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FIT4WORK

SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS

CO-FUNDED BY

AAL PROGRAMME

The National Centre for Research and Development

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User needs and requirements

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1. Introduction

The present document has as main objective to present the results obtained from the user requirement extraction activities as executed from the onset of the project Fit4Work and the findings of their evaluation. Along the different sections, the different methodologies that were used are explained as well as the results of applying these methodologies. These instruments provided us the basis to capture the preferences and wishes from the users in an organized way.

This document starts with Chapter 2 which contains an introduction of the project and the aims of the product to be developed. To illustrate how the system may work in practice, both user stories and use scenarios are described in the introduction.

In Chapter 3 we present details of the different methodologies applied by us to understand the requirements of the target users for the developed system.

After that, in Chapter 4, we present a review of literature related to creating health-related ICT solutions for older adults.

Chapter 5 discusses the results of a survey performed within the target user community using the questionnaire designed in the first stage of Fit4Work project's WP2 implementation. The survey covered the target end users in all countries participating in the project.

These results are verified and strengthened by two activities performed in the Netherlands by the project's user organization – UnieKBO. This relates to the interviews with experts active in the field of supporting older adults which are discussed in Chapter 6, and to the focus group of a number of older adults whose opinions are evaluated in Chapter 7.

Finally, in Chapter 8, overall results and conclusions are 'translated' from 'preferences to product' across four major categories related to the methodology recommended for designing and developing the system, and the features of the system ensuring the envisaged solution focuses on the right aspects, ensuring the right user perspective from the start, and enabling to turn it into a sellable product.

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2. The Fit4Work system

The Fit4Work project aims to propose a system targeted at delivering an innovative easy-to-use and unobtrusive product that will support older workers and the relevant stakeholders in reducing and managing physical and mental stress resulting from their occupation and daily duties. By incorporating advanced ICT technologies, the system will provide ambient ways of monitoring physical and mental activities at work. Smart algorithms will use the information collected to provide context-sensitive personalized recommendations for adjusting the workplace and behavior at work, as well as define long-term individual lifestyle plans to meet the demands of the work taking into consideration the worker's age. It is foreseen that the designed system will use a smartphone as the main user device and will connect with other devices worn by the user (i.e. wearable devices) and/or installed in their working environment.

2.1. User stories

The main objective of the project is to create a system that helps older workers to improve their health or maintain it in the best possible condition. Older workers have very different problems depending on their profession starting from back pain to physical and mental stress. Understanding these problems is a key factor to Fit4Work's success. Therefore, typical stories of potential users are defined to understand which problems need to be addressed in the Fit4Work system.

2.1.1. Story 1: Helena

Helena is a 63 years old accountant living in the suburbs. Two years ago her husband Stephan had a stroke and now he is partially paralyzed. He has problems with clear speech and daily activities. Helena decided to give up work in order to take care of her husband. Every day she must help Stephan during eating, dressing and moving around the house. What is more, all household duties fell on her shoulders. She is a strong and loving woman, but more often than not, fatigue and stress show on her face. Stephan often cannot clearly express what kind of help he is expecting from her and that causes lots of stressful situations at home. After the accident Stephan became a bit more bitter and grumpy affecting Helen's mood as well. She rarely goes out because she is afraid to leave her husband alone at home. The total dedication to the care of husband and the excess duties make Helena forget to find some time for herself, or to focus on anything other her husband needs. The stress which she experiences every day more and more affects her own health.

2.1.2. Story 2: Anna

Anna is 55 years old and has been working as a professional caregiver for 27 years. She loves her job because she always wanted to help other people. Her working day begins with helping patients in getting washed and ready for the day, and changing their bed sheets. After that she is supporting them during meals and making sure they take their proper medications on time. The whole day she gives them her helpful hand, starting from adjusting their pillows to supporting their rehabilitation. Sometimes it requires lots of physical effort. Patients who are paralyzed cannot move by themselves, and she needs a lot of strength to help them. There are also patients who just do not want to cooperate with her. Such situations require even more from Anna, both physically and mentally. She is proud of what she is doing but admits that it is a very demanding job. She is nearly the same age as her patients and with each passing year Anna feels the increasing tiredness in her whole body, especially in her sore back and joints.

2.1.3. Story 3: Charles

Charles is 72 year old retired psychologist and has been working voluntary in a call center for 7 years. He spends eight hours every day at his desk answering calls, trying to solve people's problems. He is so dedicated to his job that he simply forgets about taking breaks, changing positions, or doing some stretching. Even during meal breaks he does not leave his chair and phone. When he was younger Charles was leading an active lifestyle, but today he is slightly overweight and suffering from back pain. This is probably caused by his sedentary type of work and lack of upright body position. Next to that, poor working posture affects not only his physical fitness, but also his motivation to be more active.

2.2. Use scenarios

The goal of the system, and the needs of the potential end users as presented in their stories above, provide an insight into a general view of the scenarios to be supported by the designed product (Figure 1). These use-scenarios include:

- **Fitness monitoring**, that is smart monitoring of physical and mental status of the user and providing feedback on how to improve daily routines;
- **Support in implementing a Personal Fitness Plan**, defined by the system based on data captured during monitoring; the Personal Fitness Plan should encompass an individual physical and mental exercise plan which helps a given individual to stay healthy;
- **Working environment monitoring**, in order to detect bad working conditions and provide the employee/user with advice on how to avoid or improve these conditions.

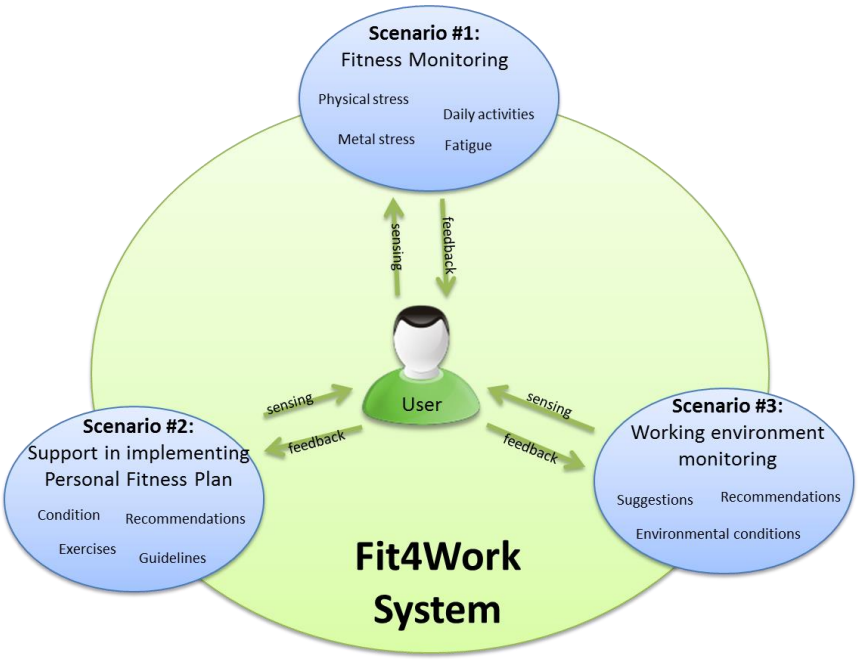

Figure 2.1. Use scenarios of the Fit4Work system

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2.2.1. Scenario #1: Fitness Monitoring (physical and mental)

The Fit4Work system will monitor and detect anomalies or unwanted situations in user's daily (life at) work, which have an impact on the proper functioning or efficiency at work. The monitoring will be smart which means that the system intelligently responds to changes - when the system detects unwanted situation it responds appropriately and gives feedback to the user. Fitness Monitor focuses on three aspects relevant to the elder employee: physical activity monitoring, physical stress (postural stress and fatigue) detection and mental stress detection. First, the system needs to sense some bio signals from the body. The next step is real time detection, which means that signals are constantly analysed. When anomalies or unwanted situations are detected, feedback is given to the user and the user may perform necessary actions to prevent undesired situation.

2.2.2. Scenario #2: Support in implementing Personal Fitness Plan

A good physical and mental condition is extremely important to keep older employees healthy and effective at work. Monitoring body parameters and detection of unwanted situations alone are not enough. In order to achieve an appropriate level of fitness (both physical and mental) or to maintain the current level of health, the user should perform special exercises. Exercise types are individual for each person. Therefore the selection of exercises needs to be personalized and adjusted on the quality of exercising by the user. For this purpose the system will prepare a personal fitness plan of exercises to be performed by the user. Sensors may produce various data related to physical and mental stress of the user. Based on these data the system will prepare fitness recommendations and guidelines, to complete the Personal Fitness Plan. The system will propose a set of physical and mental exercises to the user with information on how and when the user should do them.

2.2.3. Scenario #3: Working environment monitoring

The quality of the working environment and psychological well-being of workers are strongly correlated as well. Factors like, for instance, poor air quality, noise, ergonomic conditions, and lack of privacy, humidity, illuminance may have an effect on the worker's satisfaction and mental health. Additional problems that may be caused by inappropriate environment conditions include lack of concentration, efficiency reduction and (in extreme cases) serious deterioration of the worker's health status. Therefore the system will monitor the worker's environment and detect unhealthy situations (too loud, too dark, etc.) and give (if possible) immediate feedback containing recommendations or suggestions about what should be done to improve those conditions (open the window, turn on the light, etc.).

3. Methodology

To improve the match between the product (in progress) and the users' preferences, needs and expectations, an incremental, user-centric methodology was used. We believe that a process of good anticipation on the prospect users' preferences, eventually will lead to better sales and a more sustainable use of the product. Specifically, we adopted a variety of methodologies and techniques for user requirements which are discussed below:

3.1. Literature study

To explore the topic and getting clear the state of the art in this domain, a literature study was done. We aimed to combine the available general knowledge about occupational health, use of ICT and elderly to give direction to the specific application of Fit4Work. In that way we aimed to find out which (kind of) interventions already exist and how these are considered by the (prospect) users; which are drivers and barriers for elderly in general to use ICT and more specific in their work and to improve their health.

Literature was searched for via Google Scholar, since it was not clear in advance in which domain exactly we would find most interesting information. We used the criteria as mentioned in Table 3.1. In this schedule the topics to investigate are mentioned as well as the keywords which were used to find articles about the (sub)topics. Keywords are also mentioned with which we searched for articles/literature in which several topics were combined.

Table 3.1 . Incluson and exclusion criteria for the literature study in the context of user requirements concerning the Fit4Work system

Topic	Subtopics /keywords	Extra + combined keywords	Excluded	Motivation exclusion criteria
Health	Physical health	-Occupational health	Articles about ill people, in care, hospital etc. Articles about health care technology.	We are interested in how to stay healthy rather than how to be cured and treated when already ill. Eventually, also articles were included about ill people, since elderly people using ICT for health, appeared to be mainly about people with a certain illness. However, the background of each article is explained as a side note.
	Mental Health	- Mental stress - Stress reduction		
	Preventive health			
ICT	Use of ICT	- Drivers and barriers for ICT use - Use of ICT for health - Use of ICT by elderly people / older adults	Outdated articles; published Before 2000	ICT is a quick developing domain and older articles may be outdated already and no longer relevant.

	Wearables	- Activity sensors - Activity trackers - Smartphone and health - Health apps		
Elderly	Working older adults	- Influence working on health	Articles concerning elderly from age >70	This project is about working older adults. It is less relevant to know the opinion of very old aged people.
	Retired people	- Influence retirement on health		
Work	Office work			
	Physical labor			
	Retirement			
	Retirement age	- Relation retirement age and health		
	Role of employer	- Role of employer in occupational health		

3.2. Questionnaire

Once we knew from the literature study the most important topics to investigate and determine, a questionnaire was distributed in all of the participating countries. Questions were among others about (perceived) health, occupation and experiences with/preferences for ICT. The questionnaire included questions both concerning usability and functional requirements.

3.3. Experts Interviews

Interviews with four experts were done to test, verify and deepen the results (concerning both usability and functionality) of the literature study and questionnaire. The literature and questionnaire were explorative and delivered mainly facts and quantitative data; the conversations with experts helped to further elaborate on the facts and to ask for the mechanisms, arguments and feelings behind the findings. The conversations with the experts took place as semi-structured interviews. This structure was used since the earlier methods had delivered a list with important topics but not formulated concrete questions yet. Next to that, the four experts all had their own expertise, which made it possible to look at the same topics from different perspectives.

3.4. Focus group

Eventually a focus group was organized as an additional qualitative methodology to test all the information we found in the earlier subparts. A face-to-face meeting with multiple end users would facilitate valuable exchange and discussions that could not easily be replaced with surveys. In this focus group session all the explored topics were discussed. Next to that was checked with the prospect users which topics, elements and functionalities were most important to take into account in the development of the product. This happened among others by the means of propositions. Participants were selected among the respondents

of the survey who left their e-mail address. Before their participation in the focus group, the seniors were extensively informed about the procedure and asked to sign an informed consent form.

4. Literature study

4.1. Older adults using ICT at work

In a comparative research among workers of various age groups, the use of ICT was compared (Koning & Gelderblom, 2006). The results show that, compared with younger workers, older workers make less use of ICT in their job, use less complicated applications and have more difficulties in using ICT. This is a disadvantage as the use of ICT and particularly the level of use appear to affect performance positively. The findings of this research are interesting , since they help us to understand the way older adults use ICT at work. Although this research is about using ICT for work purposes, it says something about the attitude against ICT in the working setting in general. It might be a threshold for older adults as well for using ICT at the office for other purposes, like health and fitness. The results furthermore suggest that company policies can be of help in dealing with the problem. However, this should be done in another way than formal training in ICT. Such a training would not have a significant effect. Interesting detail is that this research was executed among employees with an ICT related job. We can assume that the differences among other employees will be even more present.

Conclusion L1: remember about introducing the system to the end users
Special attention is needed to a good introduction of the Fit4Work system to the new (older adult) users.

4.2. Elderly using ICT to improve health

In 2008 a review study (Jimison, 2008) was executed to the barriers and drivers for chronically ill, underserved elderly (65+) to use health information technology. An article from 2011 (Heart & Kalderon, 2013) mainly elaborates on the barriers for adaptation of health-related ICT by older adults; the third article we used was the most recent one and published in 2015 (Veer et al., 2015). It shows the results of a study to the intention of ICT use of residential elderly people and explorative insights in elderly people aged 57 and older. All studies had a slightly different focus, but the conclusions were clearly comparable. Although the mentioned studies don not focus exactly on the same target group as Fit4Work does and an ICT application like Fit4Work was not studied yet – because of its innovative character – we still may expect the results of this literature study to provide handles for the Fit4Work project and product.

4.2.1. Drivers

The first recommendation to support the use of a certain ICT application, is to start already during the development with involving the target group. When (elderly) consumers play a role in the development of a device and their preferences are taken seriously, they will be more likely to use it once it is there (Jimison, 2008).

Conclusion L2: involve users from the beginning
Representative of the target user group should be involved in the design and development of the product from the beginning.

Second, consumers in general, but senior consumers specifically, will be more tended to use health technology if they perceive clear benefits from using it, preferably on short term (Jimison, 2008; Heart & Kalderon, 2011). Next to that, the (perceived or expected) convenience of use needs to be high and the results needs to be worth the effort: costs and benefits need to be in balance (Heart & Kalderon, 2011). For instance, a product reminding the user to walk enough outside which takes more effort to use than thinking of walking yourself, would not be interesting. Something similar counts for the data entry. Elderly prefer their personal data to be easily accessible.

Conclusion L3: present clear short-term benefits and monitor them
The system should clearly show the benefits of its use: personal, concrete and short-term (e.g. how many calories someone has burnt or how many kilometers they have walked).

Next to this, the intervention needs to fit into the user's daily routine. This both counts for the device itself and for the use of it. Eventually, an important driver to use health related ICT is a rapid and frequent interaction with a clinician (Jimison, 2008).

Conclusion L4: fit the system into user's daily routine
The system should attempt to use the devices already in use by the user as well as propose activities that do not modify the general daily routine of the user.

4.2.2. Barriers

The barriers for using health related ICT can be derived easily from the mentioned drivers: if the circumstances are not focused in the direction that supports use, there will be barriers for this target group to use the device or product. However, some barriers are mentioned specifically and separately in the literature:

An important barrier is the fact that many older adults do not share the perception that ICT can significantly improve their quality of life (Veer et al., 2015). But most of the times, the reason that elderly people do not like to use ICT to improve their health 'just' because of 'no interest' or '(perceived) no need' (Heart & Kalderon, 2011).

Conclusion L5: carefully attend marketing ICT-based solution to older adults
The business model and marketing strategy for the final product should aim to underline the need for its use by the targeted customers and clearly show the advantage it gives to its user.

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5. Results: questionnaires for the target group

5.1. Methodology

Once we knew from the literature study the most important topics to investigate and determine, the prospect users in all participating countries were asked their opinion by means of a questionnaire (Busink et al, 2014) that was distributed in all of the participating countries. Questions were among others about (perceived) health, occupation and experiences with/preferences for ICT. The questionnaire included questions both concerning usability and functional requirements. The questionnaire was made in an interactive process between all the partners, both the technical partners, user organizations and business partners, since we wanted to know from the prospect end-user information about preferences concerning all these domains (technical possibilities, user friendliness, willingness to pay etc.).

The questionnaire was distributed in all representative countries. Respondents were found via colleagues, friends and family (Slovenia, Spain); pensioners organizations (Slovenia) and senior organizations (Poland, the Netherlands, Romania) and recruited by e-mail (Slovenia, the Netherlands); via paper invitations (Slovenia, Spain, Romania) or during meetings (Poland). In some countries the respondents filled in the questionnaire digitally (Slovenia, the Netherlands), in other countries on paper (Poland, Spain, Romania). In general it was moderately easy to find respondents. Only in Romania it took at the start unexpected effort to find the right respondents, but in the end enough respondents were found.

5.2. Results

5.2.1. Respondents

In total, 277 older adults from five countries filled in the questionnaires. Among them, 67 come from the Netherlands, 72 from Poland, 40 from Slovenia, 48 from Spain and 50 from Romania. The age of the respondents was distributed as displayed in the table below. The largest group of respondents is aged 50-65 (78%), which is still in the working age. The respondents from Romania were the youngest: 84% of them was younger than 60 years old. Respondents from the Netherlands were the oldest, with 62,7% aged older than 60.

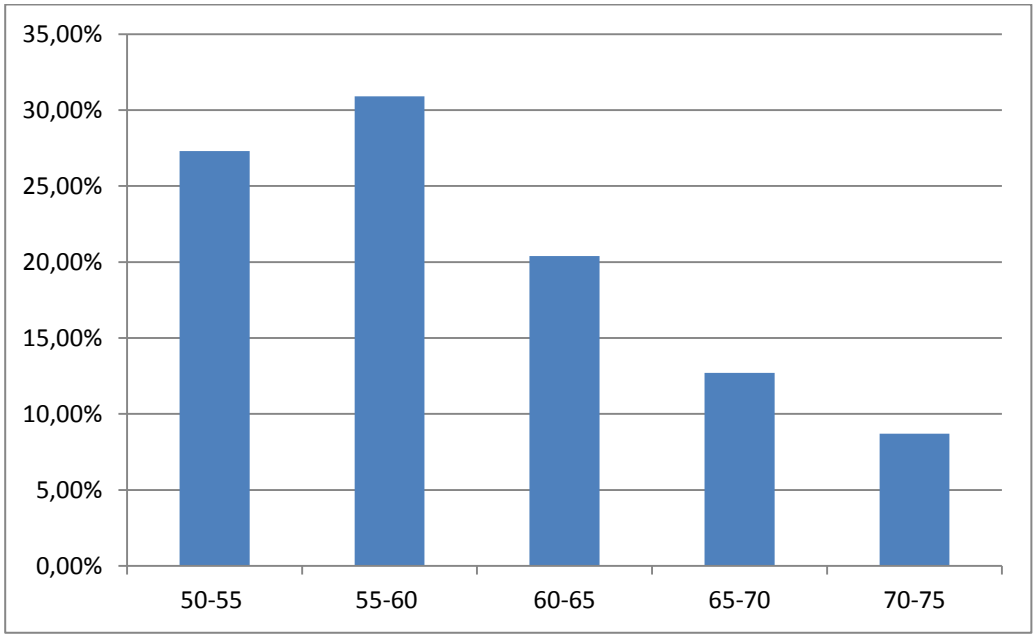

Figure 5.1. Age distribution of respondents to the Fit4Work user requirements survey

After analyzing (all) data we can conclude that the 'typical' respondent was a woman (67%) in the age 50-65 years old (78%), living in an urban area (66%) and with a 'degree' from secondary or higher education (80%). However, if we take a look more in-depth, we see many variations and deviations from this 'average' respondents. Their characteristics and preferences will be discussed in the coming paragraphs.

5.2.2. Health status and physical fitness

Almost all respondents (91%) rate their health status as fair or good; the same counts for their physical fitness (92%). However, although most of the respondents are engaged in physical activities (72%), 80% of them face difficulty with staying physically active in their daily life.

Conclusion S1: focus on prevention
Since the prospect end-users report to be fit already, Fit4Work should focus on prevention and maintenance of a good fitness level.

5.2.3. Working – physical and mental stress

Most respondents (82%) think their work is physically lighter or equal in comparison with others. They sit (77%), stand (67%) or walk (68%) at work but only seldom or sometimes (87%) lift heavy loads. They say (80%) they do not sweat very often at work. Nevertheless, 67% says to be sometimes tired after work.

Most of the respondents (67%) declare they do not feel any kind of stress at work. Respondents from Spain and Romania declare more often that they are stressed than respondents from Poland, the Netherlands and Slovenia. It is hard to say what's the cause for this differences, but when we take a look at the characteristics, the respondents from Spain and Romania appeared to be the youngest. It might be possible that respondents from these countries are still in stressful paid jobs while the older, Dutch, respondents

mainly are involved in voluntary jobs which they do because they like it, instead of they are dependent from it. The overall population of stressed respondents declares mental (82%) rather than physical stress (50%).

Conclusion S2: target physical strain related to prolonged sitting
Fit4Work should not primary focus on (safe) lifting of heavy loads. Sitting, on the other hand, is a relevant topic: the system should monitor the length of sitting position.

Conclusion S3: focus on making the user undertake enough physical activity
Physical activity at work in general is limited: physical activities should be proposed in adequate amount, most likely in leisure time.

Conclusion S4: stress is more important in paid occupation
Youngest respondents report to be stressed more often that people aged 65+.

Conclusion S5: mental stress is important
Fit4Work should focus rather on mental stress than physical stress: it is confirmed as an important challenge to cope with

5.2.4. Physical activities during leisure time

The respondents declare more physical activities during leisure time than during work. Most of them (65%) declare to play sometimes or often sports during leisure time. More than half of the respondents (53%) say to spend more than half an hour daily on physical activity.

Although there were some differences in preference among the different countries, a list of the most popular activities could be distracted. When this activity was considerably higher in a particular country than the others, this is also mentioned. Most popular activity is walking, 93% of the respondents often or sometimes walks and 23% mentions it as a popular activity; in Spain even 37%. Second popular activity is gardening (18% in general, 49% in Romania). The third popular activity is cycling 17% from the general population and even 28% in the Netherlands mentions this as a popular activity. However, 39% of the total population never bikes. This includes mainly respondents from Romania and Spain. Biking is followed by gym/fitness (7% in general, 16% in Spain) and swimming (6%). Hiking is popular among in general 5% of the respondents, but 15% of the Romanian users.

Although most respondents like to undertake physical activities, they are not always active. The main reasons for this are health problems such as chronic diseases (24%); lack of time (24%); back/legs pain, rheumatism (17%). Internal factors include laziness (12%) and lack of discipline (2%).

When we asked the respondents to compare their participation in physical activity, most of them (80%) think that their physical activity during leisure time is higher or equal in comparison with others.

Conclusion S6: take account of popular activities
The Fit4Work system should be ready to monitor physical activities often undertaken by target population (e.g. walking or cycling) and use those in personalized recommendations.

Conclusion S7: be aware a significant group of the target population suffers of chronic diseases or pains
The Fit4Work system should address the possibility of some of the users suffering of chronic diseases and/or pains.

Conclusion S8: focus on motivating to undertake physical activity
While the target population is generally active, a significant part of them report lack of time, laziness or lack of discipline: the system should aim to encourage the change of daily routine for such people.

5.2.5. Use of / familiarity with technology

Most of the respondents are familiar with technology. When they are not familiar with a certain technology, it is because they do not have this product. We can conclude that once someone owns a certain device, he or she also gets familiar with it. Nearly two out of three (71%) is familiar with the computer and does use it every day; 16% does not have a computer (note: we cannot just extrapolate this 16% to the general population of this age group; in some countries the questionnaire was distributed digitally, which means people without pc were excluded). More than half of the respondents (56%) is familiar with a smartphone; 30% does not have one. 42% of the respondents is familiar with a tablet; nearly the same: 41% does not have a tablet. 70% is familiar with digital TV, 19% does not have a digital TV.

Most of the respondents are willing or are at least neutral to use technological devices to improve their health. This willingness differs per device: 68% is willing to use the computer; 70% to use the smartphone and 57% to use the tablet to improve health. When we ask which devices the respondent would use to improve health, 65% is willing or neutral to use a wrist devices; 60% to wear clothes with sensors; 53% to have a device during the night under the mattress. More than half of the respondents (52%) declare they will not accept sensors in the work setting. In the Netherlands (64%) and Spain (77%) this is even higher.

Conclusion S9: use any type of device that brings health benefits
Most prospect users seem to be relatively familiar with modern technologies or able to get familiar quite quick and should be accepting a new technological solution. It can be based on any type of devices, including wearables and sensors in the environment.

5.2.6. Use of the smartphone

As mentioned, more than half of the respondents is familiar with a smartphone. The seniors use the smartphone mainly at home (47%). Women tend to carry their smartphone in shoulder bag, while men mostly use their pockets (49% trousers, 30% jacket, 5% inner pocket, 5% breast pocket).

The most popular operating system of the smartphone for this target group is Android – 62.5% of those respondent who know which operating system is installed on their smartphone declare using Android, with iPhone (18%) and Windows Phone (19.5%) being much less popular. About 1 out of each 4 respondents (28%) do not know which system they use on their smartphones. Almost half of the respondents declare that they need help in using smartphone (43%) especially in Poland (57%) and in Spain (66%).

Almost all of the respondents appreciate their smartphones and do not want to improve anything (84%). But if they would (16%), the improvements would include: bigger letters, screen or keyboard (27%); a case (8%); easier access to applications (8%); a simpler menu (8%); a manual (8%); tips how to make the phone faster (4%); easier update of certain applications (4%); a battery which does not need to recharge daily (4%) or a schedule for cinema or public transport (4%).

Conclusion S10: focus on delivering a solution for Android-based smartphones
The Android operating system is most prevalent on smartphones used by the target population (in Europe).

5.2.7. Use of Internet

Almost all of the respondents (84%) have access to the Internet. Exception is Spain with only 38% of access to the Internet among the respondents. Around 73% of the prospect users use the Internet daily. Around 91% evaluate their Internet connection as good.

5.2.8. Preferences for the Fit4Work technology

Half of the users (53%) declares to be interested in the Fit4Work solution. Respondents in the Netherlands are least interested (66%). A possible explanation might be again that the Dutch respondents are older and in general less in a stressful job. This might cause a lack of perceived urgency. Another reason might be that there are more competing devices or systems already at the Dutch market. At the same time, the respondents (in general) say they do not know a solution similar to Fit4Work yet.

Although half of the respondents has a certain interest, most of them (70%) is not convinced yet to buy the Fit4Work product. Elements where they concern about include the privacy of their personal (health) information (83%) the extent of (too much) interference (80%) and a lack of control (77%). About half of the users are interested in exchanging information with their peers and with specialists (45-55%). Only 29% is interested to exchange information with their peers)

If the respondents would buy Fit4Work, most of them (72%) would do this in a specialized store, after they looked for information about Fit4Work at the Internet (45%), from friends or family (17%) or from TV (14%). When they would buy the Fit4Work system, they would pay less than €600,- for it for the purchase and/or a maximum of 50€ monthly for a ‘membership’.

Conclusion S11: perform a field test in the Netherlands
The results confirm the Netherlands as the right place to perform the field test (‘*let us convince the users that are hardest to convince*’).

Conclusion S12: include a social network in the system
A social network within the system is confirmed as an interest of the users.

Conclusion S13: make sure of data privacy and security
The system must have adequate data privacy and security measures built in, and clearly inform the users about them.

Conclusion S14: create a good business model
Users are not convinced of the purpose of the Fit4Work system and investing in it. Therefore, a marketing plan and a good business model will be very important for the success of the Fit4Work product, especially in such countries as the Netherlands.

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6. Results: Asking the expert

Semi-structured interviews with four experts from the field were used to gain more insight in the motivations behind the user's preferences and the general trends in the domain of occupational health and ICT. From the literature study and the first preliminary results of the survey, four main topics were derived and formulated: kind of device; kind of health; use related factors of the device; use related factors of the user. These topics formed the structure of all the interviews. However, although the topics were similar in all the interviews, the questions were not, since all the experts had their own focus. The interviews were done in Dutch; face-to-face, at the office of UnieKBO or by telephone/Skype. The conversations were reported separately, but in this chapter the main conclusions are mentioned and structured per topic. Both the mentioned topics and new topics that popped up during the interviews.

The first expert was a consultant specialized in the domain of entrepreneurship, ICT, health and wearables. This interview mainly focused on the anticipation on different groups; reasons for people to use (new) ICT devices and device related elements to make a device attractive for elderly.
Secondly a professor was interviewed, specialized in the field of occupational health among elderly employees and (almost) retirees. This expert mainly gave information about health related issues within this specific target group and preferences at the work setting.

Thirdly an interview was done with a nurse specialized in care technology. Although the technology she talked about was mainly aimed at her clients (age 80+), she could provide a lot of information about how people get used to ICT (both colleague-nurses and clients). These general trends were useful as well.

Eventually an end-user was interviewed. An elderly man working as a volunteer at the office of UnieKBO. He mentioned different interesting trends he notices among elderly people. He told what kind of elderly people - according to him - are willing to use ICT and who are not.

6.1. Kind of health

In a research among employees aged 50-67, the professor and her colleagues explored that at at this age many disabilities start to appear, mainly chronical diseases. Although these persons are older adults rather than really elderly people, their health status is already decreasing. Chronical ill elderly employees need to get space to take a short break every now and then.

In the future, mental capacity and fitness of the brain will become (even) more important. Work is going to be mental rather than physical. However, there is not enough knowledge yet about how to reduce cognitive and psychological stress real time; that needs extra focus in the future.

Another trend is the increasing need for employees in the care sector, both formal and informal. They need special attention as well, however, more focused on their physical stress. Especially the group of informal caregivers, which are often elderly people their selves.

Conclusion E1: focus on mental stress rather than physical
A product like Fit4Work should focus on mental rather than physical stress: mental capacity and fitness of the brain is more and more important in future jobs

Conclusion E2: pay special attention to care sector employees
An important trend is the increasing need for employees in the care sector. There should be a special version/edition for this group of (older) employees, focused on physical stress and good posture as well as on a good biorhythm, since this group of workers works in quite irregular schedules.

6.2. Kind of device

In the care sector - one of the experts says - many things are possible in terms of ICT applications. However, it is important to keep thinking what is important to use, what will add value, what is comfortable. The device itself is not a separate decision: the first thing to decide is the goal of an intervention and the added value.

Conclusion E3: focus on main functions of the system
Including features in the product may distract consumers to use it in a right way. Especially older adults will be sensible for this, so the system should focus on the main purpose of the intervention.

6.3. Tailoring the message

As mentioned, elderly employees need to be facilitated to take a short break every now and then to recover. How these moments of recovery should look like, however, is specific per person. A product like Fit4Work should take this into account. Stress (physical or mentally) can have similar symptoms and complaints, but have very different determinants laying behind. Treatment, advices and recommendations should be based on both symptom and determinants. Difficulty to concentrate or to process information, for instance, can be caused by tension in back or neck; by circumstances in the private setting or by a lack of sleep. Although the symptoms are similar, the approach (and place/setting!) to reduce these might differ. Fit4Work only can distinct this if it really looks to the person itself.

Conclusion E4: personalize the recommendations
To make the Fit4Work system work efficiently and effectively, the message provided by the system to the user should be very tailored. The system needs to know the user personally so it can base advices and recommendations perfectly on their needs and preferences, both from health and use point of view.

6.4. Kind of recommendation

The professor is skeptical about special physical exercises to reduce stress. According to her, there may be thresholds to perform (physical) exercises in working setting. Especially when the stress is related to interaction with colleagues who see you doing that exercise. Besides, such exercises can be too much effort

and therefore too hard to hold on. A small walk from the desk and back again would have effect already. A cup of coffee or tea, a cookie or candy: someone may feel already a lot better just after such a break.

Conclusion E5: focus on simplification of physical activities to perform
A recommended exercise should in the first place be simple to execute. An easy walk to the coffee machine or the printer may already help and is easy to maintain.

6.5. The work setting

Next to a tailored advice elderly employees mainly need psychosocial support in the work setting. The main reason for drop out of the job in this age group is the lack of a psychosocial comfortable environment. It appeared to be really helpful if colleagues support the elderly and empathically start a small talk every now and then. Collaboration with colleagues who cause stress is an important reason to quit a job. A supportive environment can be created by both colleagues and the employer of the older employee.

According to the experts, many interventions are focused primarily on the elderly employees. But they are not the only ones who should be supported. It is important to prevent problems, not only solve them once they occur. For example: many young employees work full-time, totally focused on one job. When they get older and less fit they start to work part-time. But they replace the extra time with voluntary work, house-keeping activities etc., which makes them eventually even more busy. This distribution of workload over lifetime needs to change. Doing different things at the younger years will keep one active and fit – both physically and mentally. Reducing this at a higher age will be good as well. Such a pattern is more healthy and sustainable. Besides it needs to be more accepted to take a break every now and then. When we make this a habit, work will be more healthy for elderly and youngsters.

Conclusion E6: include the social environment of the employee
An exercise as recommendation to the user may help, but will probably be not the only solution. A supportive environment, with positive colleagues, will be of at least the same importance to reduce stress. A recommendation may also include an advice to drink a cup of coffee or go for a walk with colleagues. The Fit4Work system should pay attention to colleagues of all ages.

6.6. Use-related factors

For the clients of the nurse, devices and apps need to be as simple as possible, without too many extra features. This target group in general has only a very little experience with and interest in computers or mobile devices. An easy and efficient design of the device will contribute to a feeling of self-confidence of the client and therapy loyalty. Next to that, a good product will reduce the time that is needed for certain activities: time and energy which can be used for the client. This could also count for Fit4Work: if the product works in a good way, it may help the user to spend it not time efficiently as well.

For the elderly employees (the colleagues of the nurse) however, no special attention need to be paid to the design of the device. Also the consultant expert thinks that designing a product specifically for this age

group (50-65) is partly nonsense and overrated. He does not believe in big buttons as a solution. However, that does not mean this target group does not need any tailored approach. It is not so difficult to use ICT products as many seniors would think, but they need to get introduced It is important to get people in touch with ICT products, let them get in touch with new technology. That will work better than assume that this users need special specifications, without even asking. I think this especially is true for this younger group of elderly. The manual and teacher are more important than the device itself. Maybe everything around it, including the pressure, frightens seniors, but if it is introduced in a good way, seniors will get used to it quickly.

Implementation needs to be done step-by-step, so any prospect-user understands the idea and will have more confidence in the method. The (young) nurse tells that she is a kind of ambassador for her peer colleagues. That is important as well, to have some people who take the lead. They can convince the rest and make them enthusiastic.

Conclusion E7: include an instruction on using the system
A good introduction and instruction of the system is even more important than look and feel of the device. Older adults may hesitate to use new ICT innovations, but when they are introduced properly, they will experience quick that they are also able to work with these technologies. This will empower them more than a special designed device.

6.7. User-related

The experts emphasize not to approach the elderly user to much as a category in itself. Firstly because they appeared to be not always so different from younger consumers as you may expect. There are differences between users for sure, but age is not always the determining factor. Second reason is that there are many differences in preferences within this target group as well. However, some user related factors can be mentioned anyhow. All the experts mention that consumers who believe in the effect of a provided device, are more likely to use it. It is important that seniors do not see a certain device as a goal in itself, but as an instrument to improve health. Next to that, enthusiasm and willingness are the most important personal determinants to let someone (get) used new ICT devices.

Conclusion E8: think of using early adopters within the marketing strategy
Use willing and enthusiastic person as ambassadors for the product. Products can be totally tailored on every target group but enthusiasm in the end is the most important indicator for use of a new product. Once these early adopters started to use the device, others will follow soon.

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6.8. Motivations to use ICT to quantify health status

The reasons to use monitoring devices are many and differ between (basically) healthy people who use the products for prevention and people with a (chronical) disease who are more or less forced to use the technology. The most important reasons include:

- Curiosity to new products: some people are always tempted to use new shiny stuff;
- Curiosity to own health status: some people wants to b live more conscious;
- Forced by circumstances: for instance diabetes patients do not want to use an ICT application intrinsically, but need to measure their insulin rate anyhow;
- Making something inconvenient more easy: a pregnant woman needs to walk every day, but has to think about more important things than counting steps. She uses a step counter not to think of this all the time;
- Contribution to research: some researchers map occurrences to define relations between those and ask a population to monitor their daily things to collect data on a bigger scale;
- Story telling: medical doctors often ask patients how a week looked like, which is often very hard to remember. Many are not able to tell the right story. Monitoring devices help them.

The experts do not think obligation by the employer would work – at least not for long term. Intrinsic motivation is important to use such devices. However, this motivation can be improved by the employer in certain ways. An important strategy to use is to organize an intervention more collectively. Many health promoting programs are too individualistic. Positive people can motivate each other. Convincing people that they contribute to the health of their neighbors, on a bigger scale, will probably motivate them to join. This can be done both by the insurance and the employer. Next to that: link a program to other activities in one's daily life. So it is easier to hold on and it is not a goal in itself anymore to live healthy. That can have an adverse effect.

Conclusion E9: address adequate motivation measures
It is important to anticipate on the different motivations of people to use ICT to quantify/improve their health status.

7. Results: Focus Group

Eventually a focus group was organized to test and verify all the information found in earlier subparts. This face-to-face meeting with multiple end-users facilitated valuable exchange and discussions which could not be replaced with surveys.

7.1. Participants and set-up

Participants of the focus group were selected out of the Dutch respondents of the survey. Next to that, volunteers from the UnieKBO service desk were invited personally. Although the survey was filled in anonymously, at the end respondents were asked to leave contact information and to participate further in the project. Among the 22 respondents interested to participate in a next stage, six were direct relatives of colleagues from UnieKBO. Except of them, all the interested persons who left an e-mail address were asked to join the focus group and to pick a date together. Eventually, nine elderly people, aged 55-75, participated in the focus group, all having more or less opinions of interest about ICT in general and all having paid or voluntary jobs.

The session took place on a Tuesday afternoon (1.30-4pm) at the head office of UnieKBO and was led and reported by two employees of UnieKBO with experience with group sessions with this target group. The participants started with a lunch to get used to the setting and to get to know each other. After that the programme started with an introduction on the project Fit4Work. Next, some examples of ICT devices/app's to promote health were presented and demonstrated, to involve the participants in the theme.

The main part of the afternoon was the discussion. By the means of propositions, information was gathered about the – according to the previous parts – most important topics: motivating factors to use ICT for health; privacy; preferred device /special features and costs. The structure of the focus group was similar to the interviews: although topics were prepared and formulated as propositions, much space was given to spontaneous ideas and additions. The results of the discussion are reported per proposition and corresponding (sub)topics.

7.2. Results

7.2.1. Motivating factors

Fit4Work as a game

Presenting Fit4Work as a game will probably help to motivate seniors to use it. Especially for a reward, a game can be a good motivation to start and persevere a needed action The first trigger needs to be short-term. Although presenting Fit4Work as a game would motivate users, opponents are not preferred. Families or friends may be potential opponents to play against, but colleagues not. Improving yourself, trying to achieve own targets, being challenged by the app, reach new levels etc. are better game elements than a competition.

Conclusion F1: use adequate gamification for motivating the users

A focus group participant summarized this as *'I like it to play a healthy life style like a game; especially when I can win a prize'*. However, comparing progress with a colleague does not seem as motivating.

Rewards / prizes

The participants always love to win something, but in the end an improved health or quality of life is the best reward. Also the reassurance of a good health status can be a reward. If these aspects do not trigger a prospect user, an external reward will not work either.

Conclusion F2: make sure the system gives tangible health benefits

Rather than receiving prizes and rewards, the potential users are interested in better health status and/or better quality of life.

Bad health as a trigger to start using the product

Not for everybody a game would be a trigger to use a product like Fit4Work. An important reason for seniors to start monitoring health is not feeling well. That seems similar to good health as a trigger, but seniors mentioning this reason do not want to know everything going on in their body as long as they feel good. When something is lacking, Fit4Work can give concrete advice or help to explain the doctor what is wrong.

Obligation by employer

The participants are clear: using a product like Fit4Work needs to be one's own decision. It can be more common for companies to use such devices in the future, but in a natural process. What if something is wrong with your health which affects your employability? Would you be fired? Even if only a confidential sees the information, the employer still wants to benefit, which is not always good for the employee.

7.2.2. Privacy

Sharing information with others

Almost all of the participants strictly want to control their own information and only share data with persons they invite explicitly. Same counts the other way around: the seniors do not want to see everything from others either. Especially not from people they do not know.

The seniors prefer to share health information only with a (medical) professional, on condition that he/she can help to find a solution. The participants can imagine that in a certain case children or informal caregivers may also see the information, but privacy is very important when it comes to personal information.

As mentioned, the seniors do not want to play Fit4Work against others, since this requires to share information with others. Some of the participants would like to compare results and health status with a general population, but not with too much detail.

Conclusion F3: ensure the privacy of end-user sensitive data
The participation in the Fit4Work system should be a personal decision of the end-users and all the data collected by the system should be kept private and not shared with anybody without the consent of the user, especially the employer - *'I only want to share health data with a medical professional. Not just in the cloud'*

Checking own health status

The seniors are not only reluctant to share information with others, they are also reticent in knowing their own health status. They prefer to consult the system at a moment of their own choice and not to be reminded of their health anytime. The seniors would mainly consult the system when they do not feel so well in order to get an advice instantly. However, that requires continuous tracking. It has different sides.

Conclusion F4: do not bother the user with too much feedback
The users seem to be willing to consult the system for advice on their own, rather than to be reminded constantly of what is going on - *'I do not want to know everything going on in my body. That makes me nervous'*

Motivating each other

Sharing results in terms of health (weight, blood pressure etc.) is not desirable, but sharing activities, resolutions, enthusiasm is. However, the participants prefer to do so in real live and not at a digital platform like Facebook or a special platform generated for Fit4Work.

Conclusion F5: investigate using social network within the system
End-users might be willing to share how they use the Fit4Work system, however it must be checked whether they want to do it in the system or rather face-to-face outside of it.

7.2.3. Preferred device and special features

The seniors prefer to use devices which can be included in their daily routine, so they do not need to think about it all the time: both to the use of it and of their health being measured real time. For the seniors, the smartphone and sensors on the body do not belong to that category. Wrist devices are preferred the most: easy to wear without being aware of it all the time. If the user really believes a device improves health, he/she would be more willing to use devices which take more effort or to use these also at home.

Conclusion F6: try to user wrist devices for monitoring vital body parameters
The users seem not to accept wearing sensors – *'Monitoring health is okay, as long as I do not need to wear sensors at my body'*, however they accept wearing wrist devices such as a watch or a bracelet.

Hardware

Many seniors (both participants and members of UnieKBO calling the service line with ICT related questions) prefer technical devices with bigger buttons, clear screens and zoomable content on the screens. Especially in the fine motoric skills and the vision, seniors experience decline over the years. One of the participants mentions she uses a pencil to touch buttons.

Software

Except of the looks of the device, the participants do not have specific senior-like preferences. On the contrary, they just prefer their devices to have the same functionality as the devices the younger generations use, so different devices can interact more easily with each other. Next to that it is easier for (grand) children to help when something is wrong. Most of the seniors started to use ICT devices out of curiosity and after seeing the possibilities (e.g. nice apps) at their (grand)children's device. Most of the participants even got their first smartphone from their (grand)children.

Conclusion F7: use mainstream devices
Older adults prefer to use exactly the same devices as younger generations. This especially relates to mobile phones.

Usability

Although most of the participants say they want their device to have the same possibilities as the younger generation, most prefer to have these features presented in a clearer way. The most important possibilities should be presented at the front and the things that are less easy to use more hidden. The tablet of UnieKBO is a good example of this. This IPad is able to do anything an iPad does and can interact with iPhone and MacBook of (grand)children. However the start screen only shows the most important features and apps in a clear way and even a button to ask questions when things get too complicated.

Next to that, a product needs to be easy to install yourself. Many seniors do not understand their own devices (television, internet connection) sufficiently when something goes wrong and it is hard to communicate with a helpdesk.

Finally, the participants mention a good durability of the product. As mentioned, many seniors get their devices as second-hands from others, who used the device already for years. In many cases, the device does not work long anymore. Especially for elderly, it is hard to switch to a new product every time.

Conclusion F8: ensure the user interface fits the needs of the target users
The system should be designed in such a way that it is easy to use and maintain.

7.2.4. Costs

Willingness to pay

The participants wonder if seniors are really willing (and able!) to pay for a product like Fit4Work. Many seniors cannot even afford an iPad. And in the final years of a paid job, it is not so likely that persons would still invest in such a product if it really mainly focused on the work setting.

Who pays?

Seniors may not all be able to pay for the product, but many other actors may benefit by their health. '*If I were a health insurance*', the participants say '*I would definitely pay for this, since it will lower the costs of illness'*. Something similar does count for the employers. But when the seniors think ahead, they realize that it is not so easy. What if the insurance or employer notices that your lifestyle is not so healthy? Would they increase your rate? Is that allowed at all? For many seniors it is not so easy to have their health in control.

Again privacy plays a role. When someone else pays for such a product, they want to benefit from it: earn money, keep the data etc. It is likely that this has disadvantages for the privacy of the user. It is not clear yet what may happen with data, but the seniors tend to be very careful. When the paying actors make sure they only use the data to see a general trend, then it is okay.

Conclusion F9: focus business model on institutional payers
Older adults may not be willing to pay for a solution such as Fit4Work as individuals, rather counting on the health insurance or their employer to provide the system/service.

8. Summary of requirements

In the analysis of possible requirements concerning the construction of the planned Fit4Work system, we looked for valuable knowledge into four major areas: the literature, specially designed survey distributed among the target user population, experts in the field of supporting older adults and discussion of a focus group consisting of representatives of the target user population.

The major findings of the analysis of the information collected during our study have been listed throughout this document as conclusions of the four separate areas. In this chapter we summarize and compare these conclusions within the following categories:

- design/development methodology requirements;
- requirement related to the user perspective;
- requirements related to the designed solution perspective;
- requirements related to the resulting product perspective.

This is presented in Table 8.1.

What regards the methodology that should be used for the design and development phase of the project, the findings confirm that users must be involved into the design and development phase to ensure the end result is usable, i.e. fits the needs of the target users, especially in terms interacting with the system. This is completely in line with the general methodology recommended for all AAL projects, and the methodology assumed in the proposal. A more interesting finding in the area of methodology concerns confirmation of the location of the pilot experiment. The higher demand from the Dutch market and its customers, allows us to fully use the opportunity created by involving the user organization located in the Netherlands.

For the user perspective the most important requirements seem to concern ensuring the users experience tangible benefits for their health and understand how the system supports them through clear short-term goals and recommendations. It is extremely important that the system is capable of motivating the users to undertake appropriate activities. This may be achieved for example through right gamification of the system use, its personalization and involvement of the user's daily routine including activities already performed by the users. The system should be easy to use, with main functions exposed to the users, and with activities spanning to 'real world', such as physical exercises, relatively easy to perform. Moreover, the system should not bother the users with too much feedback.

The Fit4Work solution aims to support users with managing their fitness. The findings of our research show that this should be targeted at three main areas. First of all, the system should rather focus on maintaining the health status of the user, preventing its worsening, including making sure the proposed activities are safe for those who suffer from a chronic condition such as for example cardiac problems. Secondly, it appears that mental stress should be at the center of focus for the system as this seems to be the prevalent difficulty for older adults in their occupations. This is connected also with the fact that older adults do not undertake occupations that require a significant physical effort. They rather perform physically light tasks, where the only physical strain encountered is prolonged sitting position.

When looking at the conclusions from the perspective on transferring the developed solution into a marketable product, there is no surprise that developing the right business model is an important recommendation. This should be most likely targeted at institutional payers such as employers and/or insurers. This model should follow a good understanding of the older user of ICT-based solution, who requires understandable instructions and, where needed, training. One of strategies that could be used herewith is also engaging early adopters, users who would share their system experience with fellows. To this end a well-designed use of social networking could be an important marketing tool. It must be also noted that the potential users pay a lot of attention to the privacy and security of their personal, health-related, data: this must be addressed adequately not only at the technical level, but also at the business-strategy and marketing levels. As far as technology is concerned, older adults are open to using any technical devices that could support them to manage their health, as long as they are mainstream devices used by all generations. Therefore, the suggestion of using wrist devices in the form of a fashionable bracelet, watch or band seems right.

Table 8.1. Major requirements for the Fit4Work system

Requirements area	Literature findings	Survey findings	Expert opinions	Focus group opinions
design / development methodology	L2: involve users from the beginning	S11: perform a field test in the Netherlands		F8: ensure the user interface fits the needs of the target users
user perspective	L3: present clear short-term benefits and monitor them L4: fit the system into user's daily routine	S6: take account of popular activities S8: focus on motivating to undertake physical activity	E3: focus on main functions of the system E4: personalize the recommendations E5: focus on simplification of physical activities to perform E9: address adequate motivation measures	F1: use adequate gamification for motivating the users F2: make sure the system gives tangible health benefits F4: do not bother the user with too much feedback
solution perspective		S1: focus on prevention S2: target physical strain related to prolonged sitting S3: focus on making the user undertake enough physical activity S5: mental stress is important S7: be aware a significant group of the target population suffers of chronic diseases or pains	E1: focus on mental stress rather than physical	
product perspective	L1: remember about introducing the system to the end users L5: carefully attend marketing ICT-based solution to older adults	S4: stress is more important in paid occupation S9: use any type of device that brings health benefits S10: focus on delivering a solution for Android-based smartphones S12: include a social network in the system S13: make sure of data privacy and security S14: create a good business model	E2: pay special attention to care sector employees E6: include the social environment of the employee E7: include an instruction on using the system E8: think of using early adopters within the marketing strategy	F3: ensure the privacy of end-user sensitive data F5: investigate using social network within the system F6: try to use wrist devices for monitoring vital body parameters F7: use mainstream devices F9: focus business model on institutional payers

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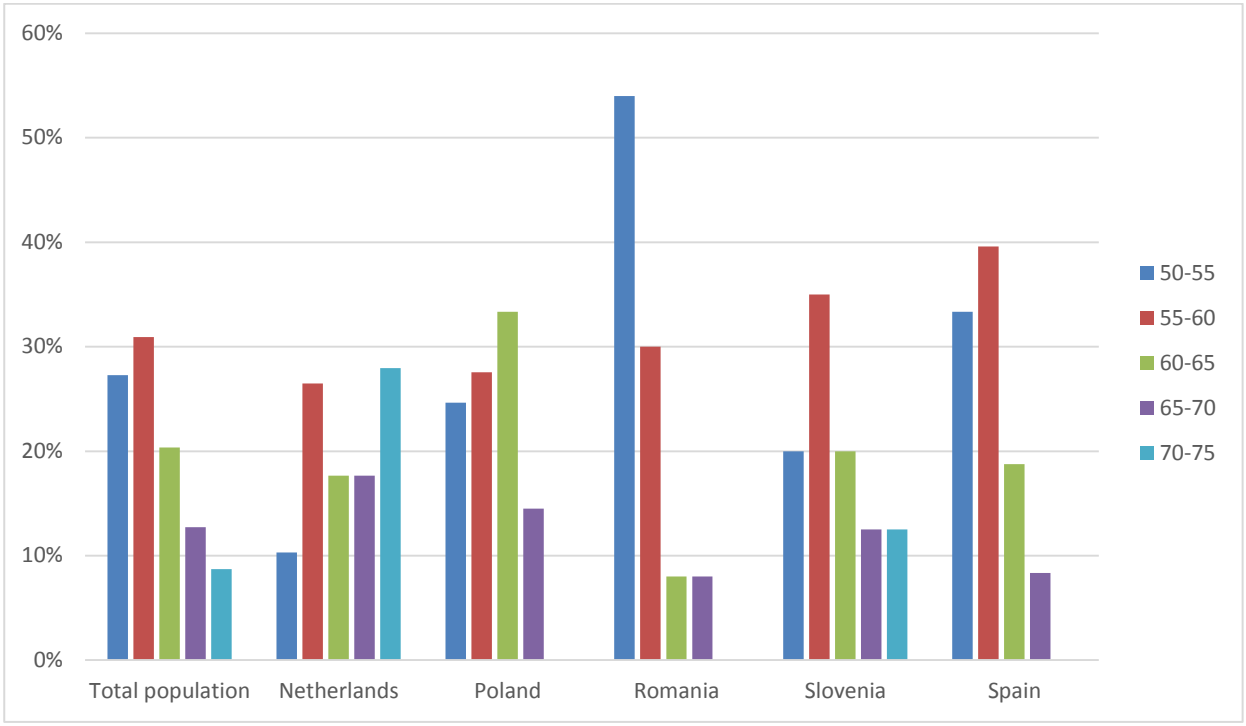
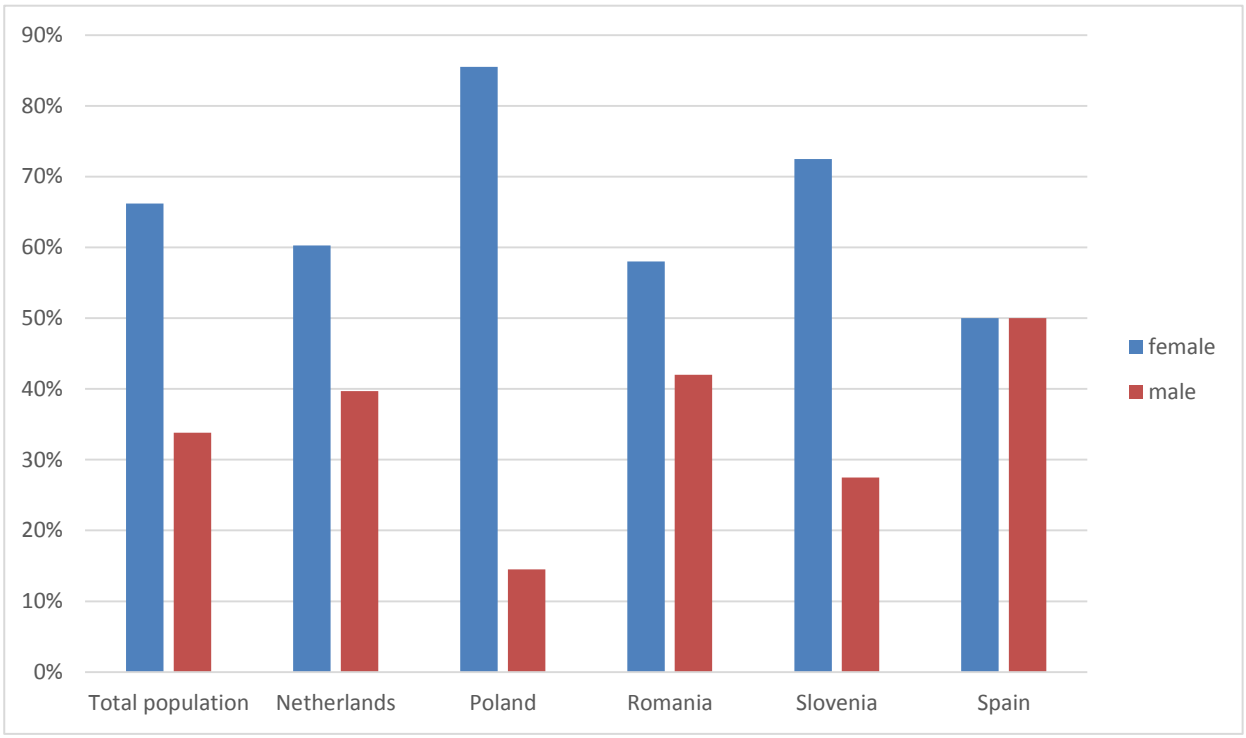
Annex A: Detailed survey results

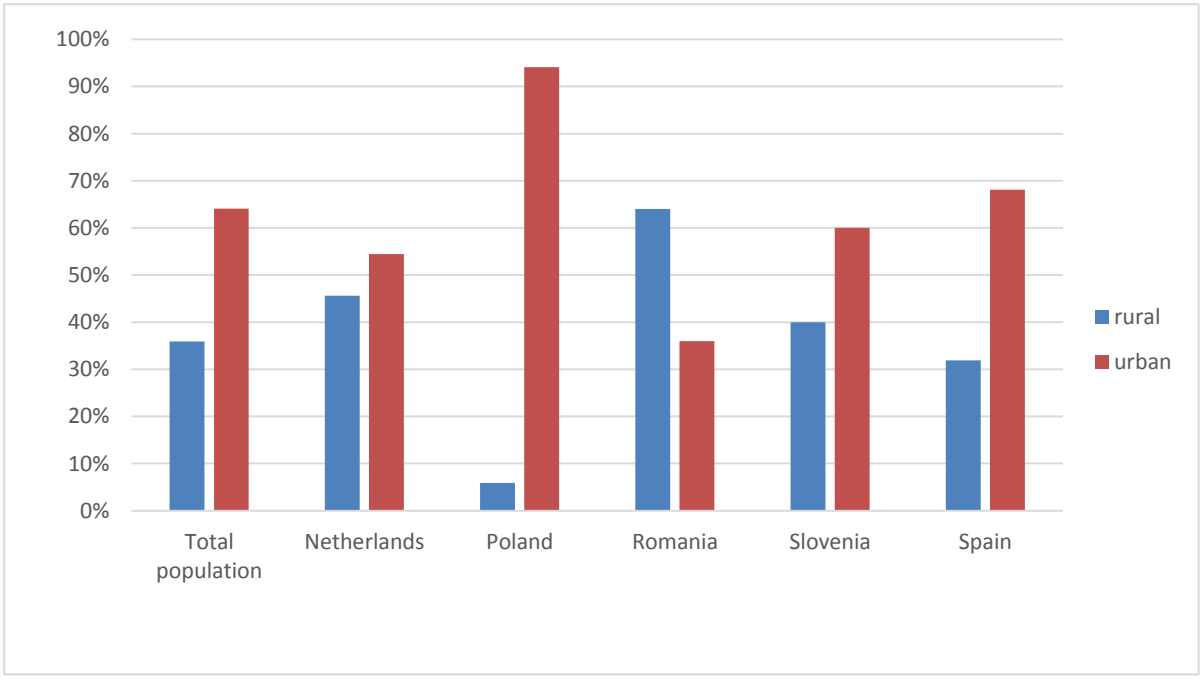
Q1. How old are you?



Q2.What is your gender?



Q3. What type of area do you live in?



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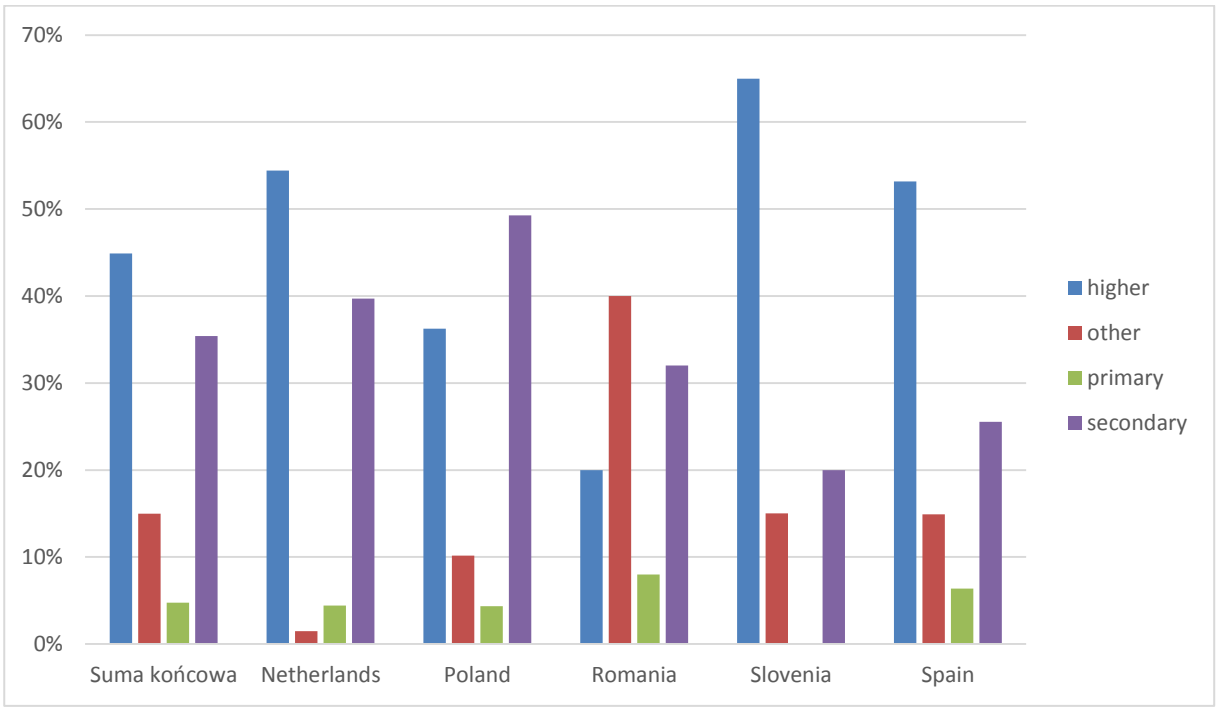
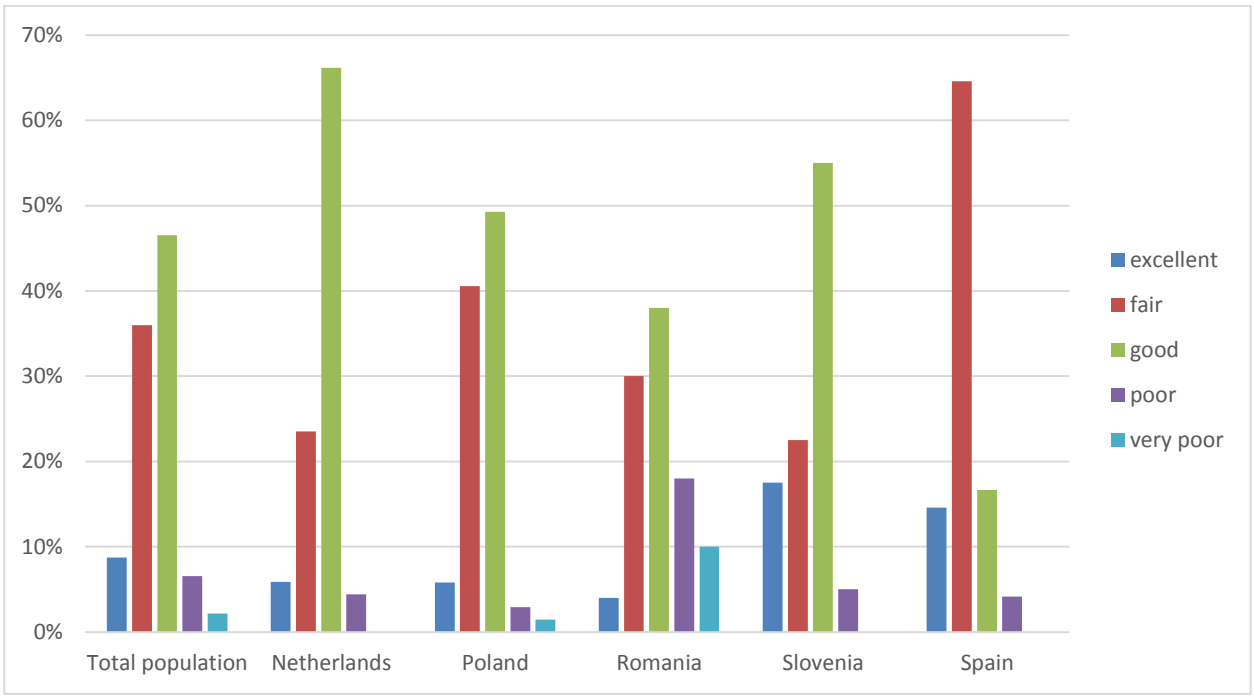
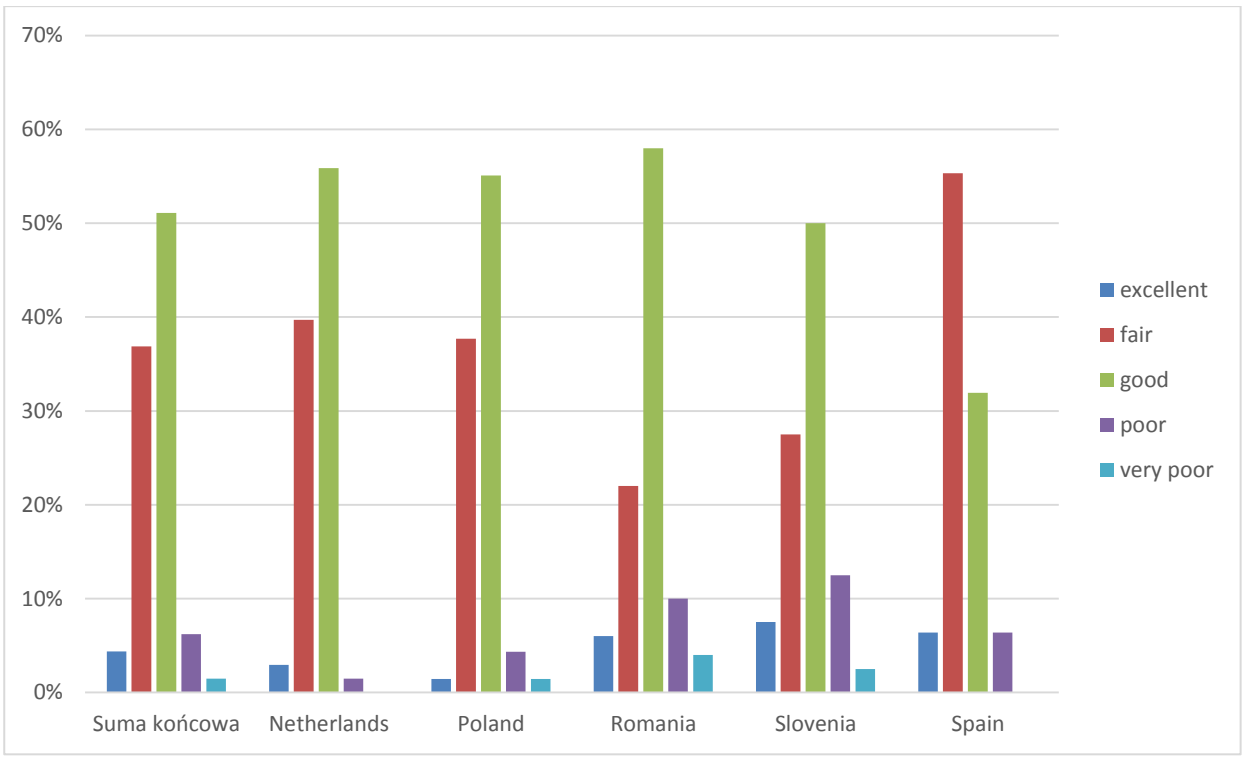
Q4. What is your level of education?



Q5. How would you rate your health status?



Q6. How would you rate your physical fitness?



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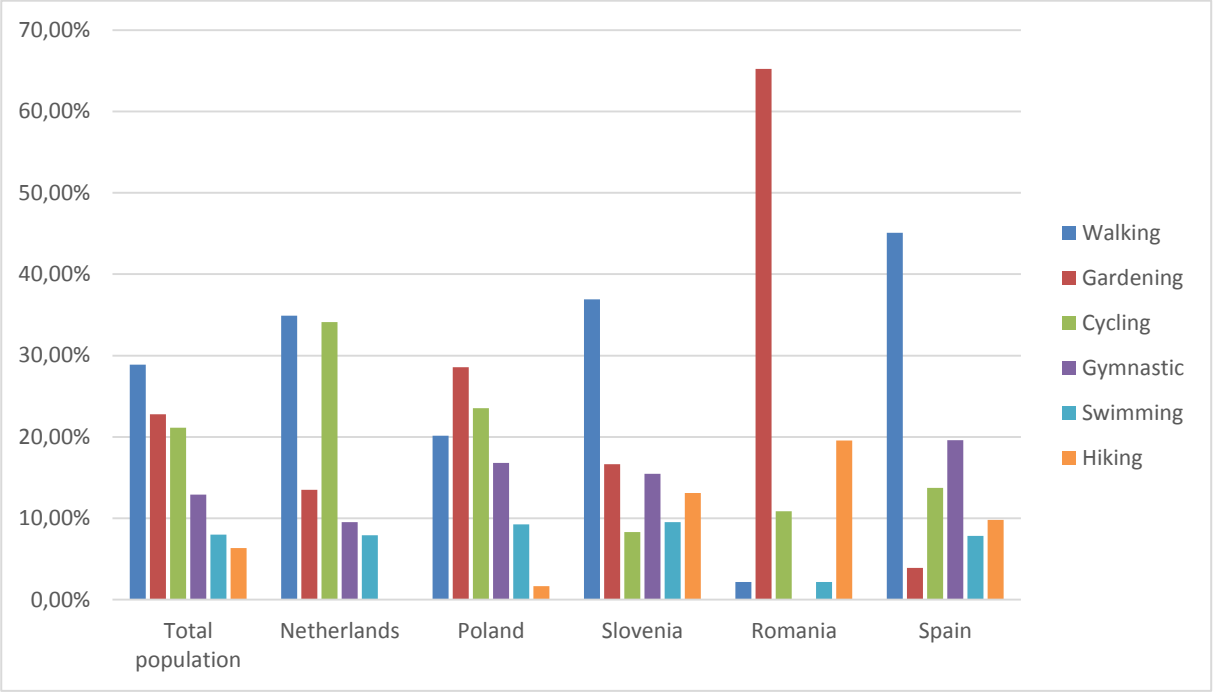
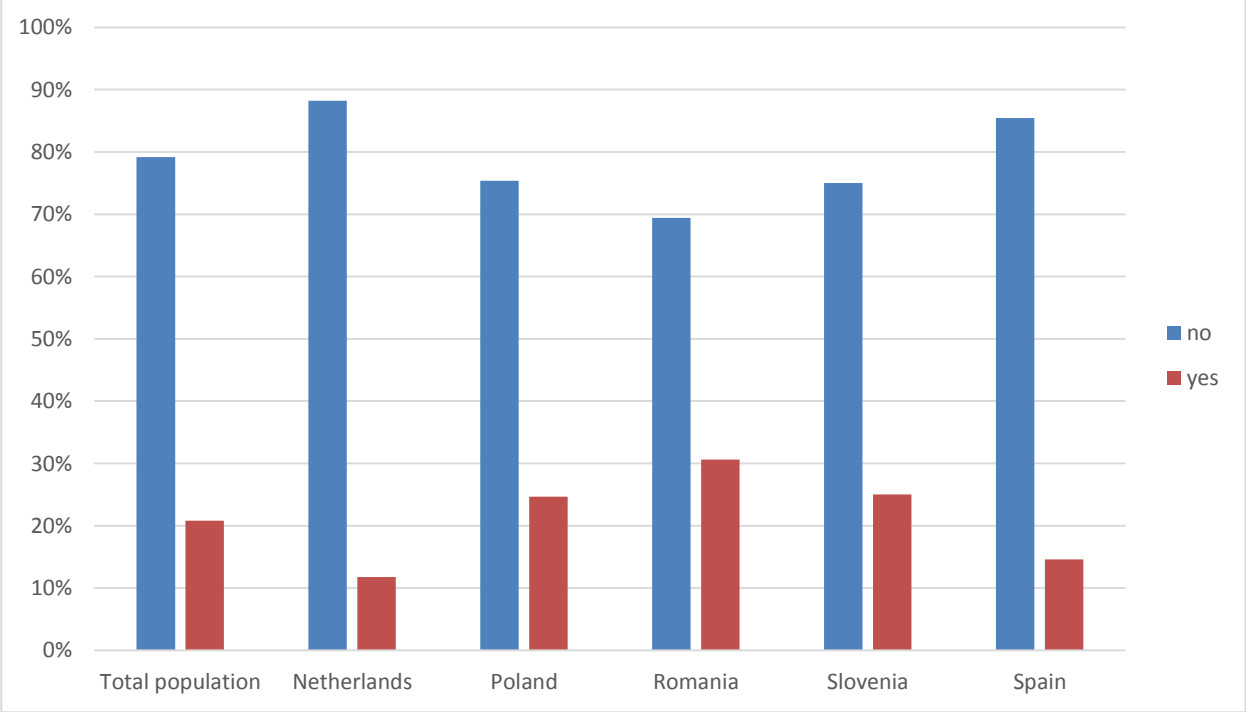
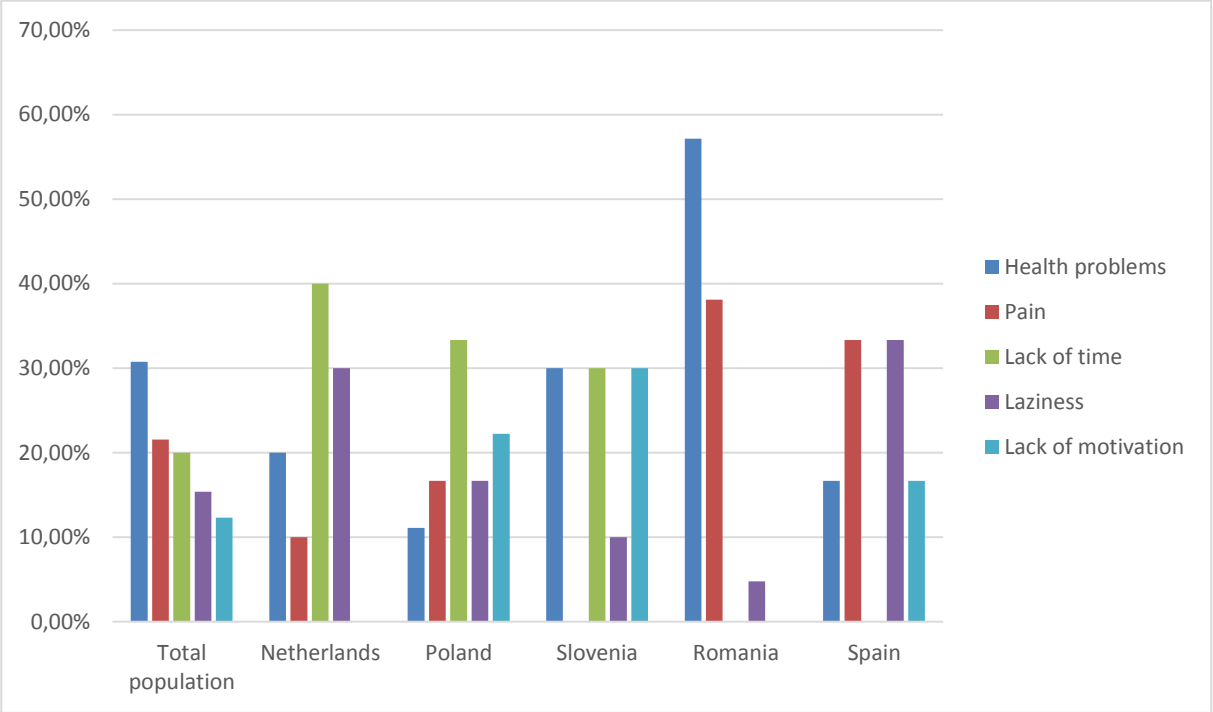
Q7. What kind of exercises do you do, such as cycling, hiking, gardening etc.?



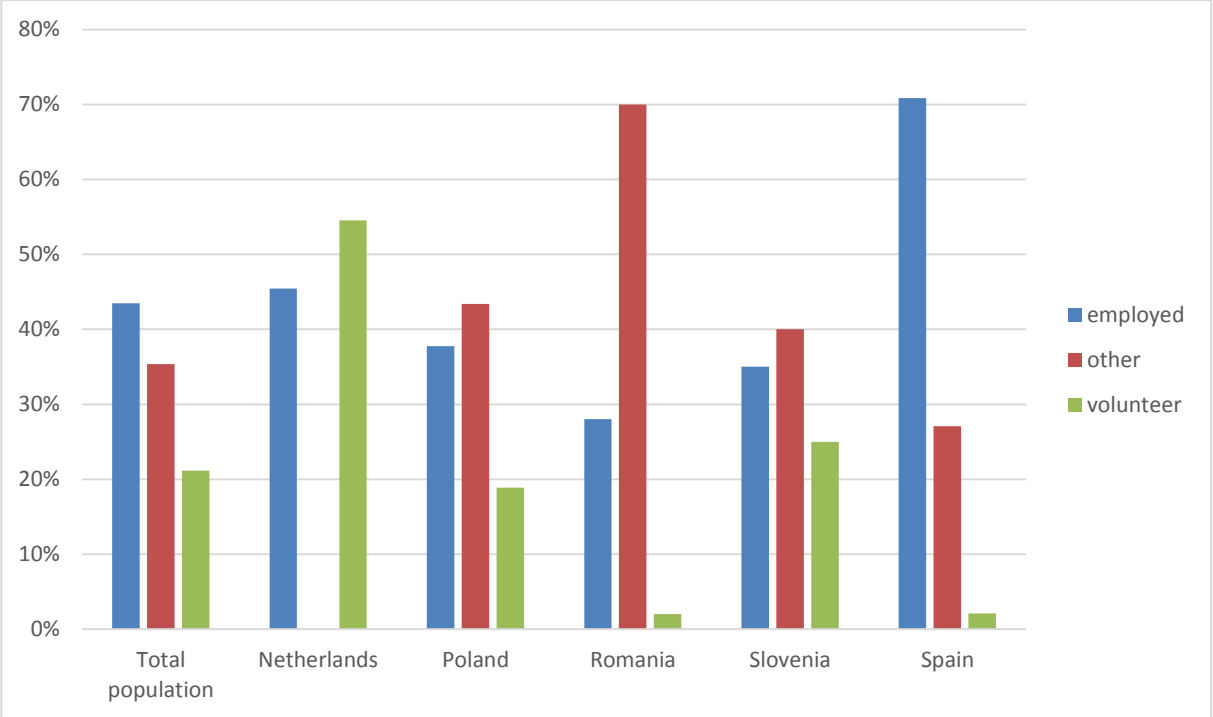
Q8. Do you face difficulty with staying physically active in your daily life?



Q9. If yes, could you tell us why?



Q10.What is your main occupation?



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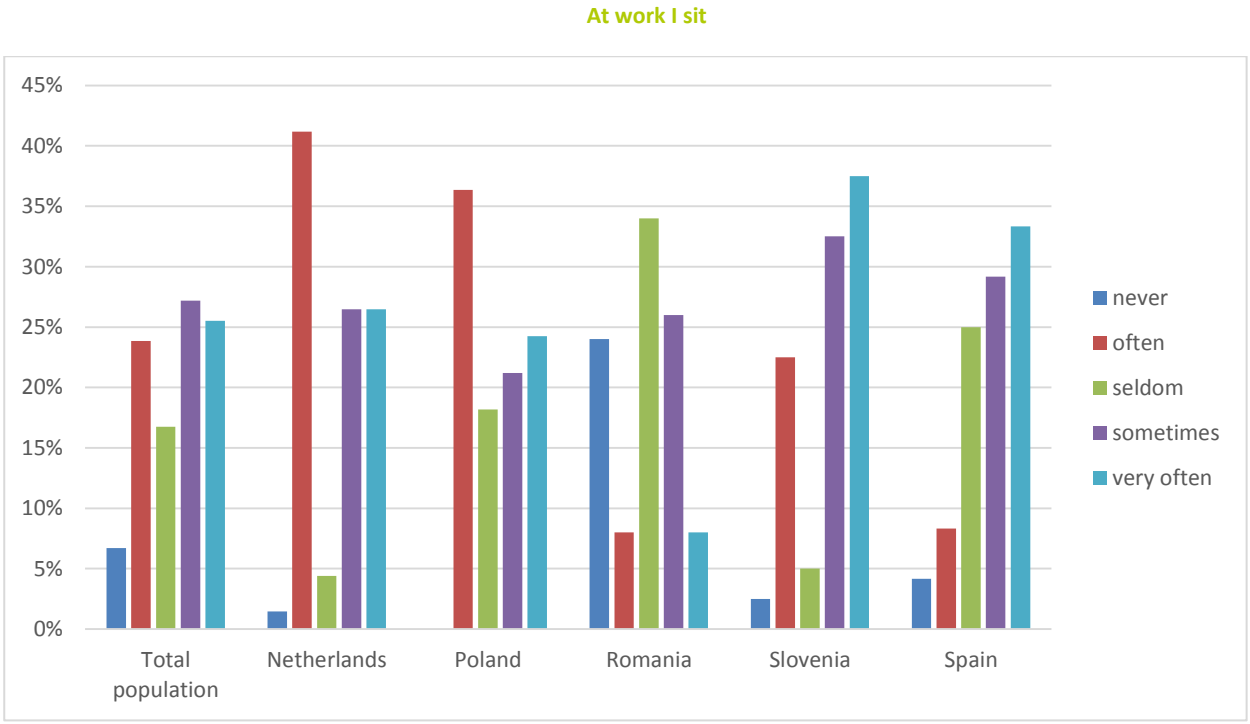
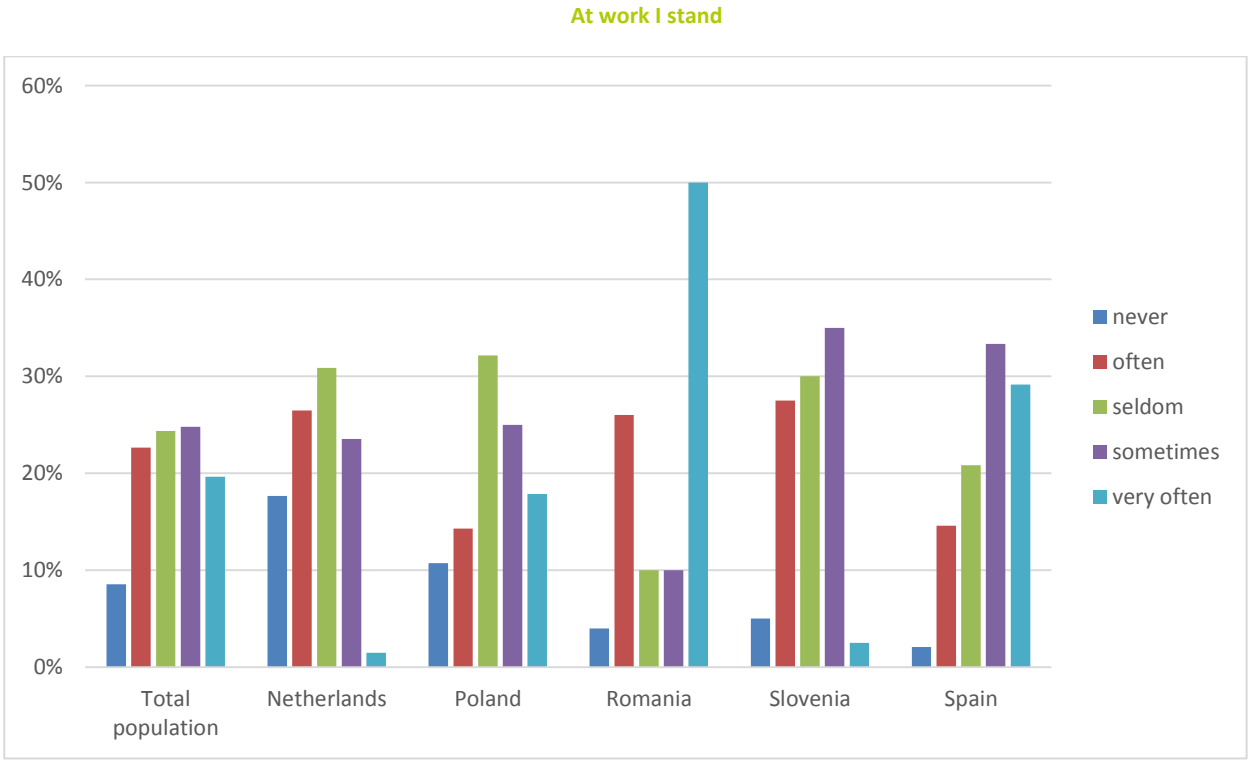
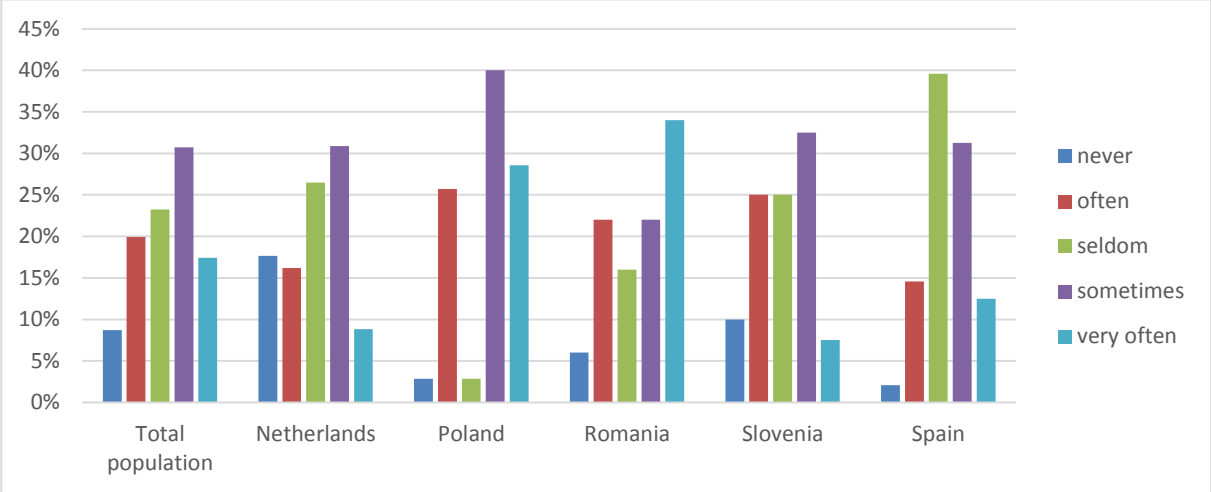
Q11. What kind of activities do you do at work, volunteer work or other, please fill in the table below

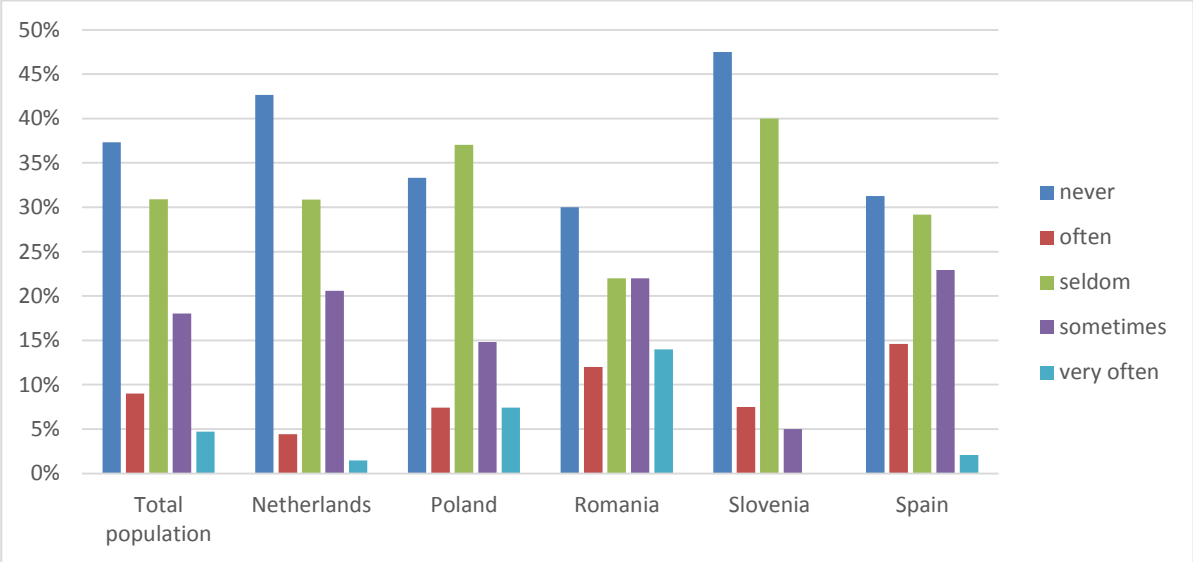




At work I walk



At work I lift heavy loads



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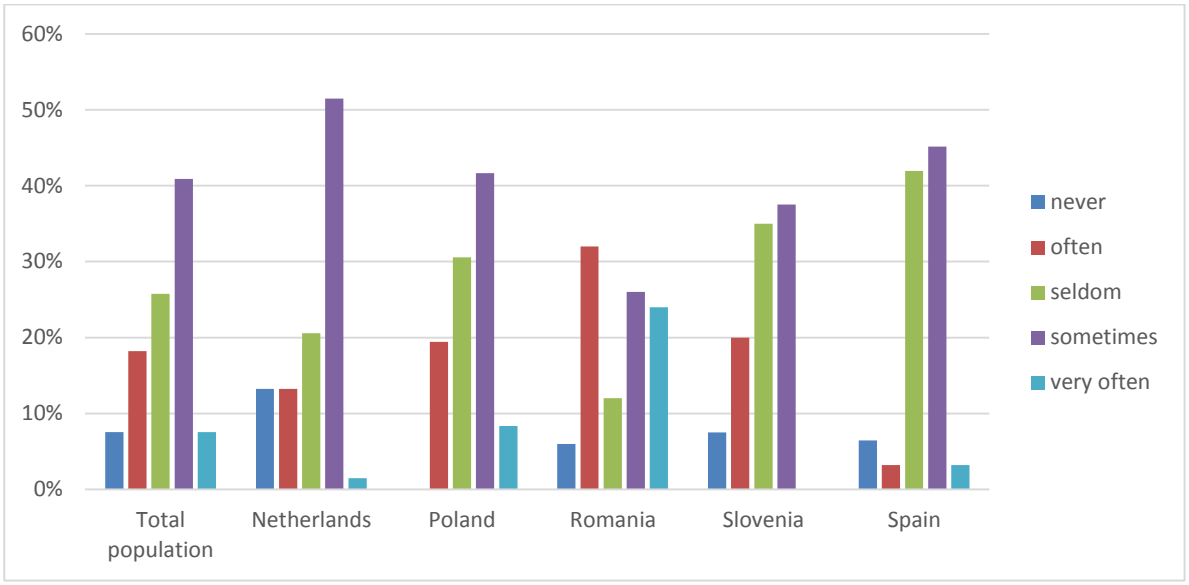
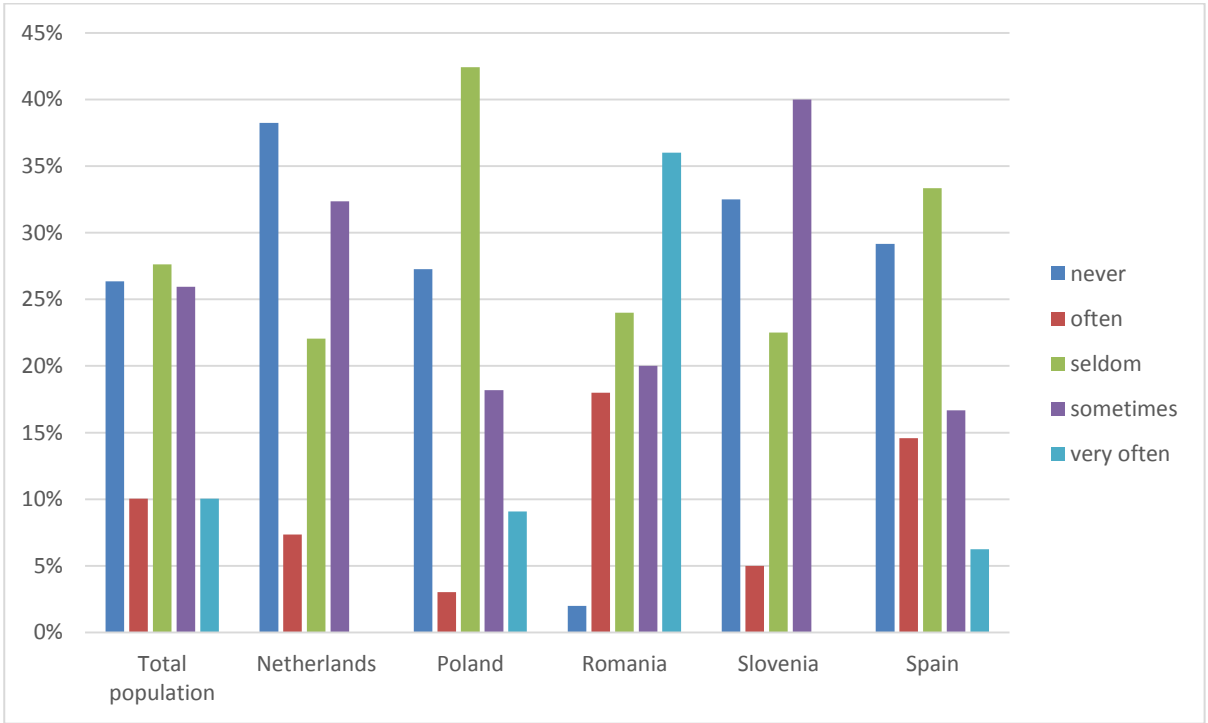
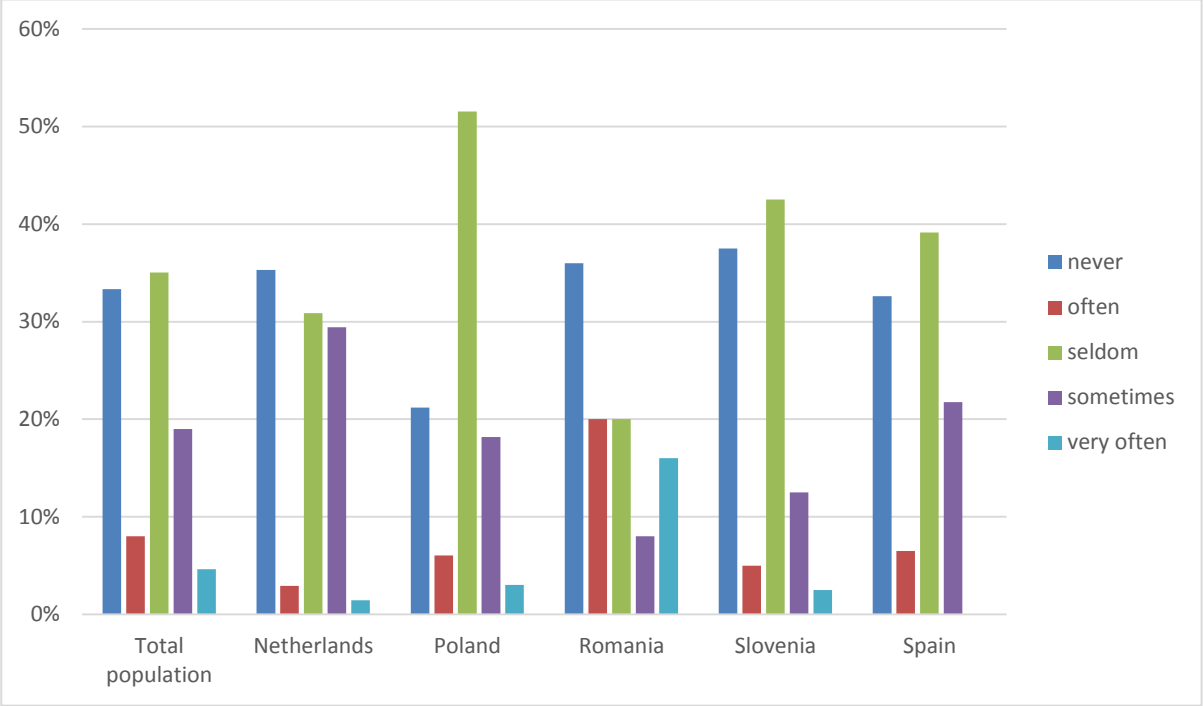
After working I am tired



At work I sweat



Other physical stressful activities



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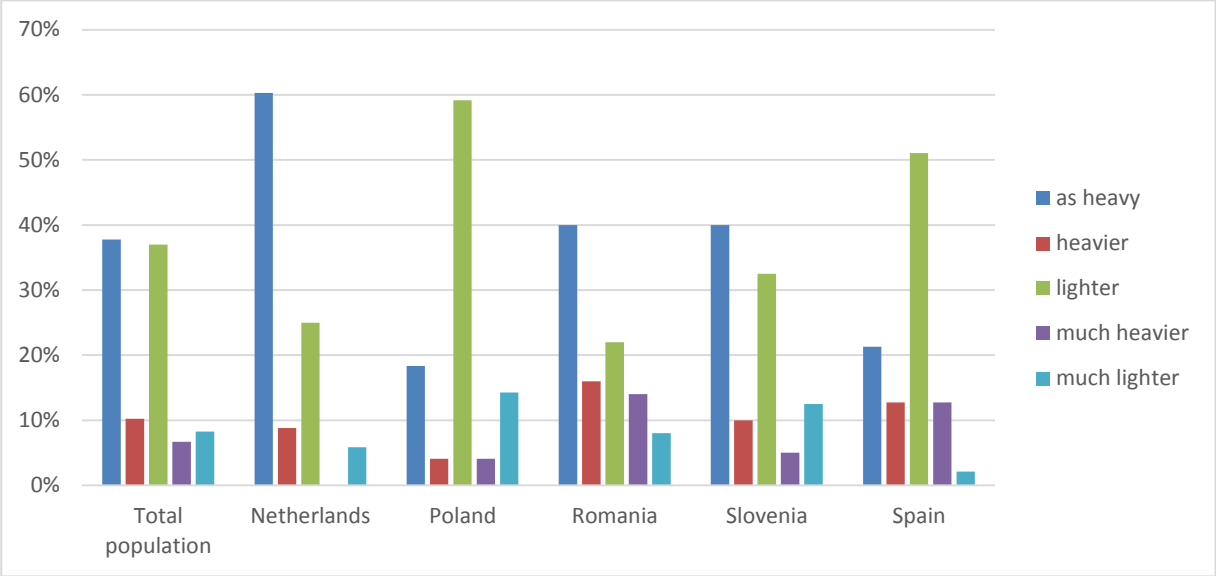
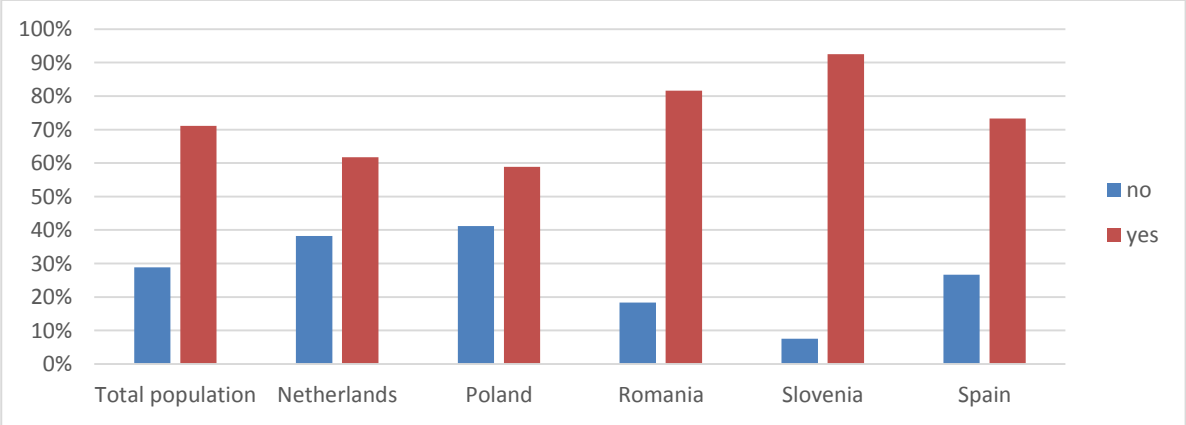
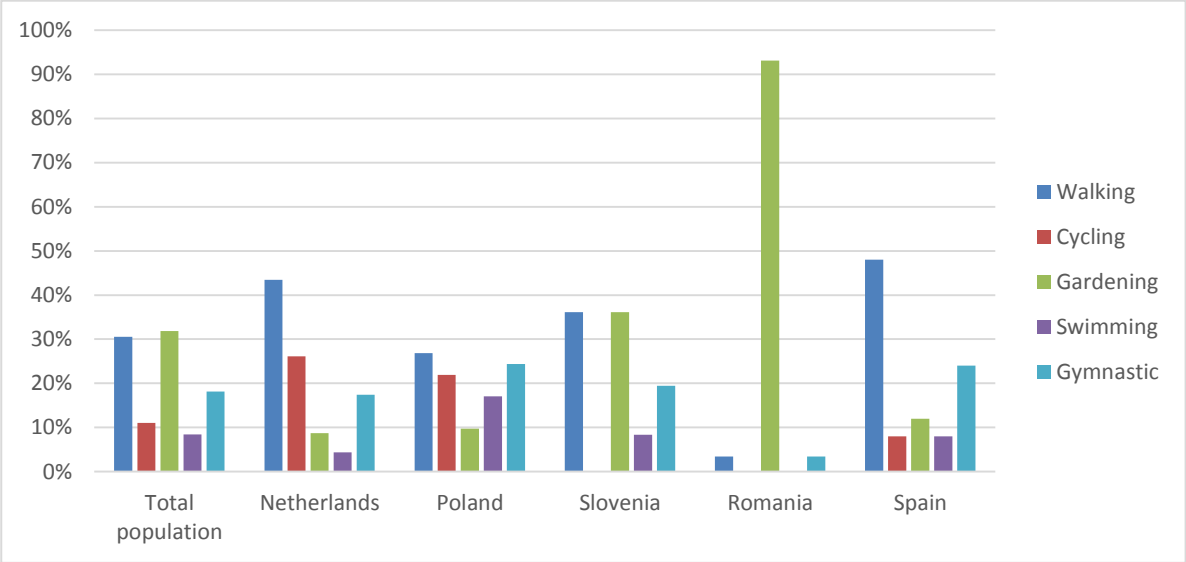
Q12. In comparison with others of my own age I think my work, volunteer work, other is physically



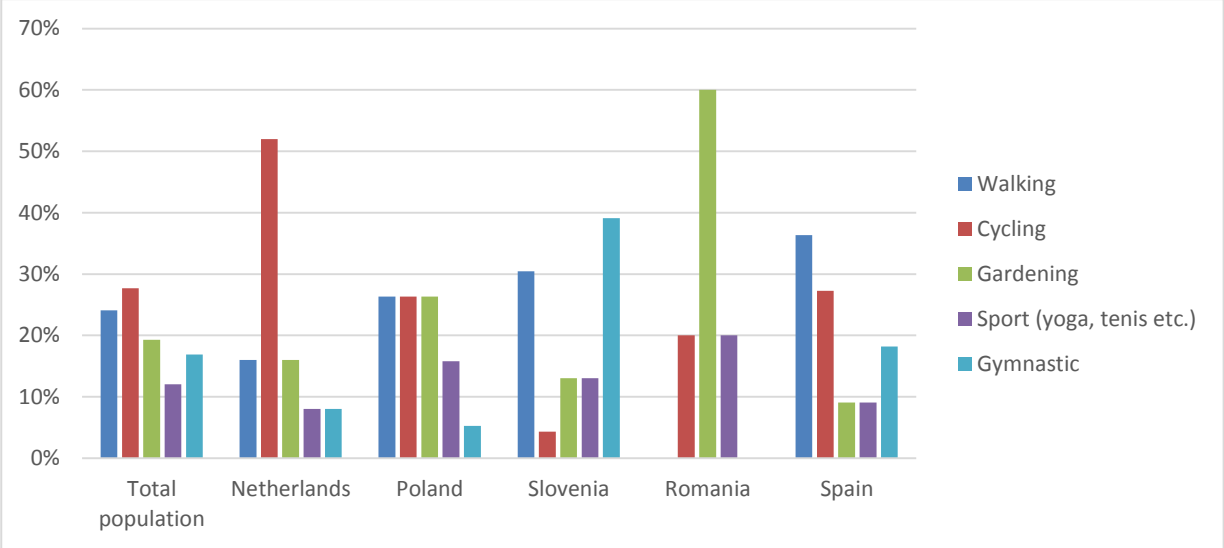
Q13. Do you engage in physical activity (such as sports, gardening, dancing etc.)?



Q14. If yes, which physical activity do you do most frequently?



Q15. If you have a second major physical activity, what is it?



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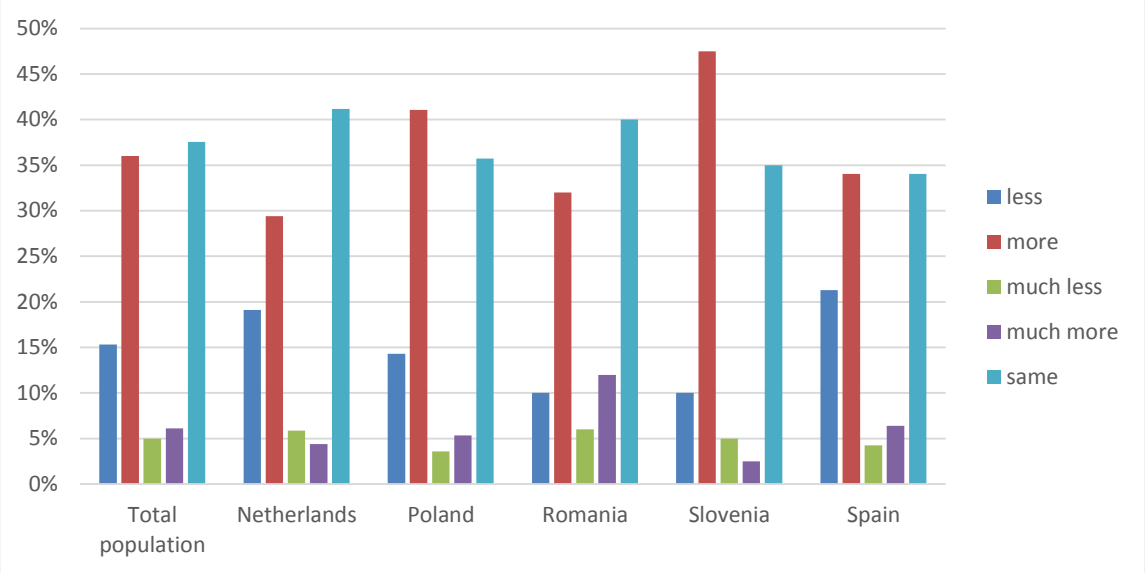
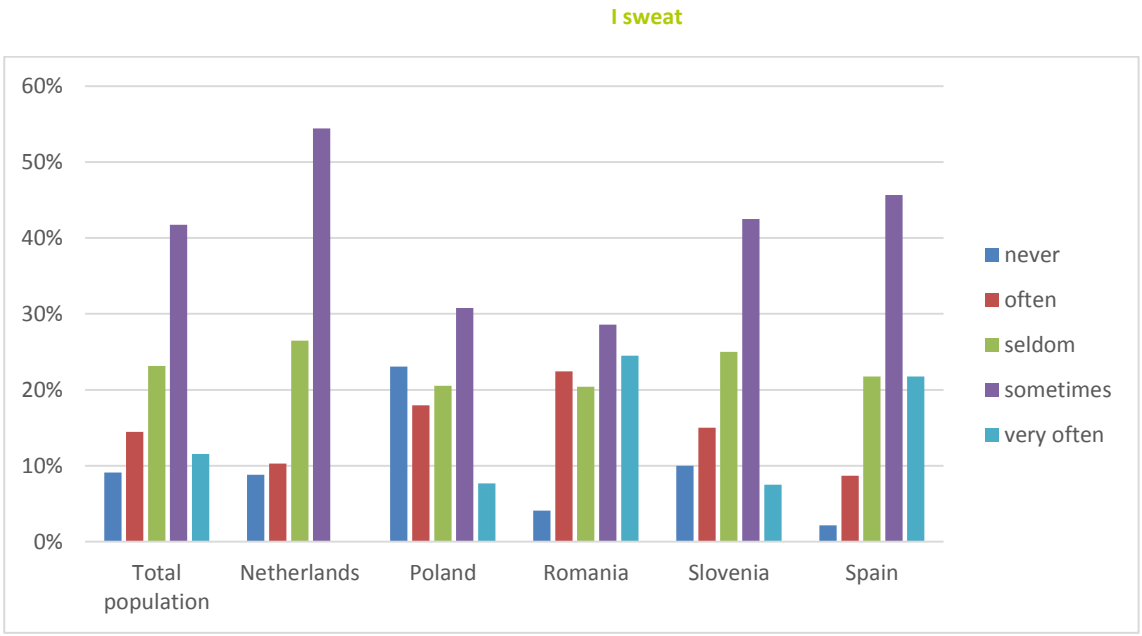
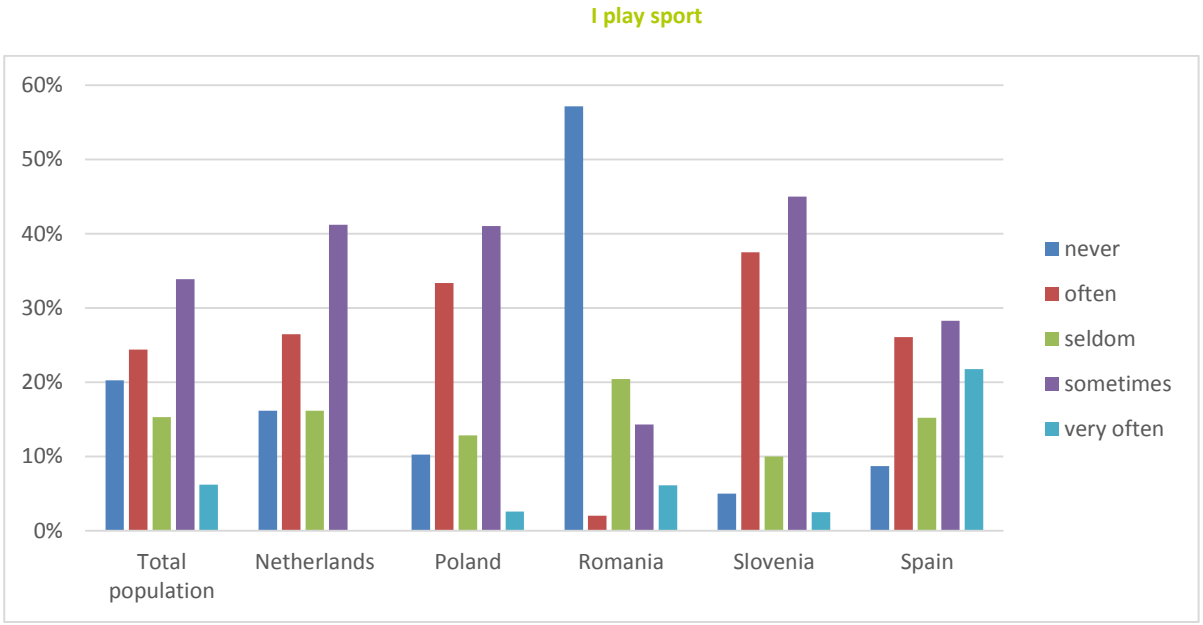
Q16. In comparison with others of my own age I think my physical activity during leisure time is:



Q17. During leisure time: please fill in the table below





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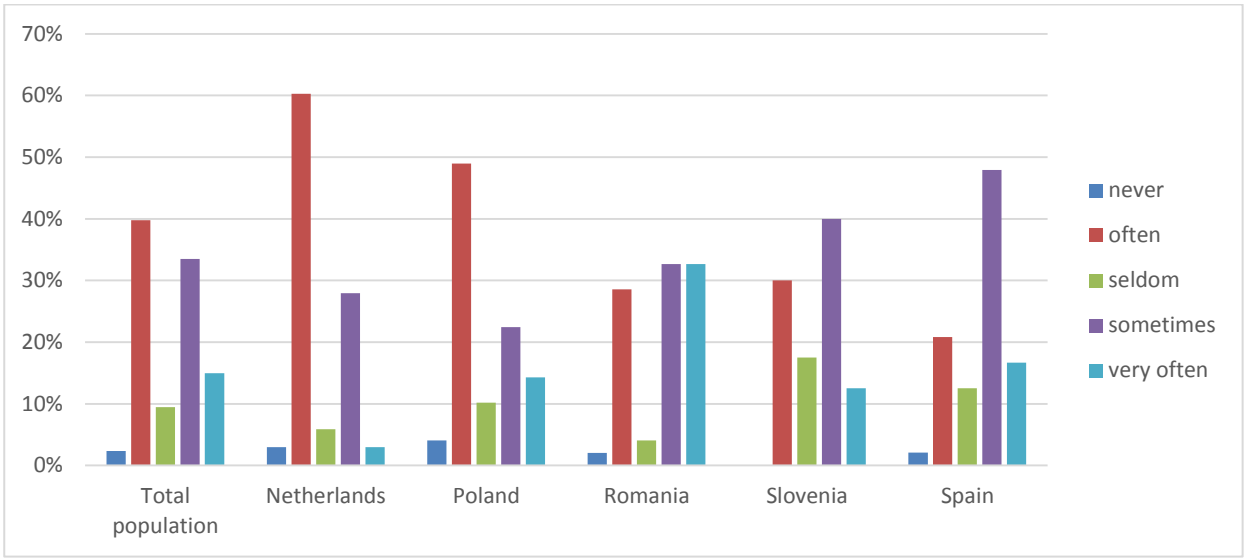
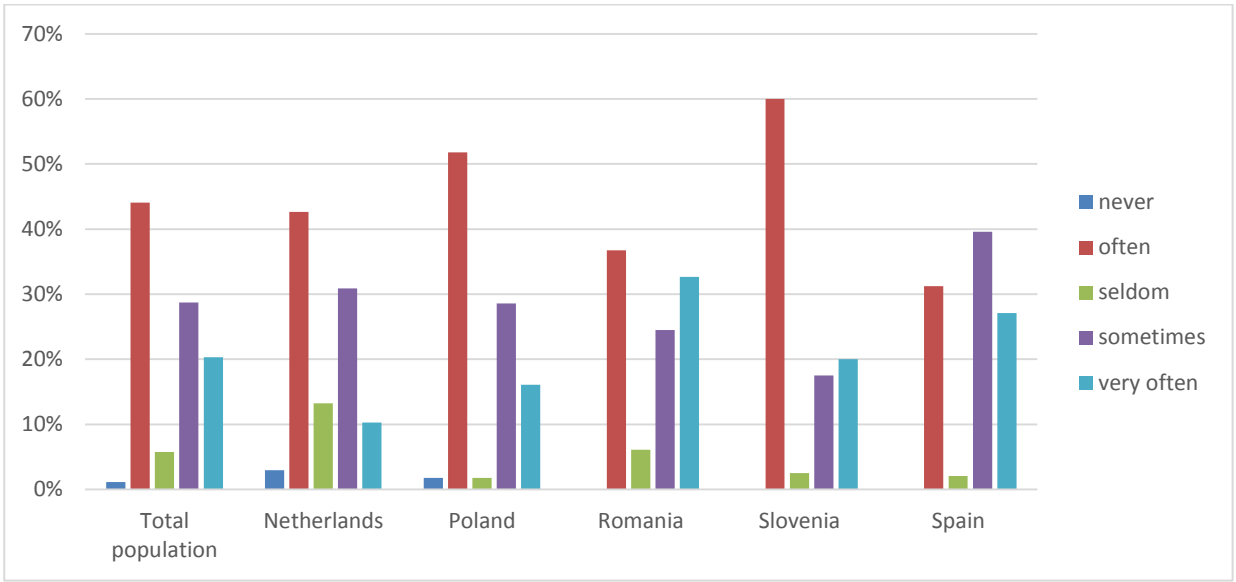
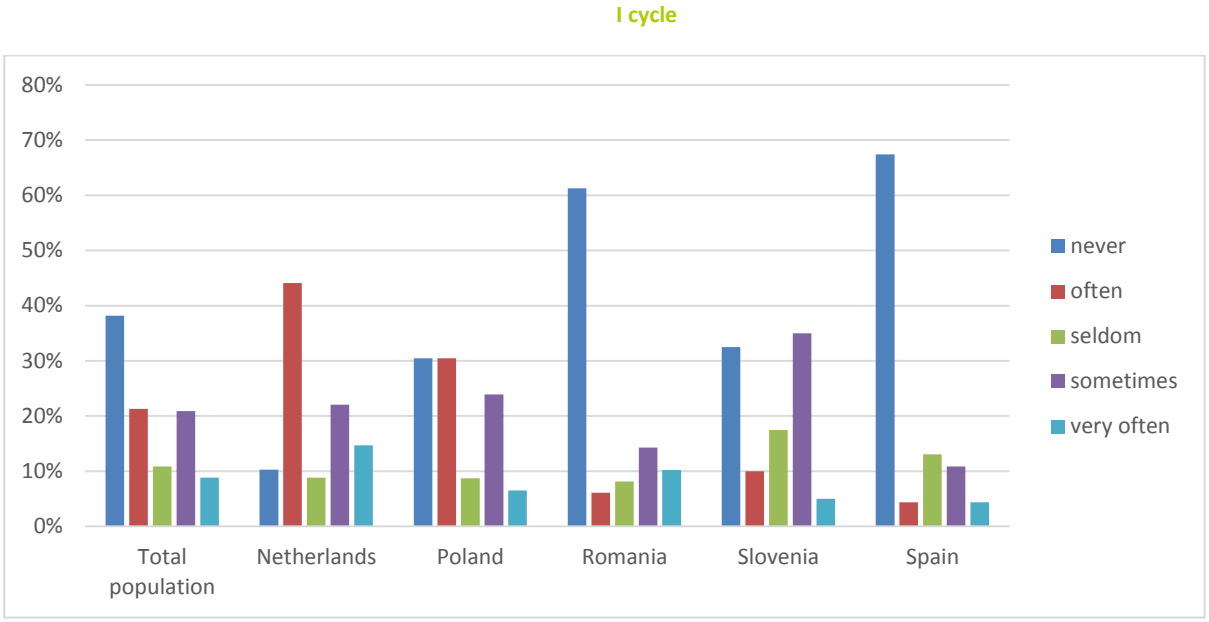
I watch television

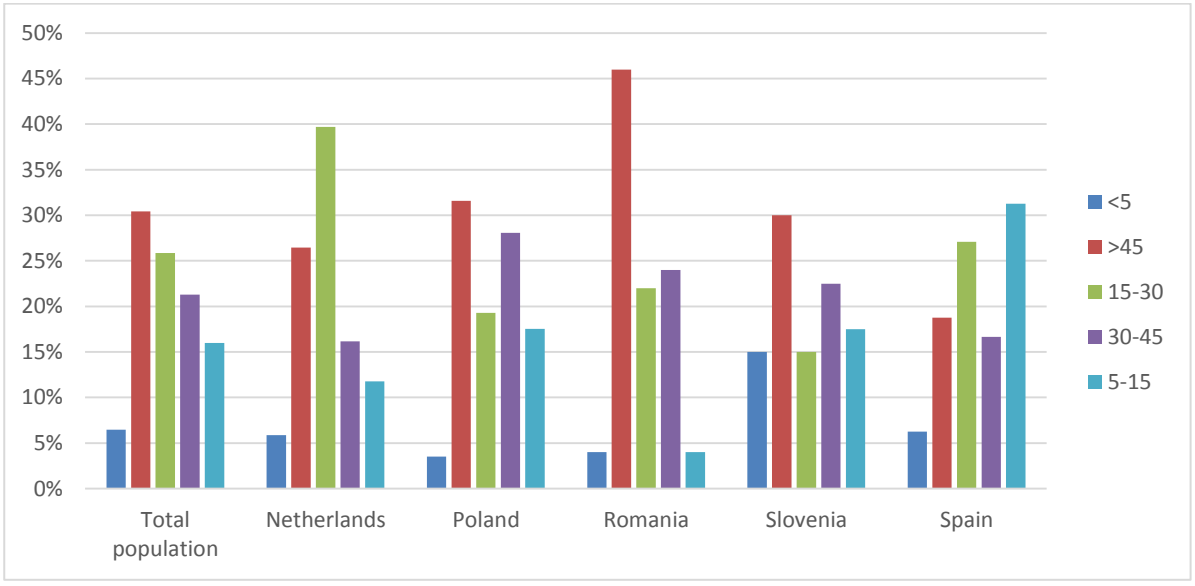


I walk





Q18. How many minutes do you walk and/or cycle per day to and from work, school and shopping?



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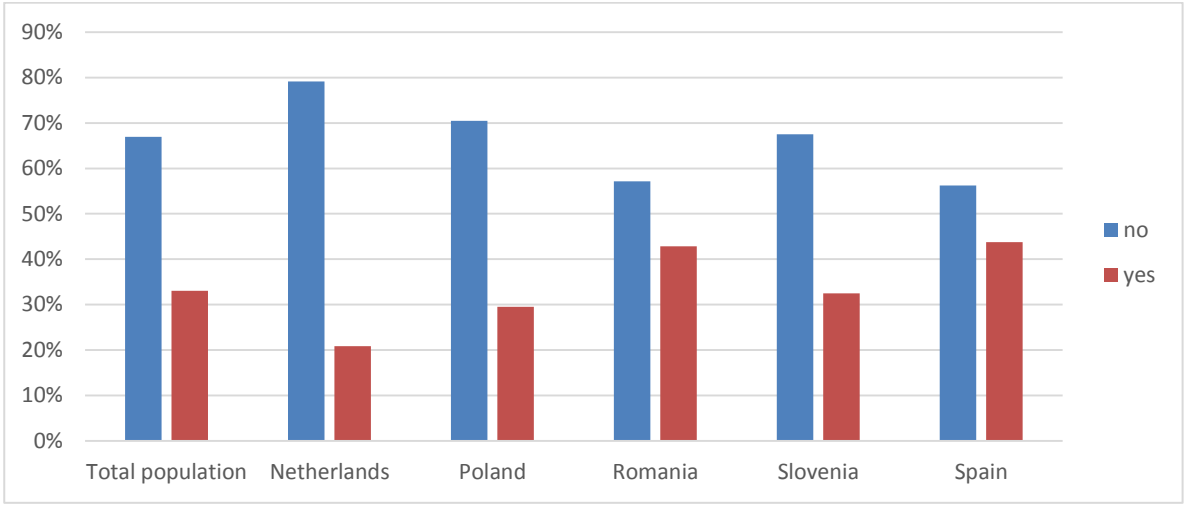
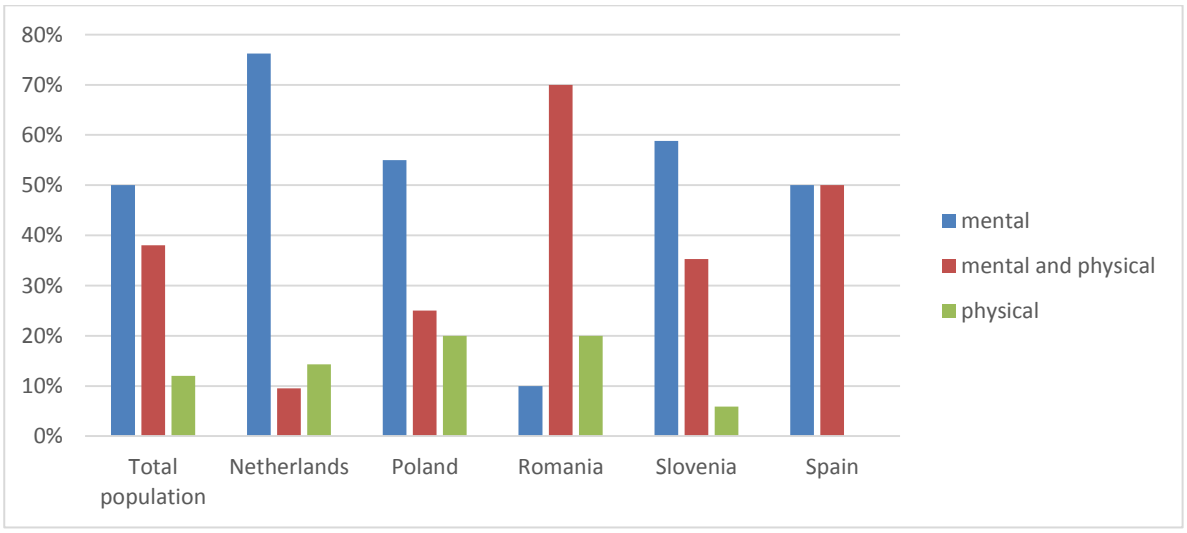
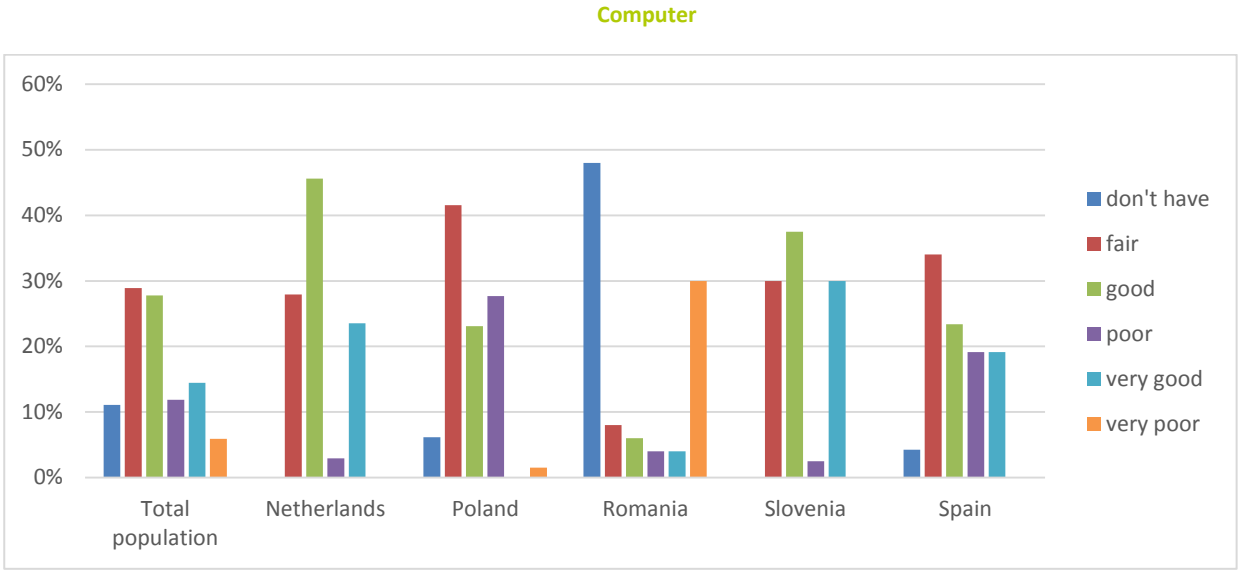
Q19. Do you feel like you have a lot of stress at work?

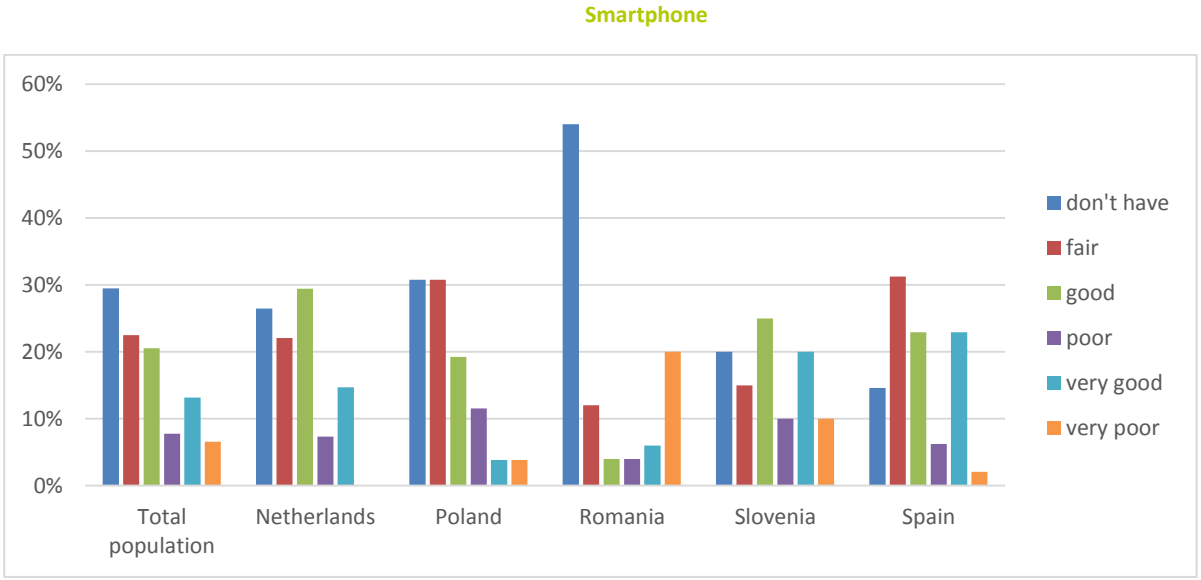


Q20. If yes, is this mainly mental or physical stress or both?



Q21. How familiar are you with….?





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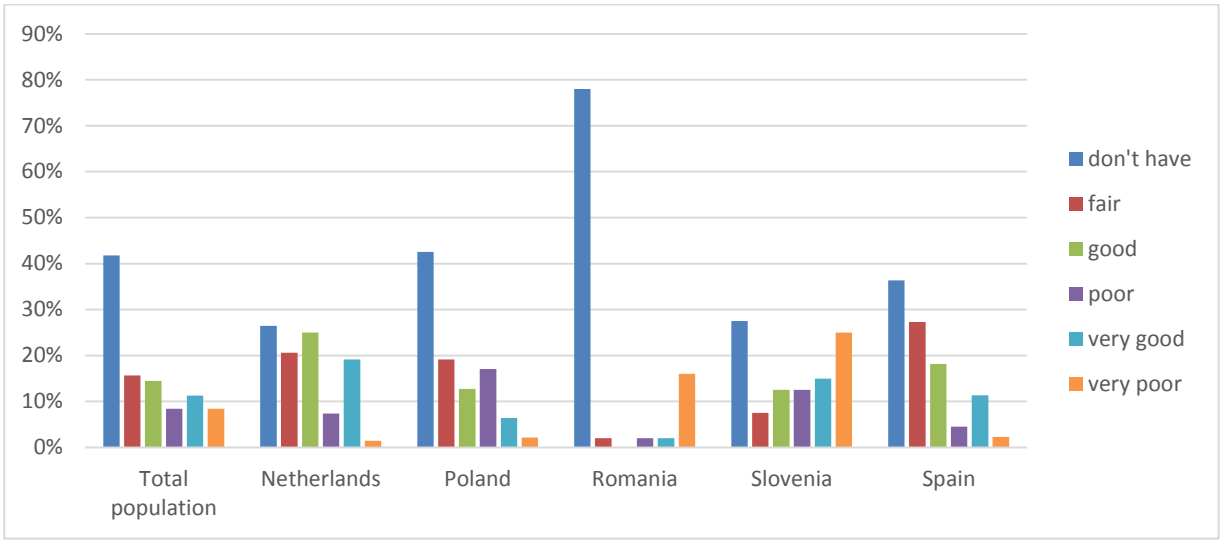
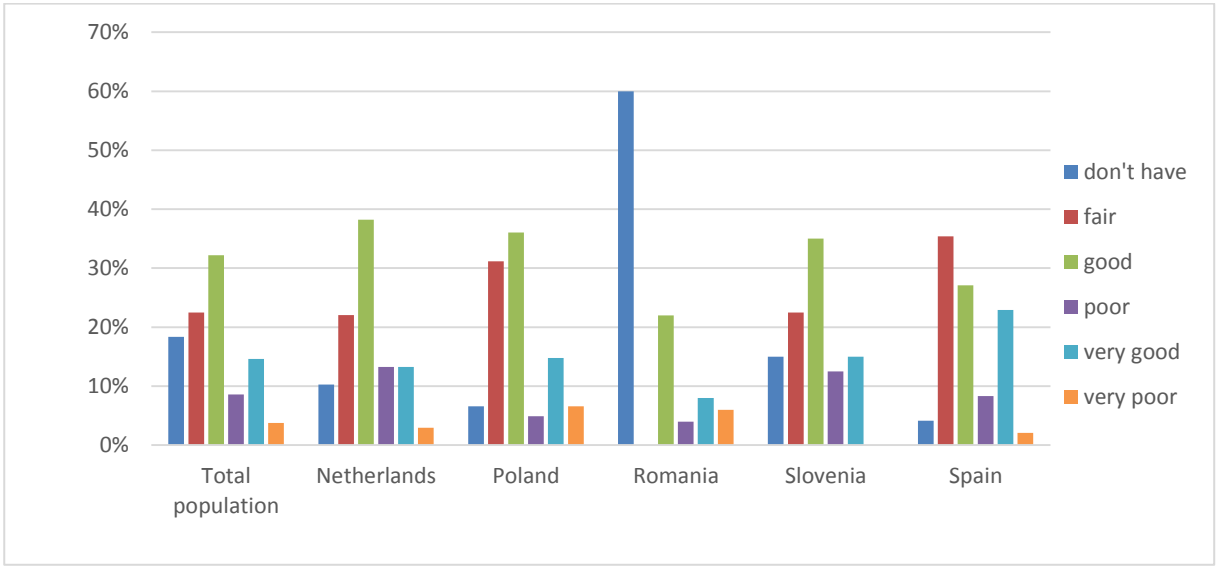
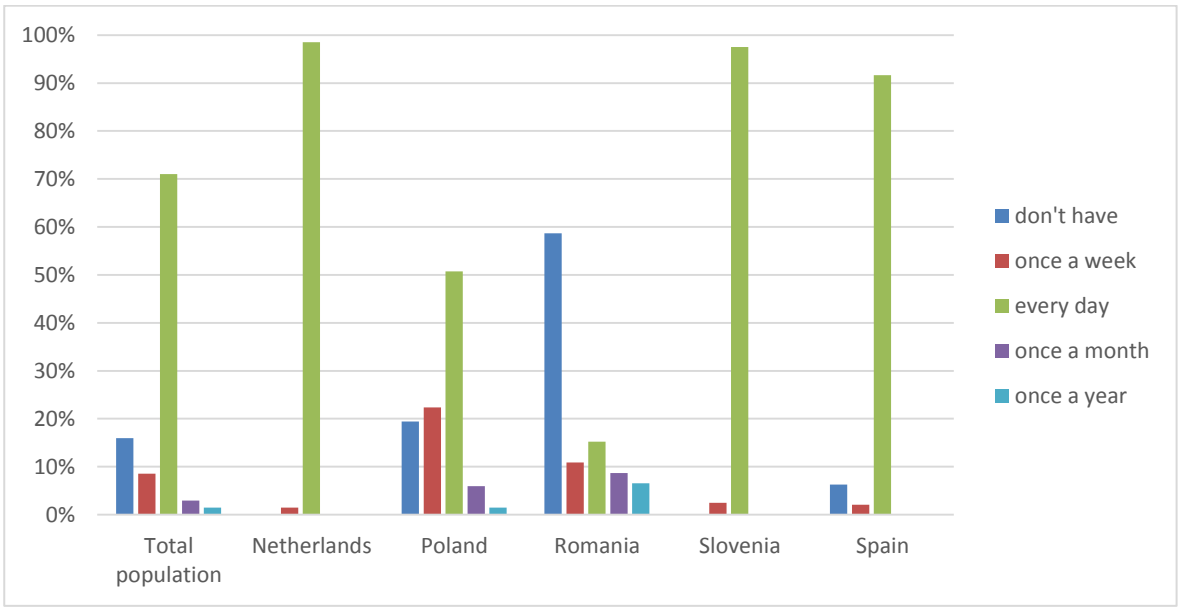


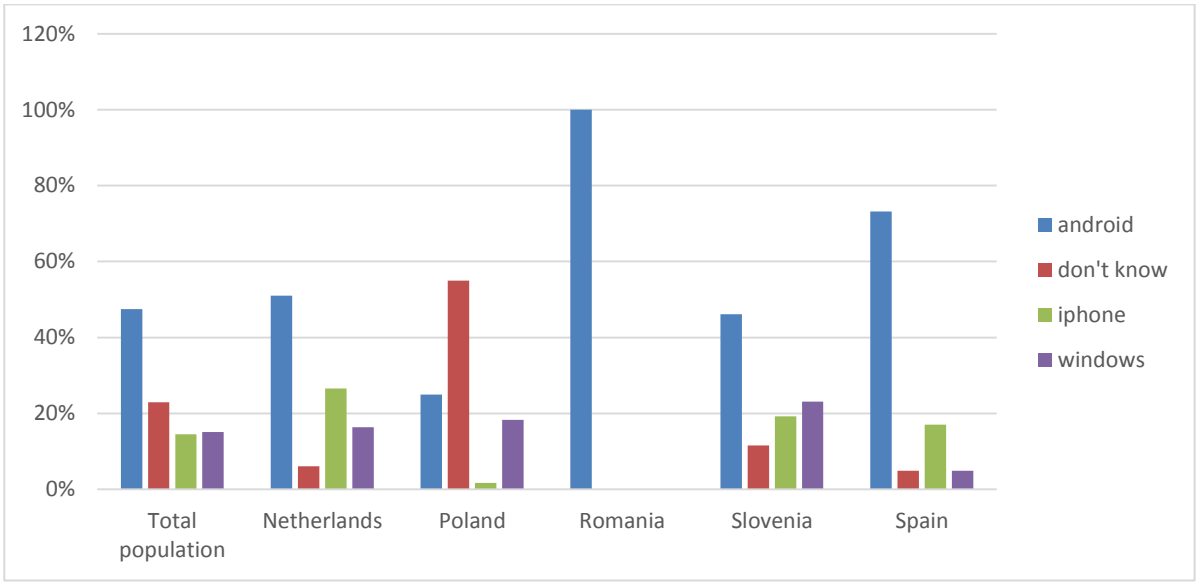
Digital TV



Q 22. How often do you use the computer?



Q23. If you own a smartphone, what type of smartphone do you own?



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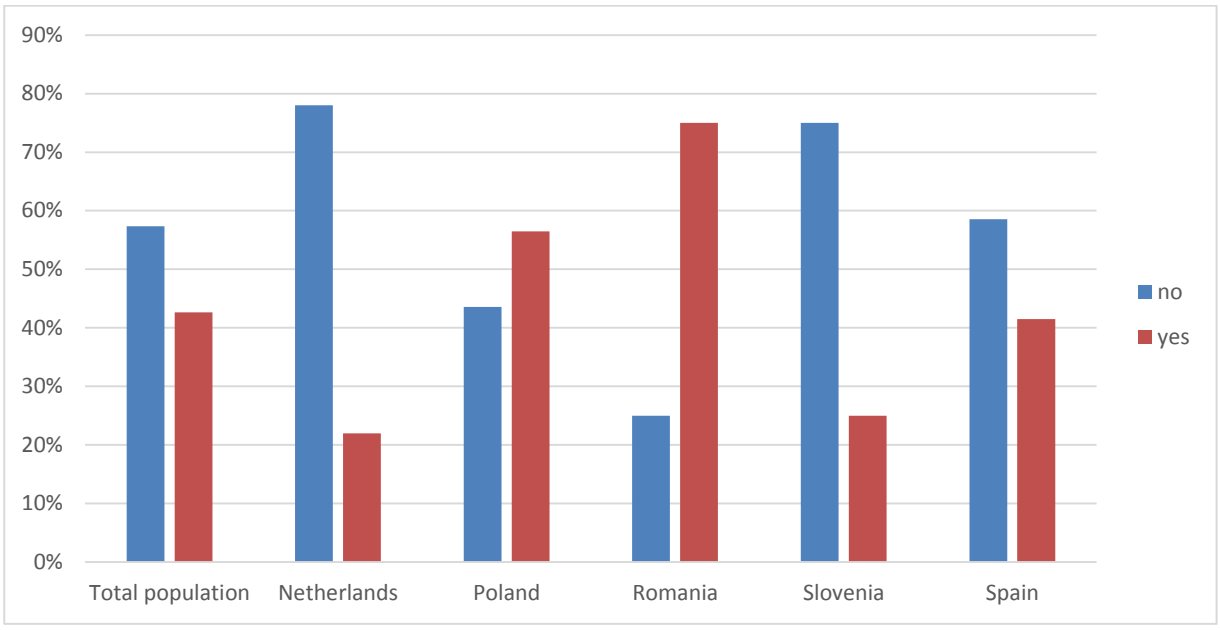
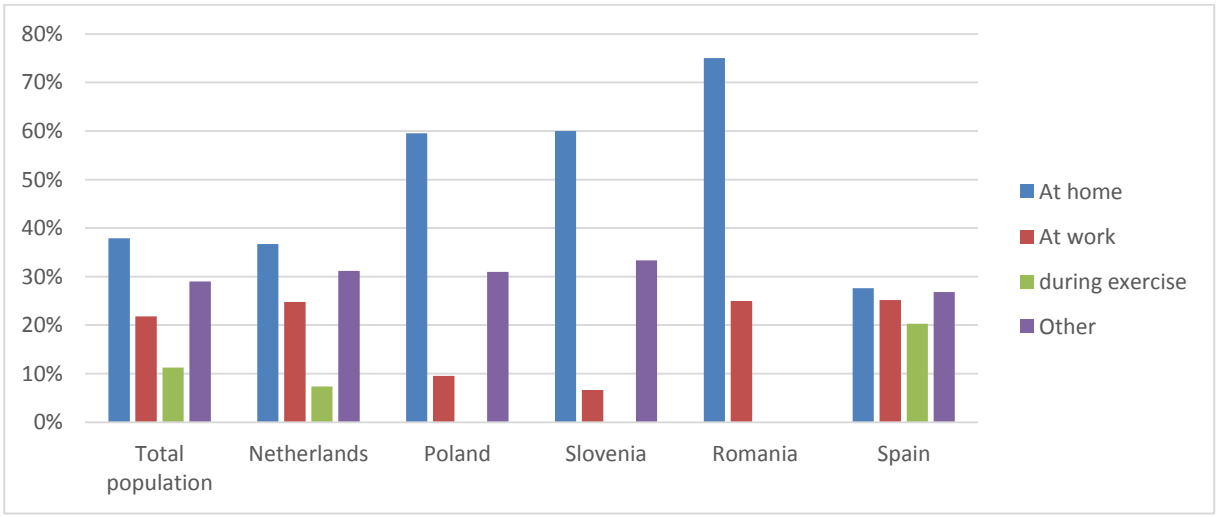
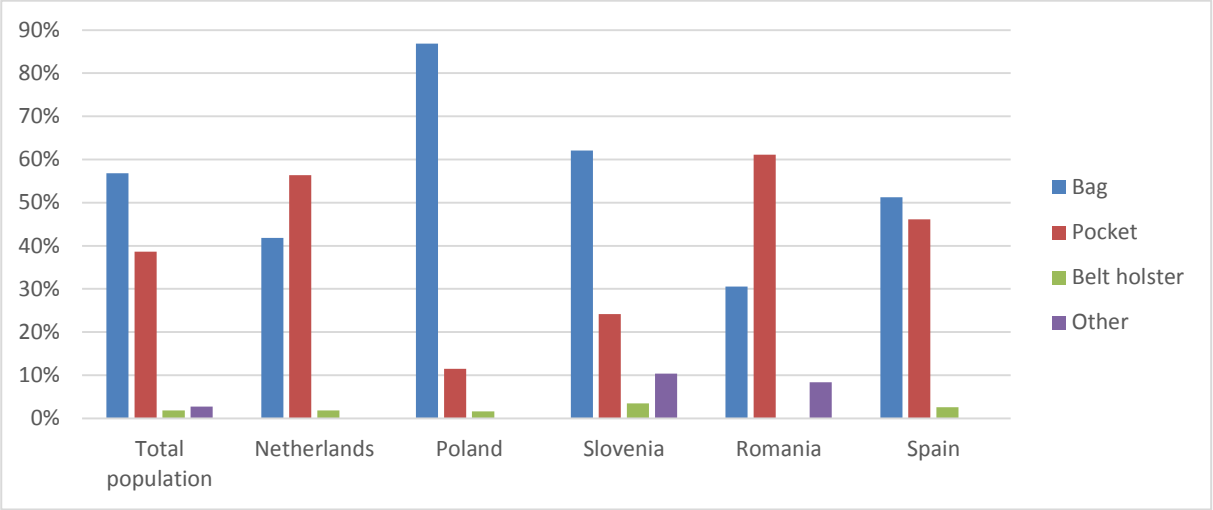
Q24. Are you able to use a smartphone properly or would you welcome extra support in this?



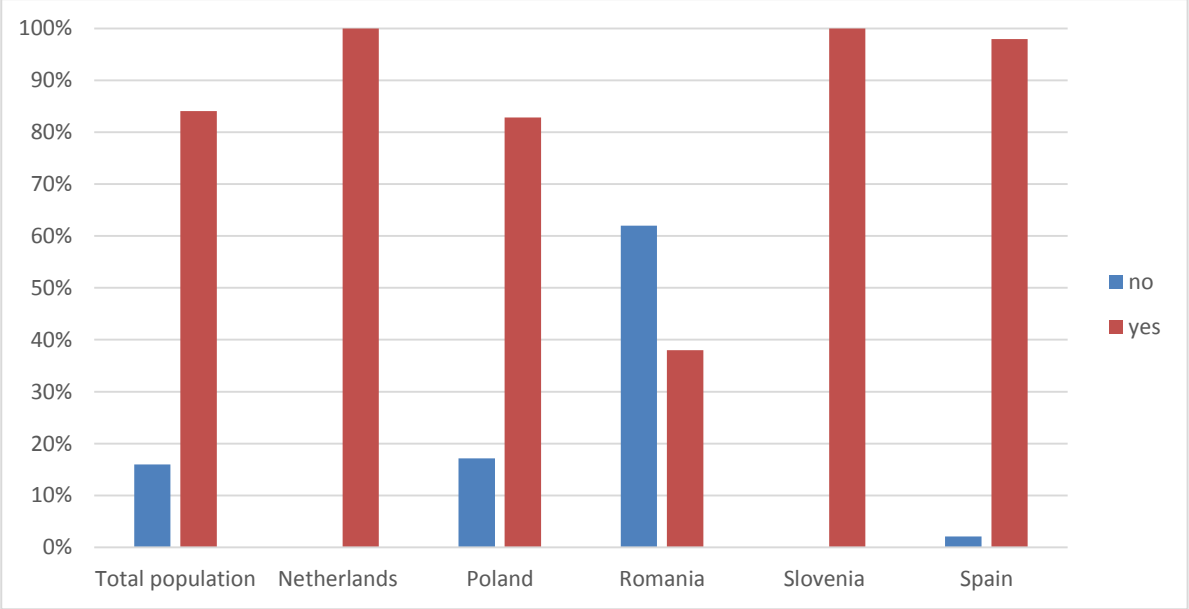
Q25. If you own a smartphone, on what occasions do you have it with you? You can choose more than one option.



Q26. Where do you usually carry your phone? You can choose more than one option.



Q27. Do you have an internet connection at home?



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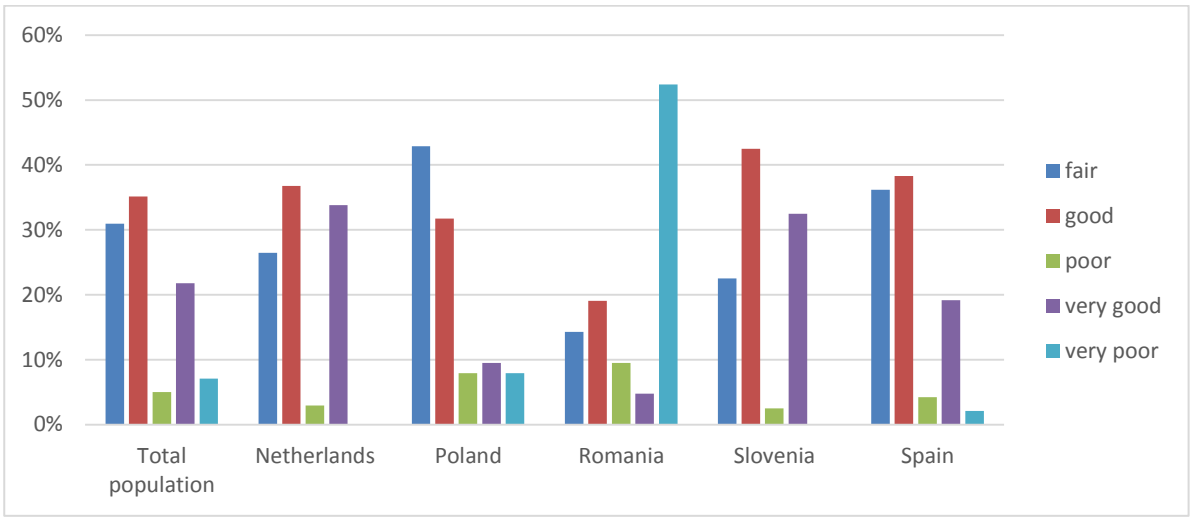
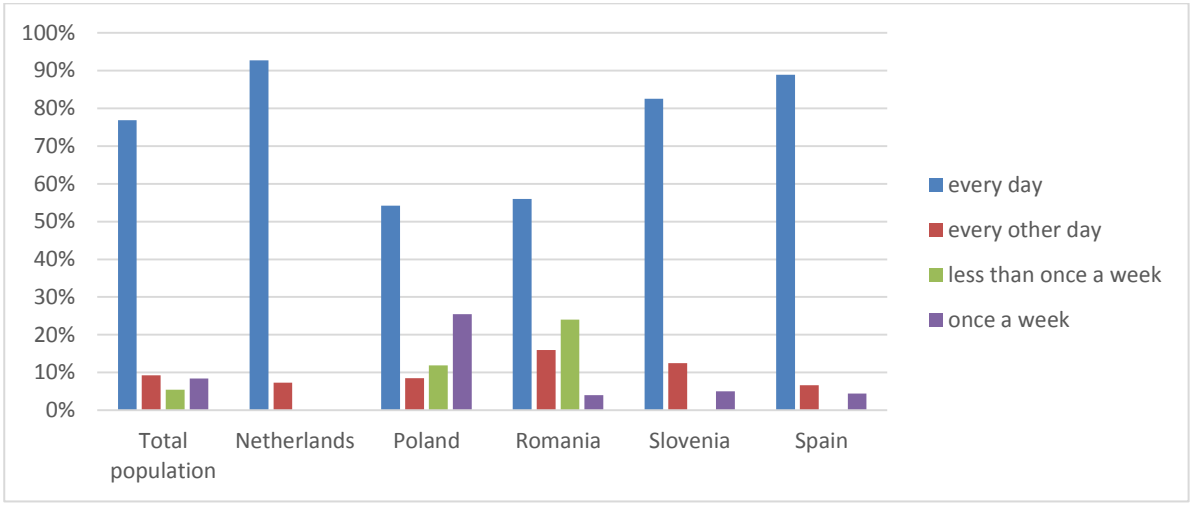
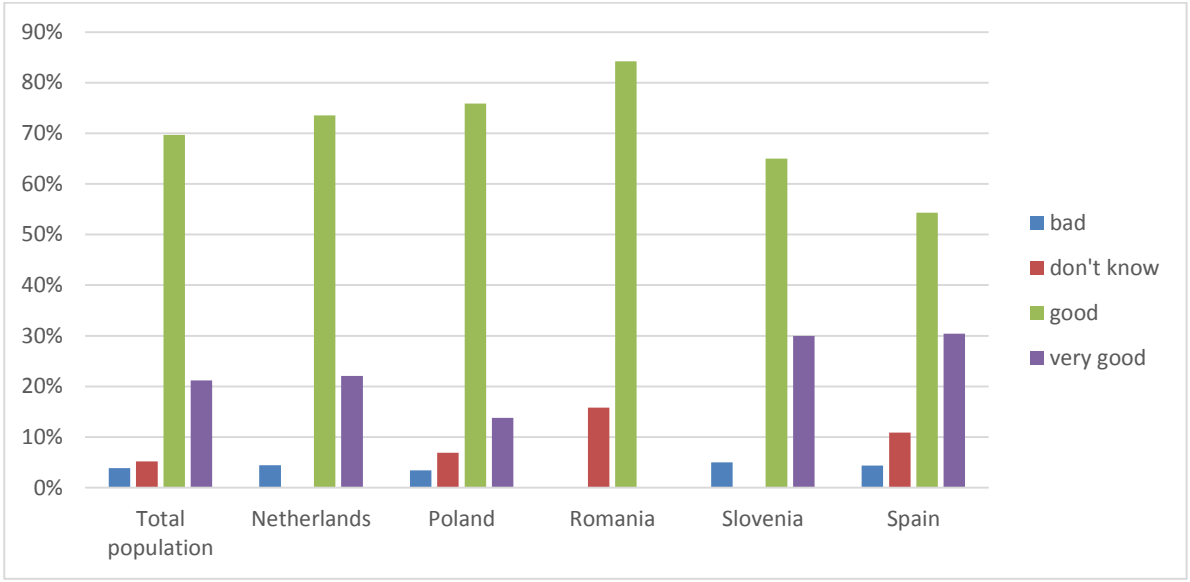
Q28. If yes, how familiar are you with the Internet?



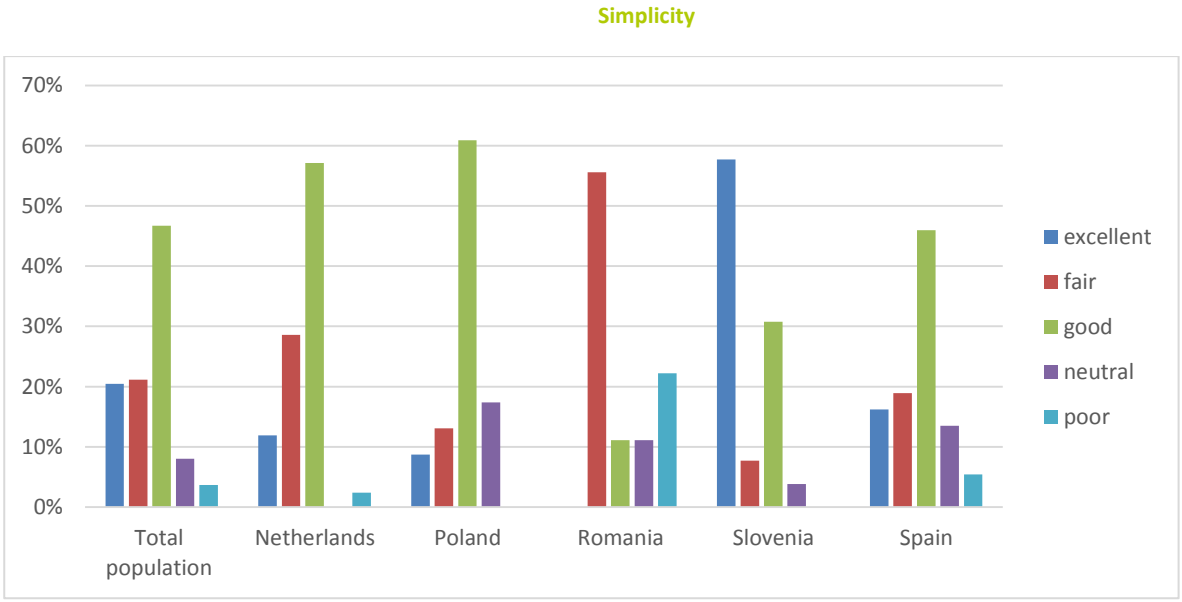
Q29. How often do you use the Internet?



Q30. If you have an internet connection, how would you evaluate your internet connection?



Q31. How do you appreciate the following features in your smartphone?



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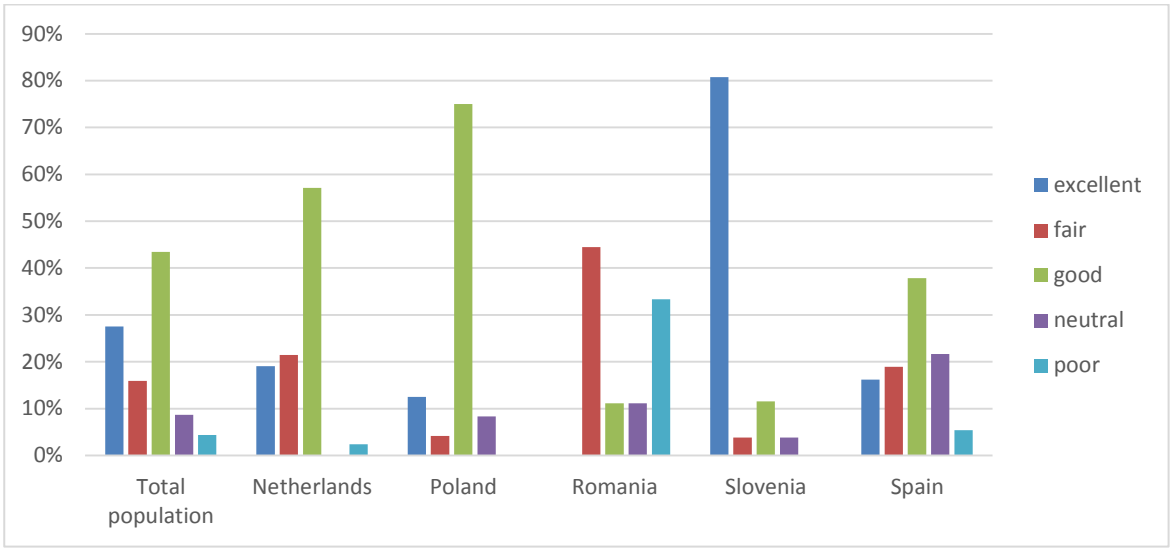
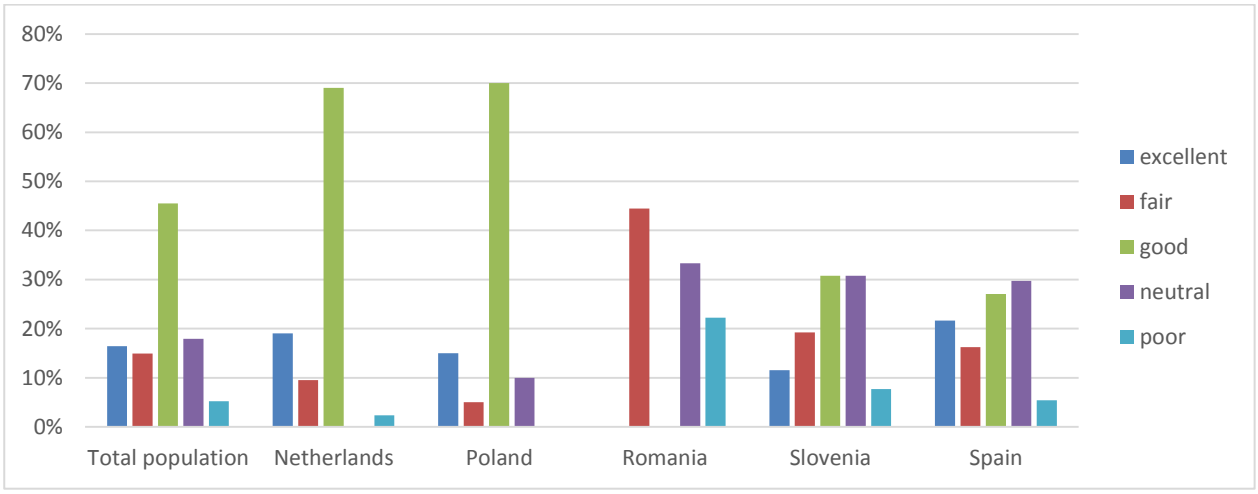
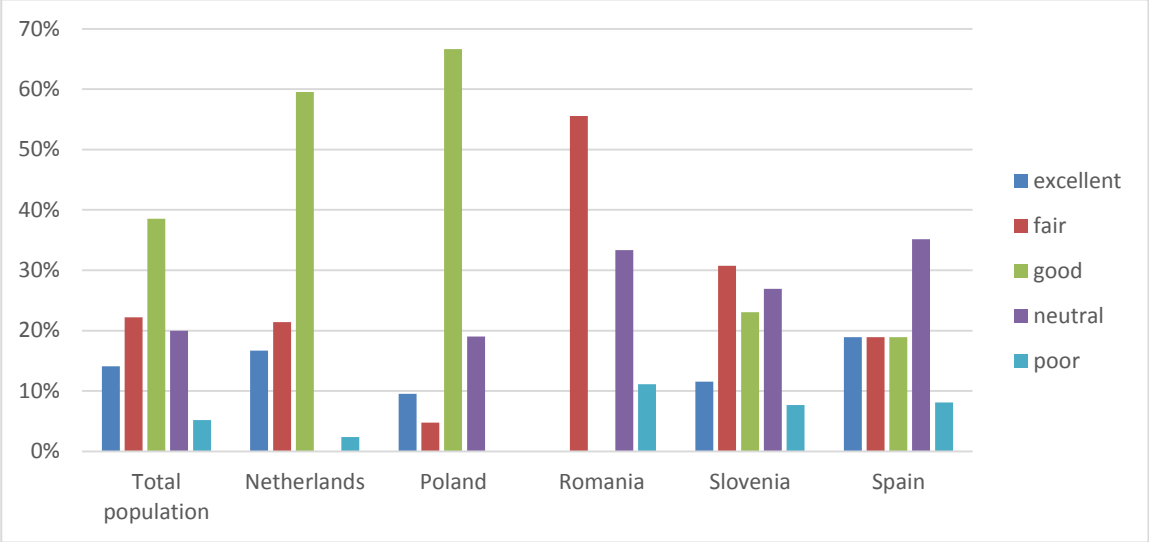
Usability



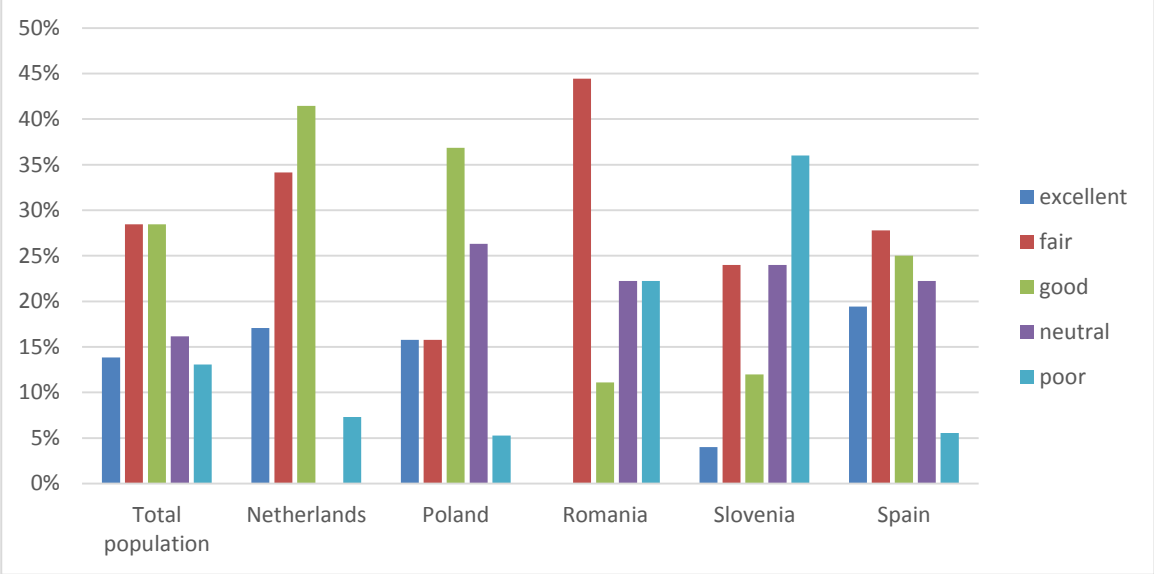
Design



Attractiveness



It is fashionable



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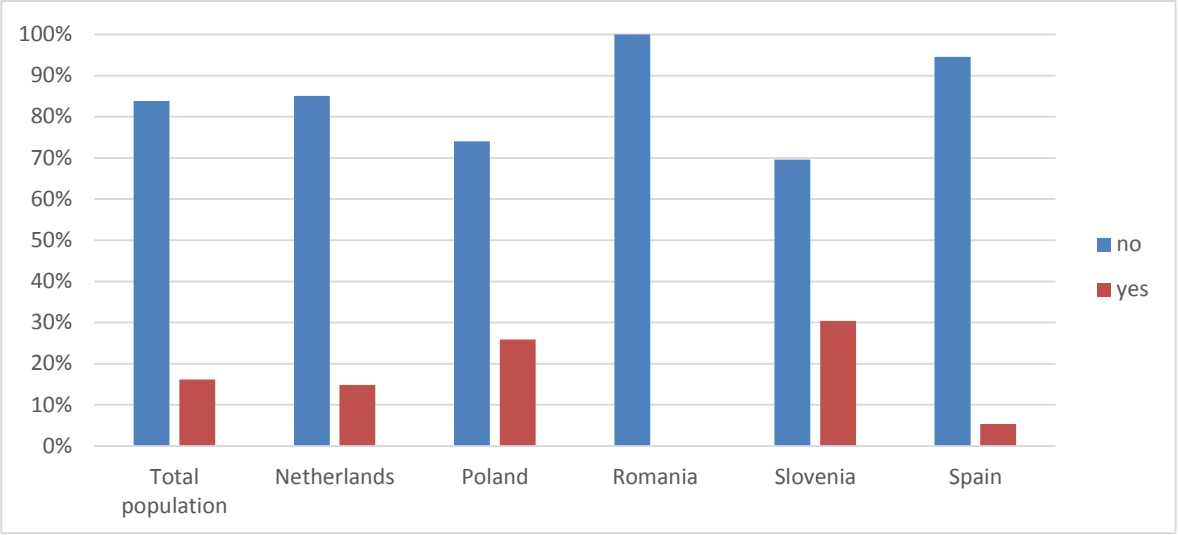
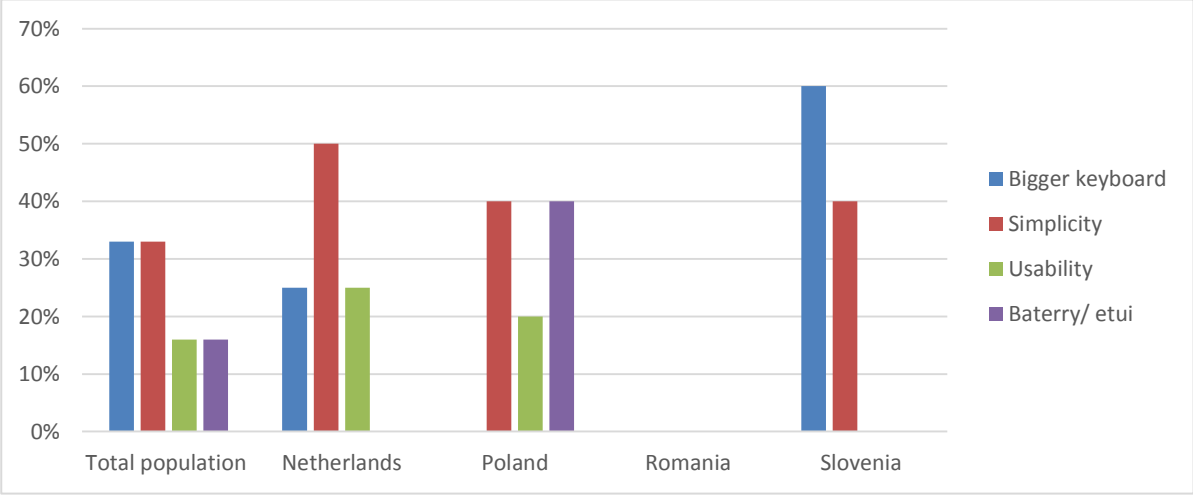
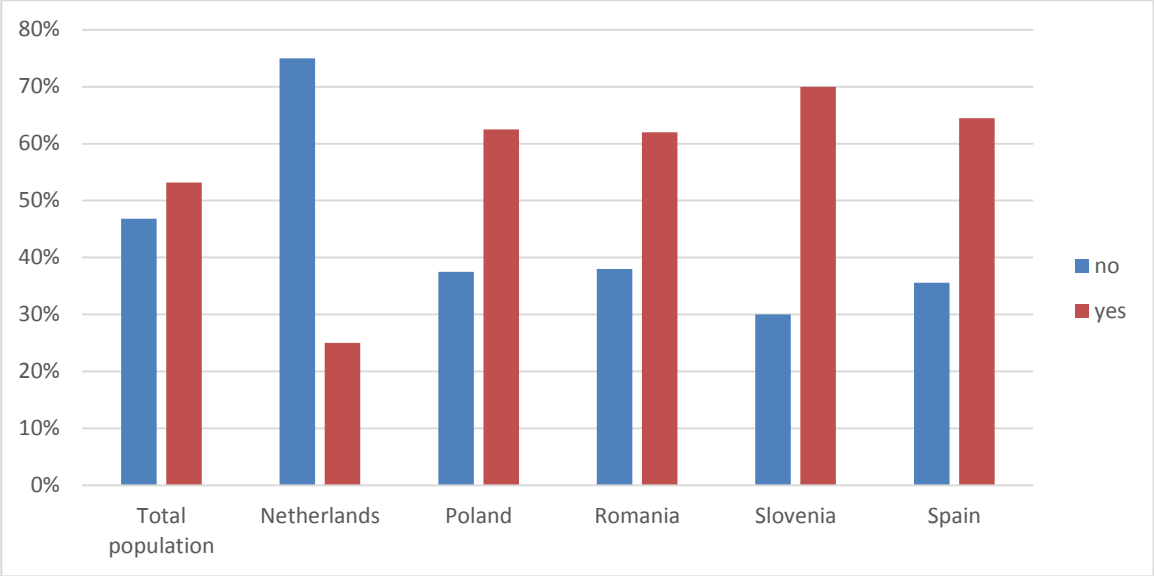
Q32. Are there specific features that you would like to improve on your smartphone?



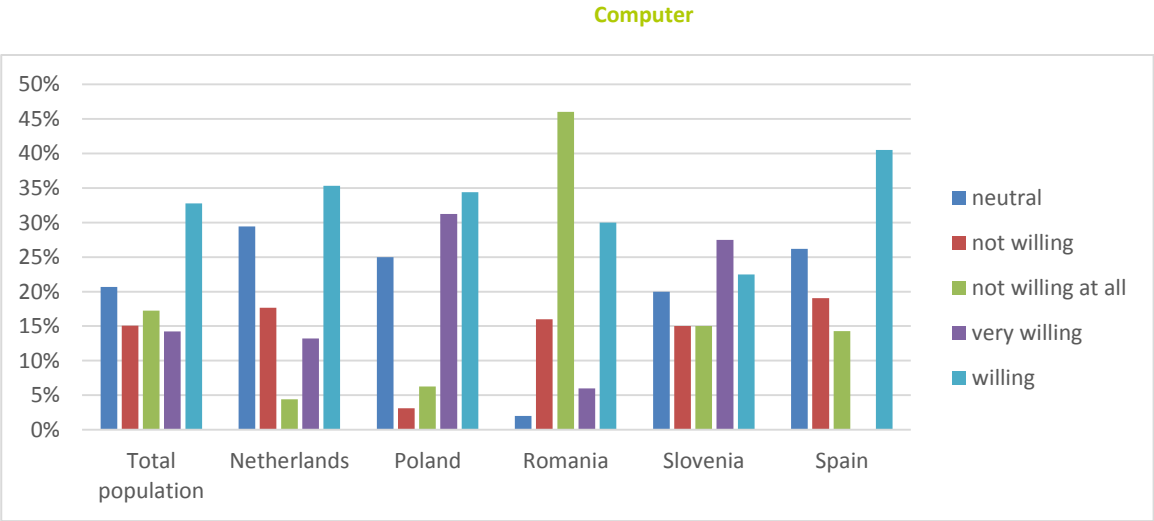
Q33. If yes, which features would that be?



Q34. Would you be interested in a technology for your smartphone that will improve your health at work and at home?



Q35. What would be your willingness to use/wear the devices listed below for improving your health status?



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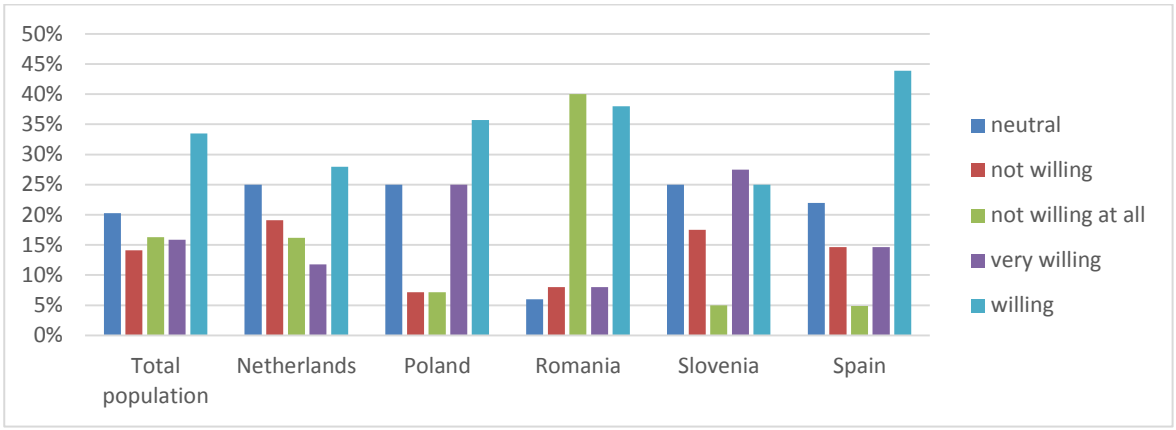
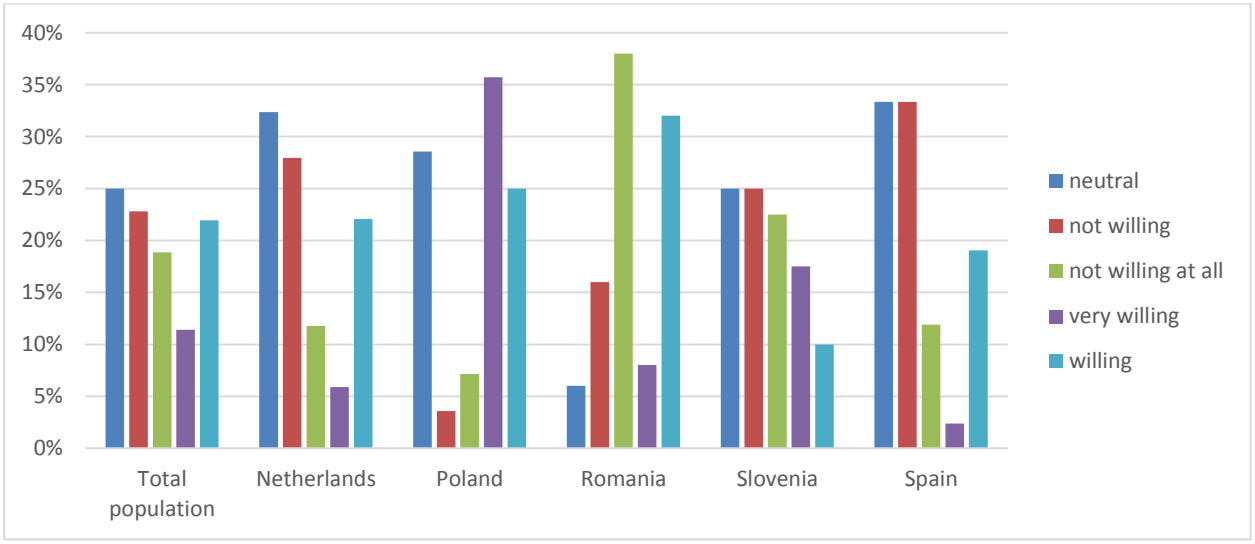
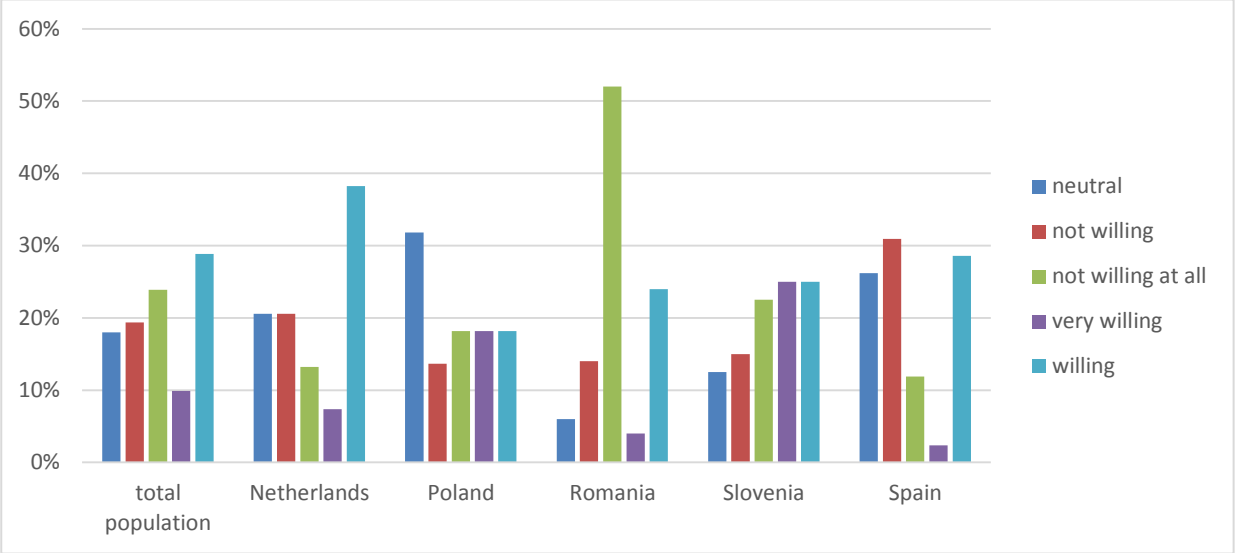
Smartphone



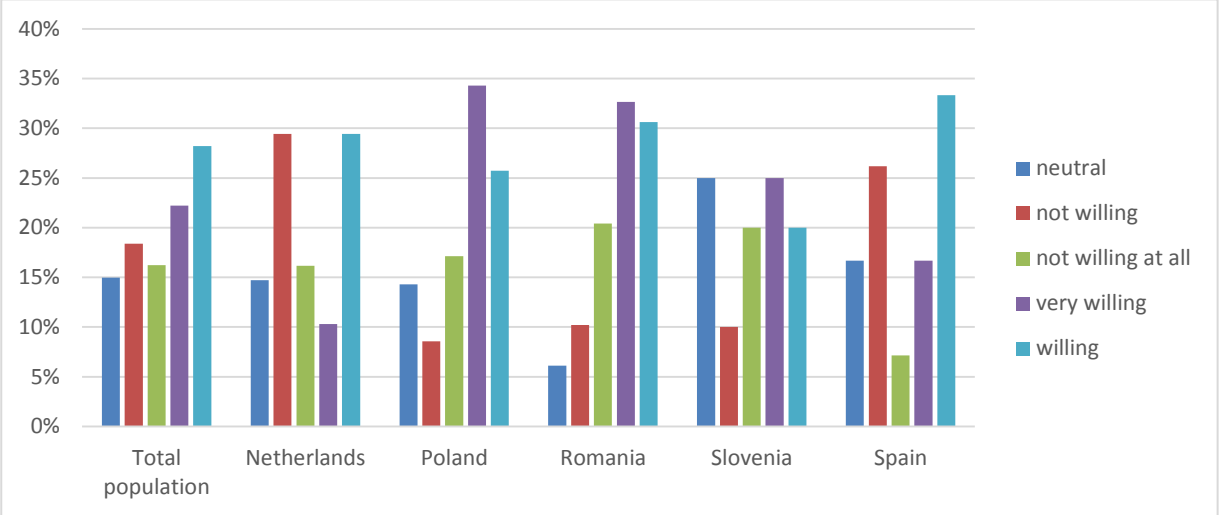
Digital TV



Tablet



Wrist device



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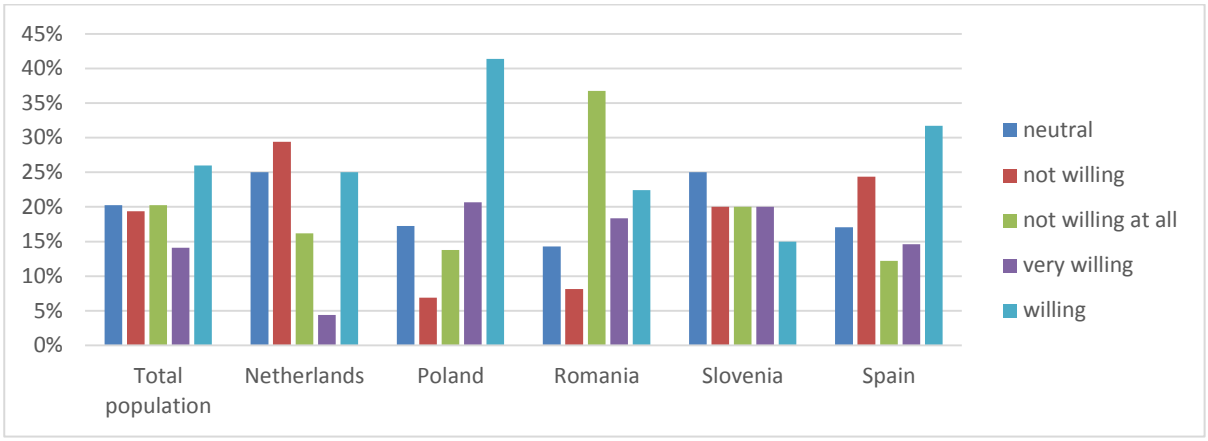
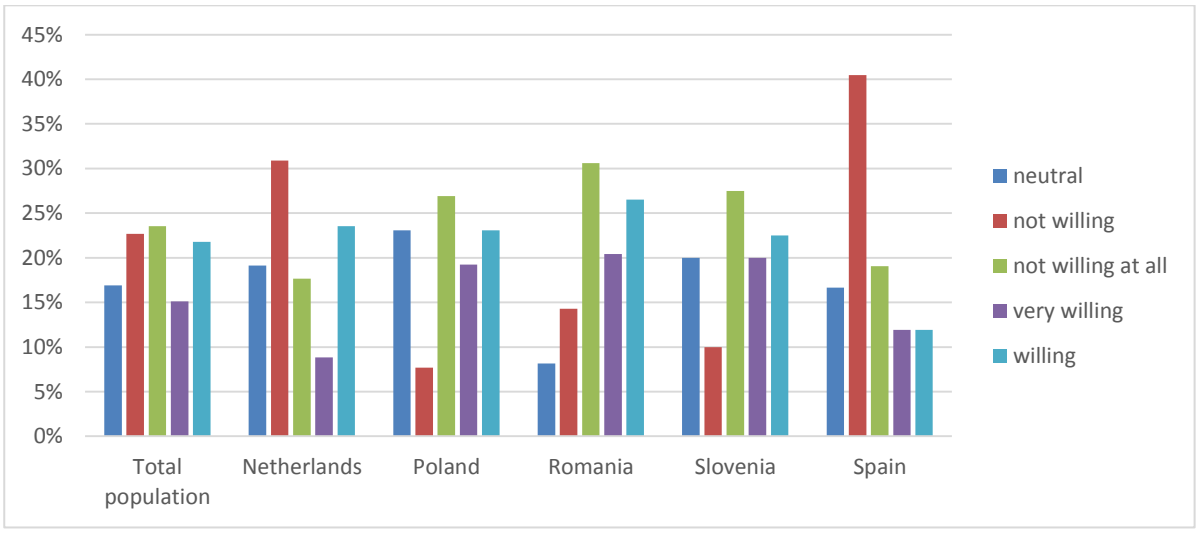
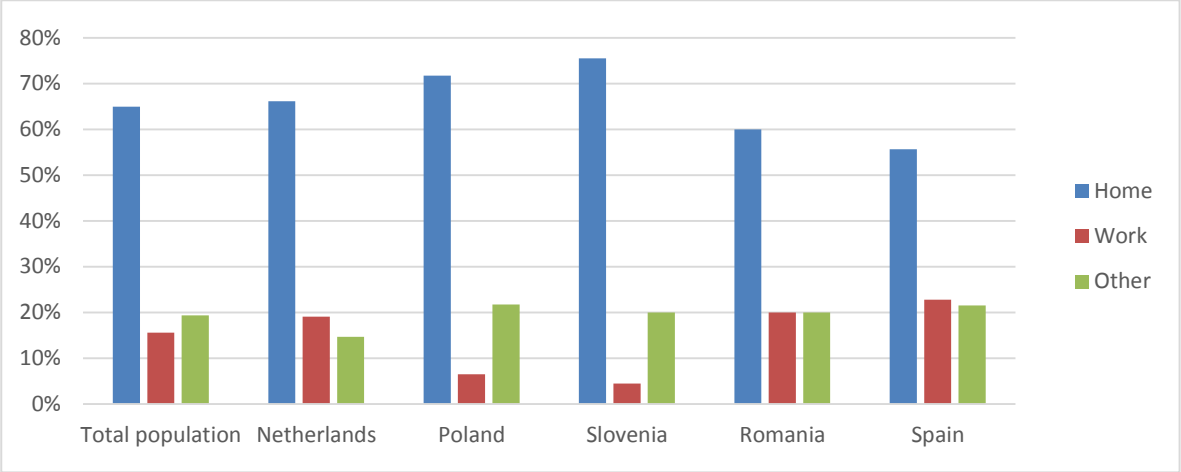
Clothes



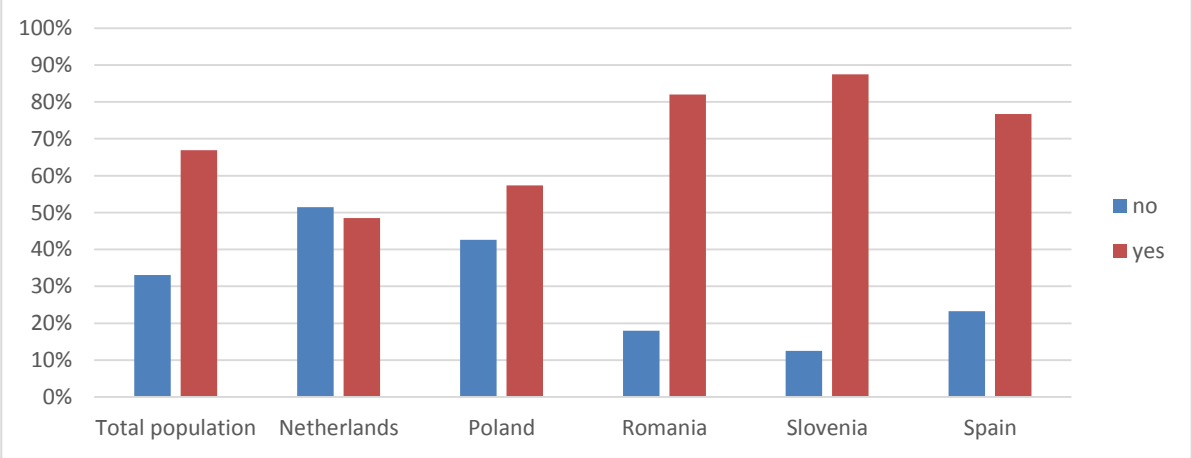
Device under mattress



Q36. With regards to clothes when and where would you be willing to wear them? You can choose more then one answer.



Q37. For optimal performance of the Fit4Work technology environmental-sensors would have to be placed in the working and home environment. Would these be acceptable if it would improve your health status?



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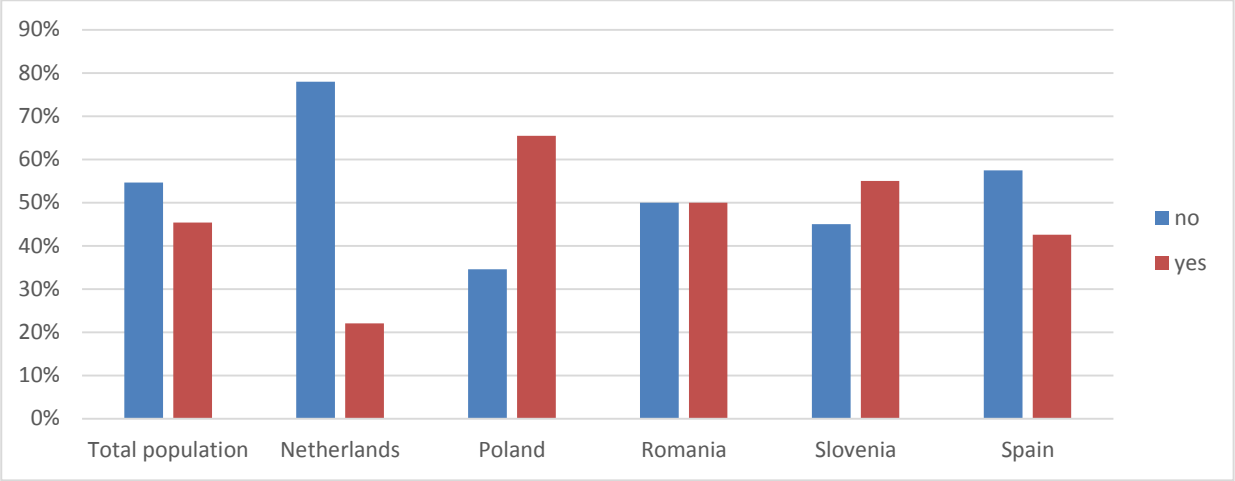
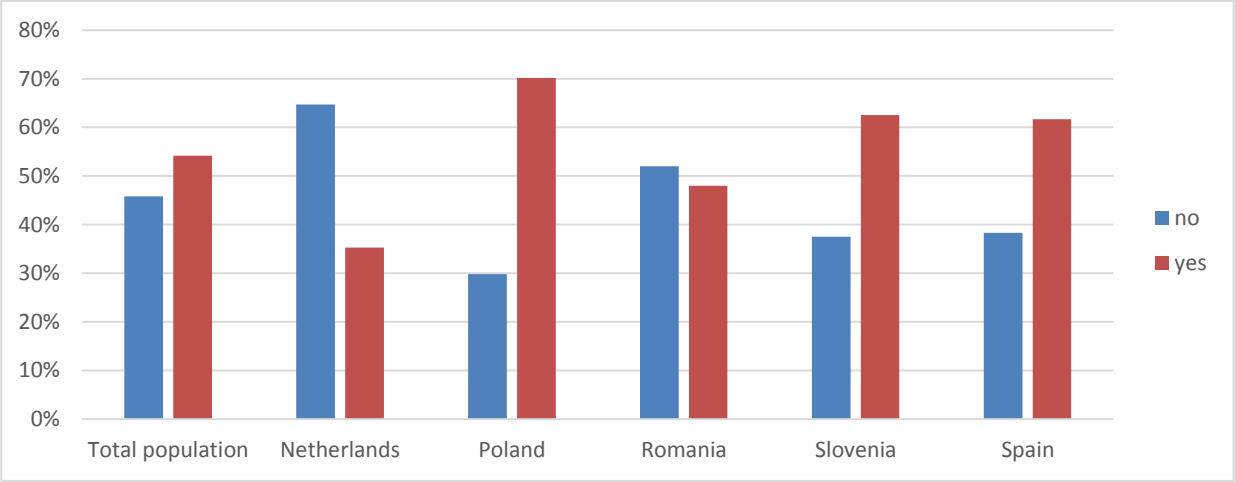
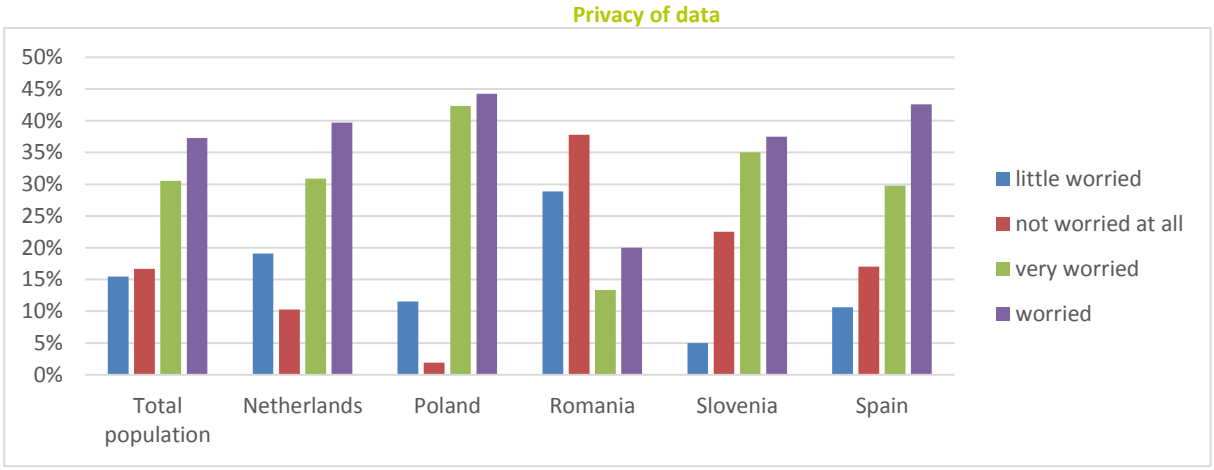
Q38. Through the Fit4Work technology you will be able to exchange your performance with other users, discuss ideas, exchange opinions etc. Would you be interested in such a feature?

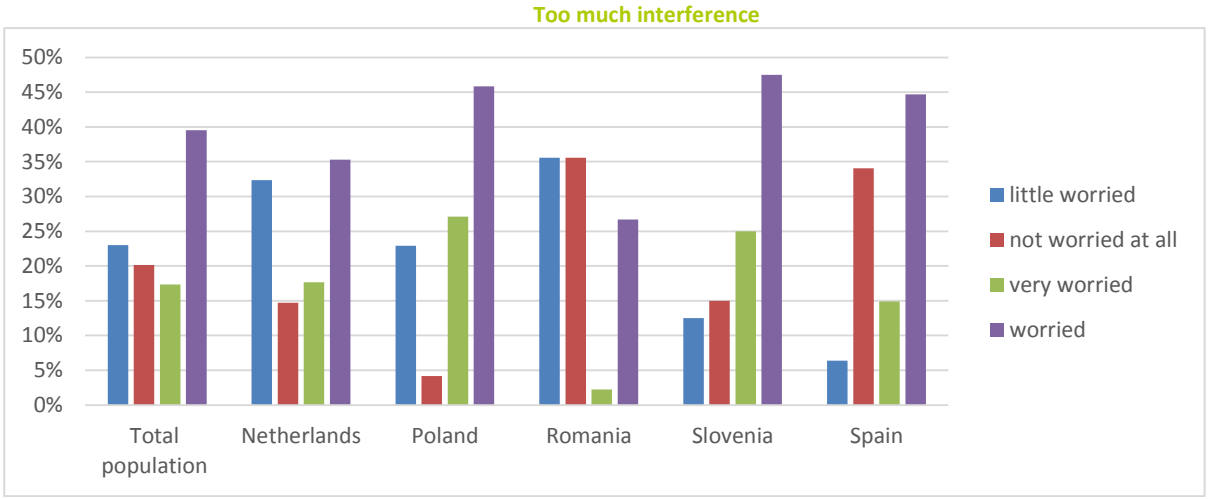


Q39. The Fit4Work technology is developed by specialists from different fields. We would like to offer the possibility for users to be in contact with fitness instructor, psychologist and physiotherapist. Would you be interested in such a element to come with this technology?



Q40. How worried are you about the following for this product:





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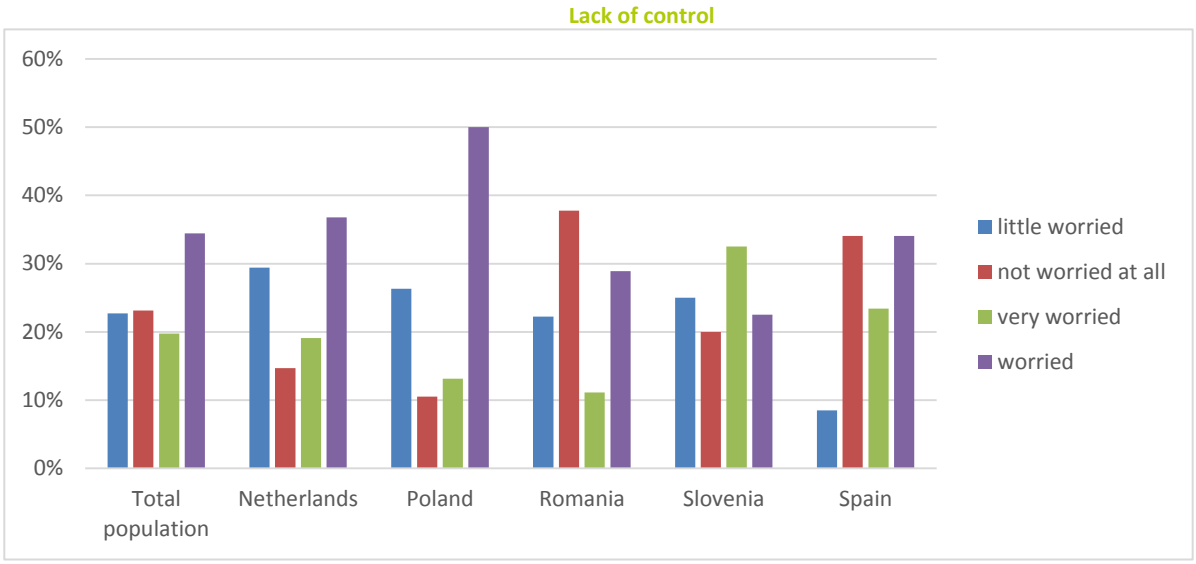
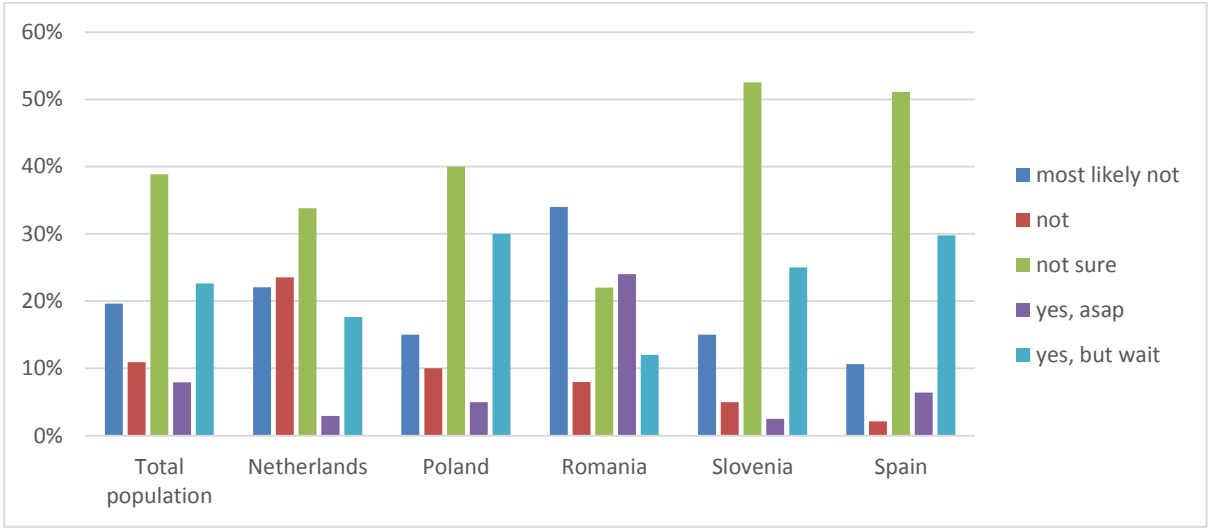
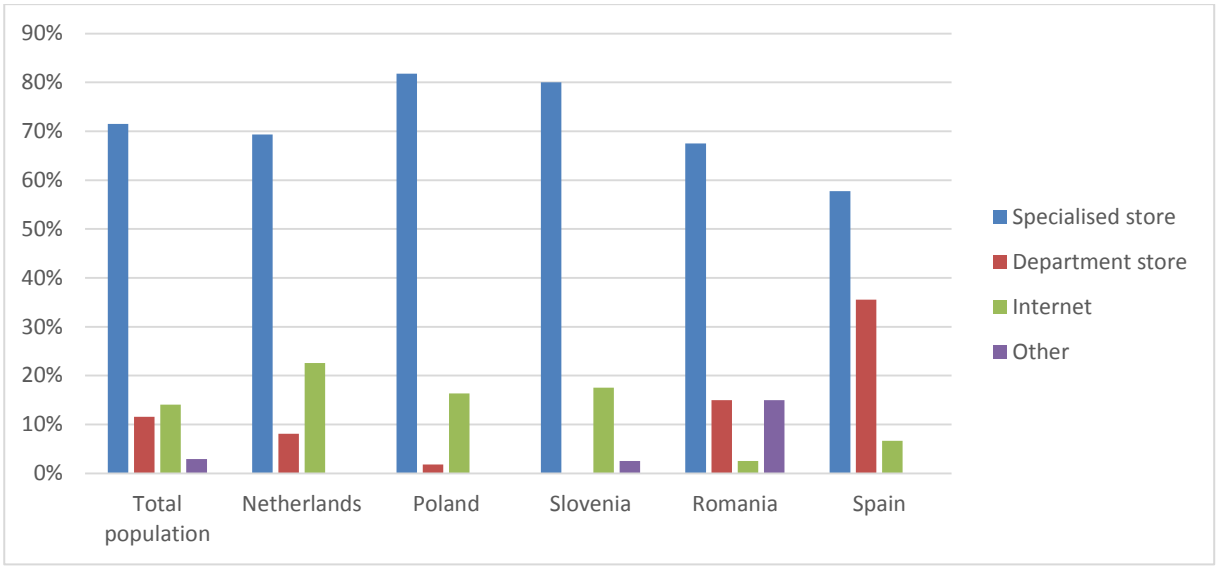


Q41. If this technology was available today and its price was right for you, would you purchase it?



Q42. If this technology were available today, where do you like to purchase the product?



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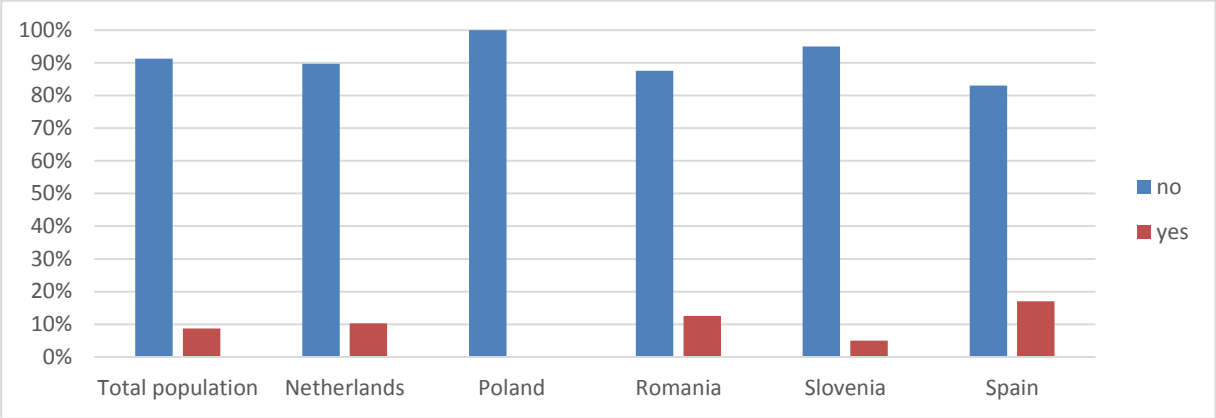
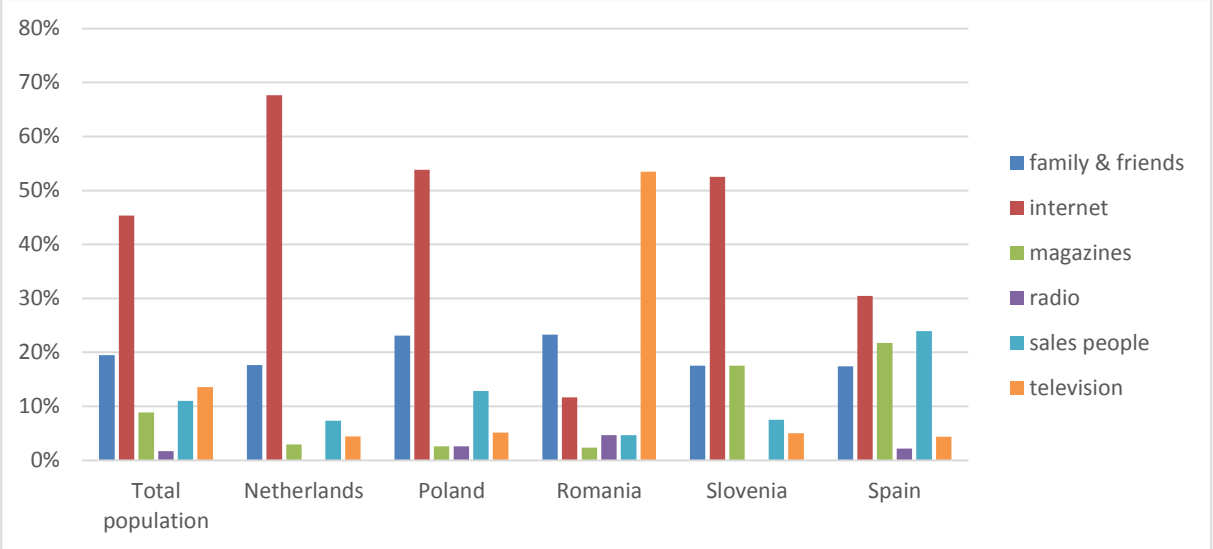
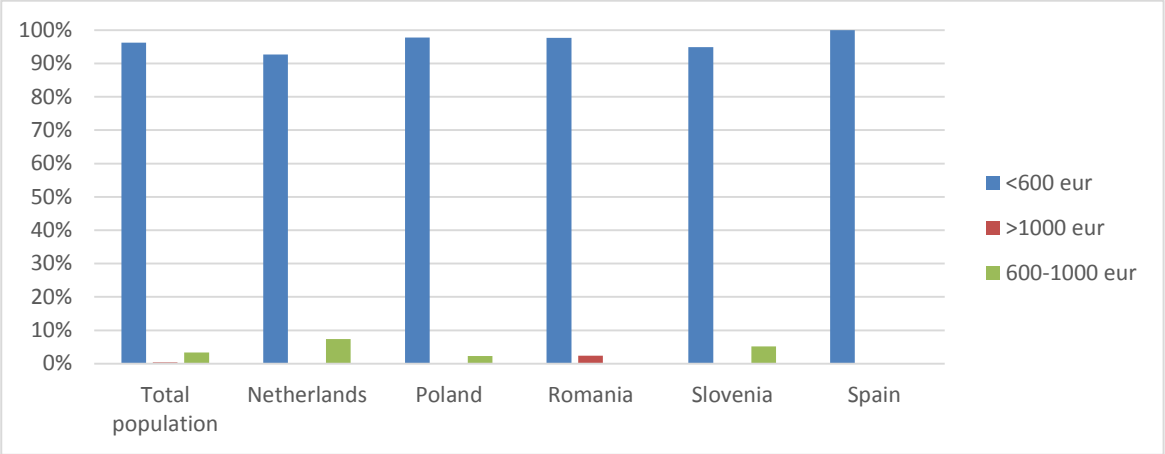
Q43. Do you know products with similar characteristics?



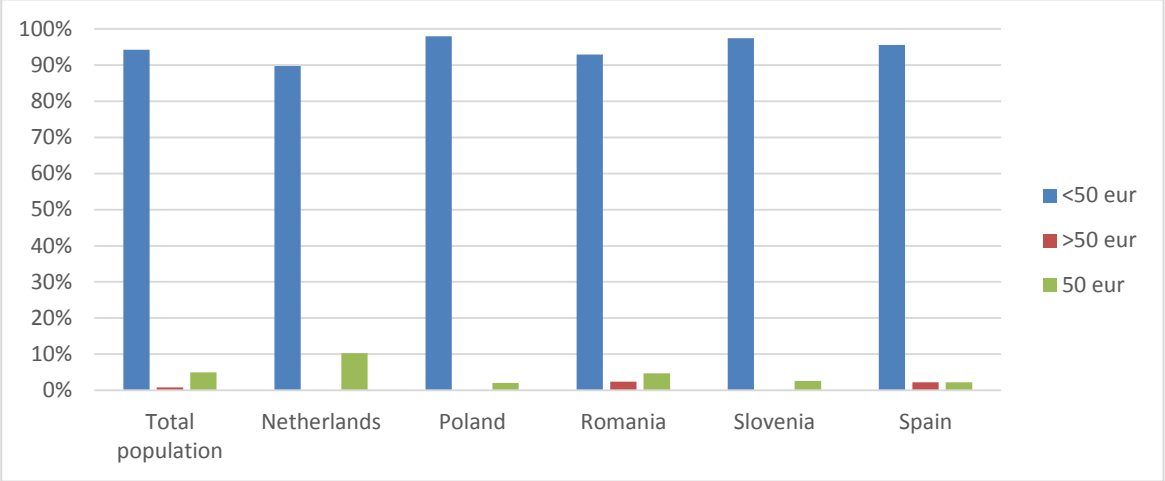
Q44. Which of the following sources do you prefer to get information about this technology?



Q45. How much would you be willing to pay for this product in total?



Q46. How much would you be willing to pay for this product per month to improve your health status?



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Q47. If our new product were available today, how likely would you be to recommend it to others?