



<b>Project acronym</b>	<b>CAMI</b>
<b>Project number</b>	<b>AAL 2014-1-087</b>
<b>Project full name</b>	<b>Artificially intelligent ecosystem for self-management and sustainable quality of life in AAL</b>
Dissemination level	Public
Type of deliverable	Report
Contractual Date of Delivery	M7
Actual Date of Delivery	M8 ( <i>Due to the winter holiday we had a delay in obtaining the questionnaires answers from the end-users</i> )
Deliverable Number	1.2
Deliverable Name	Multinational survey
Workpackage / Task	WP 1 / T1.2
Work package responsible / Task responsible	SSW
Number of Pages	49
Contributors	SSW, ECO, CITST
Version	4
Keywords	multinational survey, caretakers, caregivers
Abstract	The aim of this deliverable was to extend the analysis performed in T2.1 by a multinational survey in order to bring quantitative answers (statistical analysis) to the addressed issues. The survey was carried out in 3 countries. A total of 105 respondents representing primary end-users took part in the survey. A total of 58 secondary end-users number participated. The group consisted of 22 professional (37.9%) and 36 informal (62.1 %) caregivers. Structured interviews were prepared by the end-user organizations. The Lime survey tool was used through a web-interface for data collection and then for the subsequent data analysis.



## Table of Contents

<b>Executive summary</b>	<b>5</b>
<b>List of Figures</b>	<b>6</b>
<b>List of Tables</b>	<b>8</b>
<b>Methodology</b>	<b>10</b>
The survey	10
The researched sample	10
<b>The findings</b>	<b>11</b>
About the seniors	11
Demographic data	11
The household and living conditions	13
Health status	14
Physical & mental exercises	15
Social relations	18
To have a caregiver	18
About the caregivers	19
The demographic data	19
The experience of being a caregiver	22
The access and the usage of the technology	23
The perspective of the primary user	23
Internet access	26
The perspective of the caregivers	28
New technologies and devices for supporting the work of caregivers	29
Security concerns and emergency support	31
Are you worried about intruders breaking into the house	31
The attitude toward new technologies	33
The seniors perspective	33
The caregivers perspective	33
The attitude toward presented technological solution	34
A mobile device features	34
A mobile device (screen) which you can use from anywhere around the house to talk to your friends and family or use it as a touch-screen for obtaining information	35
several control units/panels distributed in your house which allow you to interact with	

your home environment (e.g. control temperature, devices, etc.) and friends	35
Robot features	35
a robot with a touch screen which you can use anywhere around the house for socializing, communication with other people and for providing information	35
a robot remind you on tasks and medication	36
a robot which can be manipulated remotely by your friends or relatives or even by you to check on the house or on the persons inside the house	38
a robot bring you of water, your medication or any other small object	39
Reminder and calendar features	40
maintaining/viewing a calendar of your past, present and future activities, exercise sessions, appointments.	40
The option of sharing the above calendar/history with loved ones.	40
The option of sharing the above calendar/history with doctors.	40
The ability of automatic adjustment of the future program given your past activities.	40
The ability to be reminded of required medication intake.	40
The ability to be reminded of different planned activities (other than medication intake).	41
The ability to make requests to your closest caregivers (e.g. family, friends, neighbors) regarding assistance with a scheduled activity.	41
Health monitoring functionalities	42
Viewing graphic displays of your various health measurements (blood pressure, heart rate, oxygen levels) and their change in time.	42
The ability to share such health measurements with doctors.	42
Voice control functionalities	43
The ability of interaction with the system through a vocal interface.	43
The option of turning the vocal interface off.	43
Consider the option that audio output be accompanied by another form of output (e.g. text, graph).	43
Financial opportunities	44
Payment options - renting vs buying the device	44
Health monitoring devices	44
Interactive gaming device for keeping you physically and mentally healthy	44
Devices for remote social interaction	45
Smart home sensors and devices to monitor your home and alert in case of problems	46
Intelligent program organizer	46
Fall detection and alarm device	47

Robotic home appliances	47
Telepresence	48
The preferable type of payment	48
<b>Acknowledgments</b>	<b>49</b>

## 1 Executive summary

### **Aim of the deliverable:**

The current deliverable constitutes the second stage of the study on seniors and their relationship with the technologies in CAMI. Its goal is to verify the findings and conclusions that were raised from the implementation of the qualitative research and to obtain information on the possible use of the proposed solution, taking into account different perspectives.

- to specify the main needs and requirements of the target group in terms of functionality and the technical and functional objectives of the proposed solution, taking into account the specific requirements of the primary and secondary end-users,
- the deepening of the conclusions through quantitative data,
- identification of concerns and barriers related to the use of the proposed solution,
- possible adaptation and implementation strategies for the proposed solution to be used by the end-users,
- financial opportunities associated with the acquisition and use of the solution.

### **Brief description of the sections of the document**

- Section 4 is dedicated to the methodology employed in preparing and conducting the survey.
- Section 5 is presenting the analysis of the survey data from the perspective of both caretakers (seniors) and caregivers.
- Section 6 is dedicated to acknowledgements

### **Major achievements**

The main achievements of D1.2 is to have been able to identify the technologies mostly appreciated and also accepted by the end-users. Additionally, D1.2 has also identified the interest/acceptance level for new technologies. Financial issues have been also addressed to some extent and these represent valuable input for the business model which will be developed within WP4.

### **Summary of the conclusions obtained**

Both primary and secondary users are interested in new technologies. They would not hesitate to use new solutions in their daily life if it would improve their daily routine and/or raise the level of their living conditions. In the opinion of the respondents the presented ideas are promising. The most promising idea in Poland and Romania is the mobile device that enables social contact with friends and family.

The possible barriers and concerns may be the high price of the devices or services. This concern was reflected also in the previous phase of the research (see D1.1). The financial

opportunities are differently valued depending on the rated feature, device or service.

The respondents would rather purchase the devices instead of renting them. In particular, the respondents are ready to buy the home appliances. The senior respondents also would rather buy the health monitoring devices, as they are rather intimate and private devices. Both primary and secondary users' respondents would prefer the rented devices to be provided by the public sector.

## 2 List of Figures

Figure 1 Age of primary respondents	10
Figure 2 The education LEVEL of primary respondents	11
Figure 3 The marital status of primary respondents	11
Figure 4 The employment status of primary respondents	11
Figure 5 Number of people living in the same household	12
Figure 6 Respondents health problems	13
Figure 7 Frequency of physical exercises	14
Figure 8 The games the respondents play	14
Figure 9 type of games would respondents prefer	15
Figure 10 games genre would respondents prefer	15
Figure 11 Socialization frequency	16
Figure 12 the need to socialize	16
Figure 13 type of emergency caregivers	17
Figure 14 Age of caregivers	17
Figure 15 The education of caregivers	18
Figure 16 the employment status of caregivers	18
Figure 17 age of the people being in care	19
Figure 18 years of experience as caregivers	20

Figure 19 frequency of work as a caregiver	20
Figure 20 Owned devices OWNED by the SENIORS	21
Figure 21 frequency of the devices usage	22
Figure 22 Frequency of internet usage by the seniors	23
Figure 23 The purpose for internet usage by the seniors	24
Figure 24 Frequency of internet usage among the caregivers	25
Figure 25 The frequency of devices usage among the caregivers	25
Figure 26 importance of collaboration on caregiving responsibilities	26
Figure 27 importance of obtaining a digital journal of observations	27
Figure 28 Which functionalities caregivers would appreciate	27
Figure 29 concern about the possibility of break into the house where person in care lives	28
Figure 30 How many caregivers appreciate the following features	29
Figure 31 What seniors think about automatic alarm triggered in case of falling	29
Figure 34 a mobile device how useful ACCORDING to primary users	31
Figure 35 Control units how useful ACCORDING TO primary users	32
Figure 37 A robot with reminding features how useful ACCORDING TO PRIMARY AND SECONDARY USERS	33
Figure 38 a house supervising robot how useful ACCORDING TO PRIMARY AND SECONDARY USERS	34
Figure 39 Remotely manipulated robot how useful ACCORDING TO PRIMARY AND SECONDARY USERS	35
Figure 41 Calendar and reminder functionalities opinion of the SENIORS	37
Figure 42 Health monitoring functionalities opinion of the SENIORS	38
Figure 43 Voice control functionalities opinion of the SENIORS	39
Figure 44 HEALTH MONITORING DEVICES would buy vs would rent	40
Figure 45 INTERACTIVE GAMING DEVICE FOR KEEPING YOU PHYSICALLY AND MENTALLY	

AAL Project – Call 2014 - CAMI	Report
HEALTHY would buy vs would rent	41
Figure 46 DEVICES FOR REMOTE SOCIAL INTERACTION would buy vs would rent	41
Figure 47 SMART HOME SENSORS AND DEVICES TO MONITOR YOUR HOME AND ALERT IN CASE OF PROBLEMS would buy vs would rent	42
Figure 48 INTELLIGENT PROGRAM ORGANIZER would buy vs would rent	42
Figure 49 FALL DETECTION AND ALARM DEVICE Would buy vs would rent	43
Figure 51 TELEPRESENCE Would buy vs would rent	44
Figure 52 Preferred type of payment FOR THE SENIORS	44
Figure 53 Preferred type of payment FOR the caregivers	45

### **3 List of Tables**

Table 1 the primary respondents gender and nationality	10
Table 2 the secondary respondents gender and nationality	17

# SENIORS AND TECHNOLOGY



The following document is a report that summarizes the outcomes of a quantitative study with primary and secondary end-users performed as part of the CAMI project. The goal of the research was to specify the main needs and requirements of the target group in terms of functionality, technical aspects and functional objectives, and to get to know more about the financial opportunities of the proposed solutions.

## 4 Methodology

The following study is based upon a quantitative methodology of the research which is useful to indicate the possible tendencies and to gain a better understanding of the general characteristics of the investigated end-user group.

### 4.1.1 The survey

The technique of data collection in the following research is a structured interview survey, which was implemented with the support of the interviewer and using an online survey. Two separate questionnaires were prepared for the primary and secondary users by taking into account their respective situations.

### 4.1.2 The researched sample

The respondents were from three countries: Poland, Romania, and Denmark. A total of 105 respondents representing primary end-users took part in the research. In the report they are called primary users. The respondents in the primary users group were between 55 and 75 years old, which was the only eligibility criterion applied in their selection.

A total of 58 secondary end-users number participated. The second group of the survey participants consisted of 22 professional (37.9%) and 36 informal (62.1 %) caregivers. The aim of the survey was to learn more about daily work related activities and any possible problems they face in their roles as caregivers, with the purpose of improving their work experience and personal wellbeing by utilizing modern technology.

All the respondents were informed about the anonymity and encouraged to answer honestly, as well as provided relevant informed consent

## 5 The findings

### 5.1 About the seniors

#### 5.1.1 Demographic data

In total 105 primary users took part in the research. The participants were from Denmark (26), Romania (42) and Poland (37). The participants were aged 55 - 75. Out of the respondents 49 were males and 56 females.

Countries					
Poland (37)		Romania (42)		Denmark (26)	
25 females	13 males	20 females	22 males	11 females	14 males

TABLE 1 THE PRIMARY RESPONDENTS GENDER AND NATIONALITY

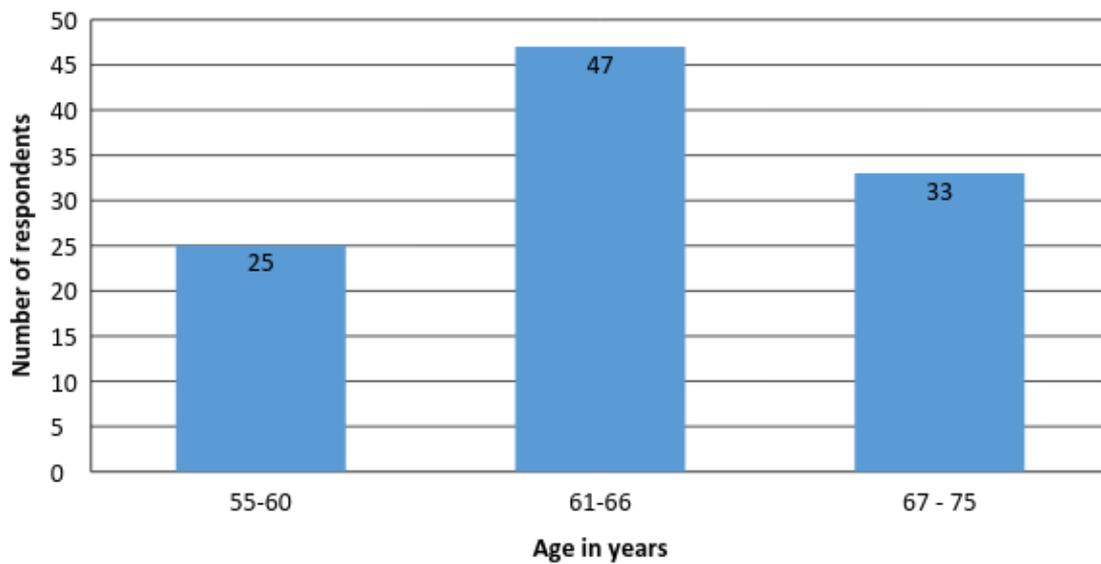


FIGURE 1 AGE OF PRIMARY RESPONDENTS

Most of the respondents (46%) holds a master degree or higher. The second popular education type is post-secondary school (28%).

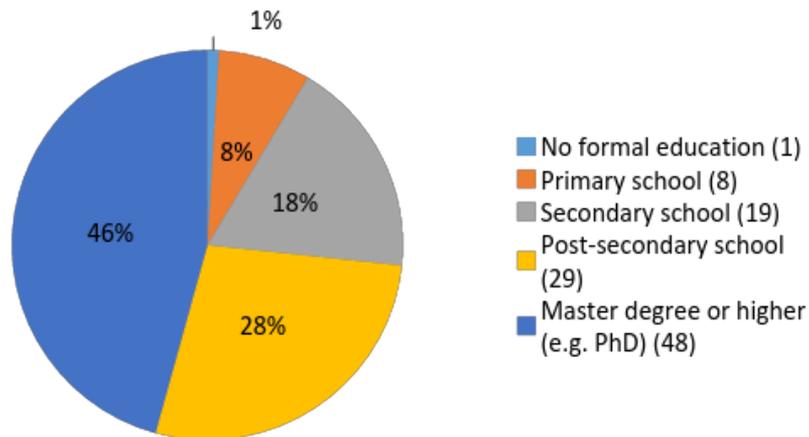


FIGURE 2 THE EDUCATION LEVEL OF PRIMARY RESPONDENTS

Most of the respondents remain in partnership or are married (64%). Almost 30% of the respondents are widowed or separated.

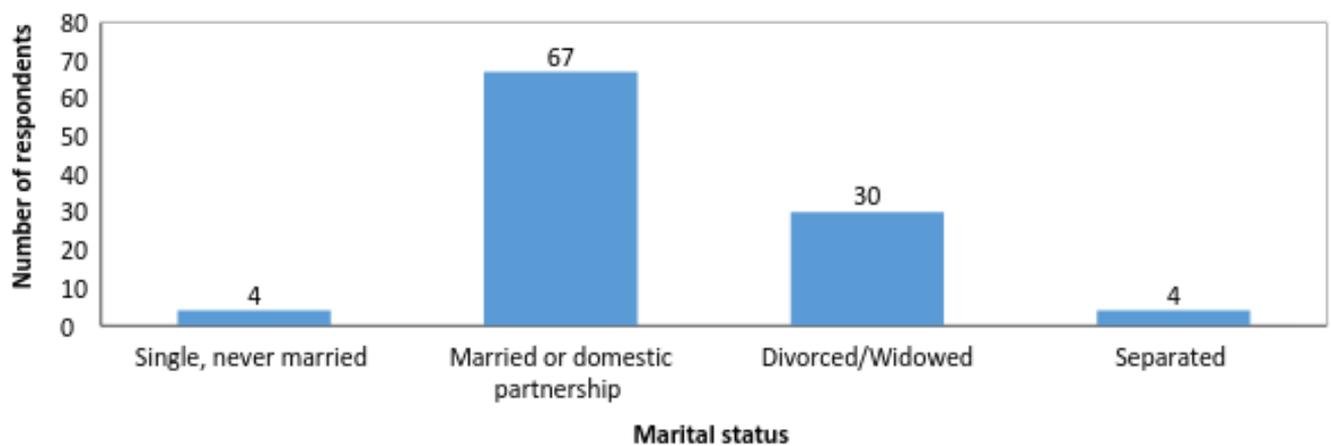


FIGURE 3 THE MARITAL STATUS OF PRIMARY RESPONDENTS

More than a half of the respondents are retired (55%) but 1/3 of the participants are still active (are employed or run their own business).

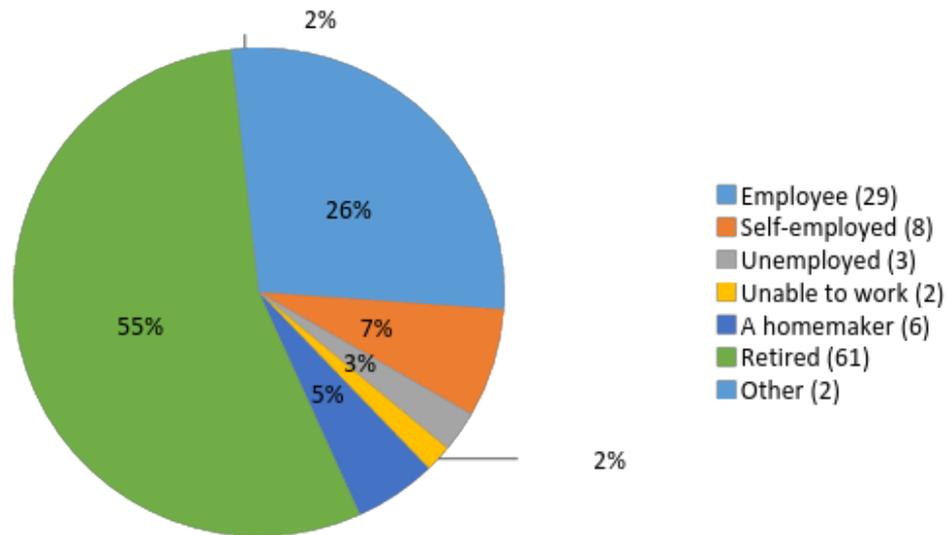


FIGURE 4 THE EMPLOYMENT STATUS OF PRIMARY RESPONDENTS

### 5.1.2 The household and living conditions

Although most (72%) of the respondents live in the urban area (only 15% in suburban and 13% in rural), a lot of the respondents live in a one family house (detached from other buildings). The majority of the respondents (47%) lives in blocks of flats (building with 5 or more apartments).



As 41% of the respondents live in non-attached houses 48 of them possess big (91 -320 square meters) apartments with gardens, the others live in smaller (31) and medium sized – up to 90 square meters houses (28 of respondents). The respondents number of rooms varies from 1 to 9, with the most popular number being a 3 room apartment (held by 29%) followed by 24% of the respondents living in 2 room apartments. A large majority , 70% of the respondents, live with at least one other person in the house. Only 30% of the participants live alone. The most popular model is living two persons together, which corresponds well with the high percentage of marriages among the respondents.

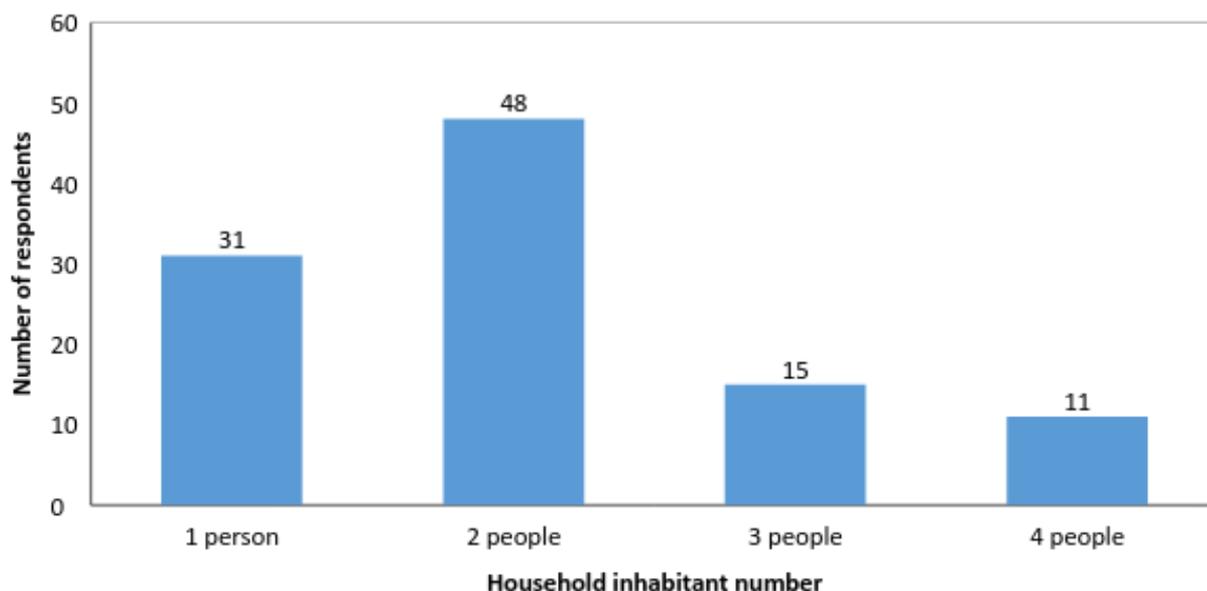


FIGURE 5 NUMBER OF PEOPLE LIVING IN THE SAME HOUSEHOLD

The respondents are satisfied with their living conditions. A total of 81% of the respondents think that their living conditions are at least “good”, while 29% of the respondents think their living conditions are “excellent”. None of the respondents rate their living conditions as “bad”.

A total of 60% of the respondents reported sharing all decisions on household finances with their spouse, while 33,3 % of the respondents manage the budget by themselves.

### 5.1.3 Health status

Nearly 20% of respondents are not satisfied with the status of their health and assess their health as “rather bad”, while 85% of the respondents think that their health is at least “good”.<sup>1</sup>

The research participants who are satisfied with the status of their health rarely encounter the problems presented in Figure 6. The most profound daily obstacle among all listed is remembering about the small things and remembering about taking their medication pills. Nevertheless almost none of the obstacles seem to bother most respondents.

<sup>1</sup> 60 respondents suffer from chronic diseases such as: cardiovascular (24), diabetes (16), respiratory System (11), osteoporosis and rheumatism (8), liver and kidneys (2), thyroid problems (3), other: obesity (1), alcoholism (1), cancer (1), depression (1), digestive system (1).

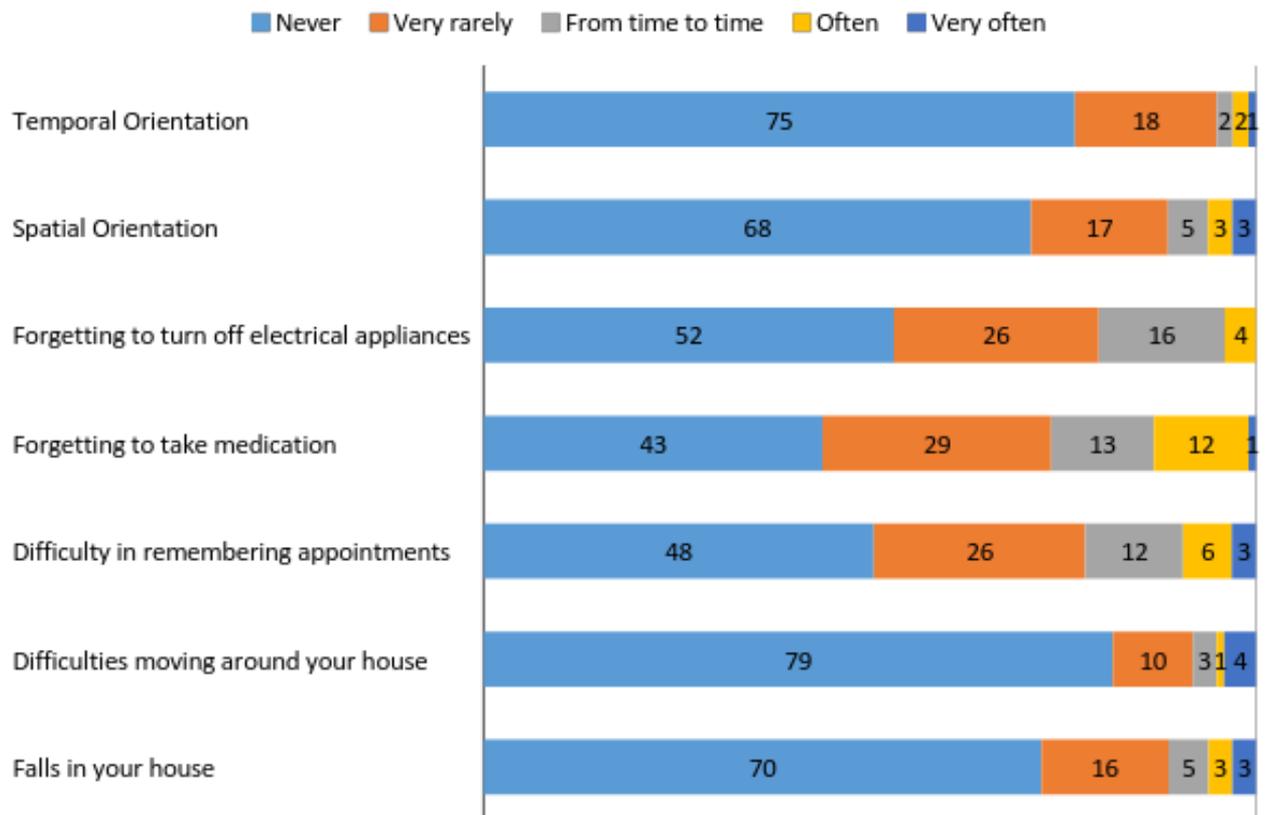


FIGURE 6 RESPONDENTS HEALTH PROBLEMS

### 5.1.4 Physical & mental exercises

Out of 105 participants 29% experiences mobility problems. A total of 44% exercises, the rest (29 respondents) does not exercise.

Among the respondents that do exercise most do it “very rarely” (50%), only 22% exercise at least once a week, most commonly from 31 minutes to 1 hour.

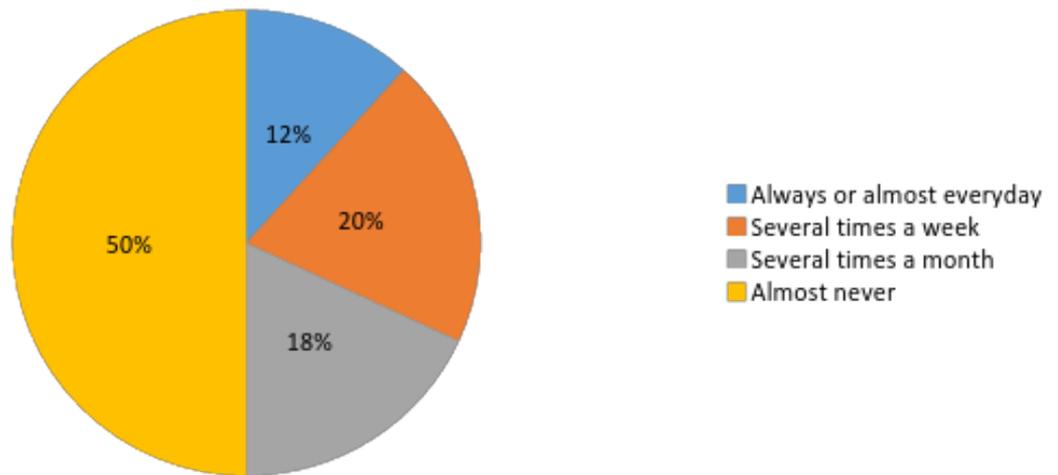


FIGURE 7 FREQUENCY OF PHYSICAL EXERCISES

Although currently most of the respondents does not play mental challenging games, rewarding games or any games on mobile or tech devices, 41% of the respondents are interested in trying or continuing to use some games which would also engage them in physical and mental exercises.

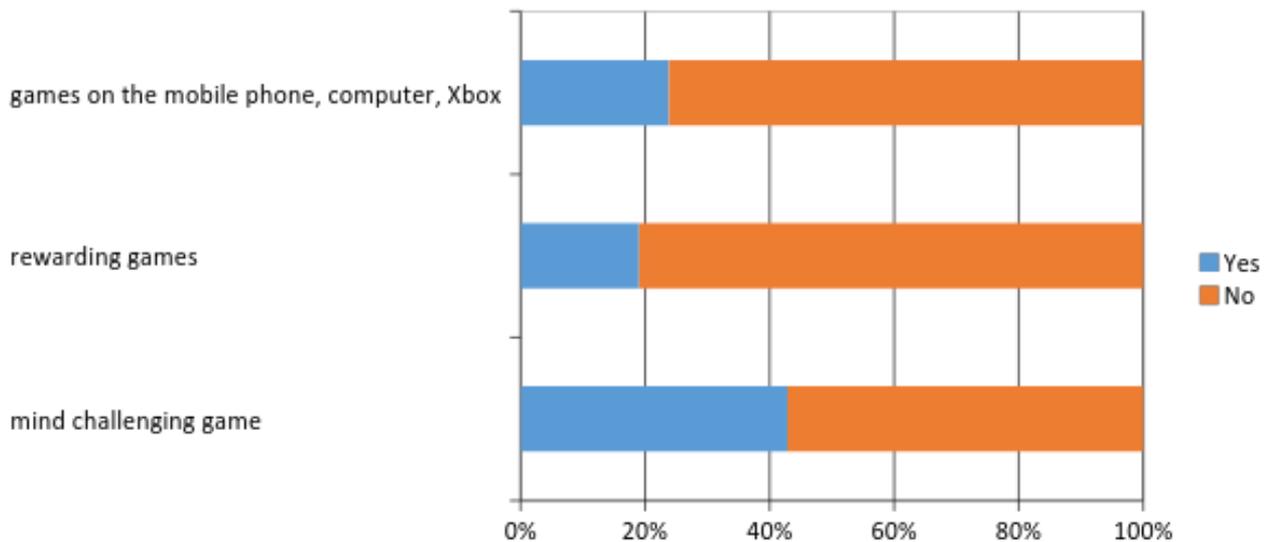


FIGURE 8 THE GAMES THE RESPONDENTS PLAY

The attention and puzzle games seem to be most attractive type of games that many of the respondents would prefer, but the respondents are not familiar with the gaming possibilities. Only 13% of the respondents are informed of the different gaming possibilities by their friends and/or family members.

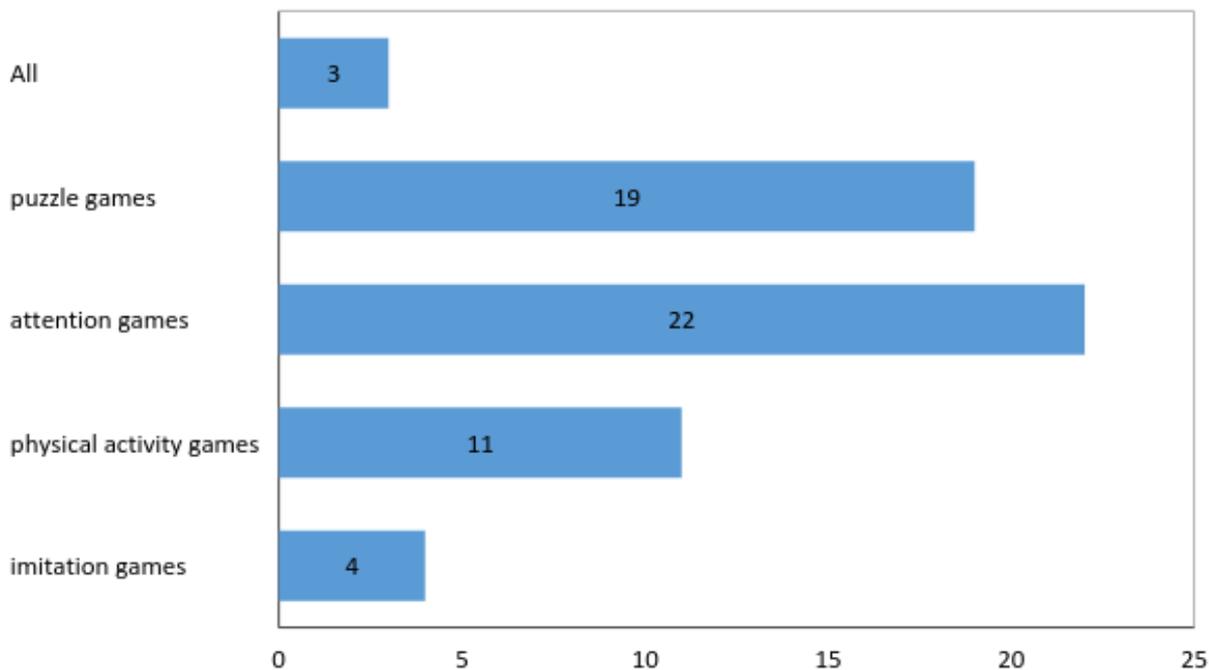


FIGURE 9 TYPE OF GAMES WOULD RESPONDENTS PREFER

The respondents are interested in playing in history and adventure games genres but what is more important is that many of the respondents do not have any specific interests in the games genre. It may be a reason they do not play or because they are not interested in playing games as well.

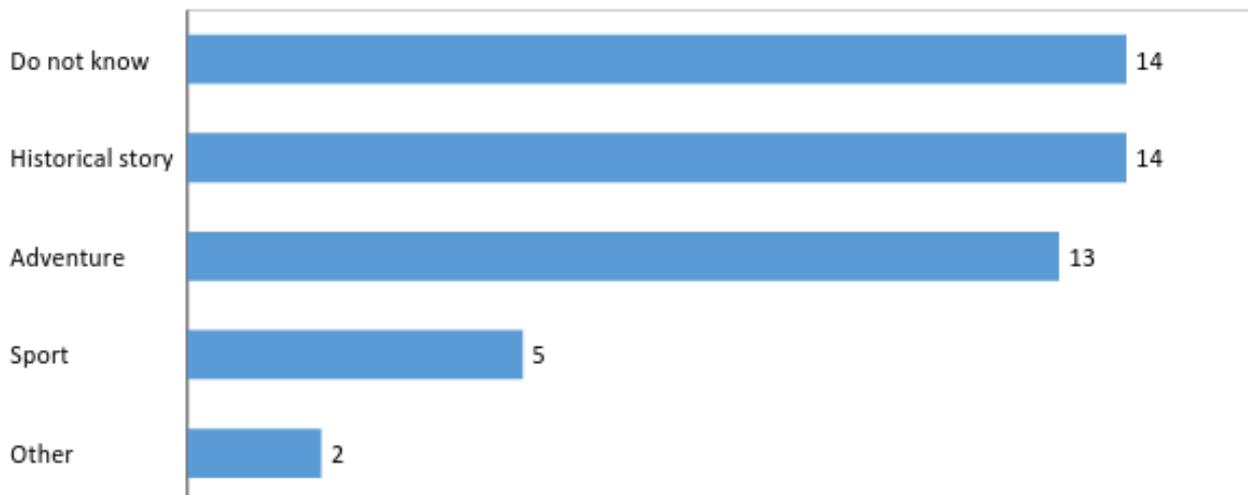


FIGURE 10 GAMES GENRE WOULD RESPONDENTS PREFER

### 5.1.5 Social relations

A majority of the respondents declare to socialize every day (40%) or at least several times a week (37%). There is also a large group of 21% who only meet other people a few times a month. Only 2 respondents declare to almost never have social contact.

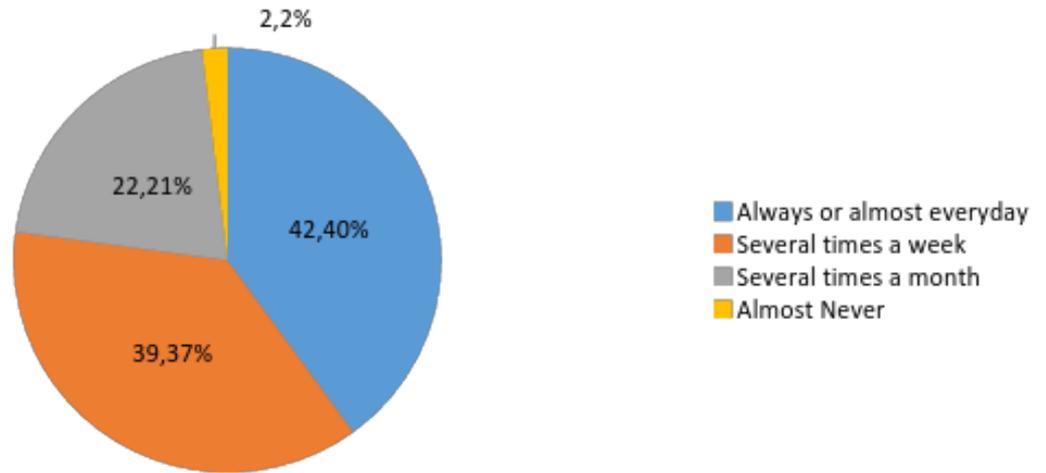


FIGURE 11 SOCIALIZATION FREQUENCY

The same interest in socialization is revealed also by the fact that 99% of the respondents expressed their need for socialization. More than half of them (64%) need to socialize often and 8% even need to socialize all the time. Only 27% of the respondents feel the need to socialize seldom. Respondents who do not need to socialize amount to only 1%.

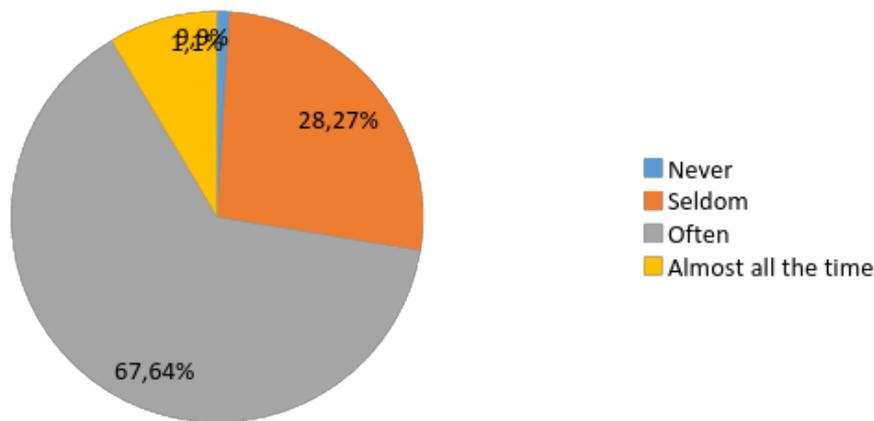


FIGURE 12 THE NEED TO SOCIALIZE

### 5.1.6 To have a caregiver

Almost all of the seniors (96%) have a caregiver they can rely on in cases of emergency such as health issues, accidents etc. The survey indicates that a common tendency is to get help and support by close family members (87%). The second popular caregiver type is a friend (46%). The public or private services are the third popular possibility (15%).

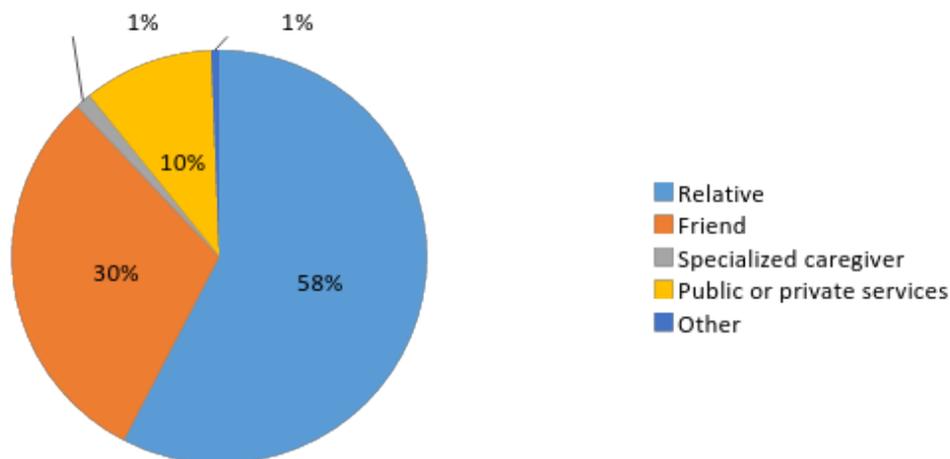


FIGURE 13 TYPE OF EMERGENCY CAREGIVERS

## 5.2 About the caregivers

### 5.2.1 The demographic data

The second survey was dedicated to the secondary users, the caregivers, with the purpose of providing a perspective of the possible appliance of using information technology to support their care activities in relation with caring for the seniors.

In total there were 58 secondary users respondents from 3 countries: Denmark (22), Poland (20) and Romania (16). Respondents are aged between 22 and 79. 46 of them are women, 12 are men.

Countries					
Poland (20)		Romania (16)		Denmark (22)	
15 females	5 males	10 females	6 males	21 females	1 male

TABLE 2 THE SECONDARY RESPONDENTS GENDER AND NATIONALITY

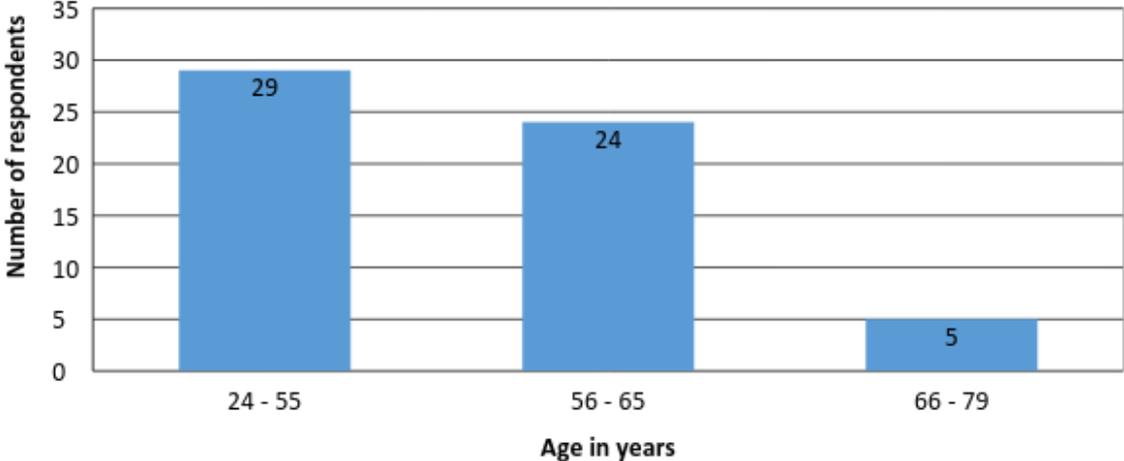


FIGURE 14 AGE OF CAREGIVERS

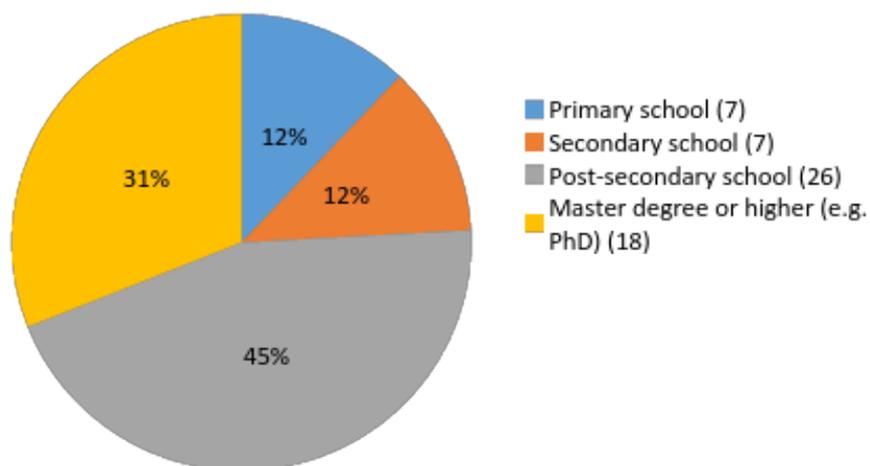


FIGURE 15 THE EDUCATION OF CAREGIVERS

All of the caregivers are educated. Most often it is higher education: 18 of 58 caregivers have a master degree or higher, 26 have post-secondary school. This is most probably due to the fact that most of the caregivers in the survey are informal ones (55%). So, their studies do not reflect their actual training as caregivers. Majority of the secondary users respondents are employed (69%) or retired (16%).

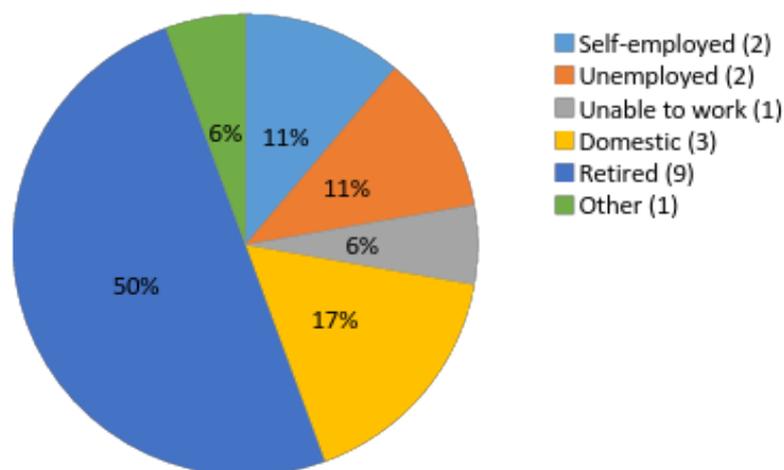


FIGURE 16 THE EMPLOYMENT STATUS OF CAREGIVERS

### 5.2.2 The experience of being a caregiver

The vast majority (87%) have only one person in care. Four caregivers declare to take care of more than one person. Seniors being cared for are between 59 and 96 years old.

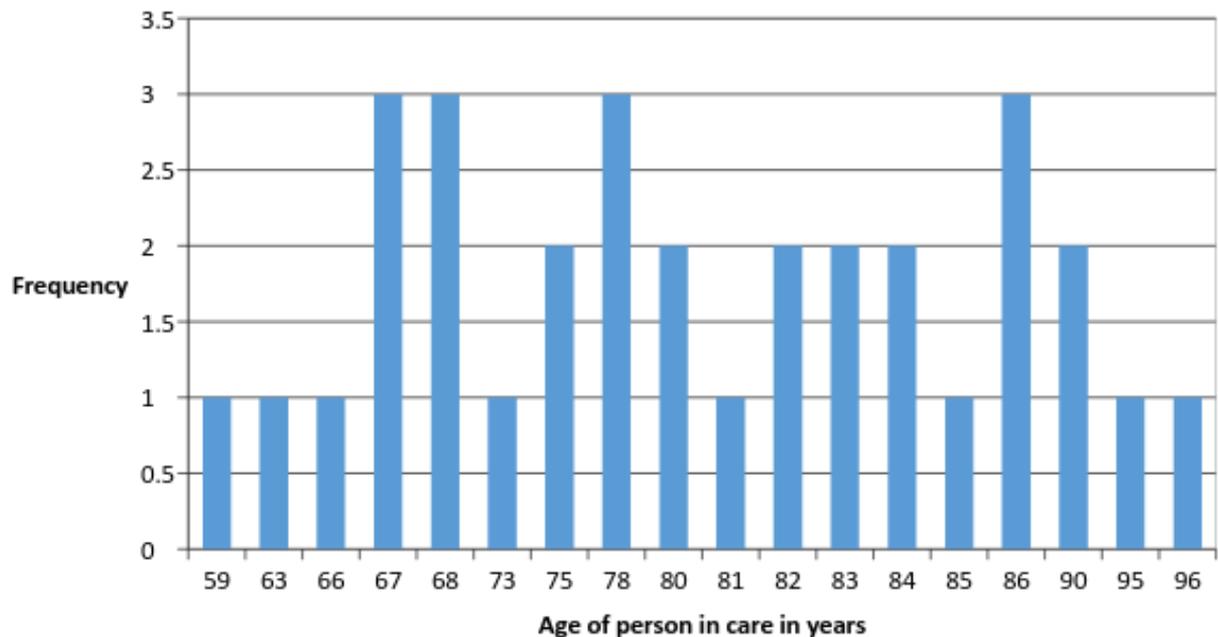


FIGURE 17 AGE OF THE PEOPLE BEING IN CARE

A total of 55% of respondents (32 respondents) declare that persons they have in care are their family members, friends or neighbors, while 45% (26 respondents) of them work as a professional caregiver. Most caregivers work in a retirement home (48%), while the 40% of the professional caregivers work in public institution but in the home of the person in care. Nearly 83% of the respondents think that collaboration with others is very important for their work.

The respondents seem to be highly engaged in their work. Most of the respondents work as a caregiver every day (60%) or almost every day (23%). Only one respondent declared to work as a caregiver only once a month.

Half of the respondents declare to live in the same house with the person they have in care (50%). The other half (50%) live in other places. Among respondents the majority (75%) is working as caregivers in urban areas, this outcome confirms also the information from the primary user research where majority of the respondents live in the urban neighborhood. Some 12% of the caregivers work in rural and 12% work in sub-urban locations.

The experience of respondents as caregivers varies between 1 and 38 years. Most frequent experience is 5 years of experience (6 respondents). 8 of the respondents has worked as a caregivers longer than 30 years.

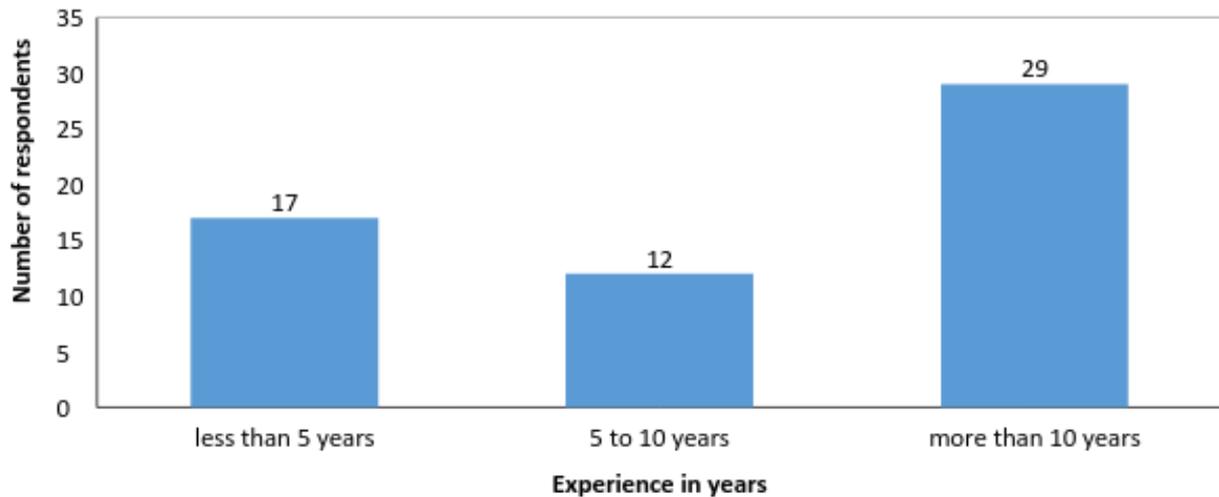


FIGURE 18 YEARS OF EXPERIENCE AS CAREGIVERS

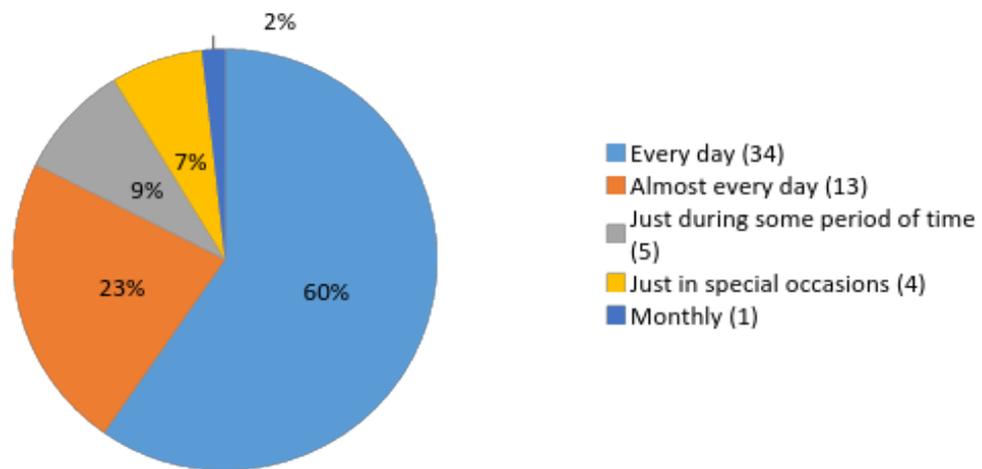


FIGURE 19 FREQUENCY OF WORK AS A CAREGIVER

### 5.3 The access and the usage of the technology

#### 5.3.1 The perspective of the primary user

Many of the seniors that took part in the research have at least one portable device. This information, both with the knowledge that nearly 90% of the respondents have internet access indicate that the study participants are interested in new technologies.

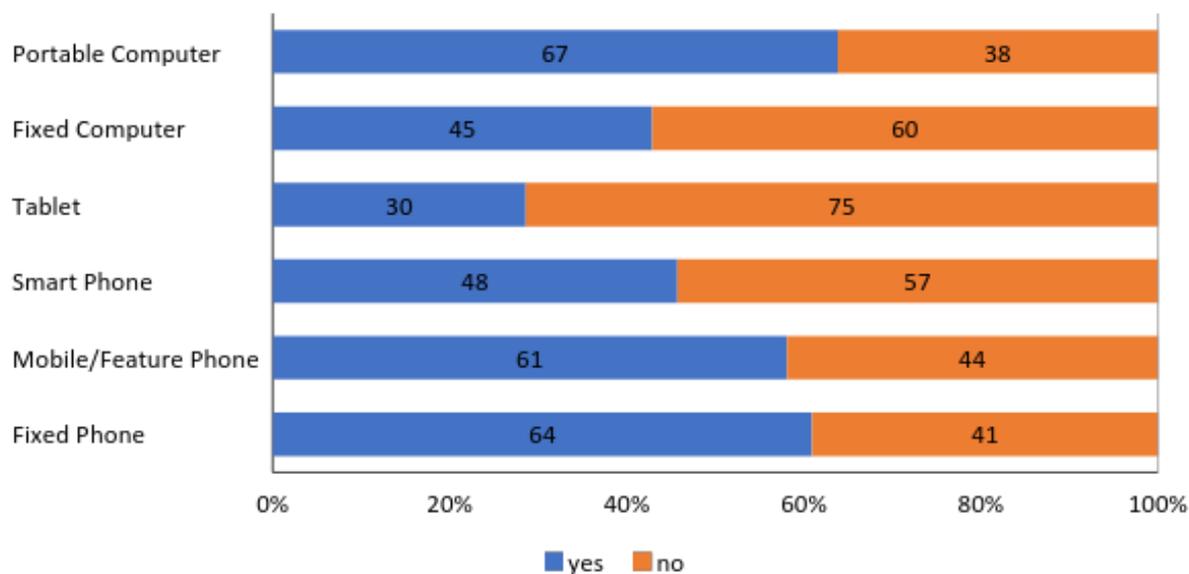


FIGURE 20 OWNED DEVICES OWNED BY THE SENIORS

A total of 15% of the respondents have at least one portable device. 85% of has 4 or less devices. The median value of number of possessed devices for Denmark is 4, while for Poland and Romania is 3. The number of possessed devices does not depend on gender ( $\eta^2 - 0.02$ ) and age ( $\eta^2 - 0.026$ ). Small influence has the level of education ( $\eta^2 - 0.279$ ) and number of people the respondents live with ( $\eta^2 - 0.206$ ).

The respondents most frequently use the mobile phone, the most rarely used device is a tablet, that is also the least popular device among the seniors.

What is interesting is that the respondents have computers more often than fixed phones. That may be a sign of rather modern attitude toward the ICT among the respondents.

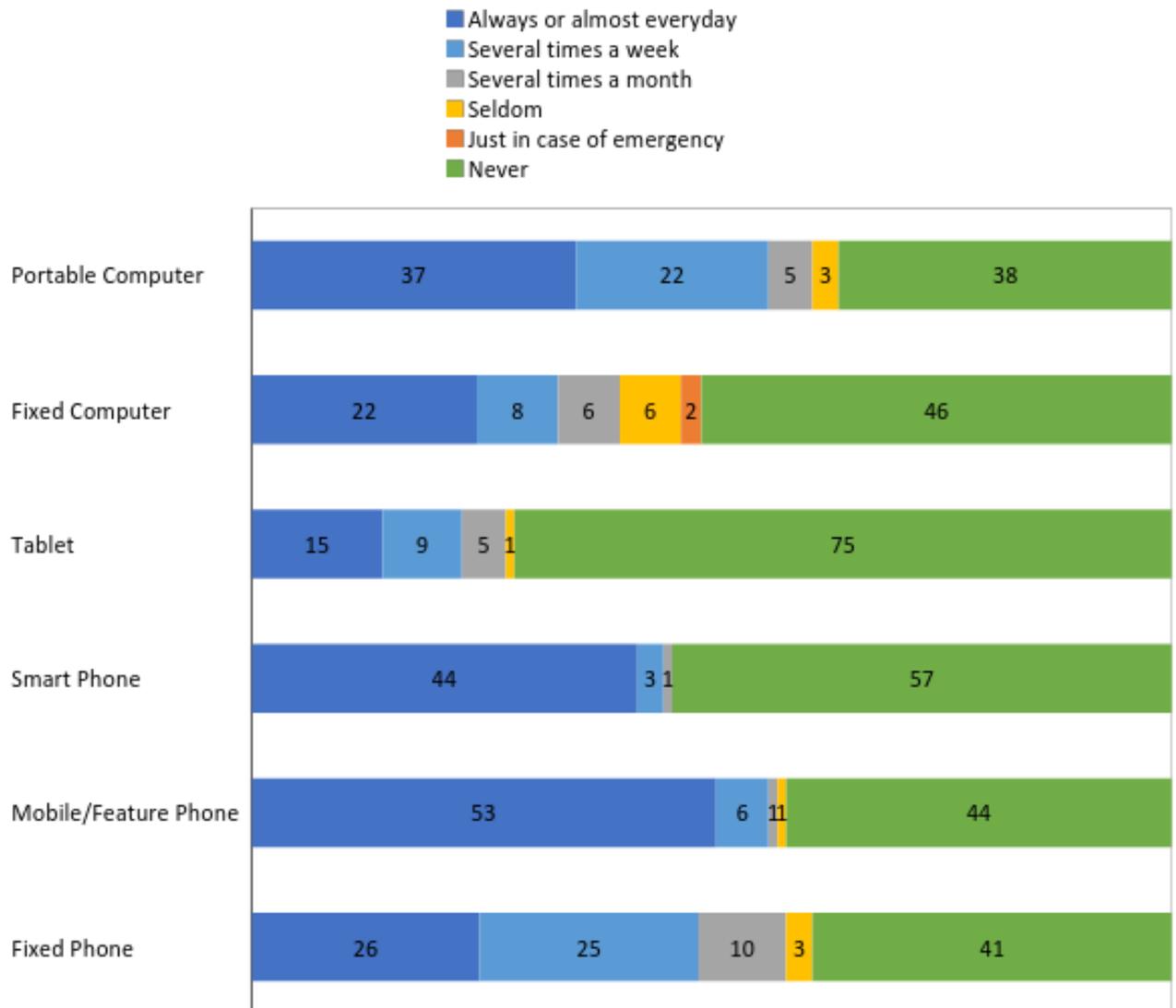


FIGURE 21 FREQUENCY OF THE DEVICES USAGE

- **Fixed Phone** – over half of respondents (61%) declared to use fixed phone. Majority of them use the device at least several times a week or almost every day. All respondents who use fixed phone do it independently without any help.
- **Mobile/Feature Phone** – Slightly fewer respondents use a mobile phone rather than fixed phone (58%). Most of them use it always or almost every day (50.4%). Only 4 respondents need some help with using the device, the rest does it independently.
- **Smart Phone** – this kind of device is being used by less than a half of respondents (45.7%). Those respondents, who use smart phones, do it always or almost every day mostly. Only one person declared to use smart phone just in case of emergency. Vast majority use smart phone independently (42 out of 48, *i.e.* 87.5%), the rest needs help

from another person.

- **Tablet** – tablets are definitely less popular among the elderly than any other device considered in this research. Only 29% of the respondents declare to use a tablet. Half of them use it every day, the rest do it several times a week or “seldom”. Almost all of the respondents, who use tablets, does it independently.
- **Fixed Computer** – 43% of respondents declared to use fixed computer, half of which do it always or almost every day. Almost all respondents are able to use it independently, only 4 people declared to need help with usage of this device.
- **Portable Computer** – portable computers are the most popular device among elderly. They are being used by 64% of respondents what is a higher result than fixed phone. Most of respondents (59 out of 67, *i.e.* 88.0%) use portable computer every day or at least several times a week. Only 10 respondents declared to need assistance.

### 5.3.2 Internet access

A total of 90 respondents (85.7%) declared that they have access to the internet, and almost 60% of them use it at least once a day.

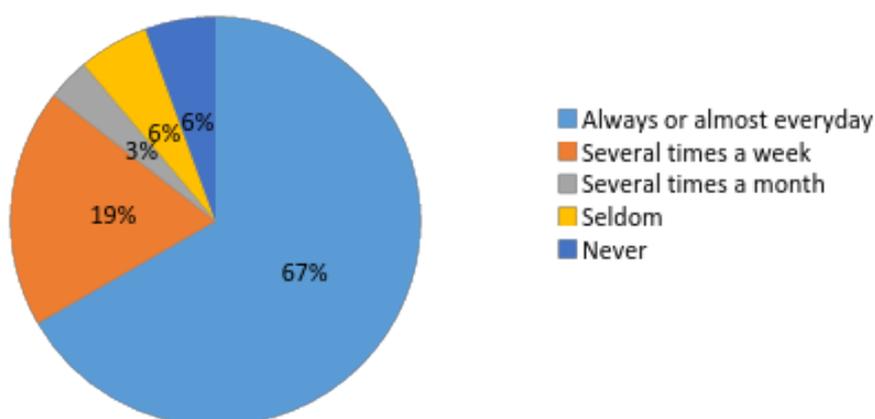


FIGURE 22 FREQUENCY OF INTERNET USAGE BY THE SENIORS

The respondents indicated the following purposes for using the internet. They most often use the internet to interact with other people (e-mail, keeping in touch with family). The respondents also search the world wide web in order to find useful informations and/or daily news. In this respect the infobot was not favored by the users who do not trust that it will be good enough in doing a comprehensive search when needed or in provided the correct information. Indeed, the respondents also do not trust using the internet as a way of meeting new people. They do not seem to be interested in participating in hobbies and/or games via the internet.

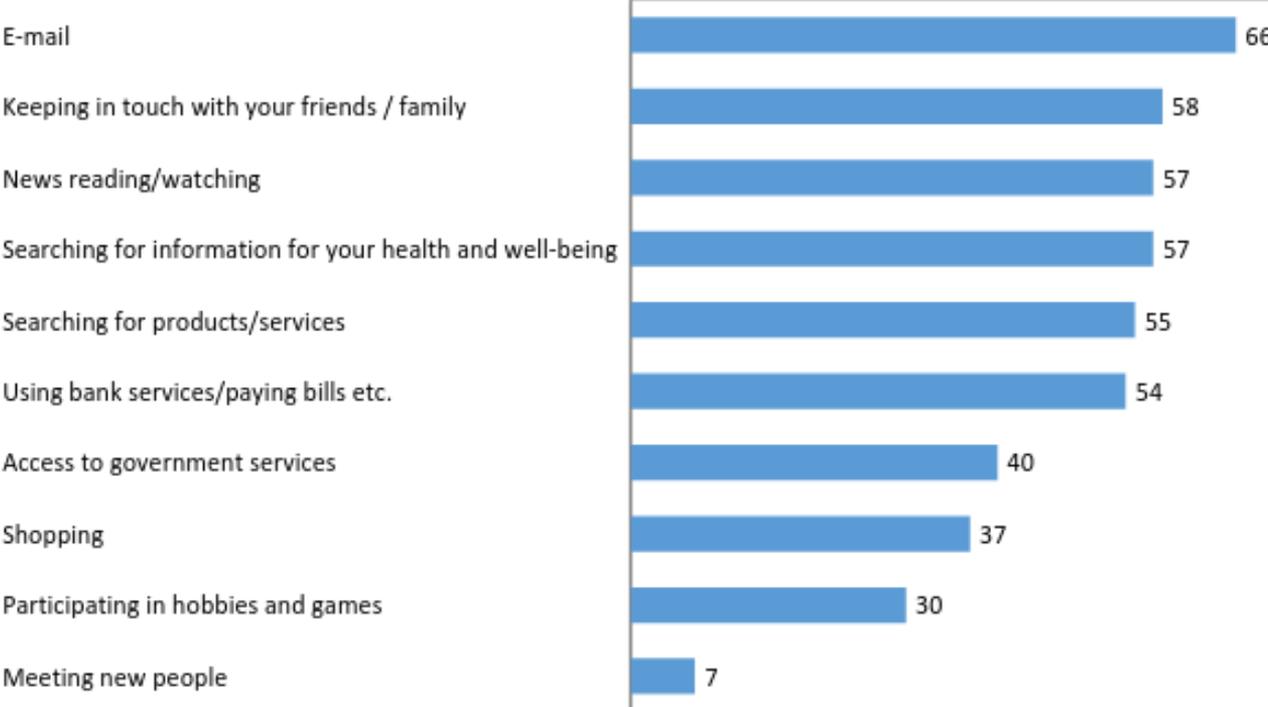


FIGURE 23 THE PURPOSE FOR INTERNET USAGE BY THE SENIORS

### 5.3.3 The perspective of the caregivers

Almost all of the respondents declare to have Internet connection at home. Only two respondents do not have it. Over half of the respondents declare to use the internet always or almost every day (72%).

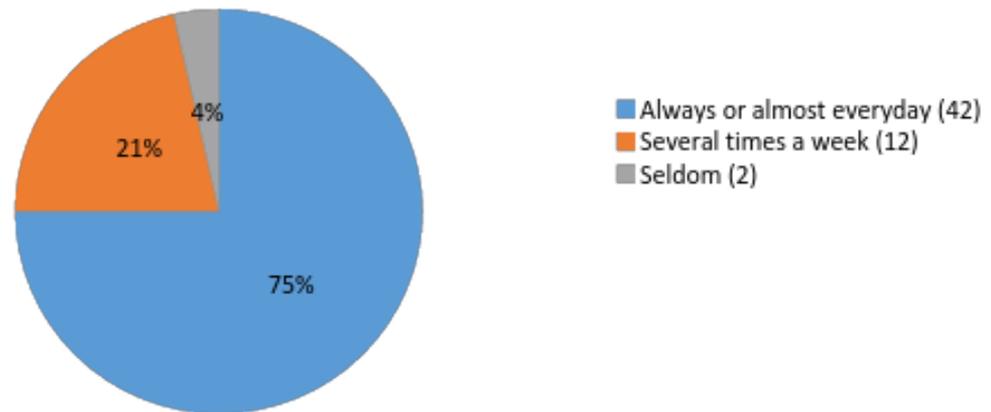


FIGURE 24 FREQUENCY OF INTERNET USAGE AMONG THE CAREGIVERS

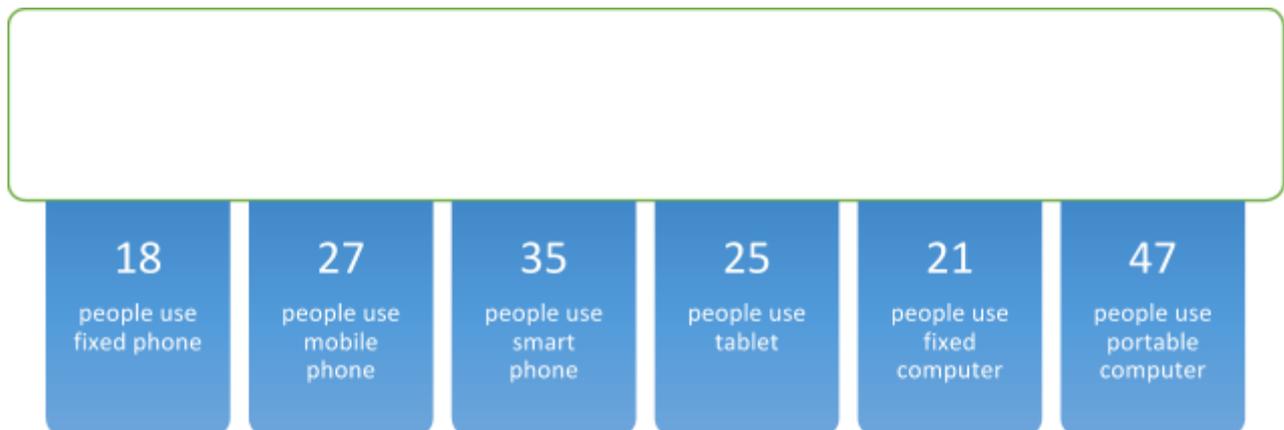


FIGURE 25 THE FREQUENCY OF DEVICES USAGE AMONG THE CAREGIVERS

- **Fixed Phone** – caregivers who declared to use a fixed phone use it at least several times a week. Half of them use it every day. All respondents use the fixed phone independently.
- **Mobile/Feature Phone** – a majority of the caregivers who declared to use a mobile phone use it every day. Only two respondents declare to use it several times a week. Everyone uses mobile phone independently.
- **Smart Phone** – nearly all of respondents who declared to use a smart phone use it every day (two respondents use it few times a week). Only one respondent declares to use the device only with “some help”, the rest use smart phone independently.

- **Tablet** – all respondents using tablet use it at least several times a week or every day. Only one respondent declares to use the device with “some help”, the rest use tablet independently.
- **Fixed Computer** –85% of respondents who declared to use fixed computer use it at least several times a week or every day. Two respondents use it with some help, the rest do it independently.
- **Portable Computer** – most of respondents use portable computers every day. Twelve of them declare to use it several times a week, three use computers several times a month. Two respondents declare to use portable computer with some help, one respondent needs to be accompanied by other person, while the rest do it independently.

#### 5.3.4

#### 5.3.5 New technologies and devices for supporting the work of caregivers

It is clear that sharing responsibilities has a big value for caregivers. The caregivers value the ability to establish and share caregiving responsibilities in a collaborative way (e.g. with other family members or with co-workers). When asked about importance of it, half of respondents pointed it as very important (50%) or essential (42%).

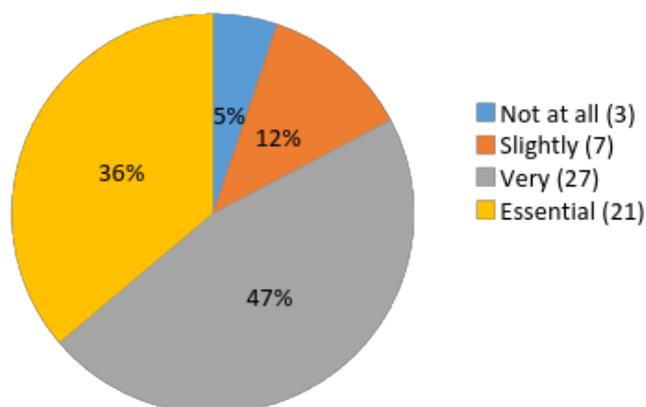


FIGURE 26 IMPORTANCE OF COLLABORATION ON CAREGIVING RESPONSIBILITIES

The opinion of caregivers on having a digital journal of observations of elderly activities varies. Most often respondents say that it is very important (37%), however there is a group which declares it is only slightly important (29%) or even not important at all (17%).

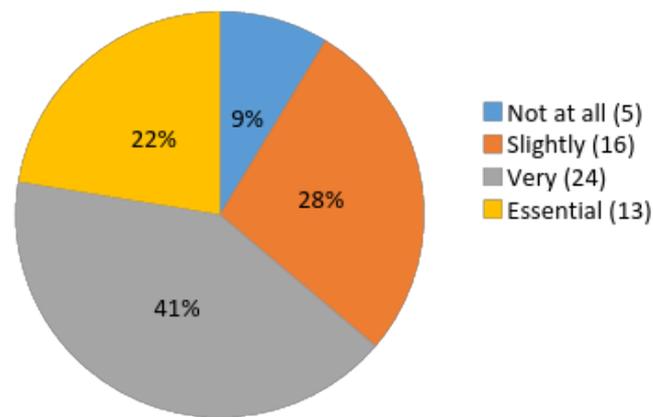


FIGURE 27 IMPORTANCE OF OBTAINING A DIGITAL JOURNAL OF OBSERVATIONS

The caregivers were asked which type of information they would like to have access to through technological devices. They most of all appreciate the functionalities – information about the health, treatments and the history of the person in care – appreciated by 84% of respondents and the functionality of medication control (the categorization, dosage and side-effects) – appreciated by 74% of the respondents. The third popular feature is the idea to present physical state and safety of the person in care – appreciated by 57% of the respondents.

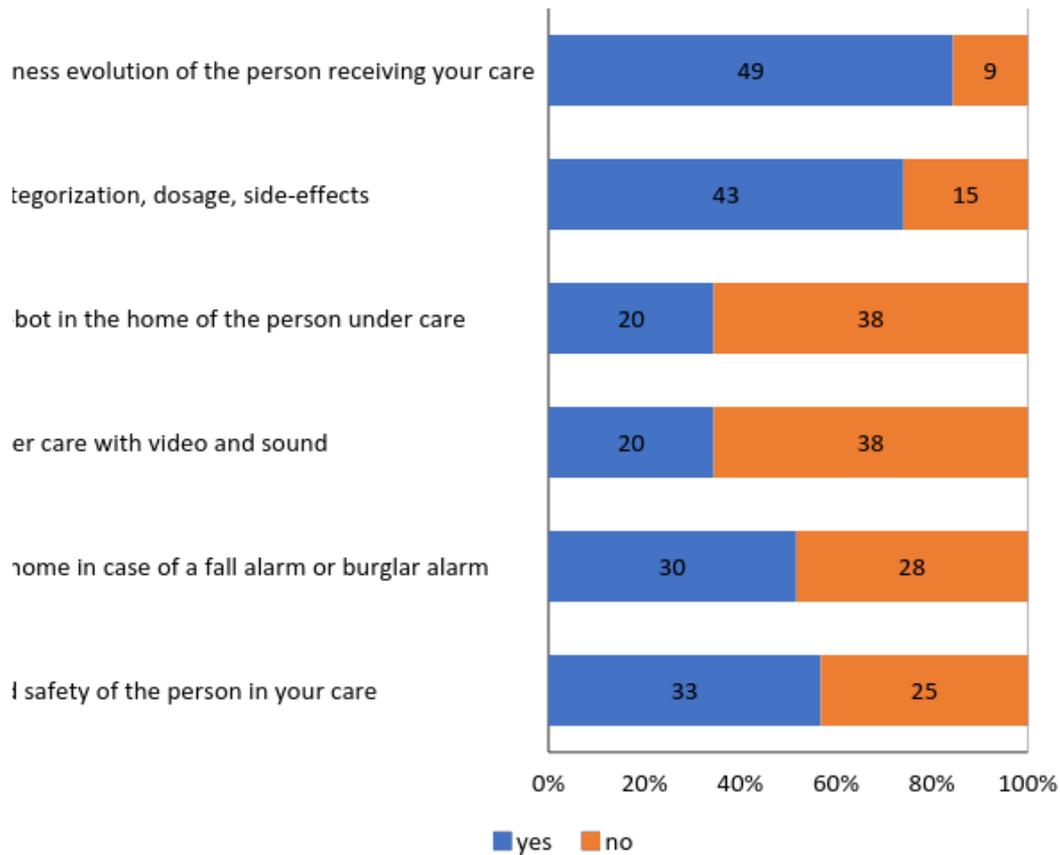


FIGURE 28 WHICH FUNCTIONALITIES CAREGIVERS WOULD APPRECIATE

## 5.4 Security concerns and emergency support

### 5.4.1 Are you worried about intruders breaking into the house

Among respondents the concern of the possibility of intruders breaking into the house where the person they are having under care is on a different level. Only 3% declare to be very worried of that fact while the another 3% is not worried at all. Almost half of respondents (75%) declare to be slightly worried.

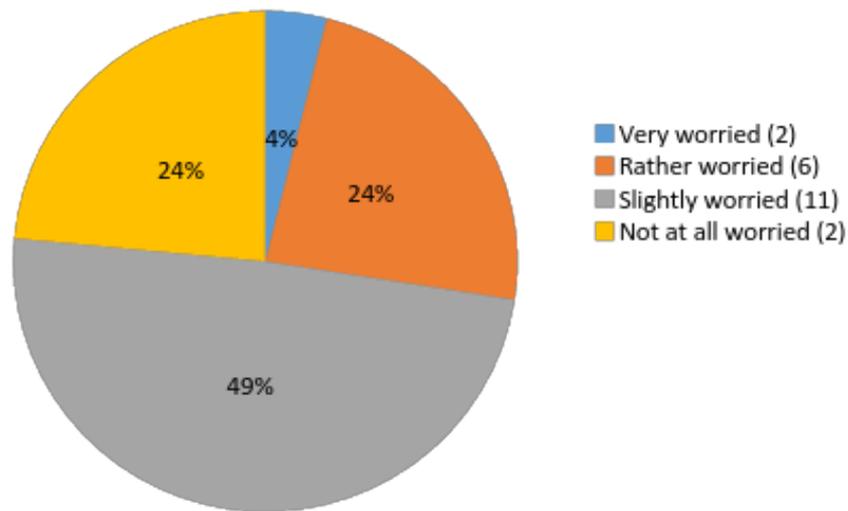


FIGURE 29 CONCERN ABOUT THE POSSIBILITY OF BREAK INTO THE HOUSE WHERE PERSON IN CARE LIVES

The respondents, nearly 78%, agree that the most important feature would be an automatic alarm triggered in case of falling that calls for help. The rest of the ideas are not that much appealing to the respondents.

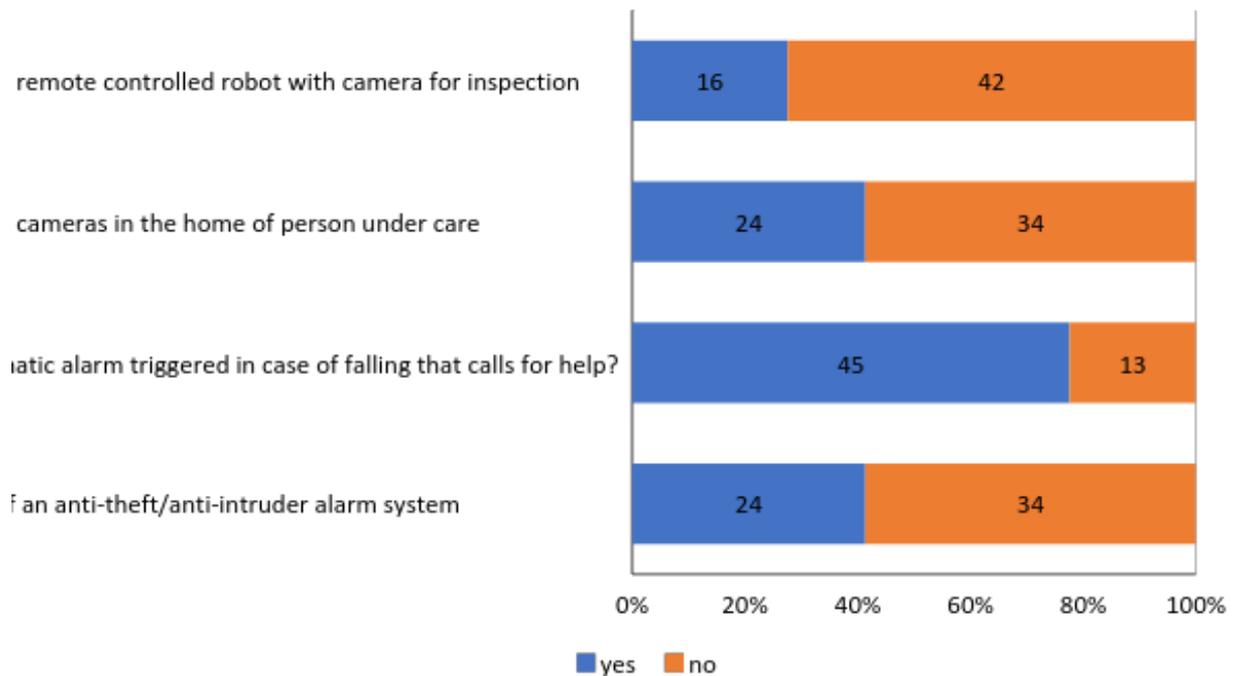


FIGURE 30 HOW MANY CAREGIVERS APPRECIATE THE FOLLOWING FEATURES

Also the seniors in care were asked about the automatic alarm triggered in case of falling that calls for help. The majority of the respondents (58%) think that such a device would be at least “rather

important”.

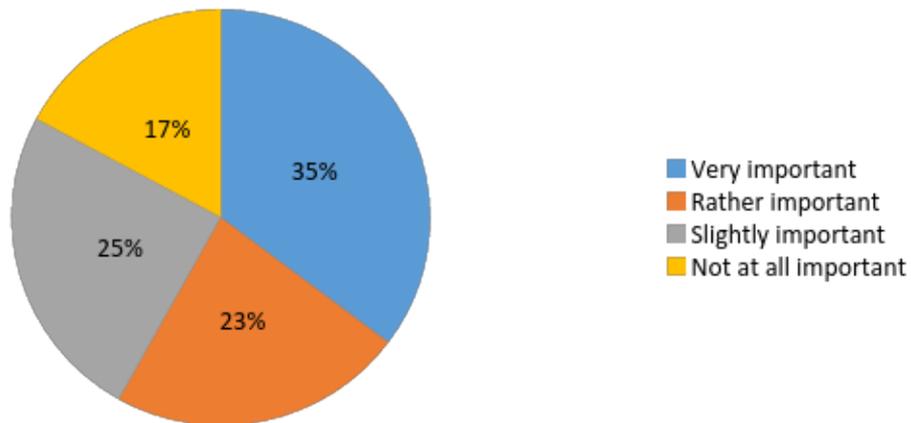


FIGURE 31 WHAT SENIORS THINK ABOUT AUTOMATIC ALARM TRIGGERED IN CASE OF FALLING

## 5.5 The attitude toward new technologies

### 5.5.1 The seniors perspective

Out of the senior respondents, 33% are very often interested in new scientific discoveries.

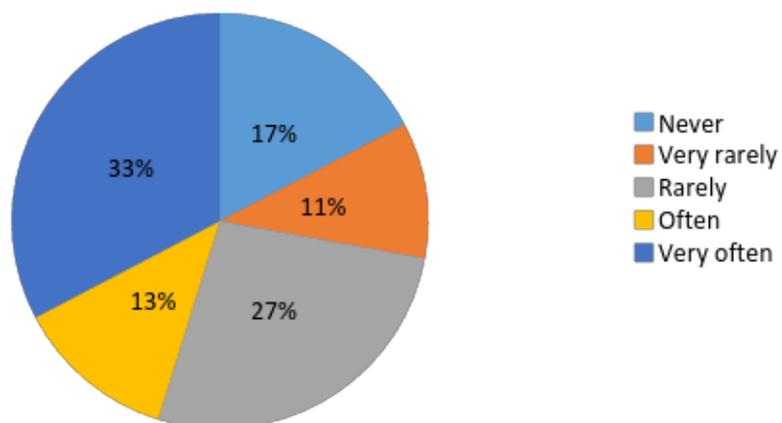


FIGURE 32 WHAT SENIORS THINK NEW SCIENTIFIC DISCOVERIES

### 5.5.2 The caregivers perspective

Among the caregivers 58% participants declare to be familiar with robotic house appliances.

Scientific discoveries and technological development are the topics of interest for majority of the respondents. A total of 77% of respondents declare to be at least slightly interested in technological development and scientific discoveries.

### 5.6 The attitude toward presented technological solution

The following part of the report presents the possible appliances of the ICT solutions that might be offered to the seniors care and the caregivers. The following ideas are presented in a form that were introduced in the survey and accompanied with the detailed assesment of the respondents. The survey participants had to give a note on a scale from 0 to 4: from totally uncomfortable – 0 points to very comfortable that is 4 points. The attitude rate is presented in percentage. For example if 104 primary users responded in total the idea could gain 4x 104 so 416 points = 100%.<sup>2</sup> The ideas that gained the least interests – less than 49% - are ranked as “slightly promising”, the ideas that gained 50% or more but not 75% - are ranked as “promising” and the ideas that gained 75% or more of the available points are ranked as “very promising”. The chosen scale is arbitrary.

Most of the suggested features gained more than 50%. The least points gained the idea of sharing the calendar with the family members. Based on the obtained results, the most promising idea is the mobile device that enables social communication. The reason that this idea gained the highest score may be that many of the respondents have mobile phones and smartphones and use them on a daily basis therefore they find such solution useful.

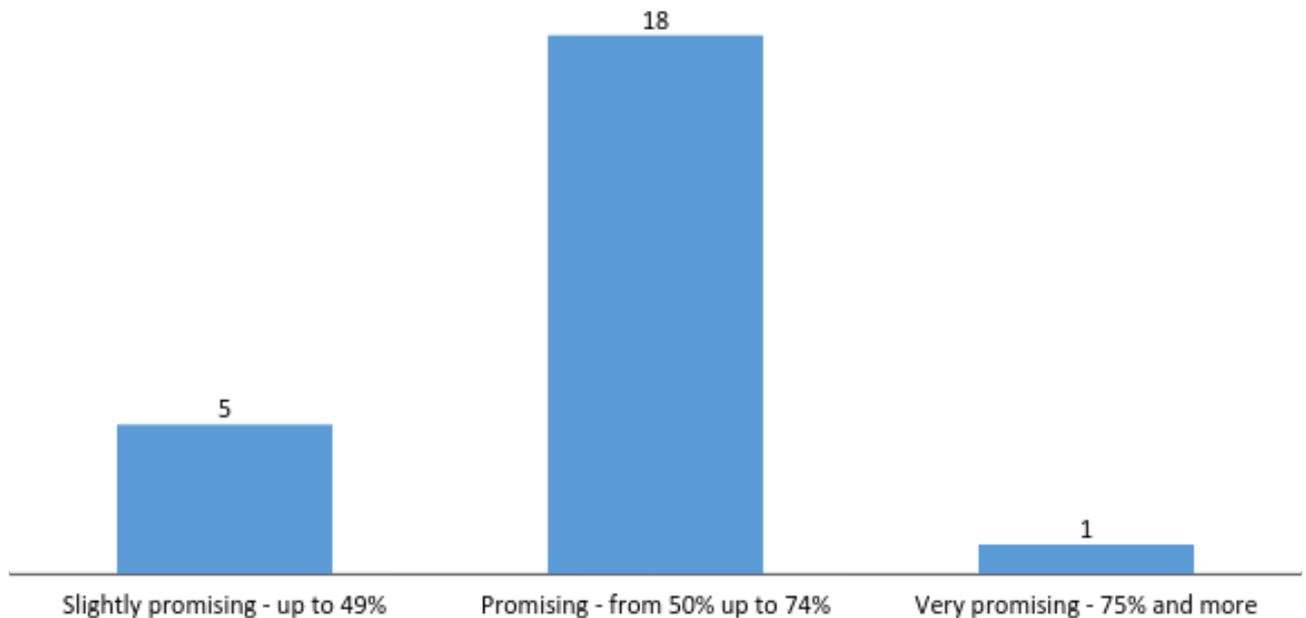


FIGURE 33 THE SCORES AMONG THE THREE NOTES - FROM SLIGHTLY PROMISING TO VERY PROMISING

#### 5.6.1 A mobile device features

More than half of the primary users think that a mobile device features might be useful (60%). Almost all respondents (95%) like this idea. More than half think that such a solution is at least useful (57%), while in the opinion of 38% such device is very useful.

This is the solution that is highly rated by the respondents.

Device feature	Primary users <sup>3</sup>
----------------	----------------------------

<sup>2</sup> Because one respondent didn't answer this series of questions

<sup>3</sup> 210 points / 252 points (63 responses)

<p>5.6.1.1 <i>A mobile device (screen) which you can use from anywhere around the house to talk to your friends and family or use it as a touch-screen for obtaining information</i></p>	<p><b>83% - very promising</b></p>
--	------------------------------------

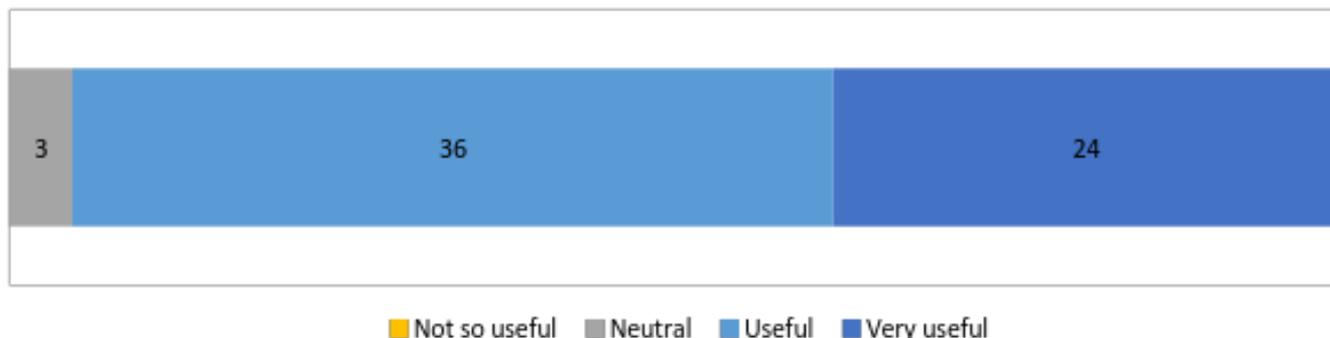


FIGURE 324 A MOBILE DEVICE HOW USEFUL ACCORDING TO PRIMARY USERS

Device feature	Primary users <sup>4</sup>
<p>5.6.1.2 <i>several control units/panels distributed in your house which allow you to interact with your home environment (e.g. control temperature, devices, etc.) and friends</i></p>	<p><b>60% - promising</b></p>

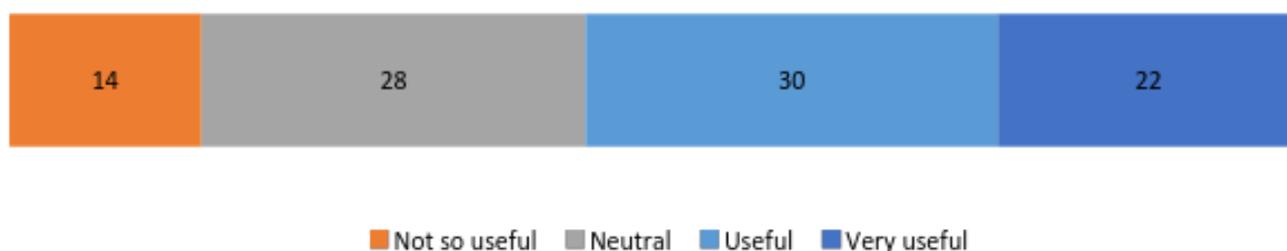


FIGURE 335 CONTROL UNITS HOW USEFUL ACCORDING TO PRIMARY USERS

### 5.6.2 Robot features

Robot feature	Primary users <sup>5</sup>	Secondary users <sup>6</sup>
<p>5.6.2.1 <i>a robot with a touch screen which you can use anywhere around the house for socializing, communication with other people and for providing information</i></p>	<p><b>54% promising</b></p>	<p><b>60% promising</b></p>

<sup>4</sup> 248 points / 416 points (104 responses)

<sup>5</sup> 174 points / 320 (80 notes)

<sup>6</sup> 121 points / 200 (50 notes)

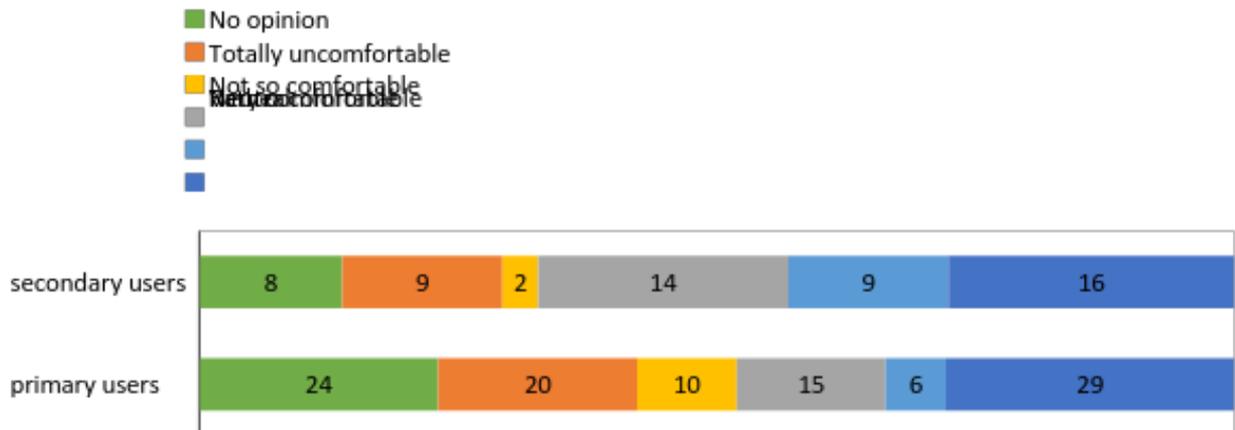


FIGURE 36 A ROBOT WITH SOCIALIZING FEATURES HOW USEFUL ACCORDING TO PRIMARY AND SECONDARY USERS

Robot feature	Primary users <sup>7</sup>	Secondary users <sup>8</sup>
5.6.2.2 a robot remind you on tasks and medication	48 % - slightly promising	80 % - very promising

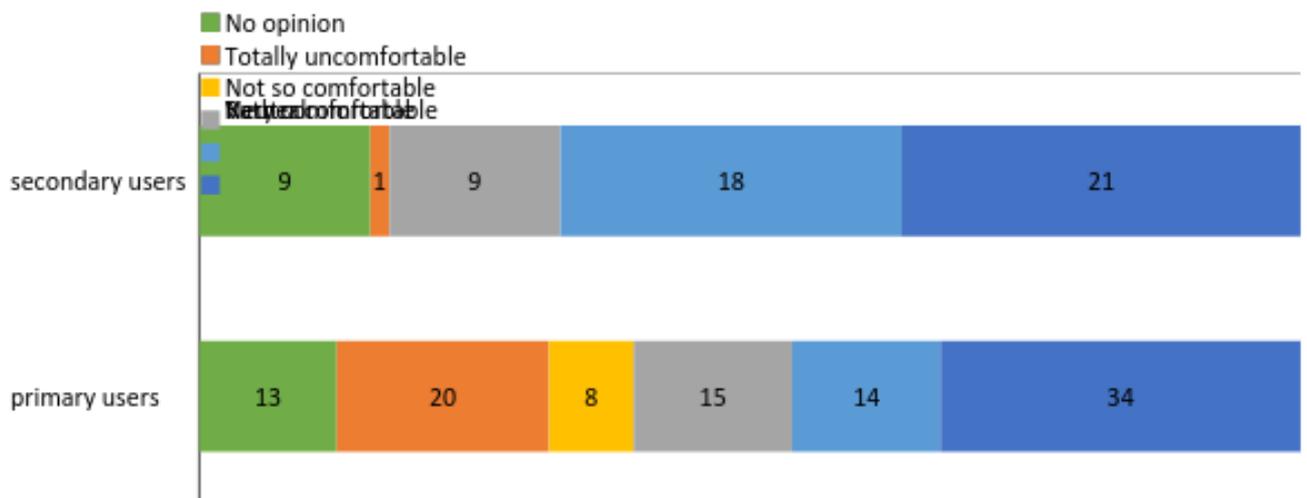


FIGURE 347 A ROBOT WITH REMINDING FEATURES HOW USEFUL ACCORDING TO PRIMARY AND SECONDARY USERS

Robot feature	Primary users <sup>9</sup>	Secondary users <sup>10</sup>
---------------	----------------------------	-------------------------------

<sup>7</sup> 216 points /364 (91 notes)

<sup>8</sup> 156 points / 196 (49 notes)

<sup>9</sup> 220 points / 340 (85 notes)

<sup>10</sup> 148 points / 232 (51 notes)

A ROBOT SUPERVISING YOUR HOUSE THROUGH VARIOUS SENSORS AND ALERTING IN CASE OF PROBLEMS	<b>51% promising</b>	<b>- 64 % - promising</b>
---	--------------------------	---------------------------

5.6.2.3

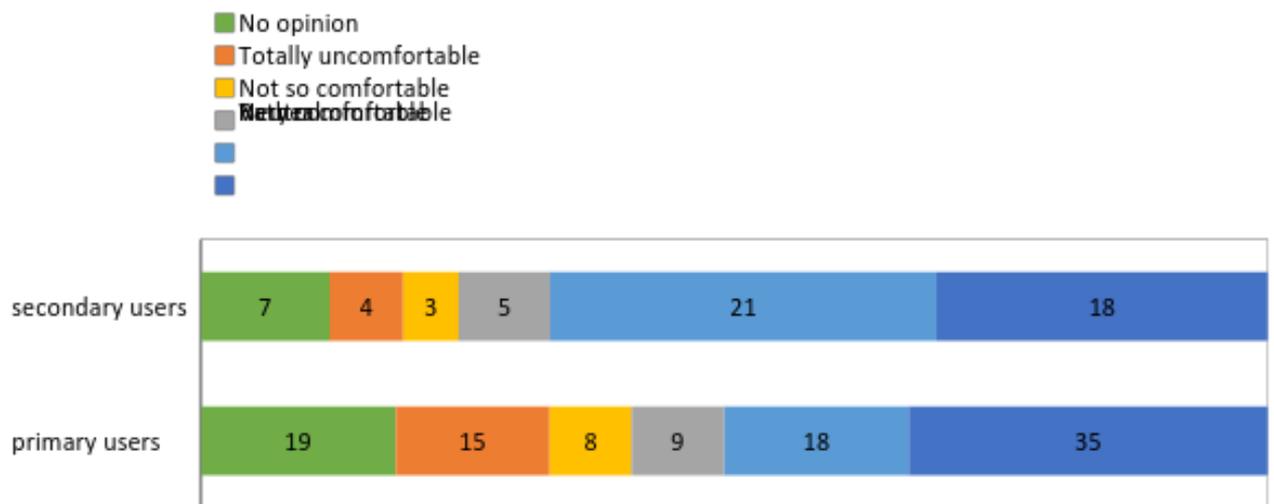


FIGURE 358 A HOUSE SUPERVISING ROBOT HOW USEFUL ACCORDING TO PRIMARY AND SECONDARY USERS

Robot feature	Primary users <sup>11</sup>	Secondary users <sup>12</sup>
5.6.2.4 <i>a robot which can be manipulated remotely by your friends or relatives or even by you to check on the house or on the persons inside the house</i>	51% promising	50% promising

<sup>11</sup> 172 points / 344 (86 responses)

<sup>12</sup> 116 points / 232 (52 responses)

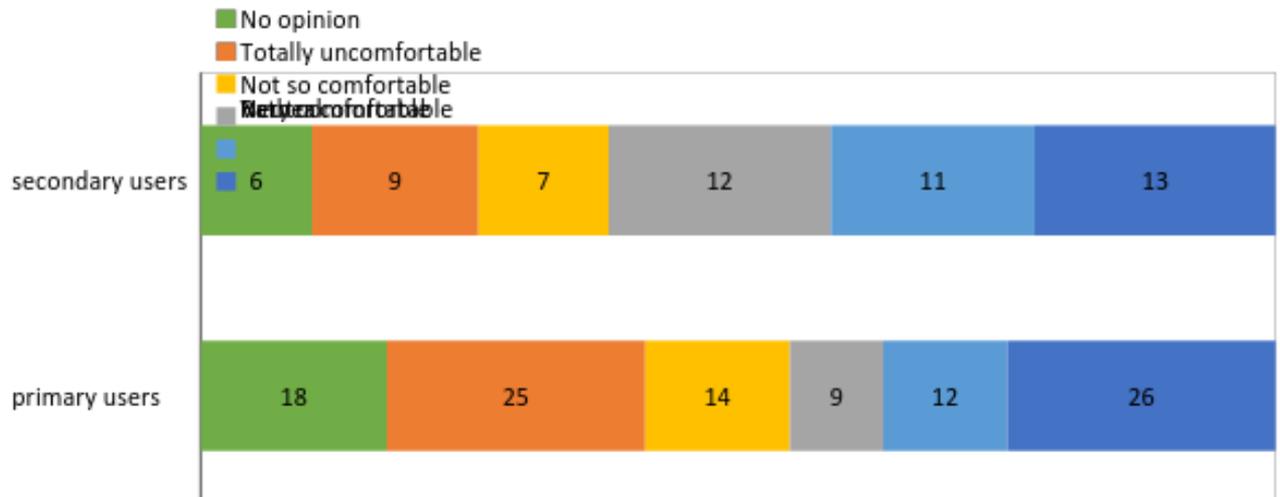


FIGURE 369 REMOTELY MANIPULATED ROBOT HOW USEFUL ACCORDING TO PRIMARY AND SECONDARY USERS

Robot feature	Primary users <sup>13</sup>	Secondary users <sup>14</sup>
5.6.2.5 <i>a robot bring you of water, your medication or any other small object</i>	50 % - promising	51 % - promising

<sup>13</sup> 167 points / 348 (87 responses)

<sup>14</sup> 119 points / 232 (51 responses)

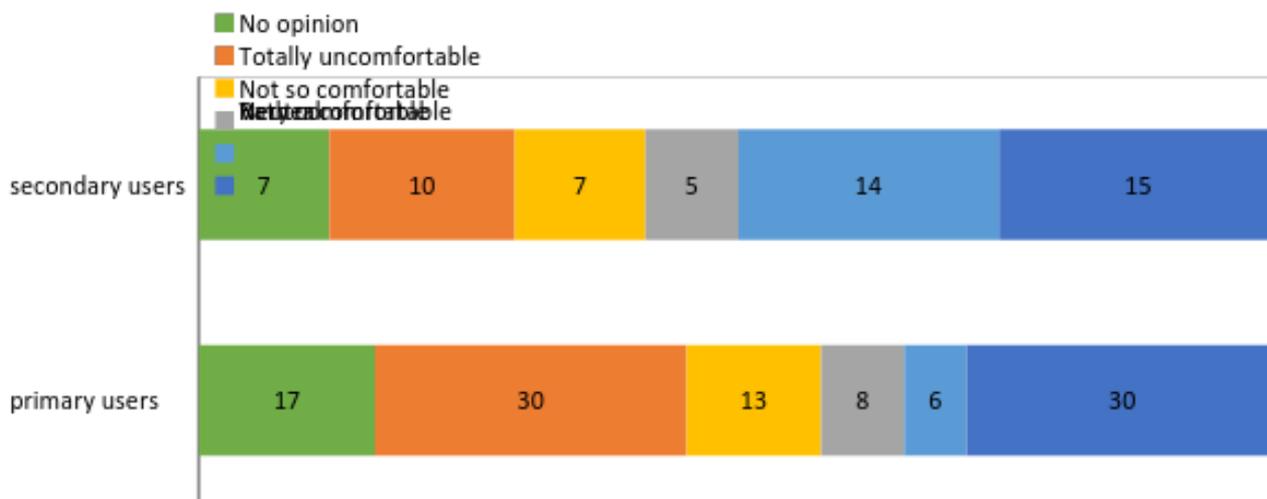


FIGURE 40 A ROBOT BRINGING SMALL OBJECTS HOW USEFUL ACCORDING TO PRIMARY AND SECONDARY USERS

### 5.6.3 Reminder and calendar features

The reminder ideas interestingly received low scores. There might be few different explanations for this. One is because the respondents already use mobile devices (smartphones and mobile phones) that might remind them of the activities. The respondents might also be used to the traditional way of remembering of their activities (the paper calendar). Finally, it could be caused by a lack of understanding of the benefits such a feature could bring.

The idea of sharing the calendar with the members of the family gained the smallest score, the reason might be that the respondents value the privacy and do not see the need to share their daily schedule with the loved ones.

The functionalities	Primary users
5.6.3.1 <i>maintaining/viewing a calendar of your past, present and future activities, exercise sessions, appointments.</i>	63% - promising <sup>15</sup>
5.6.3.2 <i>The option of sharing the above calendar/history with loved ones.</i>	42% - slightly promising <sup>16</sup>
5.6.3.3 <i>The option of sharing the above calendar/history with doctors.</i>	48% - slightly promising <sup>17</sup>
5.6.3.4 <i>The ability of automatic adjustment of the future program given your past activities.</i>	46% - slightly promising <sup>18</sup>
5.6.3.5 <i>The ability to be reminded of required medication intake.</i>	62 % - promising <sup>19</sup>

<sup>15</sup> 225 points / 360 (90 notes)

<sup>16</sup> 146 points / 348 (87 notes)

<sup>17</sup> 164 points / 344 (86 notes)

<sup>18</sup> 167 points / 364 (91 notes)

<sup>19</sup> 220 points / 356 (89 notes)

<p>5.6.3.6 <i>The ability to be reminded of different planned activities (other than medication intake).</i></p>	<p>65% - promising<sup>20</sup></p>
<p>5.6.3.7 <i>The ability to make requests to your closest caregivers (e.g. family, friends, neighbors) regarding assistance with a scheduled activity.</i></p>	<p>53% - promising<sup>21</sup></p>

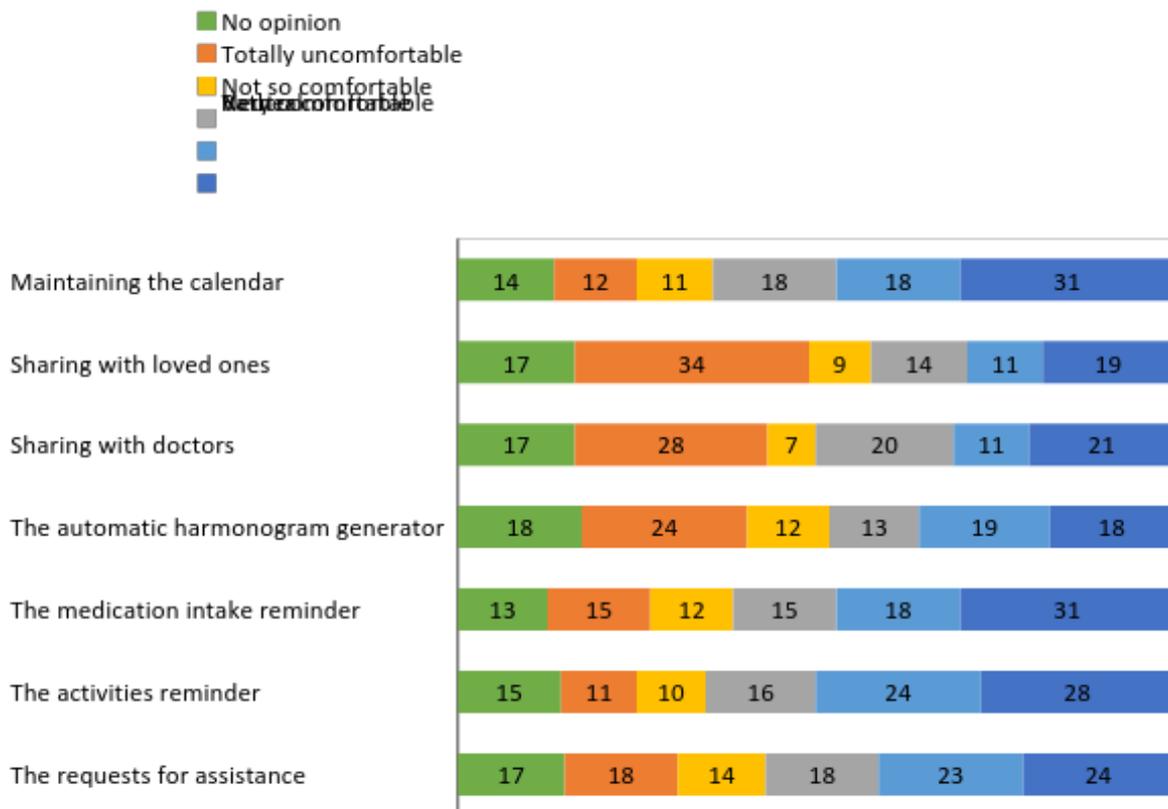


FIGURE 371 CALENDAR AND REMINDER FUNCTIONALITIES OPINION OF THE SENIORS

<sup>20</sup> 226 points / 348 (87 notes)

<sup>21</sup> 185 points / 348 (87 notes)

5.6.4 Health monitoring functionalities

The functionalities	Primary users
5.6.4.1 <i>Viewing graphic displays of your various health measurements (blood pressure, heart rate, oxygen levels) and their change in time.</i>	59% <sup>22</sup> -promising
5.6.4.2 <i>The ability to share such health measurements with doctors.</i>	60% <sup>23</sup> -promising

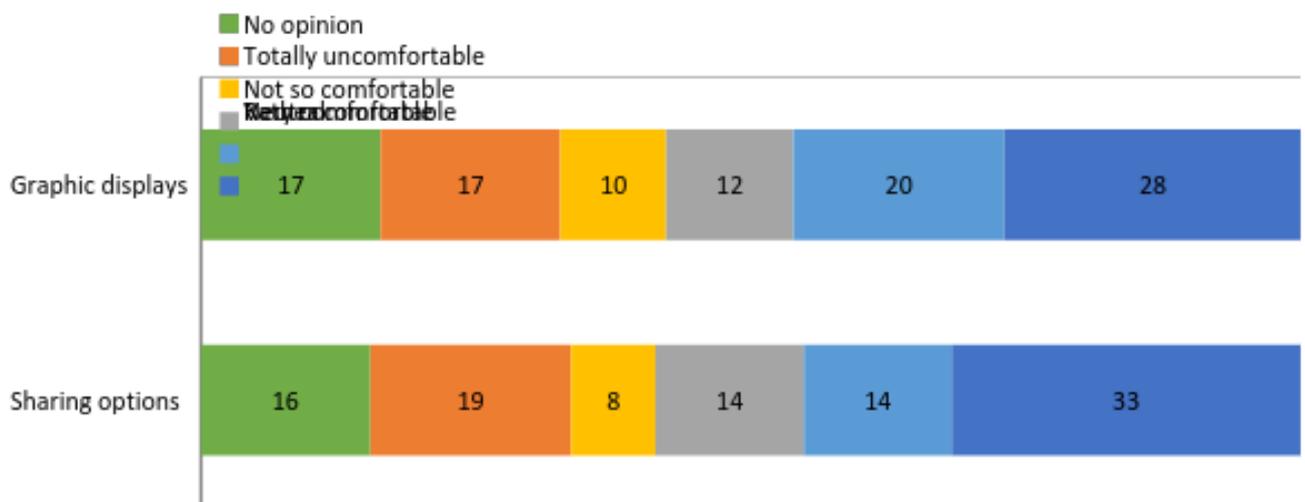


FIGURE 382 HEALTH MONITORING FUNCTIONALITIES OPINION OF THE SENIORS

<sup>22</sup> 206 points / 348 (87 notes)

<sup>23</sup> 210 points / 352 (88 notes)

### 5.6.5 Voice control functionalities

All the voice control functionalities got more than 50% notes which classifies them as promising ideas. When considering such ideas it is worth to remember the results of qualitative research. The respondents may not trust vocal controls (have bad experience in the past) or be used to more traditional – tangible way of interacting with the digital interfaces.

The functionalities	Primary users
5.6.5.1 <i>The ability of interaction with the system through a vocal interface.</i>	60% <sup>24</sup> - promising
5.6.5.2 <i>The option of turning the vocal interface off.</i>	62% <sup>25</sup> - promising
5.6.5.3 <i>Consider the option that audio output be accompanied by another form of output (e.g. text, graph).</i>	55% <sup>26</sup> - promising

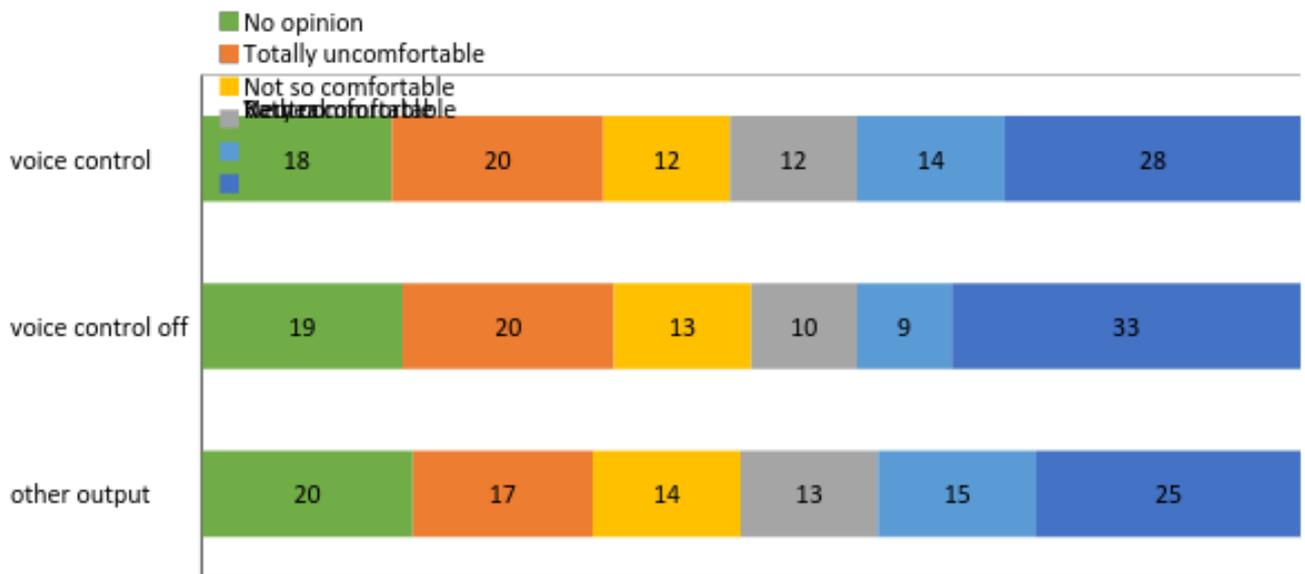


FIGURE 393 VOICE CONTROL FUNCTIONALITIES OPINION OF THE SENIORS

<sup>24</sup> 190 points / 344 (86 notes)

<sup>25</sup> 192 points / 340 (85 notes)

<sup>26</sup> 185 points / 336 (84 notes)

## 5.7 Financial opportunities

### 5.7.1 Payment options - renting vs buying the device

The following table represents the willingness to buy the devices with listed functionalities. Each idea has additional chart presenting the number of the respondents that would buy or would rent a described solution.

The respondents would rather buy a very intimate product or a product of daily use (like a health monitoring machine). In contrary caregivers often would not buy a device that might be specifically dedicated to the person in care or would rather stay as a permanent investment into the wealth of the person in care: like smart home sensors or robotic home appliances.

#### 5.7.1.1 Health monitoring devices

The respondents are more likely to buy than to rent health monitoring devices. It may be that such devices for the elderly is in a way very intimate solution that might be preferred to be a private, not shared with others.

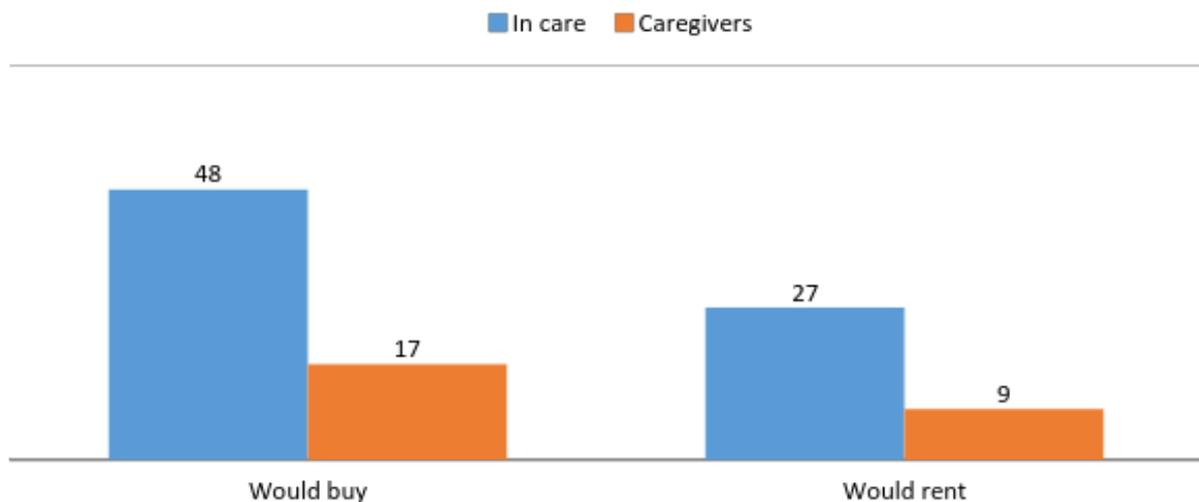


FIGURE 404 HEALTH MONITORING DEVICES WOULD BUY VS WOULD RENT

#### 5.7.1.2 Interactive gaming device for keeping you physically and mentally healthy

The respondents would rather rent the gaming devices – both the caregivers and probable primary users. The reason may be that the seniors do not play that often (as they declared in the survey), therefore they do not see the need to buy a gaming device of their own.

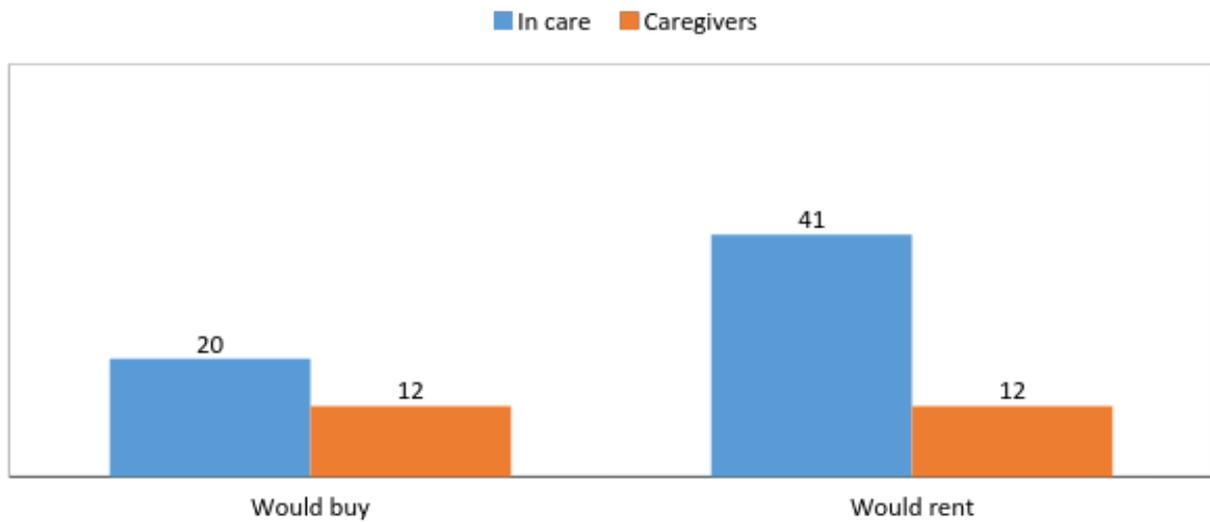


FIGURE 415 INTERACTIVE GAMING DEVICE FOR KEEPING YOU PHYSICALLY AND MENTALLY HEALTHY WOULD BUY VS WOULD RENT

5.7.1.3 *Devices for remote social interaction*

The respondents are not decisive on this topic. Difficulty of this decision might be caused by the fact that the respondents might not be sure what kind of social interaction the solution would provide and if this interaction would differ from the solutions available at the moment (smartphones, computers etc.)

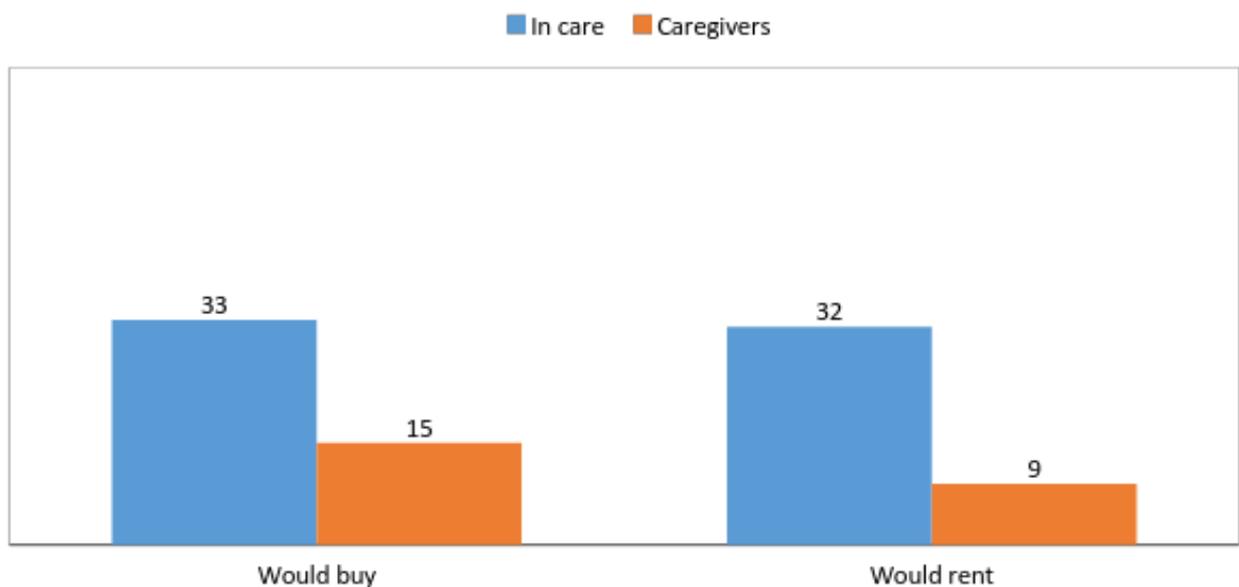


FIGURE 426 DEVICES FOR REMOTE SOCIAL INTERACTION WOULD BUY VS WOULD RENT

5.7.1.4 *Smart home sensors and devices to monitor your home and alert in case of problems*

The caregivers and the seniors differ in their preferences for this solution. The primary users would rather buy home sensors, while the caregivers prefer to rent such devices. A reason might be that the primary users are more likely to buy a device for their home rather than the secondary users buying a device for the home of another person (even a relative or a friend).

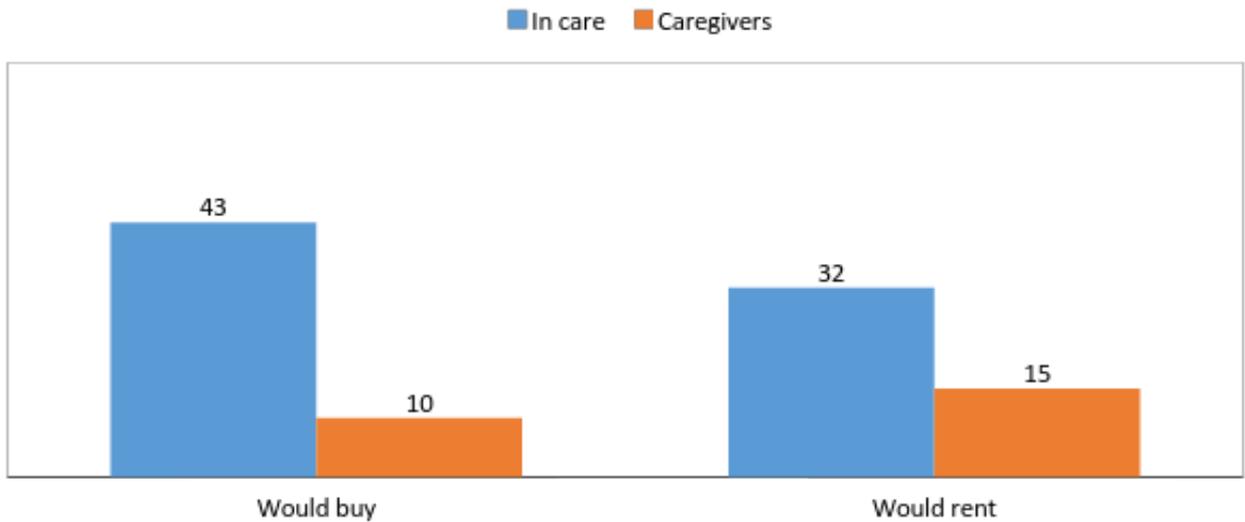


FIGURE 437 SMART HOME SENSORS AND DEVICES TO MONITOR YOUR HOME AND ALERT IN CASE OF PROBLEMS WOULD BUY VS WOULD RENT

5.7.1.5 *Intelligent program organizer*

The respondents are not sure if they would rent or buy an intelligent program organizer. The probable reason might be the same as with the remote social interaction device – the idea is too much abstract to decide whether it is worth to invest in and how it differs from other available solutions.

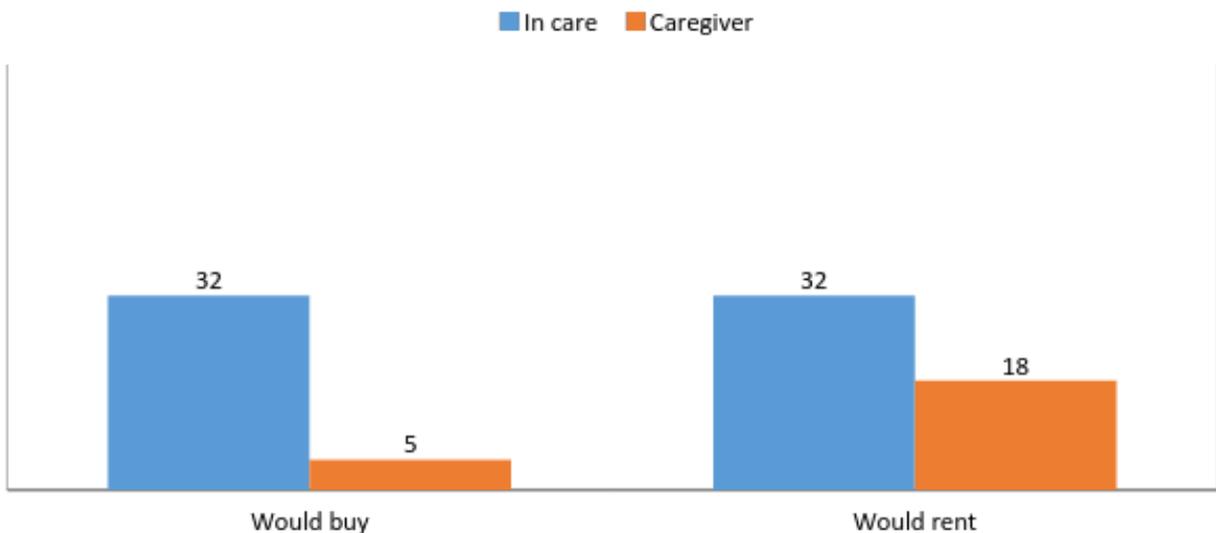


FIGURE 448 INTELLIGENT PROGRAM ORGANIZER WOULD BUY VS WOULD RENT

5.7.1.6 *Fall detection and alarm device*

Buying a fall detection and alarm device as a private property seems to be more interesting for the majority of the respondents (both seniors and caregivers).

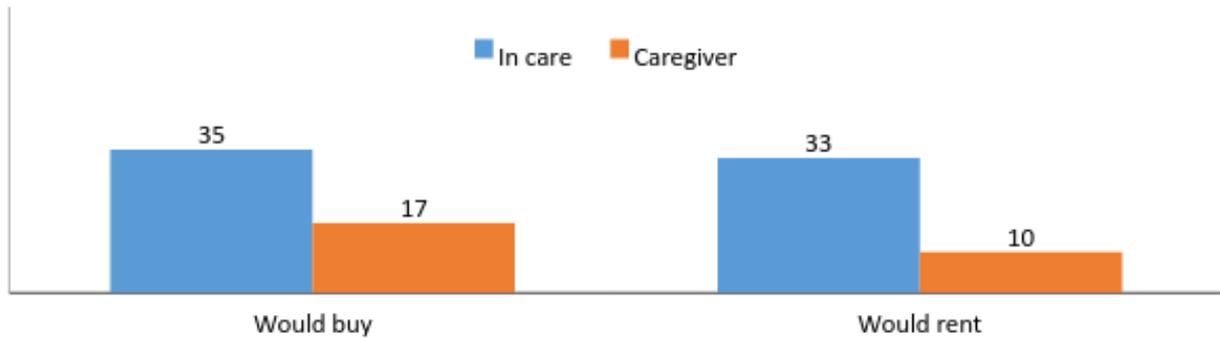


FIGURE 459 FALL DETECTION AND ALARM DEVICE WOULD BUY VS WOULD RENT

5.7.1.7 *Robotic home appliances*

Similarly as for the home security devices the people in care would rather have such devices of their own, in contrary to the caregivers that would prefer to rent such appliances.

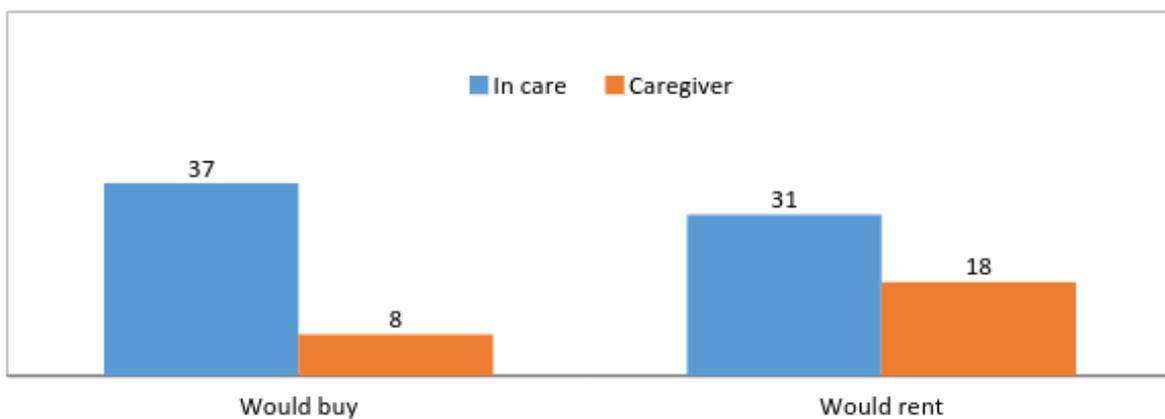


FIGURE 50 ROBOTIC HOME APPLIANCES WOULD BUY VS WOULD RENT

5.7.1.8 Telepresence

A device that would enable telepresence seems to be an interesting idea for the both of the groups. They are interested to have such solutions on their own.

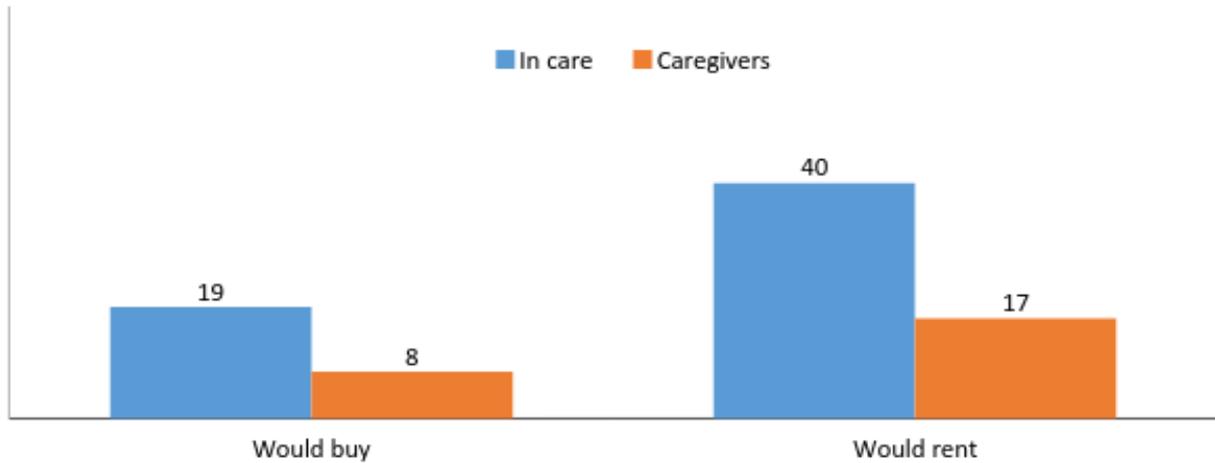


FIGURE 461 TELEPRESENCE WOULD BUY VS WOULD RENT

5.7.2 The preferable type of payment

The people in care as well as the caregivers would prefer that the rented devices would be provided by the public sector. The two groups agree profoundly in that matter as the majority agreed that this possibility is the one most comfortable and the least uncomfortable solution.

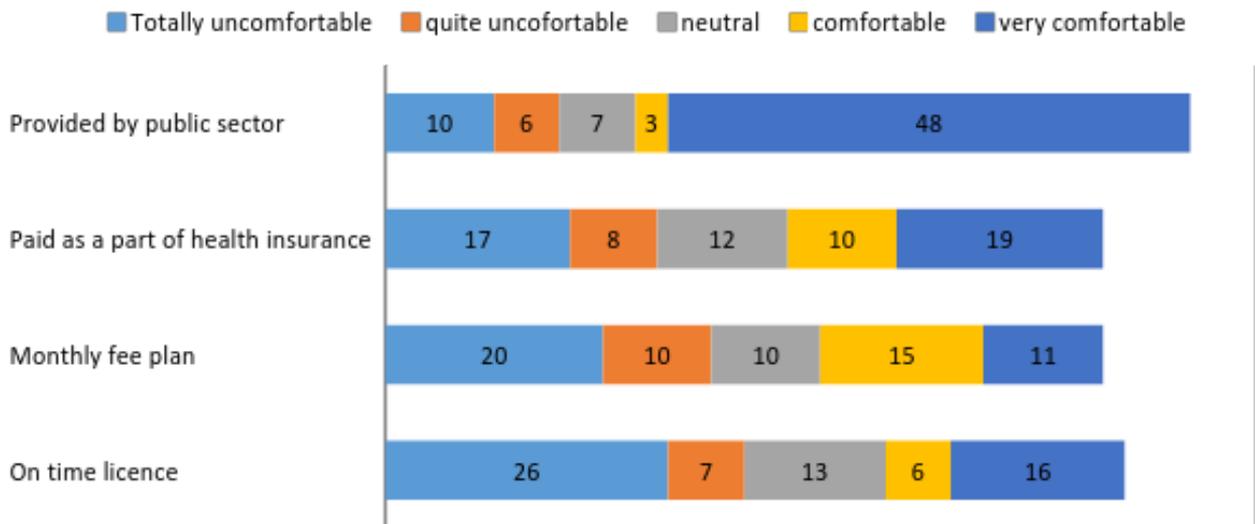


FIGURE 472 PREFERRED TYPE OF PAYMENT FOR THE SENIORS

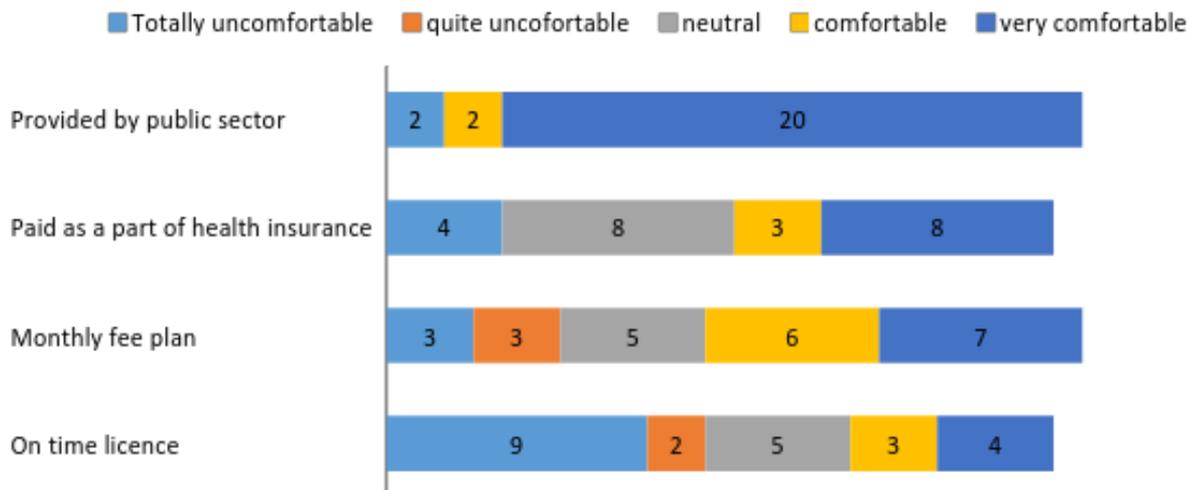


FIGURE 483 PREFERRED TYPE OF PAYMENT FOR THE CAREGIVERS

## 6 Acknowledgments

The cover photo: Jake Stimpson, 2015, Older couple walking across the street in Bucharest, Romania. Flickr.com, Creative Commons license. <http://bit.ly/1PW5Fm8>

The graphics used in the report (the houses) are designed by Freepik.com, with free for commercial use Creative Commons license <http://www.freepik.com>