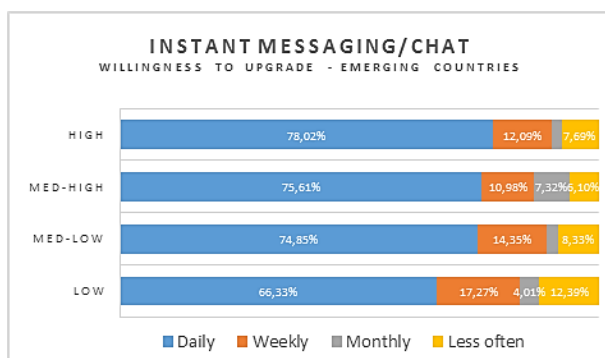


Figure 116 User distributions for instant messaging/chat for users with willingness to upgrade in emerging countries

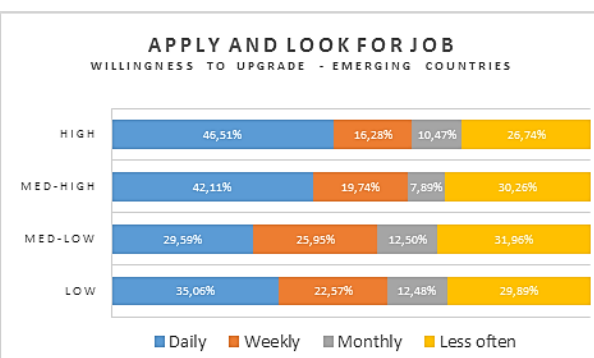


Figure 117 User distribution for applying and looking for jobs for users with willingness to upgrade in emerging countries

7.2.2.3 Information usage

The following four factors are used to describe *usage of information services*:

- Search for health or medical information
- Search for educational information
- Access news or up-to-the-minute information
- Search for information (no specification of content)

In figure 118, the graph shows how often people with different broadband speed search for health or medical related information. The distribution is fairly similar for the groups with medium-high, medium-low and low broadband speed. The share of daily users is larger in the group with high broadband speed than for the other speed levels, which is compensated by lower shares of people using it weekly or less often.

Figure 119 shows how often people with different broadband speed search for educational information. The largest share of daily users is found in the group with high broadband speed. The largest share that search for educational information weekly is part of the group with medium-high level of broadband speed. The share of people that uses the service less often decreases with increasing levels of speed.

Figure 120 demonstrates how frequently users with different broadband speed access news or other up-to-the minute information. Regardless of broadband speed, there is a vast majority of people that uses these services daily or weekly. The biggest share that uses the service daily is found in the group with high broadband speed. The higher the broadband speed the smaller the share of people that uses the service weekly.

The graph found in figure 121 shows the user distribution of people with different broadband speed that search for information. There is a vast majority of people that search for information daily and weekly, regardless of the broadband speed. The largest share of daily users is found in the group with medium-high speed, while the largest share of weekly users is found in the group with high speed.

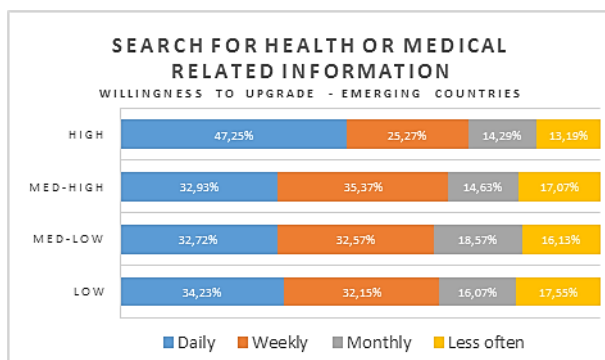


Figure 118 Usage distributions for searching for health or medical information for users with willingness to upgrade in emerging countries

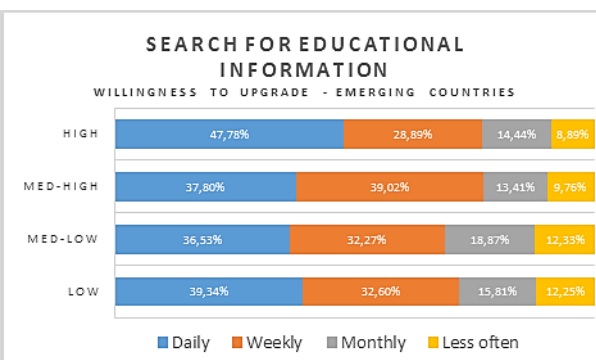


Figure 119 Usage distributions for searching for educational information for users with willingness to upgrade in emerging countries

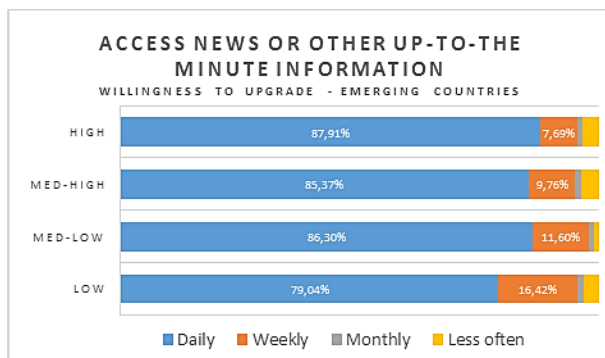


Figure 120 Usage distributions for accessing news or other up-to-the minute information for users with willingness to upgrade in emerging countries

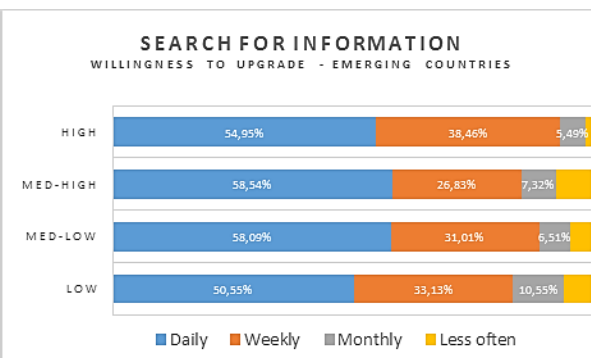


Figure 121 Usage distributions for searching for information for users with willingness to upgrade in emerging countries

7.2.2.4 Usage of entertainment related services

The following four factors are used to describe *usage of entertainment related services*:

- Listen to streaming Internet radio
- View, listen or subscribe to podcast
- Play online games
- Stream music from the Internet

The graph found in figure 122 demonstrates how frequently people with willingness to upgrade and with different broadband speed listen to streaming Internet radio. The higher the broadband speed, the larger the share of daily users. The largest share that streams radio weekly is found in the group with medium-low broadband speed. The largest share of monthly users is found in the group with medium-high broadband speed. Finally the largest share of people that uses the service less often is found in the group with low broadband speed.

The graph found in figure 123 illustrates how frequently people with a willingness to upgrade and with different levels of broadband speed view, listen or subscribe to podcasts. It shows that the higher the broadband speed, the larger the share of daily users.

Graph 124 demonstrates how often people with varying broadband speed play online games. Regardless of broadband speed, the majority of people play online games daily or weekly. The groups with medium-high and high broadband speed have a similar distribution, with a higher level of usage than the groups with medium-low and low broadband speed.

In figure 125, the graph shows how frequently people with different broadband speed stream music from the Internet. The higher the broadband speed, the larger the share of people that stream music daily. For the groups with medium-low, medium-high and high broadband speed, this is compensated by lower shares of weekly users. The share of people using the service at least once a week is approximately equally large for the groups with high, medium-high and medium-low broadband speed. The group with low broadband speed has the highest share of users streaming music less often.

Graph 126 illustrates how often people with different broadband speed stream film or TV shows from the Internet. The graph show that the higher the broadband speed the larger the share of daily users, and the smaller the share of people that stream film or TV shows less often.

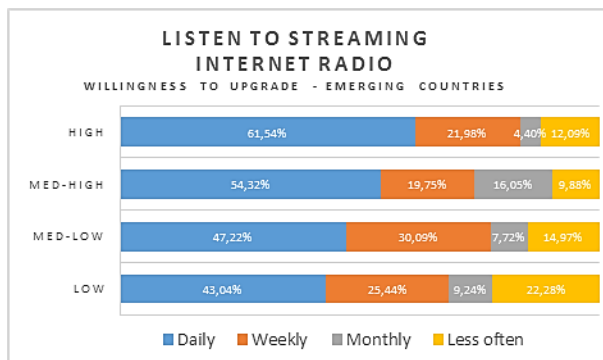


Figure 122 Usage distributions for listening to streaming Internet radio for users with willingness to upgrade in emerging countries

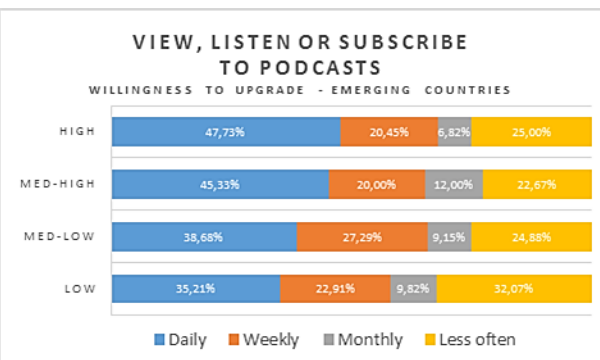


Figure 123 Usage distributions for viewing, listening or subscribing to podcasts for users with willingness to upgrade in emerging countries

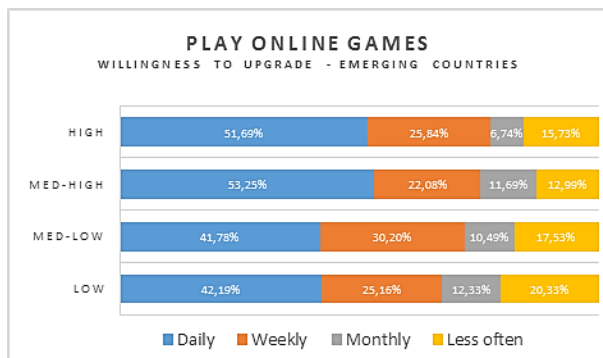


Figure 124 Usage distributions for playing online games for the users with willingness to upgrade in emerging countries

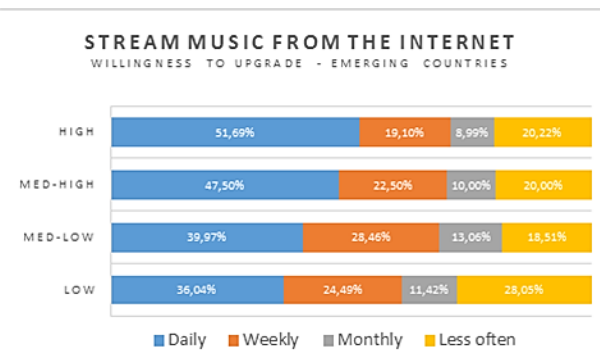


Figure 125 User distributions for streaming music from for users with willingness to upgrade in emerging countries

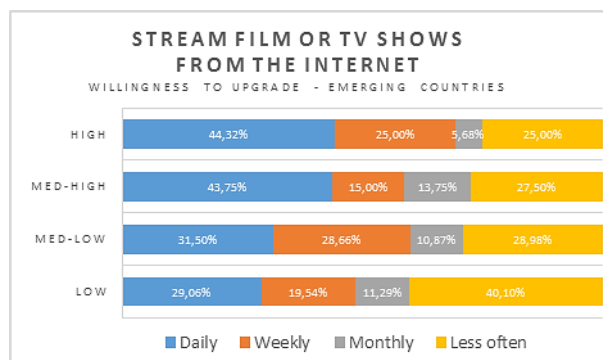


Figure 126 User distributions for streaming film or TV shows from the Internet for users with willingness to upgrade in emerging countries

7.2.2.5 Usage of Internet services

The following three factors are used to describe *usage of Internet based services*:

- Using IP-telephony
- Internet banking
- Purchasing physical objects over the Internet

The graph found in figure 127 illustrates how frequently people with different broadband speed uses the service IP-telephony. The higher the broadband speed the larger the share of people that uses the service daily or at least once a week (weekly or daily), and the smaller the share that uses it monthly.

Graph 128 shows how frequently Internet banking is used among people with different broadband speed. The higher the broadband speed, the bigger the share of daily users and the

smaller the share of monthly users. The group with low speed contains the largest share of people that uses the service less often.

Figure 129 shows how often people with different broadband speed purchases physical objects. The largest share that uses the service daily is found among the group with medium-high speed. In this group, you also find the largest share of people that uses the service monthly. The largest share that uses it weekly is found in the group with medium-low speed. The largest share that uses the service less often is found among the users in the group with low speed.

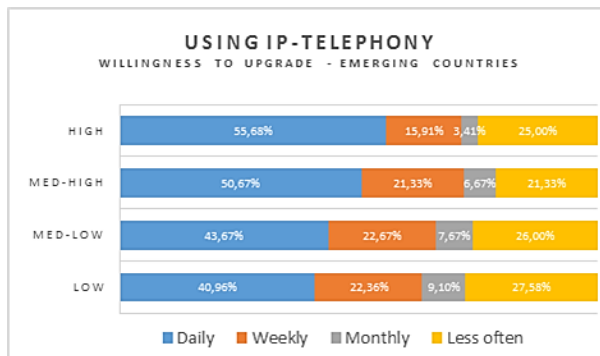


Figure 127 Usage distributions for using IP-telephony for users with willingness to upgrade in emerging countries

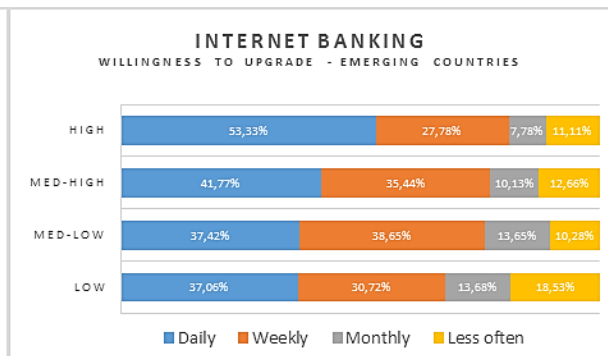


Figure 128 Usage distributions for Internet banking for users with willingness to upgrade in emerging countries

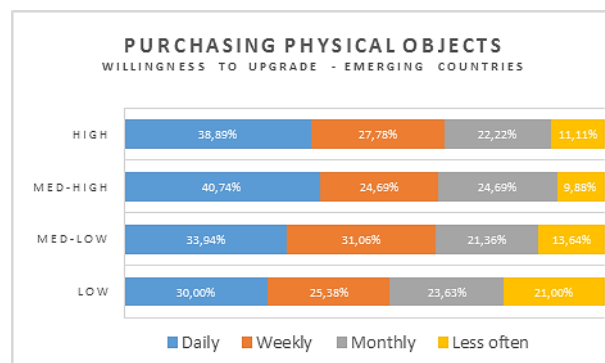


Figure 129 User distributions for purchasing physical objects for users with willingness to upgrade in emerging countries

7.2.2.6 Downloading

The following four factors are used to describe *downloading*:

- Listen to streaming Internet radio
- View, listen or subscribe to podcast
- Play online games
- Stream music from the Internet

The distributions for purchasing and downloading music and purchasing and downloading movies are very similar. The same applies for file sharing (for free) of music and file sharing (for free) of movies (see figure 130 and 131).

For downloading music and movies, the distributions of the groups with high and medium-high speed are fairly similar, and show a higher share of people downloading more than once a week (weekly or daily) than for the groups with medium-low or low speed. Especially significant is the difference between the shares of daily users, where the groups with medium-high and high speed has a significant higher level of daily users.

The graphs of free file sharing of movies and music show that the share of people file sharing more than once a month (monthly, weekly and daily) seem to increase with increasing levels of speed, as can be seen in figure 132 and 133.

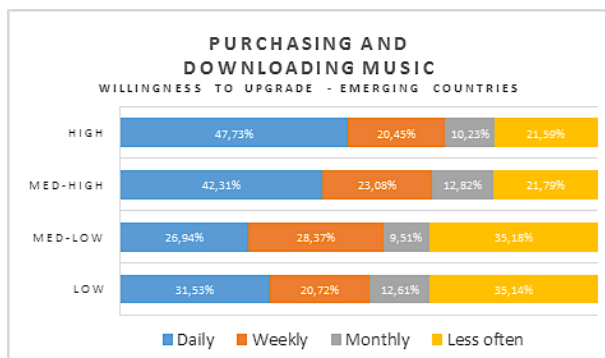


Figure 130 Usage distributions for purchasing and downloading music for users with willingness to upgrade in emerging countries

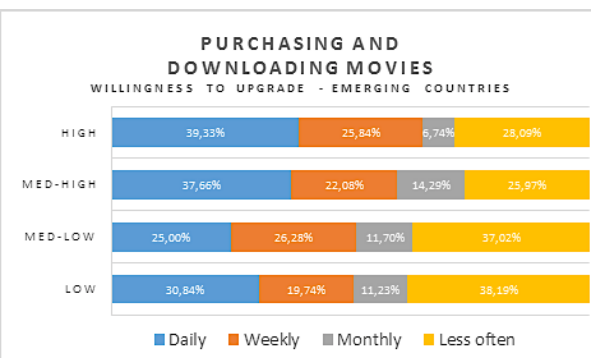


Figure 131 Usage distributions for purchasing and downloading movies for users with willingness to upgrade in emerging countries

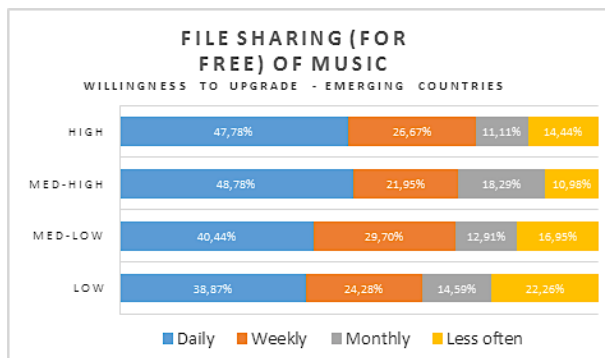


Figure 132 User distributions for (free) file sharing of music for users with willingness to upgrade in emerging countries

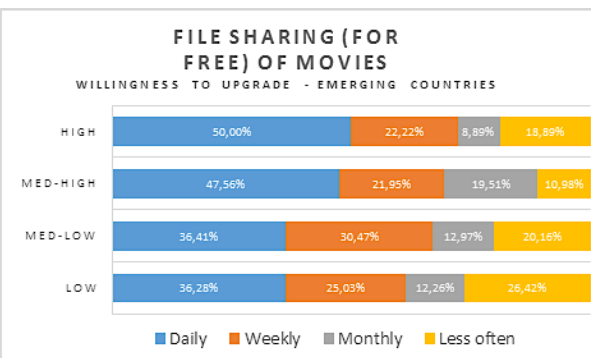


Figure 133 User distribution for (free) file sharing of movies for users with willingness to upgrade in emerging countries

7.2.2.7 Summary of speed groups for usage factors for the users with willingness to upgrade in emerging countries

In this section, the usage factors for the users with willingness to upgrade in the emerging countries are summarized speed group by speed group.

Low broadband speed: Up to 1024 kbit/s

Compared to other speed segments, this speed group contains the largest share of people that uses all the services studied less often with 16 of 23 usage factors. It also has the smallest share of daily of users in eleven of those 16 cases. The low speed group does not have a larger share of daily users than the high speed group for any of the factors and only once is the daily usage higher for the low speed group than for the medium-high speed group. It also shows a great deal of similarity with the medium-low speed group for many of the factors while the difference generally is larger to the medium-high and high speed groups. These facts could indicate that this speed group uses the Internet the least and the usage is increased with higher speed.

Medium-low broadband speed: 1024 kbit/s to 4 Mbit/s

This speed group has a usage frequency in between the low speed and the medium-high speed group. It has for some usage factors a smaller share of daily users than the low speed group but does also have in general a larger share of weekly users. This, the medium-low speed group, is therefore considered to have a higher general usage than the low speed group since it

has a higher share of regular (daily, weekly or monthly) users. It can also be noted that this speed group is overall more similar to the low speed group than the medium-high or high speed group.

Medium-high broadband speed: 4 Mbit/s to 12 Mbit/s

This speed group has the second highest usage frequency, below the high speed group and above the medium-low speed group. In general this speed group is more similar to the high speed group than the medium-low speed group. It has the second highest daily usage for nine factors and has a shared highest daily usage with the high speed level for four factors. It does however have the largest share of at least monthly users for some factors. For both factors play online games and purchasing physical objects does this speed group have a higher daily usage as well as a larger share that use it at least once a month.

High broadband speed: More than 12 Mbit/s

This speed group contains the largest share of people that uses the services studied daily. This holds true for 16 of the 23 factors. In addition, the percentages of daily or weekly usage for this speed groups is higher than the other three speed groups for 13 of the 23 factors. For all four factors in the category downloading, this speed group has the highest daily or weekly usage.

Because of the high daily and weekly usage this speed group is seen as the group with highest overall usage.

7.2.2.8 Summary of usage factors for users with willingness to upgrade in developed countries

In the following chart the findings from the usage factors for users with willingness to upgrade in emerging countries are summarized.

Table 23 Summary of usage for the users with willingness to upgrade in emerging countries

WTU - Usage in Emerging Countries		Low	Medium-low	Medium-high	High
Personal	E-mail	Daily usage: 83%	Daily usage: 84%	Biggest share of daily users, 88%	Second biggest share of daily users, 87%
	Instant message/chat	Daily usage: 79%	Daily usage: 84%	Daily usage: 82%	Biggest share of daily usage: 85%
	Browsing the internet	Daily usage: 91%	Daily usage: 93%	Biggest share of daily usage, 94%	Daily usage: 92%
Work	E-mail	Daily usage: 78%	Daily usage: 77%	Daily usage: 78%	Biggest share of daily usage, 84%
	Instant message/chat	Daily usage: 66%	Daily usage: 74%	Daily usage: 76%	Biggest share of people that uses it daily, 78%
	Browsing the internet	Daily usage: 82%	Biggest share of daily users, 86%	Daily usage: 84%	Daily usage: 85%
	Apply and look for job	Daily: 35%	Biggest share that does this weekly (26%) and less often (32%)	Second biggest share that does this daily, 42%	Biggest share that does this daily, 47%
Entertainment	Play online games	Biggest share that play less often, 20%	Biggest share of weekly usage, 30%	With 53%, the biggest share that plays daily	Second highest share of daily usage with 52%
	Listen to steaming Internet radio	Biggest share that stream less often, 22%	Largest share that listens weekly, 30%	Second biggest share that listens daily, 54%	Biggest share that listens daily, 62%
	View, listen or subscribe to pod casts	Largest share that uses the services less often, 32%	Biggest share that does this weekly, 27%	Second highest share that uses these services daily, 45%	Largest share that does this daily, 48%
	Stream music from the Internet	Largest share that stream less often, 28%	Biggest share that stream weekly, 28%	Second largest share that stream daily, 48%	Biggest share that stream daily, 52%
	Stream film or TV shows from the internet	Biggest share that stream less often, 40%	Largest share that stream weekly, 29%	Biggest share that stream monthly, 14%	Largest share that stream daily, 44%
Services	Using IP-telephony	Biggest share that uses the service less often (28%) and monthly (9%)	Biggest share that uses it weekly, 23%	Second biggest share that uses it daily, 51%	Largest share that uses the service daily, 56%
	Internet banking	Biggest share of people that uses the service less often, compared to other speed segments, 19%	Biggest share of people that uses the service weekly, 39%	Second biggest share that uses the service daily, 42%	Biggest share that uses the service daily, 53%
	Purchasing physical objects over the Internet	Biggest share that uses the service less often, 21%	Largest share that uses the service weekly, 31%	Largest share that uses the service daily, 41%	Second largest share that uses the service daily, 39%

cont' of table		Low	Medium-low	Medium-high	High
Information	Access news or other up-to-the minute information	Biggest share that uses the service weekly (16%) and monthly (1.4%). Daily usage: 79%	Second biggest share that uses the service daily, 86%	Largest share that uses the service less often, 3.6%. daily usage: 85%	Biggest share that uses the service daily, 88%
	Search for information	Daily usage: 51%, weekly usage: 33%	Daily usage: 58%, weekly usage: 31%	Biggest share of daily usage: 59%, weekly usage: 27%	Biggest share of weekly usage: 39%, daily usage: 55%
	Search for health or medical related information	Biggest share of usage less often, 18%. Daily usage: 34%, weekly usage: 32%	Biggest share of monthly usage: 19%, daily usage: 33%, weekly usage: 33%	Biggest share of weekly usage: 35%, daily usage: 33%	Biggest share of daily usage: 47%, weekly usage: 26%
	Search for educational information	Second biggest share that uses the service daily: 39%	Biggest share that uses the service monthly, 19%. Daily usage: 37%	Biggest share that uses the service weekly: 39%. Daily usage: 38%	Biggest share that uses the service daily, 48%. Weekly usage: 29%
Downloading	Purchasing and downloading music	Contains the second biggest share of people that does this less often, 35%	The biggest share of people that does this weekly (28%) and less often (35.2%) can be found here	Contains the biggest share of people that does this monthly, 13%	Contains the biggest share of people that does this daily, 48%
	Purchasing and downloading movies (full movies)	Contains the biggest share of people that does this less often, 38%	Contains the biggest share of people that does this weekly, 26%	Contains the second biggest share of people that does this daily, 38%	Contains the biggest share of people that does this daily, 39%
	File sharing (for free) of music	Contains the biggest share of people that does this less often, 23%	The biggest share of people that does this weekly have this speed, 30%	The biggest share of people that does this daily (49%) and monthly (18%) is part of this speed segment	The second biggest share of people who does this daily can be found in this speed fragment, 48%
	File sharing (for free) of movies	This speed segment contains the smallest share of people that does this daily (36%) and the biggest share that does this less often (26%)	The biggest share that does this weekly can be found here, 30%	The biggest share of people that does this monthly is part of this speed segment, 20%	The greatest share of people that share music files daily is found in this speed fragment, 50%

8. Comparison and discussion

In this chapter we first compare and analyse differences between developed and emerging countries. After that we compare the each market's willingness to upgrade with the overall market. The data presented will be discussed and personal reflections might be given.

8.1 Comparison and analysis between developed and emerging countries

The study on broadband speed (ADL & Chalmers 2012) showed that high broadband speed is an important factor to spur economic growth; both for the overall economy and for the individual. It was shown that doubling of the broadband speed for an economy increases GDP growth by 0.3 percent. Broadband speed upgrades results in increased household income, both for developed and emerging countries. In this section (8.1) the reasons for economic benefits of increasing broadband speed are explained.

8.1.1 Socio-economic factors

In general there are noticeable socio-economic and usage differences between developed and emerging countries. For developed countries three social-economic patterns were observed for the different speed groups. For these countries the socio-economic factors *city size*, *level of income* and *highest level of education* seem to have a positive association for the users' subscribed broadband speed. Compared to lower speeds, high speed levels tend to have a larger share of users with; a higher income, a higher level of education and a residence in larger cities. This tendency for *level of income*, is consistent with the findings in the report on broadband speed (ADL & Chalmers 2012).

The factor *level of education* could though explain why there are economic benefits by subscribing to higher broadband speed, which is showed in the same report. Since high education leads to well-paid jobs, the economic benefits of increased broadband speed could in fact be explained by high broadband speeds having a larger share of users with high education. That there seems to be a higher share of users living in larger cities for high speeds compared to lower speeds, could also explain why there are the economic benefits of increasing broadband speed. This is an explanation since larger cities have higher economic activity and more well-paid jobs compared to rural areas. People living in these areas could therefore have a higher household income.

Another noticeable difference is the gender distribution for the speed groups. In developed countries the share of men is consistently larger the higher the speed level is. The relation is the opposite for emerging countries. The share of females increases for higher speed groups. Previous studies claims gender to be both an important and unimportant factor for broadband adoption. The findings in this report suggest gender to be a factor of interest. A reason for these opposite relations has not been presented in this report, but could perhaps be discovered with cross-referencing the genders' Internet usage depending on speed level. This could serve as an interesting area for further research.

Pervious research shows age to be an important factor. Age has a negative correlation for with broadband adoption. When applied to speed (and not just adoption or not), this should imply that there is a larger share of elderly people among the low speed levels. A small pattern concerning broadband speeds for different age groups have been seen and it shows the opposite. This tendency for both emerging and developed countries shows that there is a larger share of young people (below 25) in the low speed groups than in the high speed groups. Since younger people in general have a lower income this could likewise *level of education* and *city size* explain the economic benefits of increased broadband speed.

8.1.2 Usage factors

There is also an overall higher Internet usage in the emerging countries compared to developed countries. This could be due to the widespread broadband access in developed countries leading to a higher rate of broadband subscription. In emerging countries however it is more of an active choice to subscribe resulting in a more active Internet user.

There are also differences in usage depending on speed level. In general for developed countries the low speed group has the highest usage frequency and the high speed group has the lowest. The opposite is true for emerging countries where the higher speed group has the highest usage frequency for all factors.

There are three factors where usage increases with higher speeds in the developed countries (compared to the general case with opposite pattern). For the factors *e-mail*, *internet browsing* and *accessing news and other up-to-the-minute information* the usage frequencies are somewhat higher for the high speed group compared to the lower speed groups. The study conducted by Ericsson AB, ADL and Chalmers University and Technology (2012) believes that the reasons for the economic benefits of increased broadband speed are that broadband makes people more informed, better educated and socially and culturally enriched, eventually leading to a faster career path. Since only three usage factors have higher usage for high speeds these three factors may matter the most for peoples career path. Since the high speed groups have the highest usage frequency for all factors in the emerging countries, it is difficult to consider one factor as more important than another, in that market.

8.2 Developed countries compared to developed countries with WTU

In this section users with willingness to upgrade (described in chapter seven) are compared to all users (described in chapter six), within the developed countries. Chapter six described the socio-economic and usage characteristics for all users and chapter seven described those users with willingness to upgrade. The reason for comparing these two chapters is to find socio-economic and usage patterns that differentiate users with willingness to upgrade to all users.

In the table 24 and figure 134 below respondents with willingness to upgrade are compared to all respondents. It can be observed that the share of respondents with willingness to upgrade is larger for low speed users compared to higher speed users. Therefore, people with low speed are more willing to upgrade.

Table 24 Share of respondents with willingness to upgrade for each level of speed

Developed countries	All respondents	Respondents with WTU	%WTU
High	1566	585	37%
Medium-high	3178	1412	44%
Medium-low	1697	782	46%
Low	1008	523	52%

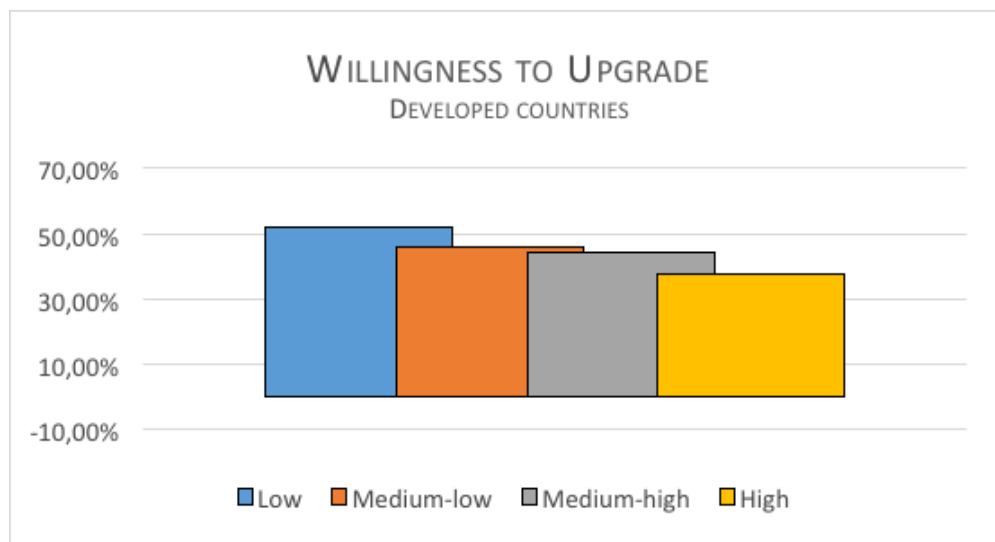


Figure 134 Shares of users with willingness to upgrade for each speed level in developed countries

The factor *gender* is described in figure 135 below. This shows, similarly to the previous graph, the number of respondents with willingness to upgrade divided by all respondents. It can be seen that among male respondents about 45 percent is willing to upgrade. The share of females with willingness to upgrade is lower. Less than 40 percent of female respondents are willing to upgrade.

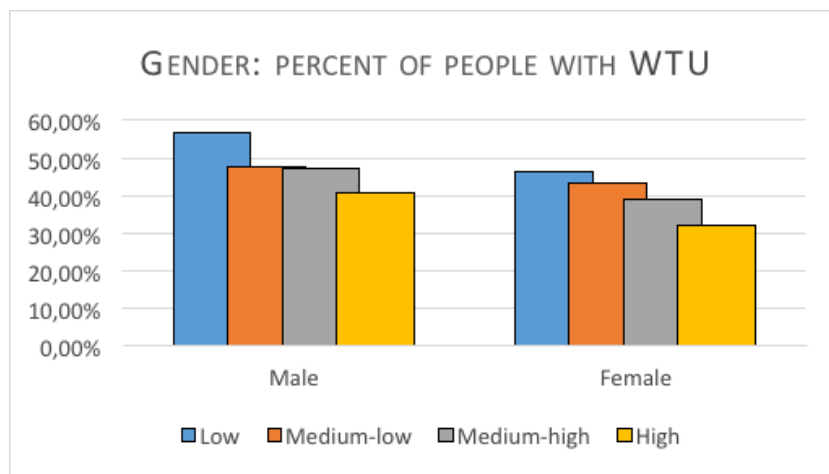


Figure 135 Shares of users with willingness to upgrade for each gender in developed countries

For the rest of the socio-economic factors the general willingness to upgrade is similar for all variables. Even though there is a difference in willingness to upgrade between the four speed groups for each variable, in total, the share of users with willingness to upgrade is similar between the variables. An example of this is the factor *marital status*. It can be seen that the percentage of respondents with willingness to upgrade is equal for all variables (single, married, widowed, etc.). This means that people living alone are as willing to upgrade as married people. This applies to all factors except *gender* where males have a higher willingness to upgrade, as described above.

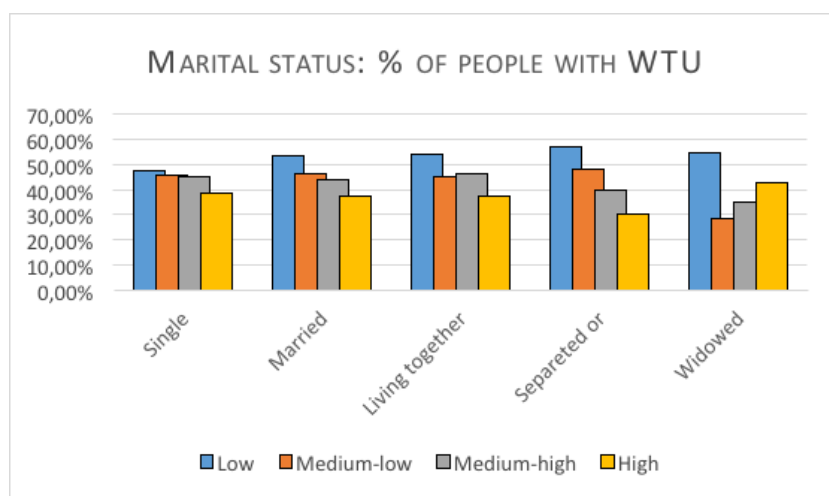


Figure 136 Shares of users with willingness to upgrade for each marital status for developed countries

For the factor city/town size there are some noteworthy findings. As can be seen in the graph 137 below there is a larger difference between speed groups' willingness to upgrade for people in rural areas compared to larger cities. This means that for metropolitan and larger cities the willingness to upgrade is similar for all speed levels. About 40 percent of the people that live in larger cities, regardless of speed, are willing to upgrade. For rural areas 65 percent of respondents with low speed are willing to upgrade. For those living in rural areas with high speed only 28 percent are willing to upgrade.

A reason why people, living in rural areas with subscription to high speed, are less willing to upgrade can be that high speed broadband is less common in rural areas. In rural areas people may be subscribed to a low broadband speed since that is the only available option. In metropolitans and bigger cities the availability of broadband is higher and more people have chosen a speed level for their needs. Therefore people for all speed groups are

equally willing to upgrade since they already have had the choice of which speed level to subscribe to.



Figure 137 Shares of users with willingness to upgrade for each city/town size for developed countries

When it comes to usage of different Internet services, respondents with willingness to upgrade have an overall higher usage frequency compared to all respondents. It is expected for people with willingness to upgrade to have a higher usage frequency. Since higher speed probably equals higher subscription cost one probably need to use Internet frequently to see the benefits of a speed upgrade. People with willingness to upgrade have higher usage frequencies. This is clearly seen for respondents subscribed to high speed. Among the people with willingness to upgrade, there is a larger increase in usage for those subscribed to high speed than for low speed. For respondents with low speeds, the usage for people with willingness to upgrade is similar to the usage for all people.

8.3 Emerging countries compared to emerging countries with WTU

This sections is similar to section 8.2 with the only difference that this section concern emerging countries. Unlike developed countries the speed level seems to have no effect on willingness to upgrade. The different speed levels all have similar percent of users willing to upgrade. This is illustrated below in chart 25 where the number of people that are willing to upgrade is compared to the total number of users for each speed level.

Table 25 Share of respondents with willingness to upgrade for each level of speed

	General	WTU	%WTU
High	131	91	69%
Medium-high	126	83	66%
Medium-low	1015	665	66%
Low	1209	823	68%

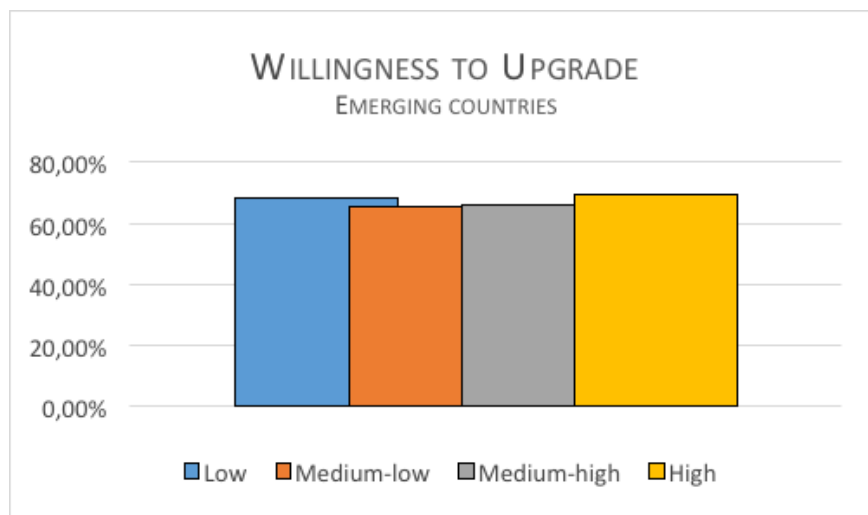


Figure 138 Shares of users with willingness to upgrade for each speed level in emerging countries

Gender seems to be the only socio-economic factor with some form of correlation to the willingness to upgrade. The share of females increases for the different speed levels when comparing the distribution for users that are willing to upgrade with all users. This relation is illustrated in figure 139. The percentages of females that are willing to upgrade seem to increase with speed level while the opposite is true for males. No explanation for this relation could be found but it might be an interesting area for further research.

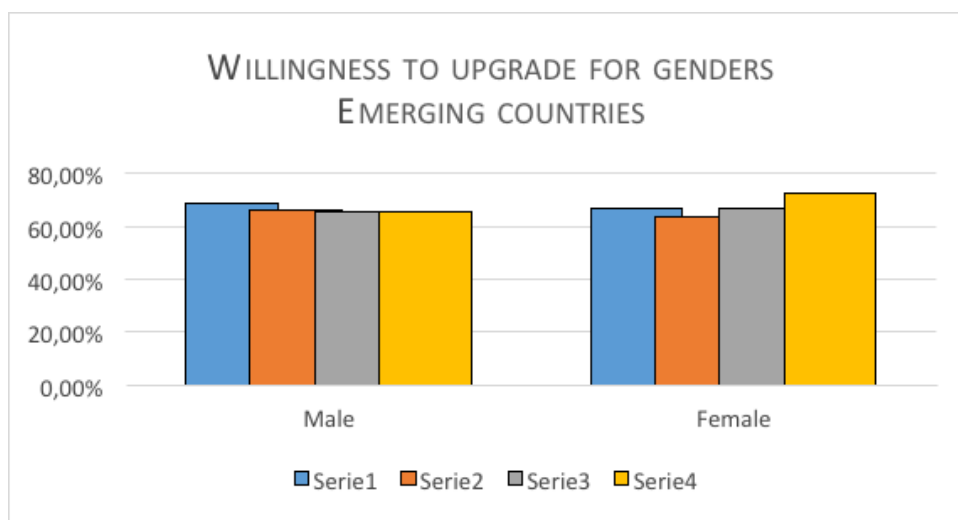


Figure 139 Shares of users with willingness to upgrade for each gender in emerging countries

The usage frequencies, in most usage categories, are higher for the group that is willing to upgrade compared to the general user. This indicates that there is a correlation between high usage and a willingness to upgrade broadband speed. The reason for users with willingness to upgrade to have higher usage frequencies is, as discussed for developed countries, maybe due to the fact that only people with high usage frequencies sees the benefits of upgrading.

Instant messaging for personal reasons is the only usage category which has a negative tendency with willingness to upgrade. This could be due to *instant messaging's* low broadband speed requirement, not making it important when considering upgrading ones speed level.

8.4 Summary and comparison tables

In this section there are three tables. All three tables summarize and compare previously found factors that affect broadband speed. The first table compares developed with emerging countries. It lists similarities and differences of users' socio-economic and usage characteristics, which were described in chapter six. If the factor seems to affect the broadband speed in both emerging and developed countries it is listed in the column named similarities. If not, it is listed in the differences column.

The second table only concerns developed countries. The third table only concerns emerging countries. These two tables compare the user group willing to upgrade with all respondents. The comparison for these tables is done in the same way as the first table.

Table 26 Comparison between emerging and developed countries (without regards to WTU)

Comparison between emerging and developed countries (without regards to WTU)			
No.	Aspects	Similarities	Differences
1.	Socio demographic factors	Lower broadband speed seems to have a larger share of young users compared to other speed groups. No other speed levels had a noteworthy difference in age groups. No relation between broadband speed and household size or marital status could be found, in either emerging or developed countries.	In developed countries an increase in broadband speed seems to increase the share of male users while the opposite is true for emerging markets. In developed countries the size of the city matters for the speed level. Medium-high and high broadband speed have a larger portion of its user base in bigger city sizes while lower broadband speed has a higher percentage of users in less populated cities. No relationship can be found between city size and speed level in emerging countries except for the single category “bigger cities” where the same relationship can be seen. For developed countries it seems that the speed level is associated with the level of income. High broadband speed have a higher level of income compared to lower speed levels. The same pattern cannot be observed for emerging markets. The high speed level follows this pattern but the other speed levels do not. In developed countries higher broadband speed to be associated with if you're a full-time employee. Higher speed levels have a larger portion of its user base that is full-time employees. The same pattern cannot be seen for emerging countries. In developed countries low broadband speed users generally have a lower level of highest education compared with higher speed levels. This is not true for emerging markets.
2.	Usages of broadband	For the usage factors, e-mail, accessing news and internet browsing the usage seem to increase with higher broadband speed for both developed and emerging countries. The usage frequencies for the medium-high and medium-low speed groups are in between the low and high speed groups for most factors.	In general and independent of speed level, Internet usage is more frequent in the emerging countries than in the developed countries. This holds true for all factors except personal related internet browsing where the developed countries have higher usage frequencies. For developed countries the lowest speed group has the highest share of usage. For emerging countries it is the opposite, the highest speed group has the highest share of usage for most factors. The usage percentages for developed countries seem to decrease with higher speed while in the usage percentages seem to increase with speed for emerging countries.

Table 27 Comparison between developed countries (without regards to WTU) and developed countries (with WTU)

Comparison between developed countries (without regards to WTU) and developed countries (with WTU).			
No.	Aspects	Similarities	Differences
3.	Socio demographic factors	For the factors marital status the distribution between the different variables (married, single, separated or divorced, etc) are similar for respondents with WTU to all respondents. Hence, there is an equal share of single respondents that want to upgrade compared to married and separated etc. This holds true for all factors except gender.	People with lower broadband speed are more willing to upgrade. Among all respondents • 52% of those with low speed are WTU • 46% of those with M-L are WTU • 44% of those with M-H speed are WTU • 37% of those with high speed are WTU Therefore, the lower ones broadband speed is, the more likely one is to be WTU. For the factor city/town size there is a larger difference between the speed groups WTU for people in rural areas compared larger cities. This means that for metropolitan and larger cities the WTU is similar for all speed levels. About 40% of the people that lives in larger cities, regardless of speed, are willing to upgrade. For rural areas 65% of respondents with low speeds are WTU. For those living in rural areas with high speed only 28% are WTU. The share of males is increasing when WTU is taken into consideration 50% out of all male respondents are willing to upgrade compared to 45% out of female.
4.	Usages of broadband	For respondents with low speeds, the usage for people with willingness to upgrade is similar to the usage for all people. This holds true for all factors except access, purchase physical, The interrelationship between the usage frequencies for the four speed groups is similar for six factors. These factors are; work and personal related e-mail, work related browsing, accessing news or other up-to-the-minute information and online gaming.	For all respondents (regardless of their WTU) the low speed group has the highest usage frequency. For the respondents with WTU the high speed group has the highest usage. The respondents with willingness to upgrade have an overall higher usage frequency compared to all respondents. Among the people with WTU, there is a larger increase in usage for those subscribed to high speed broadband than for low speed. For respondents with low speeds, the usage for people with WTU is similar to the usage for all people.

Table 28 Comparisons between emerging countries (without regards to WTU) and emerging countries (with WTU)

Comparison between emerging countries (without regards to WTU) and emerging countries (with WTU).			
No.	Aspects	Similarities	Differences
1.	Socio demographic factors	Most socio-economic factors are similar between the respondents with WTU compared to all respondents. For the factors marital status, city/town size, household size, working status, level of education and type of residence the distribution of the various types is similar between respondents with WTU and all respondents. There is overall 60-70% with WTU among all respondents. For the factor age the distribution is similar for those with WTU compared to all respondents. Among the different age groups there is therefore overall an equal willingness to upgrade. 60-70% out of the total respondents is WTU. Noticeable though is that among people with age 25 or above there is a slight increase in WTU for people subscribed to high speed. This may be irrelevant due to a small sample size.	For the factor gender there is a higher percentage of males for medium-high, medium-low and low speeds and a higher percentage of females for high speed. This is both the case among respondents with WTU and among all respondents. There is though a higher share of females for high broadband speed among those with WTU compared to the share of females for all respondents. For the factor level of income the interrelationship among the different income levels is similar for respondents with WTU compared to all respondents. Noticeable though is a slight increase in WTU for those subscribed to high speed and having a medium high or high level of income. This means that among the two highest speed levels the percentage of people with high income is larger among respondents with WTU than for all respondents.
2.	Usage of broadband	For all respondents (regardless of their WTU) the usage frequencies are higher for the groups with higher broadband speed. This is similar to respondents with WTU. For this group the usage increase with speed as well.	The respondents with willingness to upgrade have an overall higher usage frequency compared to the usage of all respondents. This usage difference is largest for users with medium-high broadband speed and second largest for users with high broadband speed. The usage for respondents with WTU and low or medium-low broadband speed is only slightly higher than the usage for all respondents with low or medium-low broadband speed. This can be seen in the entertainment category for all five factors. For the WTU group, daily usage for medium-high and high speed group is up to 10% higher while the usage for medium-low and low speed groups are more similar to that of all respondents. An exception from the general higher usage for the WTU group is for the factor instant messages/chat for personal use. For this factor the usage is 5-10 % lower for the respondents with WTU. For the factor personal internet browsing respondents with WTU have noticeable higher usage. The usage is 10-15% higher for all speed groups.

9. Conclusions and recommendations for further research

Following chapter is divided in two sections. The first presents the thesis conclusion and the second aims to give recommendation for future research. The research questions, stated in the introductory chapter, intend to be answered. The conclusions presented below are discussed in the previous chapter, comparison and discussion.

9.1 Conclusions

For developed countries some socio-economic factors seemed to have an impact on the subscribers speed level. The ones that had an observable difference in speed were *city size*, *level of income*, *highest level of education* and share of *full-time employees* which all displayed a positive relation with broadband speed. These factors have been identified in previous literature as factors having a positive correlation with Internet penetration and access rate (see chapter 4). These patterns for the factors could not be found for emerging markets.

For both emerging and developed countries, there is a larger share of young people in the lower speed groups than in the higher speed groups. Developed countries also seem to have an association between gender and broadband speed where the user base has an increasing share of males with increasing broadband speed. In emerging countries a relation between broadband speed and gender could be observed as well, but with an increasing share of females with increased broadband speed. It should be noted that previous studies have presented split results for the genders' importance. All of these patterns are more distinct for developed countries. For emerging countries the different socio-economic factors instead seem to affect the size of the share of users for all speed levels.

This thesis contributes to the existing studies identifying the impact of broadband speed upgrades on economy (ADL & Chalmers 2012, Rohman & Bohlin 2012). While previous studies statistically analysed and identified the impact for broadband speed upgrade on income; they did not elaborate further on how and why speed upgrades do affect the income. This thesis draws possible links that additional income generation might be the result of that broadband speed has a higher association with the factors, *city size*, *level of income*, *highest level of education*, share of *full-time employees*, *age* and *gender*. These factors could be a part of the explanation that relates an increase in broadband speed with economic benefits.

In terms of usage, emerging countries have an overall higher usage frequency than developed countries. This holds true for all factors except personal related Internet browsing. There are also differences in usage depending on speed level. In general for emerging countries, the users with higher broadband speeds have a higher usage frequency than users with lower broadband speeds. For developed countries, the opposite is true for most factors, users with high speed tend to have lower usage frequencies than users with lower speed. In the developed countries, there are five factors where usage increases with higher speeds (compared to the general case with opposite pattern). For the factors *accessing news and other up-to-the-minute information*, *personal and work related e-mail* and *internet browsing* the usage frequencies are somewhat higher for the high speed group compared to the lower speed groups. These factors are considered to be of more importance when it comes to explaining the economic benefits of increased broadband speed.

Knowing that the broadband upgrade is important as it might spur economic growth (both for the overall economy and for the individual), this thesis also intends to contribute by mapping the willingness to upgrade based on the survey study. The results are important for stakeholders to design further policies to promote broadband, especially for unconnected areas and lower speed subscribers.

In developed countries men are more interested in upgrading their subscribed broadband speed. It has also been identified that there is a higher share of people that are willing to upgrade among those with lower broadband speed than among those with high. The lower the

broadband speed for the group is, the larger the share that is willing to upgrade their broadband speed is. These patterns do not apply to emerging countries. All speed groups have an equal share of people that are willing to upgrade. Therefore, in emerging countries, the willingness to upgrade is independent of speed level. This hold true for all factors except *gender* where the share of females that are willing to upgrade is larger for higher speed levels compared to lower speed levels.

In emerging countries, users with willingness to upgrade have higher usage frequencies than all users for all factors except one, instant messaging for personal use. In developed countries users with willingness to upgrade have higher usage frequencies as well. This increase in usage is largest for the higher speed groups while the lower speed groups are fairly similar. This gives a different usage pattern for the group with willingness to upgrade than for all respondents. The users in this group with high broadband speed have the highest user frequency, opposite to the usage pattern of all users where users with low speed have the highest usage frequencies. For emerging countries there is no change in usage pattern between all users and users with willingness to upgrade. For these countries high speed users have the highest usage frequencies for both all user and for those with willingness to upgrade.

9.2 Recommendations for further research

In this study large amounts of data have been presented and described. The analysis and conclusions are based, with knowledge from the literature study, on pure observations. Thus the results have not been statistical tested. To assure the identified and presented factors significance to the observed patterns further research and testing is necessary. This thesis has not only assisted in answering research questions but the data and findings contribute for possible further research. For example a post hoc study, cross-referencing the socio-economic factor *city size*, *current work situation* or *level of education* with usage, could give a deeper understanding on how and why these factors affect the subscribed broadband speed and household income. One hypothesis for further research based on these findings could be:

“Since jobs demanding high level of education are more common in bigger cities, level of education is the prominent factor for adoption to higher levels of broadband speed.”

Subsequent research could also address the different distribution patterns in genders for broadband speed. It would be interesting to see if the answers to these questions could help to explain the income differences between men and females.

Such a hypothesis could be formulated as follows:

“The different distribution patterns for how men and women subscribe to broadband speed affect the income differences between gender.”

It has been found that the higher speed groups in emerging countries are more frequent users of different Internet services. The relation of causality could be determined using a *Granger causality test*, a way to test for cause and effect. This statistical hypotheses test can show whether the relation is one-directional causality or bi-directional.

One such hypothesis that could be tested using the *Granger causality test* could be:

“Adoption to higher broadband speed is driven by a heavy usage of different Internet services.”

The descriptive analysis in this thesis is based on a quantitative study. The findings in this report, regarding users willingness to upgrade, could be complemented with a qualitative analysis. For example interviews with stakeholders, in the broadband market, presented with these findings and hypothesis could be conducted. Such a study could result in strategic recommendations for policies of companies and/or regulatory authorities. The policies would be beneficial for all stakeholders wanting to expand the penetration and accessibility of faster broadband.

In this study the users willing to upgrade were compared to all users, themselves included. For further research this group could also be compared to the group unwilling to upgrade their Internet speed. Such research could find differences where this study did not. This since if the share of people willing to upgrade is very high, and is also included in the comparison group, the groups will be very similar.

References

- ADL & Chalmers. (2012) *Socioeconomic effects of broadband speed*, Unpublished
- Alleman, J. *et al.* (2003) Residential demand for access to the Internet, In *Emerging telecommunications network, Volume 2*, Madden, G., 55-72, Bodmin, Cornwall: MPG Books Ltd
- Andersson, B. *et al.* (2002) Domesticating broadband - What consumers really do with flat-rate, always on and fast Internet access, *BT Technology Journal*, Vol. 20 (1), p. 103-114.
- Atapattu, L. (2010) *Channel tracking algorithms for highly efficient wireless broadband communications in rural areas*, Faculty of Build Environment and Engineering, Queensland University of Technology, Brisbane.
- Badran, F. (2011) *Promoting economic growth by broadband development in emerging countries: an empirical study*, Technical Symposium at ITU Telecom World, p. 199-204
- Badran, M. (2007) What determines broadband uptake in emerging countries? An empirical study, *MPRA Paper No. 37529*
- Ben-Akiva, M. *et al.* (1994) Combining revealed and stated preferences data, *Marketing Letters, Volume 5 Number 4*, p. 335-350
- Brundtland, G. H., World Commission on Environment and Development (1987) *Our Common Future*. Oxford University Press
- BT Group (2003) *Development of broadband markets*, The Times 100 Business Case Studies: <http://businesscasestudies.co.uk/bt/meeting-customers-needs-in-growth-markets-online-gaming/development-of-broadband-markets.html#axzz2RO7qkWYw> (Retrieved on April 10th 2013)
- Budde, P. *et al.* (2011) *Broadband: A platform for progress*, Broadband Commission for Digital Development
- Broadband Commission (2010a) *Overview*, Broadband Commission for Digital Development: <http://www.broadbandcommission.org/about/overview.aspx> (Retrieved on April 10th 2013)
- Broadband Commission (2010b) *Background*, Broadband Commission for Digital Development: <http://www.broadbandcommission.org/about/background.aspx> (Retrieved on April 10th 2013)
- Broadband Commission (2012a) *Leveraging broadband for sustainable development*, The Future we want; 20-22 June, 2012, Rio de Janeiro, Brazil
- Broadband Commission (2012b) *The state of broadband 2012: achieving digital inclusion for all*, The Broadband Commission for Digital Development, [broadbandcommision.org](http://www.broadbandcommission.org), <http://www.itu.int/en/osg/activities/Pages/2013-02-GETHealthsummit.aspx> (Retrieved on February 20th 2013)

Chaudhuri, A. & Flamm, K. (2007) An analysis of the determinants of broadband access, *Telecommunications Policy* 31, p. 312-326.

Choudrie, J-K & Dwivedi Y. (2006a) A comparative study to examine the socio-economic characteristics of broadband adopters and non-adopters, *Electronic Government, Vol. 3 (3)*, p. 272-288

Choudrie, J-K. & Dwivedi Y. (2006b) Investigating factors influencing adoption of broadband in the household, *Journal of Computer Information Systems*, p. 25-34.

Cochrane, W. G. (1977) *Sampling techniques (3rd ed.)* New York: John Wiley & Sons

Doody J. (2012) *Building a new power balance BRIC by BRIC*, OECD Insights: <http://oecdinsights.org/2012/07/19/building-a-new-power-balance-bric-by-bric/> (Retrieved on April 8th 2013)

Dwivedi, Y. & Lal, B. (2007) *Socio-economic determinants of broadband adoptions. Industrial Management & Data Systems*, Vol. 107 (5), 654-671.

European Commission (2010a) *Digital Agenda for Europe*, Digital Agenda for Europe: <http://ec.europa.eu/digital-agenda/en/digital-agenda-europe> (Retrieved on April 10th 2013)

European Commission (2010b) *Digital Agenda for Europe: Action 97: Promote the internationalisation of Internet governance*, Digital Agenda for Europe: <http://ec.europa.eu/digital-agenda/en/international/action-97-promote-internationalisation-internet-governance> (Retrieved on April 10th 2013)

European Commission (2010c) *About our goals*. Digital Agenda for Europe: <http://ec.europa.eu/digital-agenda/about-our-goals> (Retrieved on April 10th 2013)

European Commission (2013) *About the EU as a whole: Broadband*. Digital Agenda for Europe: <http://ec.europa.eu/digital-agenda/about-eu-whole> (Retrieved on April 10th 2013)

European Commission (2012) *Digital Agenda Scoreboard 2012*. http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/scoreboard_broadband_markets_0.pdf (Retrieved on April 10th 2013)

Farid-Badran, M. (2007) *What determines broadband uptake in emerging countries? An empirical study*, <http://ideas.repec.org/p/pramprapa/37529.html> (Retrieved on February 20th 2013)

Ferguson, C. H. (2004) *The broadband problem*, Washington, D.C: The Brookings Institution

Freidrich, R. *et al.* (2007) *The Mobile broadband opportunity in emerging markets*, booz&co: <http://www.booz.com/global/home/what-we-think/reports-white-papers/article-display/mobile-broadband-opportunity-emerging-markets> (Retrieved on April 26th 2013)

Grimes, A. *et al.* (2011) *The Need for Speed: Impact of Internet Connectivity on Firm Productivity*, Springer, p. 187-201

Horriban, J. B. (2010) Broadband adoption and use in America, *OBI Working Paper Series No. 1*

Investopedia (2013a) *Developed economy*, Investopedia: <http://www.investopedia.com/terms/d/developed-economy.asp#axzz1legO8olO> (Retrieved on April 8th 2013)

Investopedia (2013b) *Emerging markets economy*, Investopedia: <http://www.investopedia.com/terms/e/emergingmarketseconomy.asp> (Retrieved on April 8th 2013)

ITU (2008) *ITU Sec-Gen emphasizes key role of technology in next-generation healthcare*, itu.int, <http://www.itu.int/en/osg/activities/Pages/2013-02-GETHealthsummit.aspx> (Retrieved on February 20th 2013)

ITU (2012a) *Leveraging broadband for sustainable development*, itu.int <https://itunews.itu.int/En/2469-Leveraging-broadband-for-sustainable-development.note.aspx> (Retrieved on February 20th 2013)

ITU (2012b) *Broadband Commission calls for a low-carbon economy*, itu.int <https://itunews.itu.int/En/2466-Broadband-Commission-calls-for-a-low-carbon-economy.note.aspx> (Retrieved on February 20th 2013)

Jakob, P. (2010) *The history of broadband Internet*, EzineArticles: <http://ezinearticles.com/?The-History-of-Broadband-Internet&id=3948723> (Retrieved on April 15th 2013)

Koutrompis, P. (2009) The economic impact of broadband on growth: A simultaneous approach, *Telecommunications Policy*, p. 471-485

Kridel, D. J., Taylor, L. D., and Rappoport, P. N. (2003) The demand for broadband: access, content, and the value of time, In *Broadband: should we regulate high-speed Internet access?* Alleman, J. H., Crandall, R. W., p. 57-82 Washington D.C.: Brookings Institution Press

Larose, R. *et al.* (2012) Measuring sustainable broadband adoption, *International Journal of Communications* 6, p. 2576-2600

Lehr, W. *et al.* (2005) *Measuring broadband's economic impact*, Massachusetts Institute of Technology, Massachusetts.

Lennett, B. and Meinrath, S. (2009) *Building a 21st Century Broadband Superhighway* New America Foundation

Lynn, J. (2012) *Developing countries must boost broadband: UN*, reuters.com, <http://www.reuters.com/article/2009/10/23/ozatp-tech-developing-idAFJOE59M08620091023> (Retrieved on February 20th 2013)

Marcus, J. (2005) *Broadband Adoption in Europe*, IEEE Communications Magazine, p. 18-20

Mourad, S. & Yardley, M. (2012) *Making Broadband in Emerging Markets a Reality*, Analysys Mason: <http://www.analysysmason.com/About-Us/News/Insight/Broadband-emerging-markets-Aug2012/#.UXvwNoJ93zM> (Retrieved on April 26th 2013)

NTIA (1995) *Falling through the net: A survey of "have nots" in rural and urban America*, NTIA: <http://www.ntia.doc.gov/ntiahome/fallingthru.html> (Retrieved on April 13th 2013)

OECD (2013a) *OECD broadband statistics update*, OECD: <http://www.oecd.org/sti/broadband/broadband-statistics-update.htm> (Retrieved on April 10th 2013)

OECD (2013b) *List of key indicators*, OECD: <http://www.oecd.org/statistics/> (Retrieved on April 8th 2013)

OECD (2012a) *Fixed and wireless broadband subscription by technology*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2012b) *Historical penetration rates, G7*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2012c) *Yearly penetration increase*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2012d) *Fixed and wireless broadband subscriptions per 100 inhabitants*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2011a) *Average advertised download speeds, by country*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2011b) *Fastest advertised connection available among all surveyed operators, by country*, OECD: <http://www.oecd.org/sti/broadband/broadband-statistics-update.htm> (Retrieved on April 10th 2013)

OECD (2011c) *National Broadband Plans*, *OECD Digital Economy Papers*, No. 181, OECD Publishing: <http://dx.doi.org/10.1787/5kg9sr5fmqwd-en> (Retrieved on April 15th 2013)

OECD (2010a) *Households with access to home computer*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2010b) *Business use of broadband*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2010c) *Households with broadband access*, OECD: <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm> (Retrieved on April 10th 2013)

OECD (2009) *Indicators of broadband coverage*, Committee for information, computer and communications policy: <http://www.oecd.org/internet/broadband/44381795.pdf> (Retrieved on March 28th 2013)

OECD Insights (2012) *Building a new power balance BRIC by BRIC*, OECD Insights: <http://oecdinsights.org/2012/07/19/building-a-new-power-balance-bric-by-bric/> (Retrieved on April 8th 2013).

O'Neill, J. (2001) Building better global economic BRICs, *Global Economics Paper No 66*, New York, USA: Goldman Sachs, Group Inc..

Ovum (2012) *Emerging Markets*, <http://ovum.com/emerging-markets/> (Retrieved on February 20th 2013)

Ovum (2010) *Emerging markets paying three times more than the rest of the world*, http://ovum.com/press_releases/emerging-markets-paying-three-times-more-than-rest-of-the-world-for-broadband/ (Retrieved on February 20th 2013)

Rohman, I.-K. and Bohlin, E. (2012) Does broadband speed really matter as a driver of economic growth? Investigating OECD countries, *Int. J. Management and Network Economics*, Vol. 2 (4), 336-356.

Shekher, I. (2012) *Broadband evolution, types and features*, Tikonaplans: <http://tikonaplans.blogspot.in/2012/07/broadband-evloution-types-and-features.html> (Retrieved on April 15th 2013)

Trkman, P., Jerman, B., Turk, T. (2008) Factors of broadband development and the design of a strategic policy framework. *Telecommunications Policy*, 32, p. 101-115.

United Nation Statistics Division (2013) *Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings*, United Nations Statistics Division: <http://unstats.un.org/unsd/methods/m49/m49regin.htm> (Retrieved on April 8th 2013)

Wallsten, S. (2009) *Understanding international broadband comparisons*, Washington D.C.

Weiner, M.-D. et al. (2012) *Consider the non-adopter: Developing a prediction model for the adoption of household-level broadband access* Socio-Economic Planning Sciences 46, p. 183-193

Appendix I: Broadband technologies

There are multiple technologies of deploying broadband. Below DSL, Cable, Fiber and Satellite is described. The definition of broadband is a service providing Internet access at speeds higher than 256 kbit/s. With a high-speed Internet connection you are able to send and receive information, which is represented as bits, in large quantities fast. OECD chose this threshold because that was the threshold for the vast majority of commercial DSL and cable modem operators offered at that time.

i. DSL

DSL, Digital Subscriber line, is a service that uses the existing copper wires to transfer data. It combines separate voice and data channels over a single telephone line. This is possible by using the lower frequencies for voice and the higher frequencies for data and telephone and Internet can therefore be accessed simultaneously. The capacity or speed DSL technology offer ranged from 256 kbit/s to 40 Mbit/s in the direction to the customer (downstream). This depends on what type of DSL technology is being used and the distance to the local exchange.

The distance between the customer and the closest telephone switching station may not exceed 5,5 km to be able to use its full speed. The further away you get from these stations the lower bitrate (speed) you will get.

The specific DLS technology determines the bitrate as well. DSL is often used as synonym to ADSL, asymmetrical DSL, which means that the downstream and upstream speeds differ. Typically the downstream is much faster than upstream. SDSL, symmetrical DSL, however is often offered to businesses and the speed of both streams are, as the name suggest, equal.

ii. Cable Internet access

Cable Internet or cable modem provides Internet access through cable television infrastructure. Just like DSL is integrated into the copper telephone wires, cable modems are integrated into the existing cable TV coaxial wires. A splitter is installed to divided the incoming signals. One of the connections gives cable TV and the other supplies you with Internet access. Downstream the bitrates can be as big as 400 Mbit/s and upstream bitrates can go up to 20 Mbit/s.

iii. Fiber to the x (FTTX)

Fiber network is a network where data is transferred via fibre-optic (a transparent fibre made of glass or plastic). The term FTTX is a generalization for several different fiber connections. FTTN (to the neighbourhood), FTTB (to the building) and FTTH (to the home) are some of the different ways of deployment. FTTH means that there is fiber-optics all the way to the home, compared to FTTN where each residence in the neighbourhood connects to one fiber connected node by metallic cables.

Fiber networks are compared to DSL and Cable Internet much faster. The speed of fiber-optic is, likewise copper for DSL, limited by length but copper is much more sharply limited. Tens of miles of fibre-optics can easily carry 1 Gbit/s (1000 Mbit/s). Fiber networks are also symmetrical and can therefore offer gigabit speed in both directions.

The speed is today limited by the terminal equipment rather than the fiber, which implies that this is the most “future-proof” technology.

iv. Satellite Internet

This technology is provided via satellites. Satellite Internet relies on three primary components:

- Satellites in fixed position above the earth
- Ground stations (gateways) that relay the transferred data to and from the satellite
- VSAT (Very small aperture terminal) dish antenna to receive and send data to and from the gateway.

Satellite Internet's advantages are that Internet can be accessed from anywhere on earth. Its main disadvantages are that due to the long distance to the satellite and then back to the receiver the latency becomes substantial. Via cable or DSL the latency is around 14- 40 ms compared to Satellite Internet where latency is around 1 000-1 400 ms.

Appendix II Relevant survey questions from questionnaire

CLASSIFIER

ASK ALL:

1. Are you (Single code)

- 1 ☐ Male
2 ☐ Female

ASK ALL:

2. What is your age? (Numeric)

WRITE IN EXACT YEARS
AGE:

Terminate if under 15 or over 69 for UK, US, Japan, Sweden, Spain, France, Italy, Germany
Terminate if under 15 or over 59 for Brazil, India, China, Russia, Mexico, South Africa

ASK ALL:

3. What is the highest level of education you have completed? (Single code)
(Code education in both local and global columns. Add local categories.)

	A. Local Codes		B. Global codes
1. No school	☐	PRIMARY OR LESS	☐ 1
2. Primary	☐		
3. Some secondary school	☐	SOME HIGH SCHOOL	☐ 2
4. 'O' levels/CSE/GCSE	☐		
5. 'A' levels/HND/Highers (6th Form college)	☐		
6. Technical/trade studies/GNVQ	☐		
7. University graduate	☐		
8. Some postgraduate studies	☐	POST-GRADUATE	☐ 4
9. Postgraduate degree	☐		
10. Don't know	☐	DON'T KNOW	☐ 5

USAGE OF INTERNET SERVICES

Ask Q28 if respondent uses the Internet, code 1–8 in at least one of the items 1–3 in Q26. Others go to Q53.

28. How often do you do any of the following on any of your Internet capable devices? Please tick one answer for each activity. (Single code per item)

	More than 3 hours per day 1-3 hours per day		Less than 1 hour per day, but several times a week	Once a week	Several times a month	Once a month	Less often	Never	Don't know	
	1	2	3	4	5	6	7	8	9	10
<u>Communication:</u>										
1. Personal e-mails										
2. Work/business related e-mails										
3. Browsing the Internet for <u>personal use</u>										
4. Browsing the Internet for <u>work related</u> reasons										
5. Using Instant messaging/chat for <u>personal</u> reasons (ICQ, MSN Messaging, AOL messaging etc.)										
6. Using Instant messaging/chat for <u>work related</u> reasons (ICQ, MSN Messaging, AOL messaging etc.)										
7. Visiting web communities (e.g. MySpace, MSN Spaces/Windows Live Spaces, Yahoo 360°) (Agency: please add local examples if necessary)										
8. Making phone calls over the Internet using IP-telephony (Skype or similar)										
9. Reading blogs (Internet diaries)										
10. Writing blogs (Internet diaries)										
<u>Content:</u>										
1. Access news or other up-to-the minute information										
2. Reading web versions of printed newspapers or magazines										
3. Internet banking (make bank transactions online)										
4. Search for information (timetables, health information, maps etc.)										
5. Listen to streaming Internet radio										
6. View, listen or subscribe to pod casts										
7. Play online games										
8. Window-shopping: search and compare products and prices										
9. Purchasing physical objects over the Internet (e.g. buy/order books through Internet)										
10. Apply and look for job opportunities										
11. Search for health or medical related information										
12. Search for educational information										
13. Sharing your personal photos with other people via e.g. Facebook, MSN, Flickr, PhotoBucket, KodakGallery, etc (e.g. upload family pictures)										
15. Upload and store content on a filehosting service for <u>personal use only</u> (e.g. Rapidshare, etc)										
16. Upload and store content on a filehosting service for <u>sharing with others</u> (e.g. Rapidshare, etc)										
17. Purchasing <u>and</u> downloading music (full songs) e.g. via iTunes, Amazon, 7digital etc.										
18. Purchasing <u>and</u> downloading movies (full movies) e.g.										

DEMOGRAPHICS II

Ask if more than one person in household, code 2–9 in Q93:

102. Here is a list of income categories. Please tell me the category that best describes the combined annual income (before tax) of all members of your household, including wages of salary, pensions, interest or dividends, and all other sources. If you live in a shared household, please give your best estimate for the income of your entire household. **(Single code. Insert local categories and adjust to local standards)**

Add local categories	A. Local Codes		B. Global codes
1. Under £5,999	☐	LOW	☐
2. £6,000 to £7,999	☐		
3. £8,000 to £11,999	☐		
4. £12,000 to £15,999	☐		
5. £16,000 to £23,999	☐	MEDIUM LOW	☐
6. £23,000 to £26,999	☐		
7. £27,000 to £34,999	☐		
8. £35,000 to £39,999	☐	MEDIUM HIGH	☐
9. £40,000 to £45,999	☐		
10. £46,000 to £59,999	☐		
11. £60,000 to £69,999	☐		
12. £70,000 to £99,999	☐	HIGH	☐
13. £100,000 to £149,999	☐		
14. £150,000 to £199,999	☐		
15. £200,000 or over	☐		
16. Prefer not to answer	☐		

103. Which of the following options best describes your current situation?
(Single code)

- | | |
|--|--|
| 1 ☐ Self-employed | 6 ☐ Full-time student |
| 2 ☐ Full-time employee | 7 ☐ Unemployed |
| 3 ☐ Part-time employee | 8 ☐ Retired |
| 4 ☐ Temporarily/seasonally employed | 9 ☐ Other |
| 5 ☐ Full-time homemaker | |

Ask if respondent is working, code 1–4 in Q103 others close.

104. Which of the following options best describes the level of management role you perform? **(Single code)**

- | | |
|--|--|
| 1 ☐ Senior manager/executive/director | 3 ☐ Other management role |
| 2 ☐ Middle or line manager | 4 ☐ I do not perform a management role |

108. City/town size:

- 1 ☐ Metropolitan
 2 ☐ Bigger city
 3 ☐ Medium sized city

- 4 ☐ Small town
- 5 ☐ Village
- 6 ☐ Rural

Appendix III All available graphs

All graphs used in this thesis is available from:
<https://www.dropbox.com/sh/hv2p6rztuyr882t/loX7X-Tu8R>

Or by the QR-code below:

