



LIFE

Listen. Innovate. Field-test. Evaluate.

Market assessment
Example Market survey

The LIFE methodology has been developed during the ACCRA project by the ACCRA consortium. Please refer to the project's website, www.accra-project.org, if you use any of the materials.



This market survey was developed for the ACCRA project. It is tailored to the robots and use cases of this project. Be aware that this survey contains validated instruments of which we do not hold the copyright.

PART I: QUALIFICATION OF RESPONDENT
FOR SELECTION OF SAMPLE
AND DISTRIBUTION BY USE CASE (DAILY LIFE + CONVERSATION / MOBILITY)

In this first part, we're going to ask you some questions about yourself.

You can change the size of the text using the key combination CTRL and + (to make it bigger), CTRL and - (to make it smaller) or CTRL and 0 (to go back to the default size).

SEX. First of all, you are...

		QUOTA
A man	1	Objective: 50%
A woman	2	Objective: 50%
Prefer not to say	3	Stop inter

AGE. Please state your month and year of birth:

PROG: Take the usual list

Month _____ (pull-down list) Year _____ (pull-down list)

REC_AGE1

PROG: HIDDEN SINGLE

Recoding of month and year of birth to age	
--------------------------------------------	--

REC_AGE

PROG: HIDDEN SINGLE

Under 50 years	1	→ STOP INTER
50-59 years	2	Quota
60-69 years	3	Quota
70-79 years	4	Quota
80 years and over	5	Quota

PAYS. In what country do you live?

		QUOTA
France	1	300 persons in France
Italy	2	300 persons in Italy
Netherlands	3	300 persons in Netherlands
None of these countries	4	→ Stop Inter

FOR FRANCE ONLY

DEP. In what Department do you live?

PROG: SINGLE / PROG: Take the usual list and associated recoding

I don't live in France	→ Stop Inter
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REC_ regions

PROG: HIDDEN SINGLE

Paris Region	1	75 -77- 78-91-92--93-94-95
West	2	14-16-17-18-22 -27-28-29-35-36-37-41-44-45-49-50-53-56-61-72-76-79-85-86
North & East	3	02-08-10-21-25-39-51-52-54-55-57-58-59-60-62-67-68-70-71-80-88-89-90
South-West	4	09-12-19-23-24-31-32-33-40-46-47-64-65-81-82-87
South-East	5	01-03-04-05-06-07-11-13-15-20-26-30-34-38-42 -43-48-63 -66 -69-73-74-83-84

AUT0. How do you rate your degree of autonomy?

Completely autonomous	1
Slight loss of autonomy: I need help occasionally for a few limited acts in my everyday life.	2
Moderate loss of autonomy: I need help for certain things in my everyday life.	3
Severe loss of autonomy: I need help for a lot of things in my everyday life.	4
Complete loss of autonomy: I need help for most things in my everyday life.	5

AUT1. Are you being helped by a family caregiver or by a professional caregiver for activities in your daily life? (one answer only)

No, I'm completely autonomous	0
Yes, I'm being helped regularly by a close relative (family, friend, neighbour, etc.) for some activities	1
Yes, I'm being helped by a professional caregiver (home help, home care nurse, other home caregiver)	2
Yes, I'm being helped by both a close relative (family, friend, neighbour, etc.) and by a professional caregiver (home help, home care nurse, other home caregiver)	3

AUT2. How often do you get help from a close relative (family, friend, neighbour) or from a professional caregiver to do certain things in your daily life?

I get help from a family caregiver or a professional caregiver...

	AUT2x	AUT2y	AUT2z
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			(masked)
	Family caregiver	Professional caregiver	Combined family and professional caregivers
Several times a day	7	7	Automatic calculation: AUT2z = score AUT2x + score AUT2y
Once a day	6	6	
Several times a week (but not every day)	5	5	
Once a week	4	4	
Several times a month (but not every week)	3	3	
Once a month	2	2	
Less than once a month	1	1	
Never	0	0	

AUT3. For each of the following activities, state how well you can do them alone or how often you need help:

			I can do it alone		I need help		
			Easily	With difficulty	Sometimes	Often	Always
Moving around and getting out and about	Moving outside my home (trips, walks, going to medical appointments, etc.)	1	1	2	3	4	5
	Moving around inside my home (walking, going from one room to another, etc.)	2	1	2	3	4	5
	Getting out of bed, going to bed	3	1	2	3	4	5
	Sitting down, standing up	4	1	2	3	4	5
	Using transport	5	1	2	3	4	5
	Doing activities alone or in a group	6	1	2	3	4	5
Housework and paperwork	Chores (cleaning, laundry, washing up, ironing, upkeep of home, etc.)	8	1	2	3	4	5
	Shopping (outside or online)	9	1	2	3	4	5
	Managing accounts, paperwork and formalities	10	1	2	3	4	5

Personal care	Preparing meals	11	1	2	3	4	5
	Washing myself	12	1	2	3	4	5
	Using the toilet	13	1	2	3	4	5
	Following my treatment and taking my medication	14	1	2	3	4	5
Exercise and sports	Doing exercise, sports or gymnastics.	15	1	2	3	4	5
Communicating	Using the telephone	16	1	2	3	4	5
	Calling for help	17	1	2	3	4	5

AUT4. Where are you living?

I'm living:

In my own home	1
At the home of one of my children or of someone I'm close to	2
In a flat in a senior residence	3
In a room in a nursing home or retirement home	4
In a long-term care facility	5
Other: please state _____	99

SOL0. To what extent do you feel loneliness?

	Several times a day	Every day or almost	Two to three times a week	Once a week	Two to three times a month	Less often	Never
I experience loneliness	7	6	5	4	3	2	1

Conv1. What is your cohabitation status?

I live...

Alone	1
With a spouse	2
With someone from my family (parent, brother, sister, child...)	3

With a friend	4
With a roommate	5

INFO

You are now at the end of the first part of this questionnaire.

The rest of this questionnaire is in four parts. At the end of Part 3, we suggest you take a break and finish answering the questionnaire later. When you go back to the questionnaire, start again exactly where you left off.

To go on with the questionnaire, please click on the arrow.

PART II: NEEDS

2.1 Daily life

BES1 - DL. We all have our own difficulties and needs as we grow older. We'd like you to tell us what yours are.

Please tell us how important for you personally the needs stated below are.

When several examples are offered to illustrate a difficulty or a need, please answer based only on the one that is the biggest problem for you.

RANDOMIZE		No, I have no problem	Yes, I have problems			
			Not very important	Fairly important	Important	Very important
I have problems with my sight and hearing	1	1	2	3	4	5
I have mobility problems: <ul style="list-style-type: none"> - Difficulty walking - Fear of falling - Difficulty leaning over, lying down, sitting down, standing up - Physical pain (back, knees hands, joints, etc.) <i>(Answer based only on the item that is the biggest problem for you.)</i>	2	1	2	3	4	5
I am worried about feeling safe indoors: <ul style="list-style-type: none"> - I'd like something to identify when I've fallen and call my loved ones or a caregiver to get help 	3	1	2	3	4	5

<ul style="list-style-type: none"> - I'd like something to help me identify obstacles to prevent falling - I'd like something to keep an eye on me during the day <i>(Answer based only on the item that is the biggest problem for you.)</i>						
I have difficulties doing housework (cleaning, laundry, washing up, ironing, upkeep of the home, etc.)	4	1	2	3	4	5
I have difficulties taking care of myself: <ul style="list-style-type: none"> - to get washed - do body care - get dressed. <i>(Answer based only on the item that is the biggest problem for you.)</i>	5	1	2	3	4	5
I have difficulties with food <ul style="list-style-type: none"> - Preparing meals - Forgetting to drink - Forgetting to eat - Fear of dehydration - Fear of malnutrition. <i>(Answer based only on the item that is the biggest problem for you.)</i>	6	1	2	3	4	5
I have difficulties with medical care: <ul style="list-style-type: none"> - Forgetting to take medication - Forgetting medical appointments - Difficulties getting to medical appointments. <i>(Answer based only on the item that is the biggest problem for you.)</i>	7	1	2	3	4	5
I have difficulty using communication devices <ul style="list-style-type: none"> - Telephone - Communication technology: texting, video calls (Skype, etc.), emails, etc. <i>(Answer based only on the item that is the biggest problem for you.)</i>	8	1	2	3	4	5
I suffer from loneliness	9	1	2	3	4	5
I suffer from isolation	10	1	2	3	4	5

I'd like to be in contact more often with those close to me (children, grandchildren, friends, etc.)	11	1	2	3	4	5
I have memory problems	12	1	2	3	4	5
I sometimes have trouble remembering what day or what time it is.	13	1	2	3	4	5
I have difficulties with formalities and financial paperwork (accounts, form-filling, administrative formalities, etc.)	14	1	2	3	4	5
I'm worried about coping with emergencies: I'd need help to call a professional or family caregiver if there was an emergency (fall, health problem, blocked pipes, fire, gas leak, etc.)	15	1	2	3	4	5
I suffer from: - stress, fear, anxiety - or depression <i>(Among these different negative emotions, answer based only on the one that bothers you most)</i>	16	1	2	3	4	5
I have health problems: - chronic health problems - severe health problems <i>(Of these two problems, answer based only on the one that bothers you most).</i>	17	1	2	3	4	5
I'd like to take care of myself physically: - I would like to maintain my fitness, my body or my flexibility.... - I'd like to perform exercises: o with suggestions for easy to perform exercises o getting support with performing exercises	18	1	2	3	4	5
I'd like to take care of myself mentally: - maintain my mind, my cognitive abilities (memory, alertness of mind...)	19	1	2	3	4	5
I'd like to relax: - preserve my well-being (relaxation, sophrology, etc.)	20	1	2	3	4	5

I'd like to have more distractions because: <ul style="list-style-type: none"> - I sometimes get bored - I need distractions: listening to music, reading, playing games, doing physical , artistic or creative activities, etc. 	21	1	2	3	4	5
I'd like to continue developing and learning new things.	22	1	2	3	4	5

2.2 Mobility

BES1 - Mob. We all have our own difficulties and needs as we grow older. We'd like you to tell us what yours are.

Please tell us how important for you personally the needs stated below are.

When several examples are offered to illustrate a difficulty or a need, please answer based only on the one that is the biggest problem for you.

RANDOMIZE		No, I have no problem	Yes, I have problems			
			Not very important	Fairly important	Important	Very important
I am worried about moving around indoors: <ul style="list-style-type: none"> - I'd like something to provide me balance or act as a leaning support - I'd like something to help me move around (e.g., standing up, getting out of bed, walking and sitting down) - I'd like something to guide me getting from A to B where I live <i>(Answer based only on the item that is the biggest problem for you.)</i>	1	1	2	3	4	5
I am worried about feeling safe indoors: <ul style="list-style-type: none"> - I'd like something to identify when I've fallen and call my loved ones or a caregiver to get help - I'd like something to help me identify obstacles to prevent falling 	2	1	2	3	4	5

<ul style="list-style-type: none"> - I'd like something to keep an eye on me during the day - I'd like something to remind me to use my walking tools <i>(Answer based only on the item that is the biggest problem for you.)</i>						
I'd like to perform exercises: <ul style="list-style-type: none"> - with suggestions for easy to perform exercises - getting support with performing exercises - with explanations why doing the exercises is important <i>(Answer based only on the item that is the biggest problem for you.)</i>	3	1	2	3	4	5
I'd like help with rehabilitating: <ul style="list-style-type: none"> - to perform physical or mobility exercises - to stabilize or reduce the loss of my functional autonomy <i>(Answer based only on the item that is the biggest problem for you.)</i>	4	1	2	3	4	5
I have difficulties with daily life tasks outdoors: <ul style="list-style-type: none"> - Shopping - Public transport - Visiting friends or family who live far away <i>(Answer based only on the item that is the biggest problem for you.)</i>	5	1	2	3	4	5
I have difficulties with daily life tasks indoors: <ul style="list-style-type: none"> - Preparing a meal - Dressing up - Fetching/grabbing items - Carrying items (with a tray) - Housework <i>(Answer based only on the item that is the biggest problem for you.)</i>	6	1	2	3	4	5
I have difficulty remembering to take my medicine	7	1	2	3	4	5
I have difficulties with administering medicine or other medical treatments (e.g., as eye drops, taking pills, etc.)	8	1	2	3	4	5

I'd like help with staying in touch with my loved ones or friends: <ul style="list-style-type: none"> Verbal communication (being able to talk to my loved ones or friends when they are not close to me) Non-verbal communication (being able to see my loved ones or friends when they are not close to me, for instance their facial expression and their movements) <i>(Answer based only on the item that is the biggest problem for you.)</i>	9	1	2	3	4	5
I'd like help with viewing the schedule of activities at the facility that I live / or the activities offered in my neighbourhood.	10	1	2	3	4	5
I'd like help with remembering to turn off the gas	11	1	2	3	4	5

PART III: PERCEPTION OF GROWING OLDER

V3. We'll move on now to the subject of your health. First of all, do you consider yourself today to be in good health?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I'm in good health	1	2	3	4	5

SOL1. Please state how strongly you think each of the statements below applies to you

Loneliness scale (emotional / social)

RANDOMIZE		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I experience a general sense of emptiness	1(EL)	1	2	3	4	5
I miss having people around me	2(EL)	1	2	3	4	5
I often feel rejected	3(EL)	1	2	3	4	5
There are plenty of people I can rely on when I have problems	4(SL)	5	4	3	2	1
There are many people I can trust completely	5(SL)	5	4	3	2	1

There are enough people I feel close to	6(SL)	5	4	3	2	1
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EF. Please state how well you think each of the statements below describes the way you see yourself. You'll probably agree with some statements and disagree with others.

Tick the level of agreement that best describes your feelings about each statement. Take care to describe how you think you really are and not how you'd like to be.

General Self Efficacy scale

RANDOMIZE		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
When I make plans, I am certain I can make them work	1	1	2	3	4	5
One of my problems is that I cannot get down to work when I should	2	5	4	3	2	1
If I can't do a job the first time, I keep trying until I can	3	1	2	3	4	5
When I set important goals for myself, I rarely achieve them	4	5	4	3	2	1
I give up on things before completing them	5	5	4	3	2	1
I avoid facing difficulties	6	5	4	3	2	1
If something looks too complicated, I will not even bother to try it	7	5	4	3	2	1
When I have something unpleasant to do, I stick to it until I finish it	8	1	2	3	4	5
When I decide to do something, I go right to work on it	9	1	2	3	4	5
When I am trying to learn something new, I soon give up if I am not initially successful	10	5	4	3	2	1
When unexpected problems occur, I don't handle them well	11	1	2	3	4	5
I am a self-reliant person	12	1	2	3	4	5
I give up easily.	13	5	4	3	2	1
I do not seem capable of dealing with most problems that come up in life	14	1	2	3	4	5

SAT / EM. Below are some statements we've heard. Please tell us how strongly you agree or disagree with them.

Please give one answer per line

	RANDOMIZE		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
SAT	In general, my life is ideal	1	1	2	3	4	5
	My conditions of life are excellent	2	1	2	3	4	5
	I'm satisfied with my life	3	1	2	3	4	5
	So far I've got the important things I've wanted in life	4	1	2	3	4	5
	If I could start over again there's hardly anything I'd change	5	1	2	3	4	5
EM	I'm often looking for situations that make me feel good (joy, pleasure, nice surprises, etc.)	6	1	2	3	4	5

PART IV: PERCEPTION OF THE ROBOT OFFER AND INTENTION TO ADOPT (PURCHASE/RENT/USE) THE ROBOT

4.1 Daily life

4.1.1 PERCEPTION OF THE BUDDY ROBOT OFFER

We'll now present a robot that offers various services so you can tell us what you think of it.

VIDEO (general) AND DESCRIPTION

THE CONCEPT



Buddy is a little robot that keeps you company, helps you and entertains you every day.

It offers several services: daily company, protection and security, communication and social connection, well-being and entertainment, and conversation.

- **COMPANIONSHIP:** The robot is a playful and endearing companion that keeps you company and entertains you. It comes to you when you call it, will sometimes hum a tune, tells jokes, gives a warm smile when you stroke its head or nose, answers your questions about the weather, the date and the time, tells you meanings of words, etc.
- **PROTECTION and SECURITY:** The robot comes to your assistance if you fall or if you've moved and got stuck. It can put you in touch with someone close to you or call for help at your request. It reminds you of your medical appointment, medication to take, and good practices to follow (for example, it reminds you to drink regularly in hot weather).
- **COMMUNICATION and SOCIAL CONNECTION:** The robot puts you in touch with those close to you by telephone or video call simply by a spoken request (*Buddy, could you call my son by video?*) or by pressing a button on its screen. It lets those close to you (family, grandchildren, friends, etc.) send you photos, videos and drawings and displays them on its screen.
- **WELL-BEING and ENTERTAINMENT:** The robot accompanies you in your well-being or relaxation activities. It will play a video of a teacher animating a well-being activity to unwind or relax (relaxation sessions, sophrology, etc.) or keep fit (physical exercise, gentle gymnastics, yoga, etc.). It can also play with you (games for amusement, games to exercise your memory, etc.), read you an audio book or play your favourite music.
- **CONVERSATION:** The robot talks to you about a variety of topics. On the one hand, the conversation service is supportive to the other four. For example, one of the ways that Buddy keeps you company or entertains you is by talking to you. On the other hand, the conversation service is meant to stimulate your mind through your exchanges with the robot and the possibility to retrieve useful information.

ROB1 - DL. To what extent do you find this robot and its services interesting?

(display description of the concept on the screen above the question)

	Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
This robot seems...	1	2	3	4	5

ROB2 - DL. To what extent do you find each of the services offered interesting?

(display description of the concept – robot and services – on the screen above the question)

		Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
The companionship service	1	1	2	3	4	5

The protection and security service	2	1	2	3	4	5
The communication and social connection service	3	1	2	3	4	5
The well-being and entertainment service	4	1	2	3	4	5
The conversation service	5	1	2	3	4	5

Now, we would like to ask several questions specifically about the conversation service.

ROB3 - DL. How often would you talk to Buddy?

(display description of the concept – robot and services – on the screen above the question)

	Several times a day	Only once a day	Several times a week	Several times a month	Monthly	Less than Monthly	Never
I would talk to Buddy...	6	5	4	3	2	1	0

ROB4 - DL. Which topics are you interested in to talk about with Buddy?

(display description of the concept – robot and services – on the screen above the question)

		Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
The news	1	1	2	3	4	5
The weather	2	1	2	3	4	5
Myself	3	1	2	3	4	5
My memories	4	1	2	3	4	5
Friends and family	5	1	2	3	4	5
Music	6	1	2	3	4	5
Movies	7	1	2	3	4	5
Books	8	1	2	3	4	5
Fashion	9	1	2	3	4	5
Sports	10	1	2	3	4	5
Travel	11	1	2	3	4	5
Cooking recipes	12	1	2	3	4	5
Gardening	13	1	2	3	4	5

ROB5 - DL. Regarding the conversation service, to what extent do you consider it important that the

robot has the ability to understand what is happening around it and to act accordingly.
(display description of the concept – robot and services – on the screen above the question)

	Not at all important	Not very important	Fairly important	Important	Very important
I consider it is...	1	2	3	4	5

ROB6 - DL. Concerning the conversation service, to what extent do you consider it important that the robot has the ability to recognize you when it sees you and to call you by your first name?
(display description of the concept – robot and services – on the screen above the question)

	Not at all important	Not very important	Fairly important	Important	Very important
I consider it is...	1	2	3	4	5

ROB7 - DL. One goal of the conversation service is to stimulate your mind (“your cognition”). How important do you think this function is?
(display description of the concept – robot and services – on the screen above the question)

	Not at all important	Not very important	Fairly important	Important	Very important
I consider it is...	1	2	3	4	5

ROB8 - DL. What kind of activity to stimulate your mind are you interested to practice with the robot?
(display description of the concept – robot and services – on the screen above the question)

		Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
Talk about different topics	1	1	2	3	4	5
Learn songs	2	1	2	3	4	5
Learn poems	3	1	2	3	4	5
Learn foreign languages	4	1	2	3	4	5
Play memory games	5	1	2	3	4	5
Play games that stimulates my mind	6	1	2	3	4	5
Other : _____	7	1	2	3	4	5

4.1.2 INTENTION TO ADOPT THE ROBOT

IA0 - DL. In what way would you best like to obtain a robot of this type?

I'd prefer to purchase the robot	1
I'd prefer to rent the robot (monthly payments)	2
I'd prefer to get the robot through a service package offered by a mutual health insurance company, a home services company, a senior residence or some other service provider	3
I wouldn't purchase or rent this robot, or get it in any other way. I'm not interested in it.	0

IA2 - DL. If the robot was offered at a price that suited you, might you **get*** one?

Explanation that will appear when the mouse is placed on the word "get".

*(*by purchase, rental or in a service package, whichever suited you best)*

Definitely not	Probably not	Probably	Most probably	Quite definitely
1	2	3	4	5

If the respondent answered 3/4/5 (yes) for question IA2 ask the following question (IA3):

IA3 - DL. If the robot was offered at a price that suited you, how soon might you **get*** one?

Explanation that will appear when the mouse is placed on the word "get".

*(*by purchase, rental or in a service package, whichever suited you best)*

In 6 months	This year	In 2 years	In 5 years	In 10 years or later
1	2	3	4	5

RecIA3 – DL. Lag time to adoption Short Term, Medium Term, Long Term

RECODE

1 or 2 => Short term (in 6 months to 1 year) = 1

3 or 4 => Medium term (in 2 to 5 years) = 2

5 => Long term (in 10 years or later) = 3

If the respondent answered 2 (rent) for question IA0, ask question IA1, otherwise pass.

IA1 - DL. What organisation would you best like to rent this robot from?

(Presentation of answer options in random order)

Your mutual health insurance company	1
Your telephone service provider	2
Your bank	3
A home services company	4

A senior residence	5
Your national insurance organisation	6
The company that made the robot	7
A general rental company (rental of all types of equipment)	8
A homecare store (A shop where you can rent all types of care appliances)	9
Other (please state): _____	10

If the respondent answered 1 (purchase) for question IA0

Prix1 - DL. Below what purchase price would you think the robot was of low quality?

500€	1
1000€	2
1500€	3
2000€	4
2500€	5
3000€	6
3500€	7
4000€	8

Prix2 - DL. Above what purchase price would you think the robot was too expensive?

500€	1
1000€	2
1500€	3
2000€	4
2500€	5
3000€	6
3500€	7
4000€	8

If the respondent answered 2 (rent) for question IA0

Prix3 - DL. Below what monthly rental charge would you think the robot was of low quality?

20€	1
40€	2
60€	3
80€	4
100€	5
120€	6
140€	7
160€	8

Prix4 - DL. Above what monthly rental charge would you think the robot was too expensive?

20€	1
40€	2
60€	3
80€	4
100€	5
120€	6
140€	7
160€	8

If the respondent answered 3 (service package) for question IA0

You've stated that you'd prefer to get the robot through a service package offered by a mutual health insurance company, a home services company, a senior residence or some other service provider.

We'd like to know what monthly added price supplement you'd be ready to pay to get the robot in a service package.

Prix5 -DL. Below what monthly price supplement would you think the robot is of low quality?

10€	1
20€	2
30€	3
40€	4
50€	5
60€	6
70€	7
80€	8
90€	9
100€	10

Prix6 - DL. Above what monthly price supplement would you think the robot was too expensive?

10€	1
20€	2
30€	3
40€	4
50€	5
60€	6
70€	7
80€	8
90€	9
100€	10

4.2 Mobility

4.2.1 PERCEPTION OF THE ROBOT OFFER

We'll now present a robot that offers various services so you can tell us what you think of it.

VIDEO (general) AND DESCRIPTION

THE CONCEPT



ASTRO is a socially assistive robot designed with elderly to support their indoor mobility.

The core of the mobility application is the “walking support service”. Other services are: exercise, supporting caregivers at work, which consists of managing exercises, monitoring, communication and telepresence.

1. **WALKING SUPPORT:** ASTRO is able to support the walking of elderly users through the robotic handle by acting like a rollator. Older persons can easily drive ASTRO by changing the hand grip strength. Thanks to the customized machine learning algorithm, ASTRO is able to adapt to the residual hand grip strength of the user. Additionally ASTRO is able to monitor the hand grip strength and the velocity over time.
2. **EXERCISES:** The user can use ASTRO to do physical exercises, which he can select among a list of videos managed by the caregiver. He can see himself on various ASTRO interfaces while he is performing the exercise. At the end of each exercise, the elderly can perform a self-assessment.

3. SUPPORT CAREGIVER AT WORK: ASTRO is able to support three main aspects of the work of formal caregiver:

- Manage the exercise: the caregiver can select the proper exercises for each users.
- Monitoring: the caregiver can have an overview of the satisfaction on performance of the exercise and walking support services. He can access the overview of the usage of the service, the total travelled time and the mean velocity. The data are clustered and organized in bar graph to enhance the overview.
- Communication and Telepresence: the caregiver can call the elderly through this service. Additionally, the caregiver can use ASTRO to remotely visit the elderly. Thanks to ad hoc interface he can guide ASTRO and see what he sees.

ROB1 - Mob. To what extent do you find this robot and its services interesting?

(display description of the concept on the screen above the question)

	Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
This robot seems...	1	2	3	4	5

ROB2 - Mob. To what extent do you find each of the services offered interesting?

(display description of the concept – robot and services – on the screen above the question)

		Not at all interesting	Rather not interesting	Neither interesting nor uninteresting	Rather interesting	Very interesting
The Walking Support service	1	1	2	3	4	5
The Exercise service	2	1	2	3	4	5
The Support caregiver at work service	3	1	2	3	4	5
The Manage Exercise service	4	1	2	3	4	5
The Monitoring service	5	1	2	3	4	5
The communication and telepresence service	6	1	2	3	4	5

4.2.2 INTENTION TO USE THE ASTRO ROBOT

Inst0 – Mob. Are you at present a resident in any of the following institutions?

Yes I'm living at present in a	Hospital	1
	Nursing home / retirement home	2
	Rehabilitation centre	3
	Senior residence	4
	Other 	5
No	I live in my own home alone or with my husband/wife	6
	I live at the home of my family	7
	I live with an informal caregiver	8

REC_Inst0. Residence in an institution: yes/no.

Answer No (6,7,8) to Inst0 => recode 0

Answer Yes (1 to 5 inclusive) to Inst0 => recode 1

>> If there is a mobility problem + residence in an institution:

If the respondent answers 2 for question AUT3. (= needs help getting about at home) + answer Yes (1 to 5) to question Inst0 (residence in an institution) => ask question IU1 - Mob

IU1 - Mob. If the robot was offered in the institution where you're living at present, would you want to use it?

Definitely not	Probably not	Probably	Most probably	Quite definitely
1	2	3	4	5

If the respondent answers 3, 4 or 5 for question IU2-Mob (yes), ask question IU2-Mob

If the respondent answers 1 or 2 (no), skip question IU2-Mob (do not ask question IU2-Mob).

IU2 - Mob. What might you want to use this robot for?

You may tick more than one box

To help me get about inside the institution	1
To keep up my mobility	2
As part of a rehabilitation programme	3
To improve or recover my mobility after a fall	4
To be even more in touch with the caregiver and the clinicians since I would be able to communicate with them through the robot	5
To be checked by the caregiver because he will monitor my results through the robot.	6

To improve my independence (for example in case of chronic conditions)	7
To recover as soon as possible in order to return to my home	8
Other <input type="text"/>	9

>> If there is a mobility problem + NOT in an institution:

In the respondent answers 2 for question AUT3. (= needs help getting about at home) + answer No (6,7,8) to question Inst0 (not in an institution) => ask question IU3 - Mob

IU3 - Mob. Supposing someday you had to stay in an institution, either temporarily (in a hospital after a fall, for example) or permanently (senior residence, retirement home or other institution), would you want to use this robot?

Definitely not	Probably not	Probably	Most probably	Quite definitely
1	2	3	4	5

If the respondent answers 3, 4 or 5 for question IU3-Mob (yes), ask question IU4-Mob

If the respondent answers 1 or 2 (no), skip question IU4-Mob (do not ask question IU4-Mob).

IU4 - Mob. What might you want to use this robot for?

You may tick more than one box

To help me get about inside the institution	1
To keep up my mobility	2
As part of a rehabilitation programme	3
To improve or recover my mobility after a fall	4
To be even more in touch with the caregiver and the clinicians since I would be able to communicate with them through the robot	5
To be checked by the caregiver because he will monitor my results through the robot.	6
To improve my independence (for example in case of chronic conditions)	7
To recover as soon as possible in order to return to my home	8
Other <input type="text"/>	9

>> If there is NO mobility problem + residence in an institution:

If answer 2 to question AUT3 is NOT ticked (= NO need for help getting about at home), + answer Yes (1 to 5) to question Inst0 (residence in an institution) => ask question IU5 - Mob

IU5 - Mob. Supposing someday you had mobility problems (after a fall, for example). If this robot was offered in the institution where you are a resident at present, would you want to use it?

Definitely not	Probably not	Probably	Most probably	Quite definitely
----------------	--------------	----------	---------------	------------------

1	2	3	4	5
---	---	---	---	---

*If the respondent answers 3, 4 or 5 for question IU5-Mob (yes), ask question IU6-Mob
If the respondent answers 1 or 2 (no), skip question IU6-Mob (do not ask question IU6-Mob).*

IU6 - Mob. What might you want to use the robot for?

You may tick more than one box

To help me get about inside the institution	1
To keep up my mobility	2
As part of a rehabilitation programme	3
To improve or recover my mobility after a fall	4
To be even more in touch with the caregiver and the clinicians since I would be able to communicate with them through the robot	5
To be checked by the caregiver because he will monitor my results through the robot.	6
To improve my independence (for example in case of chronic conditions)	7
To recover as soon as possible in order to return to my home.	8
Other <input type="text"/>	9

>> If there is NO mobility problem + NOT in an institution:

If answer 2 to question AUT3 is NOT ticked (= NO need for help getting about at home) + answer No (6,7,8) to question Inst0 (residence in an institution) => ask question IU7 - Mob

IU7 - Mob. Supposing someday you had mobility problems and had to stay in an institution, either temporarily (in hospital after a fall, for example) or permanently (senior residence senior, retirement home or other institution), would you want to use this robot?

Definitely not	Probably not	Probably	Most probably	Quite definitely
1	2	3	4	5

*If the respondent answers 3, 4 or 5 for question IU7-Mob (yes), ask question IU8-Mob
If the respondent answers 1 or 2 (no), skip question IU8-Mob (do not ask question IU8-Mob).*

IU8 - Mob. What might you want to use the robot for?

You may tick more than one box

To help me get about inside the institution	1
To keep up my mobility	2
As part of a rehabilitation programme	3
To improve or recover my mobility after a fall	4
To be even more in touch with the caregiver and the clinicians since I would be able to communicate with them through the robot	5

To be checked by the caregiver because he will monitor my results through the robot.	6
To improve my independence (for example in case of chronic conditions)	7
To recover as soon as possible in order to return to my home	8
Other <input type="text"/>	9

4.3 PERCEIVED CONTRIBUTION OF ROBOTS TO AGEING WELL

4.3.1 Daily life

CBV1 – DL. How much do you think the Buddy robot could help you age well?

	Strongly disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
This robot could help me age well	1	2	3	4	5

CBV2 – DL. We'd like you to tell us how much you think the Buddy robot could help you age well in different aspects of your life. For each statement, please state how strongly you agree or disagree.

RANDOMIZE			Strongly disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
The Buddy robot could help me...			1	2	3	4	5
... age well socially	• Feel less lonely	1					
	• Keep up relations with my family and friends (through video calls and exchanging photos and videos, etc.)	2					
... age well physically	• Keep physically fit (by having me do suitable physical activities)	3					
	• Take care of my appearance (stay attractive and slim through physical activities)	4					
	• Look after my health (by reminding me of my medical appointments and of things I should do to keep well such as drinking regularly in hot weather)	5					
	• Relax and help me sleep (through relaxation sessions or sophrology)	6					

... age well independently	<ul style="list-style-type: none"> • Feel safe (Buddy could call a caregiver or emergency services if I fell or had a sudden health problem) 	7					
	<ul style="list-style-type: none"> • Do certain activities more autonomously (video calls, reminding me of my appointments if I forgot them, etc.) 	8					
...age well mentally	<ul style="list-style-type: none"> • Exercise my memory (through games) 	9					
	<ul style="list-style-type: none"> • Keep my mind active (through activities, by responding to requests for information, through games, etc.) 	10					
...age well psychologically	<ul style="list-style-type: none"> • Keep me company 	11					
	<ul style="list-style-type: none"> • Entertain me (by its presence, our exchanges, by playing audio books, music, games, etc.) 	12					
	<ul style="list-style-type: none"> • Keep on learning new things (by helping me learn a foreign language, for example) 	13					
	<ul style="list-style-type: none"> • Make up for certain difficulties due to ageing so I go on leading a satisfactory life (for example, Buddy could let me listen to audio books if reading became difficult, make video calls if visiting loved ones became impossible, or I could opt to be reminded of appointments if my memory was failing, etc.) 	14					
	<ul style="list-style-type: none"> • Not get bored 	15					
	<ul style="list-style-type: none"> • Cope well with growing older 	16					
	<ul style="list-style-type: none"> • Keep a positive attitude 	17					
	<ul style="list-style-type: none"> • Reduce stress, peace of mind (BUDDY alerts someone if necessary) 	18					
	<ul style="list-style-type: none"> • It makes me feel young, I can share my experience with my nephews, children or grandchildren 	19					

4.3.2 Mobility

CBV1 – Mob. How much do you think the ASTRO robot could help you age well?

	Strongly disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
This robot could help me age well	1	2	3	4	5

CBV2 – Mob. We’d like you to tell us how much you think the ASTRO robot could help you age well in different aspects of your life.
For each statement, please state how strongly you agree or disagree.

RANDOMIZE			Strongly disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
The ASTRO robot could help me...			1	2	3	4	5
... age well socially	• Feel less lonely	1	1	2	3	4	5
	• Keep up relations with my family and friends (through video calls and telepresence)	2	1	2	3	4	5
	• Keep in touch with the caregiver (through the telepresence he can monitor remotely)	3	1	2	3	4	5
... age well independently	• To move independently in my home	4	1	2	3	4	5
	• Feel safe (if necessary, I can call someone)	5	1	2	3	4	5
... age well physically	• Keep physically fit (by having me do suitable physical activities)	6	1	2	3	4	5
	• Take care of my appearance (stay attractive and slim through physical activities)	7	1	2	3	4	5
	• Look after my health (by reminding me of my medical appointments and of things I should do to keep well such as drinking regularly in hot weather)	8	1	2	3	4	5

...age well psychologically	<ul style="list-style-type: none"> • Do certain activities more autonomously (move around, do right physical exercise) 	9	1	2	3	4	5
	<ul style="list-style-type: none"> • Monitor my physical performance (realtime feedback on my physical performance are sent to caregiver which can have a look on my status) 	10	1	2	3	4	5
	<ul style="list-style-type: none"> • Inspire me to walk 	11	1	2	3	4	5
	<ul style="list-style-type: none"> • Keep me company 	12	1	2	3	4	5
	<ul style="list-style-type: none"> • Entertain me (by its presence, propose me to walk, do some exercise, etc.) 	13	1	2	3	4	5
	<ul style="list-style-type: none"> • Make up for certain difficulties due to ageing so I go on leading a satisfactory life (for example, ASTRO could walk with me, make video calls if visiting loved ones became impossible, or I could opt to be reminded of appointments if my memory was failing, etc.) 	14	1	2	3	4	5
	<ul style="list-style-type: none"> • Not get bored 	15	1	2	3	4	5
	<ul style="list-style-type: none"> • Cope well with growing older 	16	1	2	3	4	5
	<ul style="list-style-type: none"> • Keep a positive attitude 	17	1	2	3	4	5
	<ul style="list-style-type: none"> • Reduce stress, peace of mind (ASTRO monitors me and alerts someone if necessary) 	18	1	2	3	4	5
	<ul style="list-style-type: none"> • It makes me feel young, I can share my experience with my nephews, children or grandchildren 	19	1	2	3	4	5

4.4 HUMANLIKE FEATURES OF THE ROBOT

4.4.1 Daily Life

In the following questions we'd like to know what you think of the Buddy robot's physical appearance. We'll give you pairs of statements to describe this robot. For each pair, please show which of the two statements you think better fits the robot.

ANT - DL. With the first series of statements, we'd like to know whether you find the Buddy robot shows human features, emotions or intentions

Please score your impressions of the robot on the scales below:

		Strongly agree	Somewhat agree	Neutral	Somewhat agree	Strongly agree	
1	Looks like a machine	1	2	3	4	5	Looks human
2	Doesn't express human emotions	1	2	3	4	5	Expresses human emotions
3	Behaves like a machine	1	2	3	4	5	Behaves like a human being
4	Moves like a machine	1	2	3	4	5	Moves like a human being

4.4.2 Mobility

In the following questions we'd like to know what you think of the Astro robot's physical appearance. We'll give you pairs of statements to describe this robot. For each pair, please show which of the two statements you think better fits the robot.

ANT - Mob. With the first series of statements, we'd like to know whether you find the Astro robot shows human features, emotions or intentions

Please score your impressions of the robot on the scales below:

		Strongly agree	Somewhat agree	Neutral	Somewhat agree	Strongly agree	
1	Looks like a machine	1	2	3	4	5	Looks human
2	Doesn't express human emotions	1	2	3	4	5	Expresses human emotions

3	Behaves like a machine	1	2	3	4	5	Behaves like a human being
4	Moves like a machine	1	2	3	4	5	Moves like a human being

4.5 AFFECT TOWARDS THE ROBOT (capacity to generate affect: friendliness, liking)

4.5.1 Daily Life

AFF - DL. The following pair of words are meant to see how much you like the Buddy robot.
Please score your impressions on the scales provided:

		Strongly agree	Somewhat agree	Neutral	Somewhat agree	Strongly agree	
1	Dislike	1	2	3	4	5	Like
2	Unfriendly	1	2	3	4	5	Friendly
3	Unkind	1	2	3	4	5	Kind
4	Unpleasant	1	2	3	4	5	Pleasant
5	Awful	1	2	3	4	5	Nice

4.5.2 Mobility

AFF - Mob. The following pairs of words are meant to measure how much you like the Astro robot
Please score your impressions on the scales provided:

		Strongly agree	Somewhat agree	Neutral	Somewhat agree	Strongly agree	
1	Dislike	1	2	3	4	5	Like
2	Unfriendly	1	2	3	4	5	Friendly
3	Unkind	1	2	3	4	5	Kind
4	Unpleasant	1	2	3	4	5	Pleasant
5	Awful	1	2	3	4	5	Nice

4.6 BRAKES ON ADOPTING THE ROBOT

4.6.1 Daily life

Fre1 - DL. We'd like to know all the reasons why you might not want to get this robot. For this purpose, please tell us how strongly you agree or disagree with the following statements.

RANDOMIZE		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I'm afraid the price might be too high	1	1	2	3	4	5
I'm afraid I wouldn't know how to make it work	2	1	2	3	4	5
I'm afraid this robot might be intrusive and not respect my privacy (that it could hear me when I'm talking about personal things and see everything I do)	3	1	2	3	4	5
I'm afraid this robot might just make me lazier instead of more autonomous	4	1	2	3	4	5
The robot seems a bit too limited	5	1	2	3	4	5
I'm afraid of having less human contact . I'm afraid the contacts I have with caregivers might lessen if the robot did certain things instead of them.	6	1	2	3	4	5
I feel the robot is 'cold', it is not human-like	7	1	2	3	4	5
I feel that the robot is too unknown for me, I don't know what it exactly is	8	1	2	3	4	5
I am afraid that I will not be able to communicate with the robot. For example, that it doesn't understand my dialect or because I have hearing problems.	9	1	2	3	4	5
It scares me. I don't feel safe using it.	10	1	2	3	4	5
I'm afraid to not be able to use the robot by myself .	11	1	2	3	4	5
I don't like robots	12	1	2	3	4	5
I find the robot not innovative enough	13	1	2	3	4	5
I'm afraid letting the robot remind me to take my medication might be dangerous (if the robot made a	14	1	2	3	4	5

mistake or malfunctioned, if wasn't set correctly, of if I misunderstood what it said)						
I find the robot too small . I'd need to bend over, which is difficult for me	15	1	2	3	4	5
Its screen is too small . I might not be able to see what's on it	16	1	2	3	4	5
The robot might not be able to move around where I live (steps, mats, various obstacles, etc.)	17	1	2	3	4	5
I'm autonomous enough . I don't need this robot	18	1	2	3	4	5
We ask you not to tick anything on this line	19	Click on this line is not compulsory Do not display in the first or last row				

4.6.2 Mobility

Fre1 - Mob. We'd like to know all the reasons why you might not want to get this robot. For this purpose, please tell us how strongly you agree or disagree with the following statements

RANDOMIZE		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I'm afraid the price might be too high for the organizations that could use this robot for their patients (hospitals, retirement homes, rehabilitation centers...)	1	1	2	3	4	5
I'm afraid I wouldn't know how to make it work	2	1	2	3	4	5
I'm afraid this robot might be intrusive and not respect my privacy (that it will share my data with everyone without my knowledge).	3	1	2	3	4	5
I'm afraid this robot might just make me lazier instead of more autonomous	4	1	2	3	4	5
The robot seems a bit too limited	5	1	2	3	4	5
I'm afraid of having less human contact . I'm afraid the contacts I have with caregivers might lessen if the robot did certain things instead of them.	6	1	2	3	4	5

I feel the robot is 'cold', it is not human-like	7	1	2	3	4	5
I feel that the robot is too unknown for me, I don't know what it exactly is	8	1	2	3	4	5
I am afraid that I will not be able to communicate with the robot. For example, that he doesn't understand my dialect or because I have hearing problems.	9	1	2	3	4	5
It scares me. I don't feel safe using it.	10	1	2	3	4	5
I'm afraid to not be able to use the robot by myself.	11	1	2	3	4	5
I don't like robots	12	1	2	3	4	5
I find that this robot is not innovative enough	13	1	2	3	4	5
I feel the robot doesn't have any benefits for me at the moment	14	1	2	3	4	5
There will not be enough robots to help me at the facility that I'm staying	15	1	2	3	4	5
I find the robot too big . I won't be able to see past it.	16	1	2	3	4	5
I don't want to be seen as a user of a robot	17	1	2	3	4	5
I'm afraid I won't be able to work it. For example because it requires too much strength or moves too fast for me to follow.	18	1	2	3	4	5
We ask you not to tick anything on this line	19	Click on this line is not compulsory Do not display in the first or last row				

PART V: FAMILIARITY WITH NEW TECHNOLOGY

TEC1. Please tell us how often you use the following technology:

Technology use for social connection (Chopik, 2016)

RANDOMIZE		Never	Less than once a year	More than once a year	More than once a quarter	More than once a month	More than once a week	More than once a day
Email (electronic mail)	1	0	1	2	3	4	5	6
Social media like Facebook, Twitter or other such platforms	2	0	1	2	3	4	5	6
Internet video or telephone calls (like Skype)	3	0	1	2	3	4	5	6
Discussions by instant messaging on a computer or mobile phone, (for example:	4	0	1	2	3	4	5	6

chat apps, WhatsApp, Messenger, etc.)								
---------------------------------------	--	--	--	--	--	--	--	--

TEC2. How comfortable are you with computers, smartphones or tablets?

Not at all comfortable	Not very comfortable	Neither comfortable nor uncomfortable	Mostly comfortable	Very comfortable
1	2	3	4	5

PART VIII: PROFILE OF RESPONDENT

In this last part, we're going to ask you some questions about yourself.

(Single) S1. Are you in paid employment?

One answer only

Yes	1
No, I've worked but I'm at present unemployed	2
No, I'm retired or in the process of retiring	3
No, I'm seeking my first job	4
No, I'm still at school or in higher education	5
No, I'm a man or woman at home	6
No, I'm not in work for another reason	7

TRIGGER - If S1=1 or 2 or 3

(Single) S2. If S1= 1: What is your present occupation?

If S1= 2 or 3: What was the last occupation you had?

One answer only

PROG: Alphabetical order

Farmer	1
Artisan	2
Merchant or similar	3
Company director	4
Liberal profession or similar	5
Public service manager, intellectual or artistic occupation	6
Company manager	7
Intermediate occupation in teaching, health, public services or similar	8
Intermediate occupation in corporate administration and commerce	9
Technician	10
Supervisory occupation	11
Public sector employee	12
Commercial or corporate employee	13
Manual worker	14

(HIDDEN SINGLE) RecCSP1. Last SPC before retirement

CSP +	1	S1 = 1 or 2 or 3 AND S2 = 1 to 11
CSP -	2	S1 = 1 or 2 or 3 AND S2 = 12 to 14
Nonworking	3	S1 = 4 to 7

(HIDDEN SINGLE) RecCSP2. Present SPC

CSP +	1	S1 = 1 or 2 AND S2 = 1 to 11
CSP -	2	S1 = 1 or 2 AND S2 = 12 to 14
Nonworking	3	S1 = 3 to 7

S3. What is your highest level of education?

F	
France	
Aucun diplôme	1
Brevet des collèges / BEPC / CAP / BEP	2
Bac / Bac professionnel	3
Diplôme Bac + 2 (DEUG, BTS ou DUT)	4
Diplôme Bac + 3 à Bac + 4 (Licence, Maîtrise)	5
Diplôme Bac + 5 ou plus élevé (DESS, Master, DEA, Doctorat...)	6

N	
Netherlands	
Fewer than 6 years of primary school 6 years	1
Primary school or special education	2
Primary school without further completed education	3
Vocational school	4
Secondary professional education	5
University entrance level	6
University / tertiary education	7

I	
Italy	
Scuola primaria (age 6-11).	1
Scuola secondaria di primo grado (age 11-14).	2
Scuola secondaria di secondo grado (14-19).	3
University degree : Bachelor degree 3years	4
University degree : master degree + 2 years	5

S4. What is your marital status?

Unmarried	1
Divorced	2
Widowed	3
Living in union, cohabiting	4
Married	5

S5. How many children and/or grandchildren do you have?

PROG: GRID

		None	1	2	3	4 or more
1	My own children	0	1	2	3	4
2	[IF S4 = 3, 4 OR 5 (has a spouse)] My spouse's children	0	1	2	3	4
3	My own grandchildren	0	1	2	3	4
4	[IF S4 = 3, 4 OR 5 (has a spouse)] My spouse's grandchildren	0	1	2	3	4

S5bis. Have you got any children and/or grandchildren?

PROG: HIDDEN MULTI

		No	Yes
		0	1
1	My own children	If S5.1 = 0	If S5.1 = 1 to 4
2	My spouse's children	If S5.2 = 0	If S5.2 = 1 to 4
3	My own grandchildren	If S5.3 = 0	If S5.3 = 1 to 4
4	My spouse's grandchildren	If S5.4 = 0	If S5.4 = 1 to 4

S6. How do you rate your present financial situation?

In constant financial difficulty	Sometimes in financial difficulty	Neither in difficulty nor comfortable financially	Financially comfortable	Financially very comfortable
1	2	3	4	5

And to finish with...

S7. What roughly is your net total household income before tax?

Please take into account all your household income:

- Earnings of all the members of your household (including all bonuses and other extras)
- Benefits and other sources of income for all the members of your household (grants, allowances, pensions, capital income, etc.)

PROG: SINGLE

Below 1 000 €	1
From 1 000 to 1 499 €	2
From 1 500 to 1 999 €	3
From 2 000 to 2 499 €	4
From 2 500 to 2 999 €	5
From 3 000 to 3 999 €	6
From 4 000 to 4 999 €	7
From 5 000 to 5 999 €	8
From 6 000 to 6 999 €	9

From 7000 to 7 999 €	10
From 8000 to 8 999 €	11
From 9000 to 9 999 €	12
Above 10 000 €	13
I don't know	88
I'd rather not answer	99

Thank you for answering this questionnaire !