AAL Project no: AAL-CALL-2019

iCan

ICT-based assistant for everyday life

D4.2 Mock-up field tests and evaluation analysis

Project ref no	AAL-CALL-2019
Project acronym	iCan
Project full title	ICT-based assistant for everyday life
Nature[1]	R
Dissemination level[2]	RE
Due date of deliverable	M16
Actual submission date	M18
Deliverable name	Mock-up field test: evaluation plan, design, and field pilots
Status	FINAL
Related WP	WP4-Pilot tests and Evaluation Analysis
Leading Partner	AGE
Other contributors	ANA, BLC, ESK
Author(s)	AGE
Keywords	Evaluation plan; field pilots; older adults; ICT
Abstract (for dissemination)	The present deliverable outlines the methodology used in the field testing of the iCan system mock-up by older adults, informal caregivers, commercial stakeholders, taxi service providers and escorts. This deliverable will allow the consortium to gather user-centered feedback and optimize the system in order to release the 1st system prototype to be tested in controlled and real-life environments.

Disclaimer

The information in this document is subject to change without notice. Company or product names mentioned in this document may be trademarks or registered trademarks of their respective companies.

Version History

Version	Edited by	Date	Description
1	Romina Sampanai	05.08.2021	First draft
2	Sotiria Moza	8.08.2021	Reviewed document and proposed suggestions
3	Marina Polycarpou,	15.09.2021	Reviewed document and proposed suggestions
4	Cosmina Paul	20.09.2021	Protocol Preparation/User requirements
5	Idoia Muñoz	24.09.2021	Reviewed document and proposed suggestions
6	Andria Hadjicosta	24.09.2021	Reviewed document and proposed suggestions
7	Foteini Yiori	25.09.2021	Reviewed document and proposed suggestions
8	Saroj Maharjan	25.09.2021	Reviewed document and proposed suggestions
9	Emmanuela Rota	25.09.2021	Reviewed document and proposed suggestions
10	Romina Sampanai	30.09.2021	Finalization

Table of Contents

Content

Table of Tables

List of abbreviations (alphabetically)

Abbreviation	Full name

DoW	Description of Work
CSs	Commercial Stakeholders
PUs	Primary Users
SUs	Secondary Users
TUs	Tertiary Users
WP	Work Package

Executive summary

iCan project's main objective is to create an inclusive online platform which will aid the end-users in various ways in their everyday life. To better achieve this goal, end-users are involved from the initial stages of development of the iCan platform to review the developmental efforts and provide multifaceted feedback. End-users' involvement commenced during the user requirement phase (T2.1) (method and results of this phase can be found in deliverable D2.1 User requirements).

After the successful completion of this phase, the technical team released a system mock-up based on end-users' collective feedback. According to the methodological plan, our goal was to test this release first in controlled environments (lab testing) and then pilot it with actual end-users.

In this context, the present deliverable contains both the methodology and the results of T4.3 Deployment of the pilots in a real environment. After a brief presentation of the lab test results and implications in section 1, section 2 is dedicated to the description of the mock-up field trials. As such, it includes the evaluation framework and the methodology used for each participant category. The fourth section includes the results of the mock-up field trials and is divided into three subsections detailing the results retrieved from primary, secondary and tertiary users. This section also includes result analyses, conclusions, future implications and suggestions for improvements. Section five describes the development and use of the requirement traceability tool by the consortium. Finally, the deliverable concludes with the behavioral analysis (T4.4) including the presentation of end-user results through a market segmentation approach as well as the provision of the fine-tuned user personas.

Introduction

Mock-up field trials phase is one of the most important phases of the iCan system. Participants and researchers have the opportunity to work together to evaluate information about the end-user requirements collected in the previous stages of the project.

During the mock-up field trials, participants with different backgrounds were recruited based on the inclusion and exclusion criteria set by the consortium in order to determine the optimal system characteristics according to their needs, but also to determine the ideal methods, channels and tools, so that the dissemination and exploitation WP can employ appropriate strategies to effectively reach the future iCan app customers.

1. Lab tests results

This section presents a summary of the main findings and conclusions of the lab testing to assist the reader to both connect and understand the two testing phases of the iCan mock-up. During the lab tests, the mock-up was tested by professionals and specialists. Participants were asked to reflect on our system via a think-aloud protocol and express their opinions from the perspective of the older adult and identify potential problems and challenges that older adults may face during the testing phase. The results of the lab tests (found in D4.1) provided guidance to the IT partners of the iCan consortium to improve the mock-up for the field-testing phase in order to be administered to real end-users during the mock-up field trials.

More detailed information on the procedure as well as the methodology followed during the lab test can be found in D4.1 Mock-up lab test: evaluation plan, design, and lab tests.

The feedback of the participants was overall satisfactory and mainly focused on 1) availability of options (rating and review modules in taxi and escort service), 2) trustworthiness of the app (background check of the taxi drivers and the escorts, protected personal data, not online payments), 3) simplicity of application (different color health data collected by the wearable, different languages) and 4) appearance (clear, simple, easy to access, and all the necessary information is included on the first page).

The lab tests results enabled the technical partners to optimize the Mock-ups platform using the comments made by professionals in the lab. Lab tests addressed major usability and functional problems that the iCan platform had before it would be tested with real users.

2. Evaluation framework of mock-up field test

The evaluation framework presented in this deliverable is the outcome of T4.3 and T4.4 and aims to guide the end-user organizations during the implementation of the first prototype mock-up field trials. The following section provides the evaluation framework for all target groups participating in the mock=up field test.

2.1 Research questions

The main objectives of the mock-up field test are to explore:

- the functionality of the iCan application
- the ease of use and learnability
- the general user experience (desirability, acceptance, etc.)
- benefits and risks purchase intentions and business models
- service/features prioritization with regards to the target customers
- suggestions for improvement
- ethical requirements (as they arose from lab tests)

The answer to the main research question *"How do end-users perceive the iCan application?"* will help the technical partners to make the necessary changes and improvements which will, ultimately lead to the release of an end-user appropriate and desirable product. There are several sub-questions that would also contribute to the improvement of the application and thus, are considered as significant research questions.

1. Is the iCan application easy to use?
2. Did the users encounter any difficulties while using the app?
3. Are the users satisfied by the features of the iCan application?
4. Is the iCan application effective in supporting older adults in their everyday life?
5. What will be the benefits for the users of the application?
6. How does the user feel when using the iCan application?
7. Does the user consider the navigation to the iCan application pleasant?
8. What users' information should be included in the iCan application?
9. What would the iCan system need to include in terms of privacy?
10. What would the iCan system need to include in terms of safety?
11. What is missing from the iCan application?
12. How could the application be improved for older adults?
13. Would the functionalities or features increase the number of current customers or help you expand the market of a business?
14. Would the users be willing to pay to own such an app?
15. What pricing model would be the optimal for this system (e.g., one-off payment, pay per month, pay per product listed, pay commission of sales, other)?

2.2 Participants

Types of users

For the mock-up field trials three target groups will be involved: (a) PUs; older adults (b) SUs; informal caregivers and TUs; business owners who would like to promote their products/services through the iCan platform, taxi services providers and escorts.

According to our DoW, the planned user numbers and categories of users for this phase included 15 PUs and 5 SUs from each end-user organization. However, when designing the methodology of the mock-up field trials, we decided to involve 15 PUs, 4 SUs and 6 TUs as feedback acquisition from all kinds of potential users of the application was deemed crucial. Details on user numbers per category can be found in Table 1.

Planned participant numbers for the end-users organizations	Final participant numbers for the end-users organizations

• 30 Primary Users
 	
• 10 Secondary Users
	● 30 Primary Users
	● 8 Secondary Users
	● 12 Tertiary Users:
	   ❖ 4 taxi service providers
	   ❖ 4 escorts
	   ❖ 4 commercial stakeholders (product/service providers)

Table 1 Mock-up field trials: planned and retrieved participant numbers per category

The inclusion / exclusion criteria used for each target group can be found in Table 2 and were used to specify what will be considered in order for a participant to be included in the 1st field testing phase and provide to the researchers his/her feedback on the application.

Type of Participant	Inclusion criteria	Exclusion criteria
PUs	● 65 years old and over ● No cognitive impairment ● Might have physical disability ● Living independently ● Preferable to have some IT literacy (but not having is not an exclusion criteria)	● Vision impairment ● Cognitive impairment (assessed either by previous records per organization or via a previous doctor's diagnosis)

	● Willing to participate voluntarily in the project.	
SUs	● Over the age of 18 ● Responsible for the care of a senior ● Willing to participate voluntarily in the project	Not fulfilling inclusion criteria
TUs	● Over the age of 18 ● Willing to participate voluntarily in the project	Not fulfilling inclusion criteria

Table 2 Inclusion and exclusion criteria for participants during the Mock-up field trials

2.3 Recruitment

The researchers used face-to-face contact, phone calls and e-mails to recruit participants for the mock-up field trials. In all cases, the researchers followed ethical guidelines in research and respected the privacy of the participants as they made it clear that users were not required to answer protocol questions that made them feel uncomfortable or were considered too personal without providing a reason for choosing so. Participants were contacted from each organization's registries and records to their previous participation in organization's research or and/or social media. Participants received a brief introduction on the iCan project content, objectives, current study's goal and after having any query resolved, they signed an informed consent. Their participation was voluntary, and no monetary incentives were offered. The researchers conducted the mock-up field trials at user homes or each organization's premises depending on participants' schedule and availability. All procedures were compliant with the nationally imposed COVID-19 restrictions at the time.

2.4 Methodology

The testing methodology for the mock-up field trials was designed to accommodate our research questions and objectives. Our main instrument was a structured questionnaire developed for the project's needs and specifically adapted to each target group. Both qualitative and quantitative items were included in this questionnaire to ensure that we collect both rich and quantifiable feedback.

The items directed to each group aimed to serve as a data source to explore different aspects of the iCan system. For example, the PUs provided the partners with feedback that would

improve the app for the older adults, the SUs (caregivers) suggested changes that would make their job (assisting the older adult) easier or make the system more effective from the older adults' perspective while the Tus' opinion had a different meaning, as the commercial stakeholders, taxi services providers and escorts answered from the perspective of the business environment and how could the iCan app get to the market.

The different protocols used for each category of participants will be described in detail in the following sections.

A.   Metrics and criteria of assessment

During the mock-up field trials, the metrics that were assessed for all categories of users are:

- Demographics
- Desirability
- Acceptance
- Ease of use
- Functionality
- User's experience
- Business aspects
- Ethics

B.   Methods

In general, researchers familiarized themselves with the mock-up before testing it with users. The methodology followed is mentioned in the steps below:

1. The researchers introduced the iCan project and informed the participants with regards to its aims, purpose and what was required by them in that testing phase.
2. Provided the informed consent to the end-users and resolved any questions before commencing the testing. The paper format for the informed consent can be found in Annex 4.
3. Collected participants' demographic data (age, sex, IT literacy, etc) with the respective questionnaire (Annex 5). For participants who did not wish to provide their demographic information researchers inserted 'n/a'.
4. Used the paper prototyping method (see Annex 2) and clickable mock-up material (Annex 1) to demonstrate the platform's interface and the functionalities of each service. The wireframes (see Annex 3) were shown through virtual teleconferencing platforms, e.g., Zoom, through PowerPoint or in hardcopy versions depending on the resources and social distancing measures in place.

   ❖ Presented the functionalities for each of the six paper prototypes by showing the paper prototypes in Annex 3 or alternatively the paper prototypes provided in PDF or PPT format or the clickable mock-ups found in Annex 4 to the participants.

❖ After demonstrating each service, researchers asked the respective questions for each one of them initiate discussion by encouraging the participants to comment on them) and noted down their answers.''

C.   Methods and instruments per user group

This section is divided in three parts, a) Methods and instruments for PUs, b) Methods and instruments for SUs and c) Methods and instruments for TUs.

Part A: Methods and instrument for PUs

For the field test with older adults, the paper prototyping method and clickable paper were used to demonstrate all the functions of the iCan application. While the user was introduced to the functions the researcher asked specific questions and tried to make discussion and identify difficulties to be encountered, gained an overview of how well the older adult understood the features and how easy it would be for him/her to use the application. Based on the comments of the user the researcher gathered the functions which were difficult for older adults to understand, recognise and use as well as suggestions for improvement.

Instructions for researchers:

The mock-up was accessed in the following link:
https://projects.invisionapp.com/share/3810Q46LNSHF#/screens/449553949

For the primary user, the researcher used the questions of Annex 7 to receive feedback.

Part B: Methods for SUs

During the sessions with a secondary group (caregivers), the researcher explained all the features of the application and asked the user how the services could work in a hypothetical scenario. The researcher conducted an interview in the form of a discussion to identify advantages and disadvantages of the application as well as proposed improvements. In addition, the users expressed their opinion on how well the older adult understood and how easy it would be for him/her to use the application.

● The testing of the iCan application with the older adults (PUs) was carried out using and users' feedback was collected through questionnaires at the end of the session. The features of the application were presented by the researcher and discussed with the users. Regarding the questionnaire, the **appearance** was evaluated with 3 questions, the **usefulness** with 2 questions, the **business aspects** with 2 questions, the **ethics** with 3 questions and the **usability** of the iCan application with 9 questions.

● Regarding the caregiver sessions (SUs), they were asked about the features of the iCan application that were presented. **Usefulness** was assessed with 2 questions, **business**

aspects with 2 questions, **ethics** with 3 questions and **usability** of the iCan application with 7 questions.

- As far as the TUs are concerned there are 3 different categories. For the escorts **usability** with the iCan application with 1 question, **ethics** with 2 questions and **usefulness** with 5 questions. For the taxi service providers **ethics** with 3 questions, **business aspects** with 2 questions, **usability** with the iCan application with 1 question and **usefulness** with 9 questions. Finally, the Commercial stakeholder, **ethics** with 2 questions, **business aspects** with 2 questions, **usability** with the iCan application with 1 question and **usefulness** with 6 questions.

- Regarding TUs, there are 3 different categories. The **usefulness** of the iCan application for escorts was assessed with 1 question, **ethics** with 2 questions and **usefulness** with 5 questions. For taxi service providers **ethics** were assessed with 3 questions, **business aspects** with 2 questions, **usability** of the iCan application with 1 question and **usefulness** with 9 questions. Finally, the commercial stakeholder, **ethics** were assessed with 2 questions, **business aspects** with 2 questions, **usability** of the iCan application with 1 question and **usefulness** with 6 questions.

Instructions for researchers:

The mock-up was accessed in the following link:
https://projects.invisionapp.com/share/3810Q46LNSHF#/screens/449553949

For the secondary user, the researcher used the questions of Annex 8 to receive feedback.

Part C: Methods for TUs

During the sessions with a TU (escorts, taxi services providers and commercial stakeholders), the researcher introduced to the tertiary user all the features of the application and asked the user how the services could work for them. The researcher conducted an interview in the form of a discussion to identify the advantages and disadvantages of the application as well as the suggested improvements.

Instructions for researchers:

The mock-up was accessed in the following link:
https://projects.invisionapp.com/share/3810Q46LNSHF#/screens/449553949

Escorts

For the escorts, the researcher used the questions of Annex 9 to receive feedback.

Taxi Service Providers

For the Taxi Service Providers, the researcher used the questions of Annex 10 to receive feedback.

Commercial Stakeholders

For the CTs, the researcher used the questions of Annex 11 to receive feedback.

D.   Material: Mock-up components

The mock-up which was tested during the mock-up field trial consisted of the following components:

1. Friends: through this module, the user can meet like-minded people, find social company, and improve social and conversational skills. A minimal and intuitive networking environment will connect the senior users to their family and friends, upload photos or videos, etc.
2. Photo Album: through this module, the user can include personal photos in the application, use them through the game feature and play with secondary or TUs.
3. Find an Escort: this tool will be used by both senior adults and people who want to offer their services as escorts. Thus, the standard interface of the escort feature will be for asking for an escort, but there will be the option to offer to be one, completing the respective resume for a new escort profile.
4. Book a Taxi: through this module, the users can either press a "call" button in the online platform or smartphone/tablet application, stating the route they want to follow, or use the platform's tool to state the starting place and the destination through a mapping service. The starting point can of course be identified by GPS.
5. Products and Services: through this module, the senior will be able to search for a product or service. iCan tool will find the corresponding items, appearing first the ones that have to do with seniors.
6. Games: those games will aim to help the user get more connected with his family, network with close friends and practice their memory. The platform will show him/her previously uploaded photos of their family with some faces hidden and will ask questions like "who might that be", or "where is this picture taken from", "when was that event" etc. When successful, the platform will contact the other persons tagged in the photo to inform them that their father, mother, grandparent (etc.) played a game and found them there, maybe you can make a phone call to say hi. That way the senior will be happy to play if the "reward" is a phone call and a possible meeting with people he loves.

It should be noted that the components were not functional during the mock-up release as planned in project DoW. Some functionality was provided in taxi service and escorts service

(e.g., ability to book a taxi driver), but overall, a clickable wireframe was used to facilitate understandability by end-users.

3.   Results from mock-up field testing

This section presents the feedback gathered from the mock-up field test with real end-users (older adults, informal carers, escorts, taxi service providers and commercial stakeholders). The results from each user category are presented separately in order to identify possible similarities and differences between both the user categories and also, the two end-user countries (Cyprus and Romania). At the end of the section, the suggestions and the improvements suggested by the users are presented.

For the collection and analysis of the users' feedback the responsible end-user organization (AGE) provided an excel template to gather the feedback of all users from all countries and proceed to the analysis. Thematic analysis was conducted for the qualitative data and descriptive statistics/frequencies were used for the quantitative data.

Feedback from end-users in Cyprus and Romania

The feedback sessions for the mock-up field test in Cyprus and Romania took place in July 2021. The sessions took place in individual sessions. During the mock-up field trials, 30 older adults, 8 informal caregivers, 4 escorts, 4 taxi service providers and 4 commercial stakeholders participated.

TYPE OF PARTICIPANTS		PRIMARY		SECONDARY		TERTIARY	
Mock-up: Field tests		CY	RO	CY	RO	CY	RO
Gender	**Male**	4	4	0	2	3	4
	Female	11	11	4	2	3	2

	54-	0	0	4	4	5	5
	55+	1	2	0	0	0	0
	65+	3	12	0	0	1	1
Age	75+	11	1	0	0	0	0
	Urban	13	11	4	4	5	6
Habitati on zone	Semi-urban	2	1	0	0	0	0
	Rural	0	3	0	0	1	0

Table 3 Demographic characteristics of Mock-up: Field trials participants

Primary Users (Older adults)

A total of 30 people participated, 22 women and 8 men, aged 65-87. Among the participants, 10% resided in semi-rural areas, 8% in rural areas and 82%in urban areas. The percentage of participants who were married was 77%, unmarried was 13% and widowhood represented 10%. Out of all the participants, 51% had graduated from university, 21% had graduated from Professional school / Apprenticeship, 18% had stopped education after elementary school and 10% had General qualification for university entrance. Regarding the participant's occupation, 75% were unemployed, including retirees and housework, 10% work full time and 15% part time.

To begin with the Friends feature, older adults said they would like it if it was possible to find people with common interests or receive notifications of upcoming events that would interest them. They would also like to find people they knew in the past and keep in touch with them and be able to communicate with them or play games as it was mentioned by 37% of participants. This feeling has been reinforced by the loneliness they felt during the COVID-19 quarantine and associated social distancing. This indicates that the iCan system may be a valuable app during the pandemic to enhance socialization among older adults. On the other

hand, 10% claimed that they were afraid of strangers but a description / photo in the user profile that would make them feel safer as they would feel as if they knew more about this person.

In terms of the Product and Service feature, 10% stated that it should be split into two different categories. In the first category of Products, the products included must be the ones that are necessary for the older adults and perhaps not so commonly found in supermarkets as mentioned by 10%. This way it would be easier for the users to find the product they need and get it delivered to their home but also, offer a competitive advantage compared to available apps. Furthermore, they stated that offering products on sales and exclusive discounts through the iCan app would hold a significant advantage. Products for the health and safety of the older adults could be included, such as a hand shower head and a bathtub / shower.

In addition, the second category entitled Services could include healthcare service providers including physiotherapists, psychologists, etc according to the other 10% . This would help older adults find the professional they need quickly and according to their needs during that period. Was also suggested that these two categories would need a cancellation policy for orders or bookings of health professionals, especially in case of incorrect order, as well as purchase instructions to make the use of these categories easier for the customer.

Regarding the appearance of the application, users suggested darker themes mainly due to the reduced sensitivity to contrast. Decreased contrast sensitivity causes the eyes of older adults to have a slower transition between dark and light areas. In addition, they would like to have a colorful application so that they could distinguish similar icons, buttons, and other shapes of user interface elements. Replacing some of the words with pictures would also help older adults to use the application as it would be easier for them to find and distinguish the service they would need. The main colors that were mentioned were red (36%), blue (26%) and green (23%).

Users continued with suggestions on escort service, 27% saying potential escorts should be trained or have previous experience with older adults in order to be trustworthy and provide quality services. Escorts should also be rated and reviewed by older adults to ensure the quality of the application. The background of the escort should be checked so that the escorts would be reliable and make the older adults feel safe while having them as companions at home or at their outdoor obligations, as people who transport them to their appointments and/or provide help in their daily chores, such as shopping. Before booking an escort, older adults would like to choose the right one, sorting the available escorts by cost, price and having a way of contacting (phone number) them to clarify further details according to 14% of participants. In the case of cancellation, the other party should know if they could claim a refund or not according to the cancellation policy in place (e.g., if cancellation is performed within a reasonable amount of time, then parties should be eligible for a refund). It should be mentioned that especially in Cyprus primary users would prefer students as companions as such a scheme would prevent the older adults from feeling socially isolated and alone and would promote intergenerational activities.

As for the photo album, 10% of the participants mentioned that older adults would like to upload their favorite photos to the app so they can use them through the game feature and play with their relatives or even caregivers. This, as they stated, would also help them avoid isolation, enhance their socialization and fill their free time recreationally. 47% were not sure or would not use this feature of the application as they didn't find it innovative considering they can store and manage their photos from their smartphones.

In addition, privacy and security were issues extensively discussed as 53% of participants mentioned that since they provided some personal data (name, phone number, photos) to the app, and explicitly would like such data to be protected and not shared by any means to advertising companies. Password- or fingerprint-protected accounts were among the features requested by end-users to promote their safety and privacy. Finally, older adults expressed their concerns about privacy of the data they share online, since many among them are not familiar with ICT products and thus, requested an explanatory video to be incorporated in the app.

In terms of commercialization models, 33.3 % mentioned that they would pay for the app and suggested having a free trial for 2 or 3 months to have the chance to try out the app and make sure they were happy with the features before purchasing. After the free trial they would like to have a monthly subscription. In addition, associations should be contacted as commercial stakeholders so that they can provide the application for free or cheaper to their customers in the future.

In general, older adults provided suggestions for the inclusion of further features such as a) a nutrition module, as they wanted to learn more about the nutritional foods that will help their human body, as well as b) a news module, because they wanted to be informed about recent events. Voice commands were reported to facilitate the use of the app for visually impaired older adults. They would also like to receive reminders for dates, birthdays, and daily chores so that they could easily keep track of their tasks.

Secondary Users (Informal Caregivers)

A total of 8 people (6 women) participated in the secondary users' sessions, aged 28-47. All the participants resided in urban areas. The percentage of participants who were married is 88% and unmarried is 12%. Of the total number of participants, 100% have graduated from university. Regarding participants' occupation, 88% worked full time and 12% part time.

First of all, 63% would like to be informed about the health and mental condition of their customers during the day, even if they were not there at that time, and they would especially like to receive emergency alerts for their customers and updates about their physical

condition. 37% of the Sus would like to know what the patient is using on the platform and how many times she/he logs in.

In terms of safety, 25% mentioned that personal data should be protected and 25% that there should be the option to use password or fingerprint in order to make the app safer. As far as the appearance is concerned 50% of SUs stated that as many words needed to be replaced with pictures, this would make it easier and less confusing for their customers to immediately find the service they would need.

The financial issue was something that made them consider it a lot, 50% would pay for the app and 25% was not very sure as they would like to know more about offers.

The caregivers said that on average 3 of the 5 older adults they had in mind would use the app as it depended on their technological skills, and they believed that their relatives could be better. One solution to the technological barrier was the education of older adults.

Tertiary Users (Escorts)

A total of 4 people participated, 2 women and 8 men, aged 17-21. All the participants resided in urban areas and were not married. Of the total number of participants, 75% has attended university and 25% has General qualification for university entrance. Regarding the participant's occupation, 50% were unemployed and 50% worked part time. All participants contributed feedback to improve the application.

100% of escorts thought it was a good idea, with 50% saying it gives them a chance to work and older adults a way to get help and companionship. They expressed some concerns regarding older adults' ability to use the app due to a lack of technological skills, with 50% of the escorts suggesting that one solution to the technological barrier could be the training of older adults.

The escorts (100%) also mentioned that they should be able to provide information such as age, work experience, distance, and price, so that older adults could choose the right one for them. It should be clear whether the attendant has a vehicle, and likewise, whether the older adult would need transportation services. In any case, escorts stated that the app should include relevant fields for the older adults to enter the exact services they would need from the escorts. As far as the services that they should provide, transportation was mentioned by 100% of escorts and company was mentioned by 75%.

In addition, 100% escorts would like to have a way of communicating directly with customers about their appointments. In terms of safety, 100% of the escorts

Tertiary Users (Taxi Service Providers)

A total of 4 people participated, 2 women and 2 men, aged 35-73. All participants resided in urban areas. The percentage of participants who are married is 50% and unmarried is 50%. Of the total number of participants, 50% has graduated from university and 50% has General qualification for university entrance. Regarding the participant's occupation 75% worked full time and 25% part time.

In general, the taxi service providers mentioned how the application would be helpful for them and what improvements were needed. Initially, they suggested that a section with all the necessary information be included, such as the entire program, if clients should be accompanied to the building or hospital, extra luggage, additional assistance. This way the taxi driver would be prepared and would provide quality service with 50% of CSs mentioning that.

In addition, taxi providers would like to receive information and metrics on how often a customer used their service. On the other hand, they believed that their companies would be advertised through the application and would gain more customers as they would be more accessible to people who have difficulty navigating the city or finding a service online using the internet. For their part, 50% suggested that prices, 75% mentioned proximity to customers' homes are features that should be more visible to the older adults.

Similarly, to escorts they believed that their services should be evaluated and rated. This way the older adults could sort and choose the right one for them.

Regarding safety, 50% stated that the background of taxi companies and drivers who would like to use the application should be checked and the personal data of drivers (previous experience, image, etc.) should be visible to customers. Protection of personal data was mentioned by 100% of taxi drivers. In terms of payment, 75% would be willing to pay for the application with a monthly subscription or one-off payment (50%).

Tertiary Users (Commercial Stakeholders)

A total of 4 people participated, all men, aged 35-46. Among the participants, 25% resided in rural areas and 75% resided in urban areas. The percentage of married participants was 75%, while the percentage of unmarried participants was 25%. 75 percent of all participants had a university diploma, with the remaining 25 percent stating the other. In terms of occupation, all participants were employed.

Prices were mentioned by 75% of commercial stakeholders as something that should be more visible to older adults, offers by 50%, and photos and videos with product descriptions by 50% as something that should be provided as it would add value to the promotion and visibility of their products. In Cyprus, payment methods and price comparison were stated as important inclusions. Furthermore, CSs stated that the application should only include specific products related to the needs of older adults and not general products found in supermarkets as the

businesses. If the products included are necessary for the application's users, it will generate a lot of sales because it will allow them to have the products they need at home and save time.

Furthermore, CSs stated that analytics from visits, clicks, purchases, and so on should be provided to them in order for them to track their progress and value from the app. The application would most likely be paid for on a month-to-month or per-product-sale basis by 50% of the CSs. The following provisions were recommended by 50% of CSs for privacy and security: cookie policy, privacy policy, terms and services, FAQ, support center, online help agents, and a registered and legitimate company.

In addition, the following features were rated by participants in the mock-up field trials:

Features	PU	SU
Dashboard Clarity	4.1	4.3
The button size	4.1	4.1
The colours	4.3	4.5
Design of buttons	3.2	3.8
The font size	4	3.6
Number of elements on screen (congestion)	3	3.7

Table 4 Scoring of iCan application's features by the PUs and SUs

The following application features were rated by the PUs.

Features	PU
Communicating with family members and friends	4.2
Improvement of cognitive functions through the games	3.6
Fun due to games	3.6
Competition through the games	3.4
Finding special taxi services	4.2
Assistance by escorts	4.6
Reminders for appointments	4.5
Notifications for your GP or family member	4.2
Health tips	4.3
Feedback on game performance	3.3
Feedback on health data collected by wearables	4

Table 5 Scoring of iCan application's features by the Sus

The following features were rated by the SUs in terms of how frequently they would be used:

Features	SU
Performance/trends/statistics	4.6
Photo Album	3.6
Friends	4.3

Table 6 Scoring of iCan application's features by the SUs

Furthermore, when asked how frequently they would use the iCan application, 2 of the 8SUs stated that they would use it daily, 4 stated that they would use it a few times a week, 1 stated that they would use it once a week, and 1 stated that they did not know.

In terms of marketing, the CSs and taxi service providers were asked which features of their products they would like to be more visible to older adults. The CSs mentioned the feature of offers twice, as well as the feature of price. Nobody mentioned the last two features, "delivery options" and "proximity to their home." The feature of the offers was mentioned once by taxi service providers, while the features of "price" and "proximity to their home" were mentioned twice. One taxi service provider mentioned another feature that should be shown to older adults, which is what the taxi provides, such as a wheelchair.

Furthermore, on a scale of 1 to 5, the escorts were asked to rate how easy it would be for seniors to use the app, with the average answer being 4.

4. Conclusions and improvements

The feedback gathered from the older adults, informal carers, escorts, taxi service providers and commercial stakeholders was invaluable and provided guidance on the direction of the consortium's efforts to provide a first prototype that could better meet their needs. This chapter contains the conclusions from the comments of both countries and the main improvements that need to be implemented before the first prototype field test.

1. Friends: According to 7 out of a total of 30 participants, PUs would like to find people with common interests, find people they knew in the past and chat with them as it was mentioned by 6 participants, or receive notifications for upcoming events that will

interest them. According to 5 participants, PUs believe that they would be afraid of strangers, and a description or photo in the user profile would make them feel safe.

2. <u>Photo Album:</u> Photos should be synced from other devices as it was mentioned by 2 participants, and caregivers or the GP could add photos for the PUs. The application should be used to store photos and use them for games. Personal photos must be protected in any case and not published was mentioned by almost all participants. Generally, it was one of the least preferred features of the application.

3. <u>Find an Escort:</u> This service is one of the most preferred as the PUs would like to book an escort for help and companionship. The PUs would like to be accompanied by an escort during the day and to have them as a companion in visits, shopping, or events as mentioned by 7 participants out of a total of 30. In addition, escorts must indicate whether they could also provide transportation. Eight PUs mentioned that it should be able to rate based on cost and distance and also review escorts and also escorts must be trained or have previous experience. In addition, 8 participants mentioned that escort backgrounds should be considered to ensure the safety of users. Escorts will provide specific information as well as PUs to indicate the exact service they would need. Especially in Cyprus the PUs would like to book students as escorts. Policies such as cancellation should be included, and PUs should be trained or include video information in the app so that they can use it easily. The payment procedure should be also explained to the PUs. In addition, escorts would like to have a way of communicating with customers and vice versa about their appointments, according to 5 participants.

4. <u>Book a Taxi:</u> PUs would like Taxi service as transportation especially if they have special needs (e.g., wheelchair) and they should provide all the information related to their transportation, for example if the customers need to be escorted into the building or to the hospital, extra luggage, additional help, according to 7 participants. PUs should be able to rate based on cost and distance and also review taxi drivers, as it was mentioned by 4 participants. Taxi drivers must be trained or have previous experience in handling older adults as customers. Taxi drivers' backgrounds should be considered to ensure the safety of users as 4 participants stated. Taxi service providers said prices, offers, proximity to the customers' home and the possibility of carrying a wheelchair are features that should be more visible to older adults. Policies such as cancellation should be included, and PUs should be trained or include video information in the app so that they can use it easily. The payment procedure should be also explained to the PUs according to 3 participants. In addition, taxi drivers would like to have a way of communicating with customers and vice versa about their appointments as it was mentioned by almost all participants.

5. <u>Products and Services:</u> The categories should be separated according to 4 participants. The category of products should include products that are necessary for the PUs and cannot be found easily in local markets, as it was mentioned by 4 participants. In the category services 3 participants mentioned that healthcare professionals such as physiotherapists should be included. Policies such as cancellation should be included, and PUs should be trained or include video information in the app so that they can use

it easily. As mentioned by three participants, the payment procedure should also be explained to the PUs.

6. <u>Games:</u> PUs could use this service in their spare time and smart games should be included to help users improve memory. Users could include photos and also play games with informal caregivers and friends, especially when they are unable to visit the PUs.

General improvements

In addition, participants stated that the overall appearance of the application could be improved. Words could be replaced with pictures, voice commands included, and the application more colorful (red, blue, green). Users should receive reminders for date, birthday and daily tasks, these reminders could also be sent to the caregiver. In addition, there should be a new section that includes clear instructions on application features, services and payments. The new section could include new categories such as nutrition, news, sports, etc.

In terms of application ethics, it should include cookie policy, privacy policy, terms and services, frequently asked questions, support center and online help agents. Passwords or fingerprints must be considered to unlock the application. On the other hand, users could pay for a monthly subscription and special offers could be applied to people in need or they could contact associations that would later provide it to their customers for free or cheaper. Free trial (2 or 3 months) was mentioned by most participants.

5.   Requirements Traceability tool

Requirements Traceability Matrix (RTM) is a document used to ensure that the requirements defined for a system are linked at every point during the verification process. It also ensures that they are duly tested with respect to test parameters and protocols.

The Consortium has developed a [Requirement Traceability Matrix](#) (Annex 6), in order to have an overview of all user requirements, internal requirements and link them to test cases. The requirements traceability matrix was designed using a spreadsheet. The user requirements were 51 in total, and the internal requirements decided from the beginning of the project are 13. Most of the user requirements were linked to the internal requirements. User requirements relate to WP2, WP3, WP5 and are divided into five categories Design, Technology, Dissemination, Exploitation and Ethics. After analyzing the user's requirements, finding ways to address them, setting deadlines and ways to evaluate them, the consortium finally had the requirements that would be implemented during project progress, before commercialization, the requirements that were out of project scope and the requirements that have been already implemented Of the requirements of 51 users, 12% have already been

implemented, 78% will be implemented as the project progresses, 6% will be implemented before commercialization and 4% are outside the scope of the project, but will be discussed again .

6. Ethics

Ethics in Design

Participants in the Ethics workshop held in Cyprus contributed to the design of the iCan system. To begin, participants stated that the application's usability is critical for users, and that older adults would like to be able to adjust the button size. Having different types of icons to explain the different sections will make it easier for them to use the application and find the service that they require. The system must be simple to use and not overburdened with data and figures that may confuse consumers. Furthermore, the application should be accessible to all users, which means colorblind people should be considered and able to use the application. Another thing that participants mentioned was that the application should be customized to the user's needs, so the user should be able to have customized reminders, volume of notifications, and so on. Furthermore, privacy is very important, and options such as muted microphones or turning off cameras in communication should be available to them. In terms of safety, they suggested adding disclaimers for the Friends service.

Ethics in Context

Participants in the same ethics workshop agreed that the application should be compatible with other existing systems and include clear disclaimers informing users of the limitations, risks, and so on of each service. Furthermore, there should be a data privacy policy to make users feel safer, as well as a Terms & Conditions document to make everything clear to users, according to the participants of the workshop. Furthermore, users would like to see a FAQ section and a project complaint officer, as well as contact information or assistance in using the application and overcoming potential problems.

Ethics in Use

Participants in the same workshop suggested including training for users on how to use the application, as this would be beneficial for users who want to have the iCan system but lack ICT skills. Through system demonstrations, users should be made aware of any ethical concerns. The cost of the system, according to the participants, should be determined based on the financial background of the target group and the features of the system that will be used by potential users.

7. Behavioral Analysis

This section aims to present a segmentation of end-user categories based on their demographic characteristics according to the results obtained by the field testing.

Gender

Both in Cyprus and Romania, male PUs were 27% and female PUs 73%. In terms of their attitudes toward the iCan system, we discovered a gender difference. Regarding escort services, which were the app's most preferred feature (4.6 out of 5), male PUs in Cyprus would like an easy way to book an escort, primarily for companionship and assistance with tasks. The female PUs, on the other hand, were more detailed and mentioned that the escorts should provide a variety of services according to the users' needs. The escorts should be trustworthy and have their background checked in order to be included on the platform and contact older adults. In Romania, female PUs were primarily concerned with establishing a channel of communication between escorts and users in order to improve understanding and to include escorts with prior experience in order to provide better assistance to the elderly. We can understand why women in both countries were concerned about the quality and trustworthiness of the escorts who would be included in the iCan platform.

In terms of secondary users, 100% of the participants in Cyprus were female, while 50% of the participants in Romania were female and 50% were male. With a score of 4.5 out of 5, Cyprus stated that they would like to get performance/trends/statistics for their patients from the iCan app. Female participants in Romania had the same idea with a score of 3 out of 5 as they did for the feature photo album, but males mentioned this feature as the least preferable, scoring 2.5 for the photo album feature and 2.5 for the friends feature.

The taxi service providers were both female in Cyprus and both male in Romania. In Cyprus participants voted 3 out of 5 on how easy it would be for older adults to use the app and in Romania they stated 5. In Cyprus, they believed that in terms of safety, the background of the drivers should be checked and evaluated, but in Romania, they mainly considered the personal data of users. In Romania, proximity to their home was in terms of marketing the feature that the taxi service provider would like to be more visible to older adults, and in Cyprus, it was agreed that price should be more visible.

In both Cyprus and Romania, 50% of the escorts were female and the other 50% were male. There was no distinction based on gender. The same situation applies to CSs, as they were all male both in Cyprus and Romania.

Age

In Romania, 80% of participants are 65 or older, while 73% of those in Cyprus are 75 or older. In Romania, PUs 65 and older were more interested in escort services and receiving health tips from the iCan app. The same is true in Cyprus, where these two characteristics were the most desirable among these ages. They preferred escort services because they believed that escorts would not only provide companionship but would also assist them with daily tasks and transportation to events or doctors' appointments. Health tips, on the other hand, are an important feature for older adults because they will be reminded of what they should do to stay healthy and independent.

The SUs in Cyprus ranged in age from 22 to 31, and their age did not make a difference in their responses, with the exception of one SU who stated she would not use the app but provided feedback and would be willing to pay for the app if it was simpler. The same situation was observed in Romania; they had similar opinions and were between the ages of 43 and 50. The most important thing for SUs in both cases was to be aware of their patients' health status, so notifications and alerts of abnormal activity from the patients' wearables would make their jobs easier, especially for those who would not be able to visit their patients on a daily basis.

Escorts in Cyprus were all the same age, 21 years old, and all shared the same opinions. In Romania, the escorts were also very young, 17 and 18, so their opinions were similar. The same things were mentioned in both countries: escorts wanted to be a part of the iCan platform because it would provide them with extra income and intergenerational connections. They would like to communicate with older adults, perhaps through chat or phone calls, to clarify details about their appointments, and they believe that their services should be rated to improve service quality.

The age of the CTs did not play a significant role because their opinions were similar, and the only difference between the countries was that in Cyprus they were primarily interested in gathering statistics and trends about the products that would have been included in the iCan platform.

Habitation zone

In Romania, 20% of PUs are located in rural areas, 6% in semi-rural areas, and 74% in urban areas. It should be noted that people living in rural areas stated that emergency calls and notifications are the most useful features for them. This could be explained by the distance between them and other relatives, as well as the distance between them and urban facilities, such as health care providers. Furthermore, the ability to record health data and send it to SUs makes them feel safer because someone will always be aware of their health status.
In Cyprus, 87% of the PUs lives in cities, while 13% lives in semi-rural areas. The PUs from semi-rural areas stated that games and the recording of their health data would be more useful for them considering that they would not have easy access to urban facilities and having someone aware of their health status from their wearable data would make them feel safe. The games, on the other hand, would make them pass their free time with quality.

All SUs in Cyprus are located in urban areas, so there is no difference in their opinions due to the habitat zone. The same situation applies in Romania as well. There was no difference observed in escorts and taxi drivers in both countries either.

Regarding the CSs in Romania, they were both located in urban areas, so there wasn't much of a difference in their opinions, given their location. The same thing happened with the CSs from Cyprus, despite the fact that one was in an urban area and the other in a rural area.

Living status

In Cyprus, PUs who were married or living with someone else made up 60% of the participants, with the remaining 40% being widowed, single, or living alone. The latter were more

interested in finding a reliable escort or taxi driver because they required assistance with daily tasks, transportation, or even companionship. They also wanted to be able to have their products delivered to their home. In Romania, 80 % of people was living with someone else, while % lived alone. The Romanian PUs were primarily concerned with engaging trustworthy people in the iCan app's services and having their backgrounds checked.

As far as SUs and CSs are concerned, their lining status did not affect their responses in both countries.

Fine-tuning customer personas based on the behavioral analysis

A persona is a fictional character that represents the average end user who will use a system. Personas contain user characteristics such as demographics, motivations, inspirations, behaviors, fears, and annoyances, as well as their goals. The goal of personas is to help anyone unfamiliar with the iCan system understand how it meets the needs of each category user. (Dam & Siang, 2018)

Personas were originally used to assist consortium partners in user segmentation and technology development using the User Centered Design (UCD) methodology, decision-making, business models and dissemination plans according to specific user characteristics, in order to be as effective as possible. The Personas are a dynamic tool fine-tuned by the consortium based on the iterative testing results, in order to outline our target customers characteristics, intentions and needs. In this deliverable as well as the upcoming 4.4 and 4.6, the personas will be redefined from a market and business perspective including messages and channels for our target groups.

The iCan field trials have a twofold goal a) to test the iCan system in terms of usability, acceptance, reliability and other functional and non-functional parameters and b) to define the route to market, customer personas and business models. The iterative evaluation processes of WP4, go hand by hand with exploitation strategies in WP5.

Subsequently, and following the feedback received through the mock-up field trials, we reevaluated the iCan user personas created in the user requirements stage. In accordance with our results, some personas have been replaced in order to meet the requirements specified by the mock-up field trial participants, while others have been modified as seen below. It should be noted that for this and upcoming testing phases the term "user" persona has been replaced by the term "customer" persona. Also, for each persona we added a marketing message and appropriate channels. The reason is that as trials progress, our efforts are increasingly focused on the definition of our product, customers and business plans and thus, even though all personas of WP2 can be users of our system, in reality, only some of them can serve as our end-customers and we want the developmental efforts to focus on them (Requirements Traceability Sheet) Those personas will also be cross tested in the upcoming testing phases.

The older adult customer persona

Regarding the first persona, Yannis, is an old older adult who is residing in a rural area. After the mock-up field trials, there is a better picture of his needs as they were added more of his requirements and his opinion of the iCan app is clearer. He would like to use it in order to keep being independent and to get as much support as needed for him to remain in his own home for as long as possible, have direct access to products and services he cannot find in his habitation zone and be socially integrated as well.

It should be noted that although Yannis is one of the main target groups of the iCan system, Yannis himself is not our target customer, since our trials showed that people in mid-old old age with low ICT literacy, rarely engage in technology purchases. Our main customers in relation to Yannis are rather his family members (mostly daughter or son) who want to ensure Yannis's wellbeing (see the family member persona in following sections).

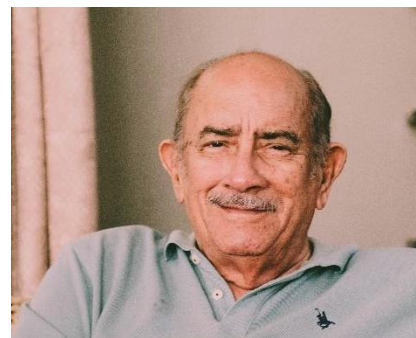### Yannis: The older adult user

Age: between *75 and 84*
Gender: masculine
Life course: widower, retired, living alone
Education: medium
Area of residence: rural
Technology literacy: poor

❖ **What's important to Mr. Yannis**

- To age in his own home
- To keep his independent living
- To continue being socially integrated

- **After the mock-up field trials, we understood that Mr. Yannis would also like to:**

- Find a reliable companion and transportation to events or

❖ **Daily activities' difficulties**

- Difficulties in managing daily tasks
- The need for support in going out
- The need for support for cleaning, transport, and medical checks
- The feeling of loneliness

- **After the mock-up field trials, we understood that Mr. Yannis has difficulties:**

- Lack of technology knowledge

appointments.
- Find an appropriate health care provider to supervise his health status even remotely.
- Find the necessary products that can be delivered to his home safely.
- He has interesting games to spend his time on that will stimulate his cognitive status and memory.
- Keeping in touch with people he used to know or meeting new people with common interests

❖ **Thoughts and feelings**

- Not to be a burden to others
- Anxious about his health status

- **After the mock-up field trials, we understood that Mr. Yannis:**

- Wants to have wearables that will record his biometrics and keep him and his family members or GP informed about his health status.
- Wants to have someone aware of his state of health and informed of abnormal activity.

Possible Solution: Training and support by the escorts.

Marketing Message:

"iCan: aging independently with technology."

Marketing Channels:
- *Healthcare providers*
- *Word of mouth*
- *A TV spot*

In contrast to Yannis, younger older adults with familiarity with ICT devices can be our main older customers. For example, in the following customer persona, Daniela is a young older adult. She recently retired and she has ICT literacy. She wishes to remain socially active. The iCan app will assist her in finding events that interest her and meeting new people who share her interests. The escort service allows her to interact with young people, share her experiences, and exchange ideas. Even if she cannot drive, she will be able to visit places and arrive on time for appointments by booking a taxi or hiring an escort through the iCan app. This persona was created to represent all of the different types and ages of older adults.

Daniela: The young adult user

Age: between *65 and 74*
Gender: feminine
Life course: married, retired, living with spouse

Copyright under the iCan Consortium

Education: high
Area of residence: urban
Technology literacy: medium or advance

❖ **What's important to Mrs. Daniela**

● Finding a reliable therapists and healthcare providers.
● Finding reliable transportation for her appointments.
● Shop online without having to go to the store.
● Being informed about events and happenings according to her interests.
● Meeting new people with same interests.
● Having intergenerational connections.
● Having games that will stimulate her memory

❖ **Daily activities' difficulties**

● Difficulties in transportation

Marketing Message:

" iCan system: The tool you need to find all the special offers and interesting people in your community"

Marketing Channels:

● *Healthcare providers*
● *Associations of older adults*
● *Word of mouth*
● *A TV spot*
● *Social Media*
● *Relatives*

❖ **Thoughts and feelings**

● Personal data should be protected.
● Escorts and taxi drivers should be reliable,
and their background should be checked.

The family member customer persona

Mary is an informal caregiver because she is responsible for her mother but is unable to visit her on a daily basis. The iCan app will allow her to be aware of her mother's health status, spend quality time with her through games, and locate the services or products she requires even when she is away. As a result, the iCan app enables Daniela to carry on with her daily activities while also providing assistance to her mother, even from a distance. Mary is a persona that has been modified and was based to a previous one.

Mary: The informal carer user / The family member

Age: between 25-50
Gender: feminine
Life course: married, leaving with her family far from her mother
Education: high or medium education
Area of residence: urban
Technology literacy: medium or advance

What's important to Mary

- She tries to support her mother as much as she can while she continues her daily life and program.
- Providing solutions for her mother without having to visit her daily
- Nice aesthetics on the app and considers health data, services, and products important.
- to get notifications about her mother's health condition and abnormal activity.
- Have quality time remotely with her mother, e.g., playing games.
- To find healthcare providers for her mother.
- To find her transportation while she is away.
- To find her mother an escort for company or help her with her chores.

Thoughts and feelings

- To keep her lifestyle without compromises'
- To take a break
- To share her responsibilities
- The guilt of not taking care enough of her mother

Difficulties:

- To visit her mother daily because of the distance.
- To keep her mother socially integrated

Marketing Message:

"iCan: being with you even when I am away."

Marketing Channels:

- *Word of mouth*
- *A TV spot*
- *Social Media*
- *Relatives*

- To have physiological support by a healthcare provider

The escort customer persona

Andreas is a student who wants to supplement his income. He can use the iCan app to plan his own schedule and receive requests for escort services. His services will be rated, allowing him to become known for his quality and gain more customers over time. Escorts can be of any age. They can provide transportation, companionship, and even assistance with the older adult's chores.

Andreas is a modified persona because in the mock-up field trials, all escorts were younger, and the iCan app strongly promotes intergenerational ties.

Andreas: Escort on iCan Platform

Age: between 18 and 34
Gender: masculine
Life course: single
Education: student
Area of residence: urban
Technology literacy: advance

What's important to Andreas

- Helping others by providing company, transportation, and assisting with daily chores.
- Having a second source of income.
- Increase customer base.
- Having intergenerational ties

Thoughts and feelings

- His work is to be valued and rated based on the level of quality he provides.
- To know exactly what services an older adult would like to receive.
- His personal information should be kept secure.
- Have a way to communicate with the older adults to confirm or cancel services.

Difficulties:

- He is able to work a few hours per week.

Marketing Message:

"iCan: Help older adults in your community for extra pocket money? Meet now the iCan system"

Marketing Channels:

- *Word of mouth*
- *Social Media*

The taxi driver customer persona

Mr. Challen is a new persona who represents taxi drivers and what they would like to see included in the iCan app to make it more appealing to them. He is a very important persona because one of the iCan app's main services is Book a taxi.

Mr. Challen: Taxi driver

Age: between 35 and 64
Gender: masculine
Life course: Married
Education: General qualification for university entrance
Area of residence: urban
Technology literacy: medium

What's important to Mr. Challen
- Wants access to older adult niche market.
- To maintain his customer base and attract new customers.
- Provide high-quality service.
- To have revenues and market shares.

Thoughts and feelings
- He wants to be aware of the opinion of the customer using a rating system.
- He wants to get statistics on how many users of the platform used his service.
- Be aware of customers' potential special needs or

Difficulties:
- He has no experience with older adult customers, but he is doing research and wants to try dealing with this type of customer.

Marketing Message:

"iCan: Help older adults in your community for extra pocket money? Meet now the iCan system"

Marketing Channels:
- *Word of mouth*
- *Social Media*

requirements.
e.g., wheelchair
- In order to have a well-organized program, he wants to include policies such as cancellation and notification in a timely manner.

The commercial stakeholder customer persona

Mr. Meletiou is also a new persona, representing the commercial stakeholders' point of view. His requirements are also very important, given that the iCan app could be rolled out throughout his company and used by his existing customers.

Mr. Meletiou: Business owner

Age: between 35 and 64
Gender: masculine
Life course: Married
Education: Higher Education
Area of residence: urban
Technology literacy: advance

What's important Mr. Meletiou
- To expand his existing business to more customers.
- To have revenues and market shares.

Thoughts and feelings
- Wants to know exactly the services that an older adult wants.
- He wants to get analytics about how often the app is being used to be convinced that the app is a good solution for his business.
- Protected personal data and privacy policy.
- A system that offers after sales support service.
- A system that will be able to connect it to his existing back-end.

Difficulties:
- He has customers in rural and semi-rural areas.

Marketing Message:

"iCan: Join now the iCan community and promote your products to the over older adults around Europe"

Marketing Channels:

- · *Word of mouth*
- · *Social Media*

The migrant customer personas (reevaluated)

Mr. Charles decided to have his retirement in a different country, so he will use the iCan system in order to adapt to the new country as the app will help him find the appropriate health care providers, necessary products, and inform him about events and happenings according to his interests and find people with the same interests as well. This persona is still under evaluation and will be finalized during the first prototype pilot trials.

Charles: a retirement migrant

Age: between *75 and 80*
Gender: masculine
Life course: retired, living in a foreign country
Education: average or high
Area of residence: rural
Technology literacy: Fair

What's important to Mr. Charles

- To continue living independently,
- To continue being socially integrated,
- To continue enjoying the countryside
- with long walks and fishing.
- Find a reliable companion and transportation.
- Find an appropriate health care provider.
- Find products that can be delivered to his home.
- Be aware of activities and events in his area that might be of his interest.
- Meet new people and chat with them.
- To have interesting games to play to pass the time.
- Has an application that could be used in his native language.

Thoughts and feelings

- Anxious about the management of his health concern in a foreign

Difficulties

- He believes that will have language and cultural barriers.

Marketing Message:

"iCan: aging independently with technology wherever you are."

Marketing Channels:
- *Healthcare providers*
- *Word of mouth*
- *A TV spot*

country.
- He wants to have wearables that will record his biometrics.
- He wants to have someone aware of his state of health and informed of abnormal activity.
- He likes practicality, readable font size, and achieving easy everyday life chores or tasks.

8. Conclusion

Generally, all target groups reacted positively regarding the iCan system but some of them would like to see the final product to be completely persuaded that the application will be completed. A very high percentage of all potential users consider affordability of the iCan system as extremely important. The prices should be different for SUs, and it should be considered if the application could be a social service.

During the first mock-up field trials there was a limitation. In this study is the unequal representation of gender between the different target groups. There was a very high percentage of PUs women participating in this phase compared to men. The plan is to aim at uniform representation in the next phase of testing of the iCan system. This is very important because if men are underestimated, there is a risk of losing the opinion and opinion of men about the system and this will affect our business strategy and commercialization.

The most unpopular feature of the iCan system was the photo album. Nevertheless, there have been some positive reactions from PUs if the photos are to be used in games with SUs to prevent loneliness. The most popular services were escorts and taxi services. Regarding escorts and taxi drivers, they suggested including information about the services that they provide transportation or/and companionship. Both services should be reviewed to ensure application quality.

None of the CUs were negative regarding buying the iCan system. All of them also mentioned that they believe the application would increase their existing customers. The most popular way of payment was monthly subscription or payment per sale/booking.

As far as the promotion of the application CUs suggested to create videos and take photos with descriptions of the application and to design info/demonstration days.

All participants suggested some improvements that would make the iCan application more useful to them, but generally agreed that the application is attractive and would like to use it.

9. References

1. Dam, R., & Siang, T. (2018). Personas–A Simple Introduction. Interaction Design Foundation. *Verfügbar unter: https://doi. org/www. interaction-design. org/literature/article/personas-why-and-how-you-should-use-them.[Zugegriffen: 26-Mai-2018]*.

2. *Guidance and Procedure: Recruitment and Screening Methods ... (n.d.). Retrieved from https://ora.research.ucla.edu/OHRPP/Documents/Policy/5/Recruitment.pdf*

3. Mentis, H. M., Madjaroff, G., & Massey, A. K. (2019, May). Upside and downside risk in online security for older adults with mild cognitive impairment. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-13).

4. Wolcott, M. D., & Lobczowski, N. G. (2021). Using cognitive interviews and think-aloud protocols to understand thought processes. *Currents in Pharmacy Teaching and Learning*, *13*(2), 181-188.

10. Annexes

ANNEX 1. Clickable paper

The clickable mock-ups will help to demonstrate the platform's interface and functionalities. The mock-ups will be accessed thru the following link: https://projects.invisionapp.com/share/3810Q46LNSHF#/screens/449553949

Using the above tool the users will have the possibility to navigate thru the different modules available:
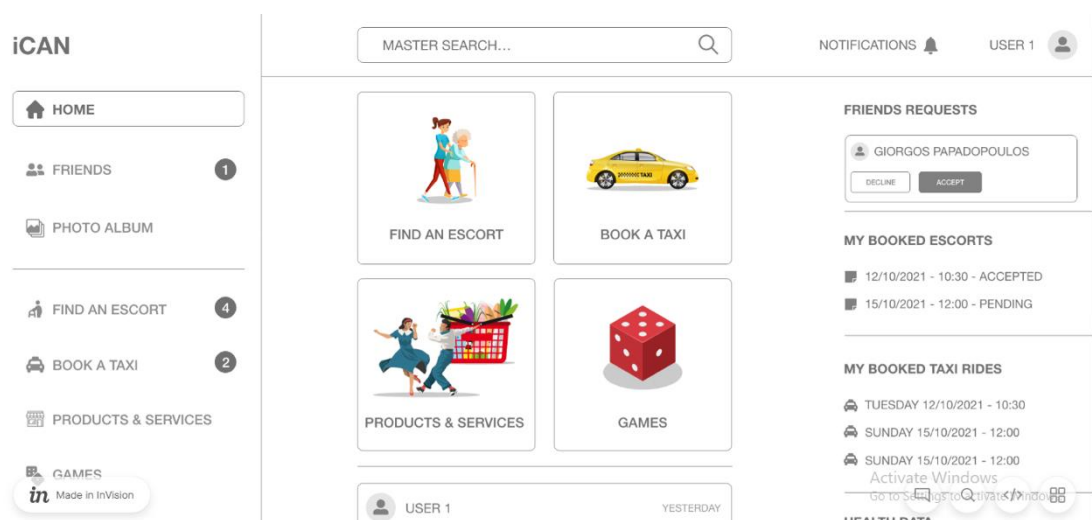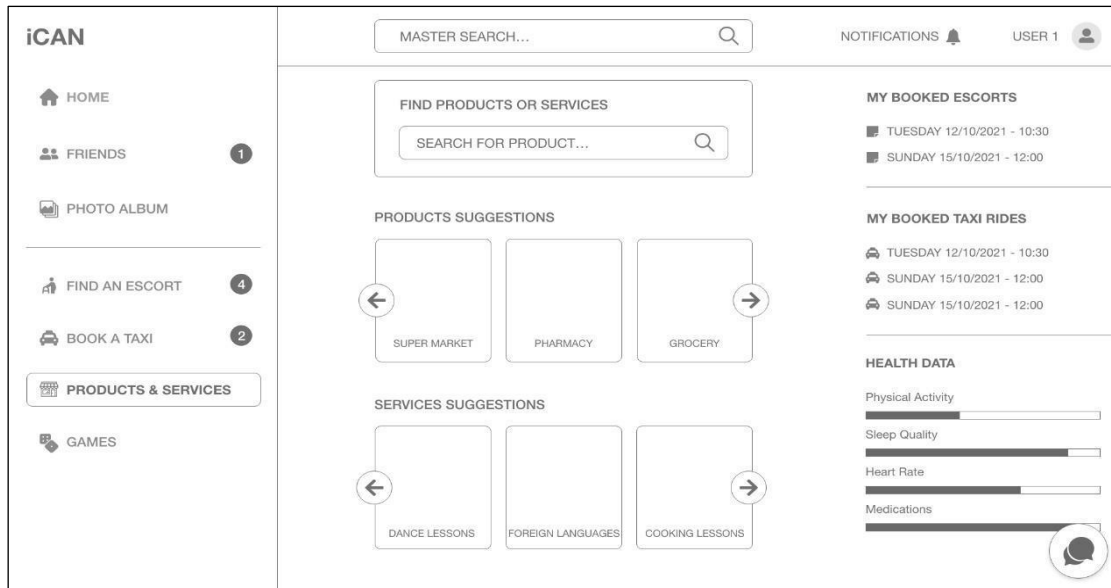
ANNEX 2. Paper prototype

Paper prototyping will help to demonstrate the platform's interface and the functionalities of each service. The paper prototyping will have the following form:

....
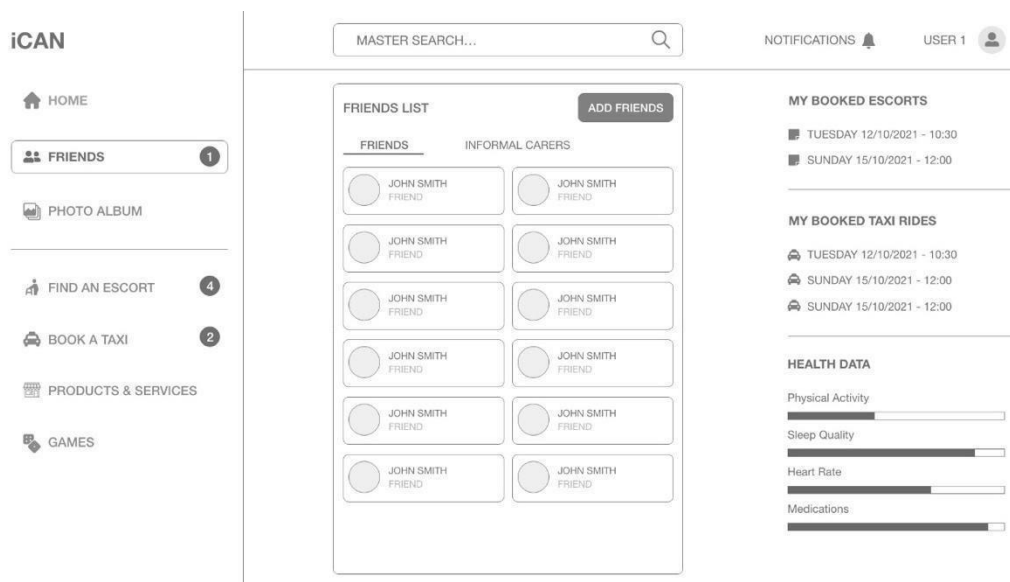
ANNEX 3 Wireframes

The wireframes can be divided into three main components: information design, navigation design and interface design. The layout of the page is where these components come together, while wireframing is what describes the relationship between these components. The wireframes that will be presented will have the following layout:

End-user organizations had to use the following consent form, but the time in Cyprus was required to use the one approved by Cyprus National Bioethics Committee.

iCan project - Informed consent

You, as a volunteer, have been invited to take part in a research study of the iCan project. iCan project objective is to develop a holistic system that incorporates features and functionalities that are not absolutely necessary to the senior adult, but they would very much like to make them part of their everyday life, giving solutions to small or bigger problems, opening doors to activities and habits that seniors thought were gone forever. The core of iCan system will be a platform with an adaptable user interface. A set of sensors (e.g. touchscreen, webcam, microphone and others) will serve to gather information about the way the end user interacts with the system while using the platform.

The platform will be accompanied by a smart watch or smart wristband that will be wirelessly connected to the platform, measuring various biometrics and dynamically informing the wearer, as well as the platform and connected people such as family and (maybe) doctors, for certain conditions and anomalies that may occur to the user. This smartwatch or wristband will have a panic button that, when pushed, the emergency contact(s) will be called in speaker mode, activating the GPS signal to locate the place of the emergency.

Before making a decision on whether you want to participate or not, please read this document carefully. Please, ask all the questions you may have so you can be completely sure that you understand the scope and procedure of the study. You will receive your personal copy of this consent to keep. At all times, we assure compliance to the current legislation.

Your involvement in this activity is very important for the success of this project because will enable the consortium on one hand to gather valuable user based feedback, and on the other hand to the technical partners to focus their efforts on the optimization of the whole iCan system.

Your involvement will consist in:

- *participating during the presentation of the project - its description, objectives*
- *completing an anonymous questionnaire*
- *expressing your opinion and active involvement in a focus group interview*

Approximate duration of this session will be 2 hours.

The working group will be led by [name of the facilitator], assisted by [in case there is any], representatives of [end-user organization]. Your participation is voluntary, and you are entirely free to withdraw at any time. The entire session will be recorded on audio. Also, we shall be taking pictures for the purpose of disseminating the information about this project and your participation in it on our iCan consortium media channels

(Facebook, Twitter, project's website, etc.). If you disagree to be photographed, please mention this below.

The information you share with us during the focus group interview and the completion of the questionnaires will be kept anonymous and confidential, in accordance with the legislation in force. The collected data will be processed and analyzed in confidentiality and the identity of the participants will not be disclosed under any circumstances. You have the right to withdraw at any time from this study and all your personal data can be deleted at your specific request.

For any information regarding this working group or the iCan project, please contact our representatives at any time.

I, the undersigned, hereby declare that at the time of signing this Declaration of Consent, I am of full age and legal capacity.

Signature: _____

Date and Place: _____

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ
για συμμετοχή σε ερευνητικό πρόγραμμα
(Τα έντυπα αποτελούνται συνολικά από ...... σελίδες)

Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε

iCan: Διευκολύνσεις στην καθημερινή ζωή ηλικιωμένων βασιζόμενες σε λύσεις ICT

Στο έντυπο αυτό δίνονται εξηγήσεις σε απλή και κατανοητή γλώσσα σχετικά με το τι ζητείται από εσάς ή/και τι θα συμβεί σε εσάς, εάν συμφωνήσετε να συμμετάσχετε στο πρόγραμμα:

1. Περιγράφονται οποιοιδήποτε κίνδυνοι μπορεί να υπάρξουν ή ταλαιπωρία που τυχόν θα υποστείτε από την συμμετοχή σας στο πρόγραμμα.
2. Επεξηγείται με κάθε λεπτομέρεια ποιος ή ποιοι θα έχουν πρόσβαση στα δεδομένα που σας αφορούν και θα προκύψουν από το πρόγραμμα που θα συμμετάσχετε ή/και άλλο υλικό/δεδομένα που εθελοντικά θα δώσετε για το πρόγραμμα.
3. Δίνεται η χρονική περίοδος για την οποία οι υπεύθυνοι του προγράμματος θα έχουν πρόσβαση στις πληροφορίες ή/και υλικό σας αφορά.
4. Επεξηγείται το τί ευελπιστούν να μάθουν οι υπεύθυνοι του προγράμματος σαν αποτέλεσμα και της δικής σας συμμετοχής.
5. Δίνεται μία εκτίμηση για το όφελος που μπορεί να υπάρξει για τους ερευνητές ή/και χρηματοδότες αυτού του προγράμματος.
6. **Δεν πρέπει να συμμετάσχετε, εάν δεν επιθυμείτε ή εάν έχετε οποιουσδήποτε ενδοιασμούς που αφορούν τη συμμετοχή σας στο πρόγραμμα.**
7. Εάν αποφασίσετε να συμμετάσχετε, πρέπει να αναφέρετε εάν είχατε συμμετάσχει σε οποιοδήποτε άλλο πρόγραμμα έρευνας μέσα στους τελευταίους 12 μήνες.
8. Εάν αποφασίσετε να μην συμμετάσχετε και είστε ασθενής, η θεραπεία σας δεν θα επηρεαστεί από την απόφασή σας.
9. **Είστε ελεύθεροι να αποσύρετε οποιαδήποτε στιγμή εσείς επιθυμείτε τη συγκατάθεση για την συμμετοχή σας στο πρόγραμμα.**
10. Εάν είστε ασθενής, η απόφασή σας να αποσύρετε την συγκατάθεση σας, δεν θα έχει οποιεσδήποτε επιπτώσεις στη θεραπεία σας.
11. Πρέπει όλες οι σελίδες των εντύπων συγκατάθεσης να φέρουν το ονοματεπώνυμο και την υπογραφή σας.

Επιστημονικός υπεύθυνος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Μαρίνα Πολυκάρπου

Επίθετο:		Όνομα:	
Υπογραφή:		Ημερομηνία:	

ANNEX 5 Demographic Questionnaire

Demographic data questionnaire:

Please answer the following questions about yourself. We would like to point out that all the data collected within the scope of these session are treated anonymously and confidentially.

Age	*Month of birth / year of birth: _____/_____*
Gender	*Female Male No answer*
Area of residence	Rural Semi-rural Urban
Education	
	Elementary school
	Professional school / Apprenticeship
	General qualification for university entrance
	University
	Others: _____
Family Status	
	Single
	Married
	Living in a partnership
	widowed
	divorced
Occupation	
	full-time employed
	part-time employed
	on maternity leave / leave of absence
	in-service training
	unemployed (including students, who are not working, people, who are retired or early retired)

ANNEX 6 Requirements Traceability tool

ANNEX 7 Questionnaire for PUs

Please rate how much you like each of the following app features (1-not at all 5-very much)
• Dashboard Clarity
• The button size
• The colours
• Design of buttons
• The font size
• Number of elements on screen (congestion)
• Other
What colours do you think you would like for this application? (Free text)
What would be the benefits for you of using the app? (More than one answer is possible) - To rate 1 to 5
• Communicating with family members and friends
• Improvement of cognitive functions through the games
• Fun due to games
• Competition through the games
• Assistance by escorts

• Finding special taxi services
What functionality would be useful to you? (More than one answer is possible) (1 = not at all important, 5 = very important)
• Reminders for appointments
• Notifications for your GP or family member
• Health tips
• Feedback on game performance
• Feedback on health data collected by wearables
How do you think that we can make the "Escort Service" work at its best? (How one imagines that can use it, like in a scenario)
How do you think that the "Book a Taxi" can work at its best? (How one imagines that can use it, like in a scenario)
How do you think that "Friends" can work at its best? (How one imagines that can use it, like in a scenario)
How do you think that the "Product and Services" can work at its best? (How one imagines that can use it, like in a scenario)
How do you think that the "Photo Album" can work at its best? (How one imagines that can use it, like in a scenario)
How can we improve it for you?
What do you think is missing from the iCan application?
What would the iCan system need to include in terms of privacy in order to be trustworthy?
What do we need to take care of in terms of safety?
What options do you need to have in the system?
Would you be willing to pay to have this application?
If yes how? (e.g., one-off payment, pay per month, other)
What policies should be included in escort service? (e.g., cancellation procedure)
How should the list of available escorts be sorted? (e.g., by cost, by distance)
What services should an escort provide? (e.g., company, transportation)

ANNEX 8 Questionnaire for SUs

Do you think the iCan platform can be a useful tool for you? Please explain your choice (free text)
Please rate how much you like each of the following app features (1-not at all 5-very much)
• Dashboard Clarity

• The button size
• The colours
• Design of buttons
• The font size
• Number of elements on screen (congestion)
• Other
How often do you think you would use the following features (1-not at all 5-very much)
• Performance/trends/statistics
• Photo Album
• Friends
What features do you think are needed, but are missing in the iCan system? Please describe.
How often do you think you would use the iCan platform?
• Daily
• Few times a week
• Once a week
• Once a month
• Never
• I do not know
How easy do you think it would be for older adults to navigate to the menu items? Rate 1 to 5
What kind of data would you like to be able to view related to your protege?
What kind of notifications would you like to receive?
Please explain how you think we can improve the app for you and the older adults.
Are you willing to pay for this app?
What would the iCan system need to include in terms of privacy in order to be trustworthy?
What do we need to take care of in terms of safety?
What options do you need to have in the system?
Imagine 5 very different older people you know. Could all of them obtain and use the iCan system? If no, why?

ANNEX 9 Questionnaire for Escorts

What is your opinion regarding the "Escort Service"?
Please, rate how easy it would be for seniors to use the app (rate to 1 to 5)
Regarding Escort's profile, what information would be relevant for seniors from your perspective
Regarding Request for Escort, what information would be relevant for seniors from your perspective
What would the iCan system need to include in terms of privacy in order to be trustworthy?
What do we need to take care of in terms of safety?
What options do you need to have in the system?
What services should an escort provide? (e.g., company, transportation,)

ANNEX 10 Questionnaire for Taxi Service Providers

In terms of marketing, what features of your services would you like to be more visible to older adults?
• Offers
• Price
• Proximity to their home
• Other
What additional features do you think your customers need but are missing in the iCan application? Describe.
Please, rate how easy it would be for you to use the app (1 to 5)
What do you think is missing from the interface intended for businesses?
What kind of notifications would you like to receive from the app?
Are there any other functionalities or features related to your business?
Do you think that functionalities or features would increase the number of your current customers or help you expand your market? Please explain
Would you be willing to pay to own such an app?
If yes, what pricing model would be the optimal for this system (e.g., one-off payment, pay per month, pay per product listed, pay commission of sales, other)?
What would the iCan system need to include in terms of privacy in order to be trustworthy?

What do we need to take care of in terms of safety?
What options do you need to have in the system?
What policies should be included in Taxi service? (e.g., cancellation procedure)
Regarding Taxi service providers' profile, what information would be relevant for seniors from your perspective.
Regarding Requests for Taxi service providers, what information would be relevant for seniors from your perspective.

ANNEX 11 Questionnaire for Commercial Stakeholders

In terms of marketing, what features of your product would you like to be more visible to older adults?
• Offers
• Price
• Delivery options
• Proximity to their home
• Other
What additional features do you think your customers need but are missing in the iCan application? Describe.
Please, rate how easy it would be for you to use the app (1 to 5)
What do you think is missing from the interface intended for businesses?
Are there any other functionalities or features related to your business?
Do you think that functionalities or features would increase the number of your current customers or help you expand your market? Please explain
Would you be willing to pay to own such an app?
If yes, what pricing model would be the optimal for this system (e.g., one-off payment, pay per month, pay per product listed, pay commission of sales, other)?
What would the iCan system need to include in terms of privacy in order to be trustworthy?
What do we need to take care of in terms of safety?
What options do you need to have in the system?