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List of Authors

Partner	Authors
PBN	Zoltán Molnár, Norbert Horváth
IRBLL	Carmen Nuin, Roland Pastells
HIB	Inmaculada Luengo, Paloma Jimeno
CON	Priscilla Esser, Janna Alberts
UniGe	Katarzyna Wac, Matteo Ciman

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Glossary

Acronym	Meaning
bpm	Beat Per Minute
ICT	Information and Communicaton Technologies
MCI	Mild Cognitive Impairment
UTAUT	Unified Theory of Acceptance and Use of Technology
NCP	National Contact Point

References

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2. **Kosecki, Danielle.** How Much Sleep Do Fitbit Users Really Get? A New Study Finds Out. *Fitbit.* [Online] <https://blog.fitbit.com/sleep-study/>.
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1. Introduction

The tasks related to this deliverable are going to perform a deep analysis and evaluation of the trials for each of the prototypes envisaged in the project with two aims. The first is to refine the protocols and procedures of the evaluations where necessary. The second is to provide relevant and qualified feedback to the requirements engineering process. This means that any underlying sentiments of user expressions have to be clarified and confirmed with the end-users so as to arrive at an approved set of feedbacks for the requirements process to incorporate into the set of requirements. This information will also be made available directly to the development WP (WP3) to ensure that any development related suggestions are directly taken into account.

In addition to the above mentioned, this document contains an explanation of the procedures followed for the gathering of data from end-users in Spain, Hungary and the Netherlands as well as a clarification of the methodologies used in each of the prototypes.

2. Methodology

When designing the methodology for the evaluation and validation of the functionalities offered by the different prototypes envisaged in CoME, one of the most important factors was the selection of a random sample of the population under study in order to ensure that significant data is achieved.

Because of this, three different trials sites have been defined for CoME in Spain (IRBLL), Hungary (PBN) and The Netherlands (CON), where different samples of the population we are interested in have been taken, i.e. the one defined in D2.1 User Involvement Plan:

- **Seniors older than 60 years** who want to carry out a **healthier lifestyle** or seniors that are worried about their health (main target group);
- **Formal caregivers** (doctors, nurses, etc.) who require communication tools and other devices to **help the monitoring of the seniors** and delve into the behaviours that give rise to MCI initial signs;
- **Informal caregivers** (family members, friends etc.) of those seniors who are involved in their care and want to support them to carry out a healthier lifestyle.

CoME offers three different interfaces for each of these target groups so their needs could be covered. In order to get specific data from each of them, each of these interfaces will be tested by the target group they are directed to, through an evolutionary and iterative process that will enable the creation of a more complex, complete and suitable prototype each time. This iterative process will consist on the design and development of a certain prototype as well as its validation by the target groups defined above with the aim of gradually refine this solution in coming prototypes ensuring the final delivery of the best and most suitable solution for CoME.

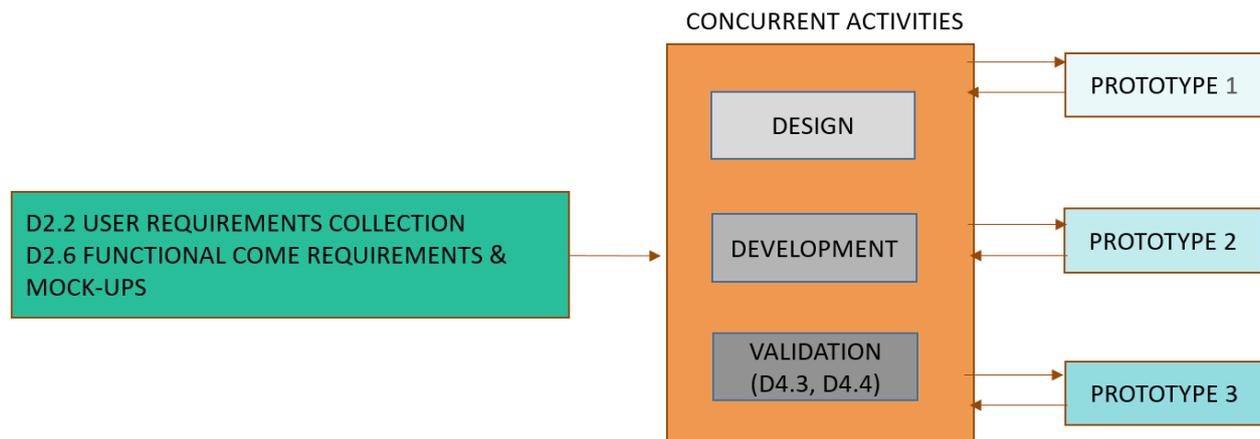


Figure 1 Evolutionary process followed in CoME

The scheduling of this iterative process is listed below with the different evaluation periods (seniors could use the CoME platform as well as the fitness bracelets for a longer period of time between the evaluation periods too):

1. Evaluation of the first prototype: the one reflected in this document.
 - a. First Sprint: 01.02.2017 – 15.02.2017
 - b. Second Sprint: 15.03.2017–05.04.2017
2. Evaluation of the second prototype:
 - a. First Sprint: 15.12.2017 – 15.01.2018
 - b. Second Sprint: 05.02.2018–28.02.2018
3. Evaluation of the third prototype:
 - a. First Sprint: 07.03.2018 – 18.04.2018
 - b. Second Sprint: 18.07.2018 – 17.09.2018

2.1. *Focus of field trials throughout the project*

As mentioned in the previous section, throughout the project, three different incremental prototypes have been tested and validated in CoME. Due to this evolutionary feature and in order to collect more feedback each time, each successive field trial was required to be more elaborated and detailed than the previous one.

In order to have a clear overview of the functionalities that have been included in each of the prototypes envisaged for CoME, the table below is shown with the planned functionalities for each prototype:

INITIAL PROTOTYPE	SECOND PROTOTYPE	FINAL PROTOTYPE
<ul style="list-style-type: none"> - Personalized User Interfaces (HIB) <ul style="list-style-type: none"> - <u>Login/Registration</u> - <u>Web interface for Seniors</u> - <u>Profile</u> - <u>Home</u> - <u>Goals</u> <ul style="list-style-type: none"> - Basic Goals in the platform - Goals timeline - <u>Info (CMS)</u> - <u>Content Management System (CMS)</u> - Data Security & Privacy Module (HIB) <ul style="list-style-type: none"> - <u>Authentication/ Authorization</u> - <u>Privacy Settings in Seniors' profile</u> - User State Assessment Module (UNIGE) <ul style="list-style-type: none"> - <u>Wearables integration in the platform</u> - <u>Mobile application for wearable devices</u> - <u>Questions for users' assessment – generation of self-reports</u> - Design of CoME DB (HIB) - Translation to Spanish (HIB) - Translation to Dutch (CON) - Translation to Hungarian (PBN) 	<ul style="list-style-type: none"> - Personalized User Interfaces (HIB) <ul style="list-style-type: none"> - <u>Web interface for Seniors</u> <ul style="list-style-type: none"> - Improve seniors' profile - Home <ul style="list-style-type: none"> - Caregiver Circle - Goals improvement - Memory Games - <u>Web Interface for Informals</u> <ul style="list-style-type: none"> - Profile <ul style="list-style-type: none"> - Seniors under care <ul style="list-style-type: none"> - Access to seniors information - Sharing information (CMS) - Rating of goals (like/dislike, comment, send picture and send reminder) - <u>Web Interface for Formals</u> <ul style="list-style-type: none"> - Profile - Seniors' panel - Health Recommendations and report generation - Sharing information (CMS) - Intelligent Match-Making Engine (HIB) <ul style="list-style-type: none"> - <u>Form for the request of help</u> - <u>Intelligent Semantic Search of candidates</u> - User State Assessment Module (UNIGE) <ul style="list-style-type: none"> - <u>Visualization of monitored data (current and historical) – Trends</u> - Data Security & Privacy Module (HIB) <ul style="list-style-type: none"> - <u>Secure Content and Monitored Data Management</u> - Personalized Status Update Agent (CON) <ul style="list-style-type: none"> - <u>Agent Design</u> - <u>Tips and Recommendations from agents</u> - Integration with MyGuardian (CON) - Translation to Spanish (HIB) - Translation to Dutch (CON) - Translation to Hungarian (PBN) 	<ul style="list-style-type: none"> - User State Assessment Module (UNIGE) <ul style="list-style-type: none"> - <u>Emotional status awareness based on the interaction with the device</u> - <u>Final version of algorithms for physical, cognitive and emotional assessment of senior's state (self-reports)</u> - Intelligent Match-Making Engine (HIB) <ul style="list-style-type: none"> - <u>Improvements</u> - Personalized User Interfaces (HIB) <ul style="list-style-type: none"> - <u>Different look&feel options</u> - <u>Different parameters for usability&accessibility</u> - <u>Web Interface for Formals</u> <ul style="list-style-type: none"> - Improvements - <u>Web Interface for Informals</u> <ul style="list-style-type: none"> - Improvements - Forum (CON) <ul style="list-style-type: none"> - <u>Forum for formal and informals</u> - Personalized Status Update Agent (CON) <ul style="list-style-type: none"> - <u>Alarms management in the formal's panel:</u> <ul style="list-style-type: none"> - <u>Management of Notifications</u> - <u>Requests notifications</u> - Translation to Spanish (HIB) - Translation to Dutch (CON) - Translation to Hungarian (PBN)

2.2. *Distribution of trial participants*

As mentioned previously, due to it was not possible to cover all the populations we were interested in CoME, i.e. seniors, formal and informal caregivers around Europe, a **random sample 320 end-users** composed of **200 seniors, formal and informal caregivers from Spain (IRBLL) and 120 from Hungary (PBN)** was selected in CoME.

Within the project CON plays a crucial role in the design and development of the concept of the avatar interaction. In order to get a more hands-on experience and get better insight into the design of the CoME platform, CON proposed to be involved in small pilot tests. Due to the experience they have with the design and development of such tools for these end-users, and the variability that new geographical locations add to the sample, the proposal was successfully received by IRBLL and PBN so they were engaged in parts of the field trials with minimal numbers of participants and results from small tests to be reported as optional additions to the main results from IRBLL and PBN.

2.3. *Overview of the involvement of users among trials*

In the framework of the first prototype only the senior interface was created, however, end-users' organizations involved in the project (IRBLL, PBN and CON) tried to get feedback not only from seniors, but also from formal and informal caregivers in order to get a more complete picture of the existing sections and functionalities of the platform.

It is important to remark that all seniors participating in this evaluation of the first prototype were healthy seniors or seniors with some health problems, e.g. pulmonary emphysema, diabetes, overweight, etc., that did not prevent them from enjoying independence on the daily living activities.

In the second prototype, when the three interfaces had already being developed (seniors, formal and informal caregivers one) and most of the functionalities of the platform were already available, the participation of both, seniors, formal and informal caregivers was more active. In addition, according to the recommendations provided by reviewers, seniors with some cognitive impairment like MCI, were already involved in order to evaluate the functionalities of the platform for this population, especially after the integration with MyGuardian.

The third prototype of CoME has also involved the participation of both seniors, formals and informal caregivers. From this last validation of CoME is especially remarkable: (1) the involvement of seniors non-diagnosed with MCI, due to the results of the second prototype showed unfeasibility of CoME for this target group and (2) the increase of formal caregivers for this phase and that is justified because of the importance of knowing their feelings and insights, key for the definition of the B2B approach to be followed in CoME.

Below, the tables for the number of users involved by type of population in each for each of the testing periods covered in the project are shown:

Number of seniors testing:

Organization		IRBLL		PBN		CON		TOTAL
Test period		non-MCI	with MCI	non-MCI	with MCI	non-MCI	with MCI	
First prototype	First sprint	30	-	13	-	-	-	43
	Second sprint	30 (same)	-	13 (same)	-	3 new	-	46
Second prototype	First sprint	8 new	4 new	16 (3 new)	1 (new)	4 new	-	67
	Second sprint	12 new	-	20 (4 new)	2 (1 new) (1 quit)	4 (same)	-	84
Third prototype	Pre-trial	-	-	20 (same)	1 (same)	Did not participate		84
	Post-trial	30	-	23 (3 new)	1 (same)			<u>117</u>

Same = Users that continued from the previous phase of validation

New = New users who arrived in that validation phase

Total takes into consideration only the new users involved in every phase.

Number of informal caregivers testing:

Organization		IRBLL	PBN	CON	TOTAL
Test period					
First prototype	First sprint	15	13	-	28
	Second sprint	15 (same)	13 (same)	-	28
Second prototype	First sprint	12 new	17 (4 new)	1 new	45
	Second sprint	12 (same)	20 (3 new)	1 (same)	48
Third prototype	Pre-trial	-	20 (same)	Did not participate	
	Post-trial	50 new	27 (7 new)		

Number of formal caregivers testing:

Organization		IRBLL	PBN	TOTAL
Test period				
First prototype	First sprint	15	5	20
	Second sprint	15 (same)	5 (same)	20
Second prototype	First sprint	4 new	7 (2 new)	26
	Second sprint	4 (same)	7 (same)	26
Third prototype	Pre-trial	-	7 (same)	26
	Post-trial	54 new	8 (1 new member)	<u>81</u>

A total of 303 users were involved in the testing process of CoME platform. Although 375 users were promised along the project, we did not have wearable devices enough, and although our idea was to involve users in waves and so one device could be share among different users, seniors already involved with a device didn't want to stop the monitoring. So although some users were involved without bracelet they felt discouraged and left the trials so these users were not considered in the total amount of users involved. This fact was mainly observed in the initial phases of the project due to, although seniors without devices were also involved in the final prototype, there was not such problem of discouragement with seniors in this phase.

As can be extracted from the above tables, it is important to highlight that this evaluation had tried to follow a combined approach: on the one hand, PBN has tried to maximize the number of users involved in previous phases to other phases (using mainly new users to compensate dropouts); on the other hand, IRBLL, with more facilities to involve users, has focused on involving as many new users as possible in every phase. The reason why this combined approach has been followed is because it allows us to get both biased results from participants coming from previous phases as well as unbiased results from new incomers with any preconceptions about CoME. This enables to increase the range of answers and provide greater insights from the evaluation of CoME.

2.4. Setup of the trials

The methodology that has been used in the setup of each of the trials has consisted on the creation of three different test phases for each prototype: pre-trial, testing trial and post-trial.

1. Pre-trial phase

Pre-trial meetings are one of the most important parts of any testing process. In these meetings, members of end user organizations aimed to give proper knowledge in short time to the group of end-users involved in order to provide an introduction to them how to use the wearables and how to handle the CoME platform. This had to be done in the shortest time possible and in an easy and friendly way with the aim of not losing the attention and interest of the senior (and/or his/her informal caregiver, if participating too).

Joint sessions and 1 on 1 meeting were arranged by the end user organizations to inform the end users joining to the tests about the participation. However, the setup of bracelets as well as the provision of useful information about them ideally required of more 1 on 1 meeting with end users in order to really ensure the highest level of autonomy and satisfaction during the testing phases with them. These sessions were usually around 30-45 minutes long.

Every time that a senior (and his/her informal caregiver) wanted to participate, the process below was followed by the end user organization:

1. Presentation and information about CoME tests
2. Informed consent to be signed, if the end user agreed to participate
3. Distribution of the wearable device
4. Information about the wearable and set it up together
5. Fill in the CoME pre-trial questionnaire (socio-demographic data, let the end users try the use cases and observe the process in order to get to know their specific needs and possible barriers)
6. Give the end user contact data, in case problems could arise.



Figure 2 Pre-trial phase with Hungarian end-users

2. Testing trial phase

Once the end-users were set-up with the smart watch and the CoME platform, in the testing phase, the end-users experienced the corresponding prototype of CoME platform by testing and evaluating it at home in a real life setting. During this period, the end-user organisation researchers were ready to help the seniors whenever help was needed.

3. Post-trial phase

The post-trial meeting also can be done with joint sessions and 1 on 1 meetings too.

Use of specialized questionnaires was very well needed here to measure the level of satisfaction of the different type of end users separately.

1. Seniors:

The questionnaires for seniors were focused on aspects related to their specific needs. The questions were about:

- a. Measuring process and monitoring
- b. Perceived health and self-health management
- c. Functionalities, design and usability of the CoME platform

2. Informal caregivers:

The questionnaires for informal caregivers were mainly focused on get insights from the seniors' experience, and then retrieving their personal feeling about the usefulness and usability. The questions were:

- a. Questions about their connection with their senior
- b. Questions about how the senior seemed to feel like since started with the testing
- c. Questions about the platform itself

2. Formal caregivers:

The questionnaires for formal caregivers were focused on the functionalities, usefulness and usability of the platform.

- a. questions about the idea itself
- b. questions about the platform itself

It was needed to hold at least one joint session with all the involved seniors to share their experiences together and stay motivated to be active in the testing.

Of course, the questionnaires compiled by the end user organizations did not measure only the level of satisfaction, but also gave insight into the improvements and new functionalities that could better fit their needs.

3. The evaluation process for the first prototype

The current and following sections include a summary of statistical reports and results derived from the evaluation of the first prototype after the setup of trials with end-users in Hungary, Spain and The Netherlands (following releases of the deliverable will include the results of the second and final prototype). These results were gathered by personnel from IRBLL, PBN and CON with experience on validation and testing with users, that have thoroughly assessed and determined the usability and veracity of this data by comparing it to different “control” datasets/results like e.g., the recent Nature article (1), available from Fitbit itself (2) or even available from online “data donation” services like OurDataHelps.org¹.

It is important to mention that although some of the results gathered in this deliverable were already reported in the previous Need Analysis phase, it's important to repeat them again due to the big size of the sample for this phase as well as the statistics of the new end-users who joined after the need analysis phase. Variables related with the profile of users, i.e. socio-demographic questions and others related with Internet using habits that were already retrieved in the Need Analysis Phase, were asked only to newly involved end users.

However, also new questions were added. These new questions have had as basis the UTAUT (Unified Theory of Acceptance and Use of Technology) model (3) –a set of original questionnaires

¹<https://ourdatahelps.org/>

brought by CON (Priscilla Esser) that aim to assess the capabilities and resistances shown by users in the use of modern technology through observation and interview questions.

It is important to remark that **despite having the same basis and following the same setup** for trials, **different questionnaires were used in the post-trial phase of the first prototype by each end-user organization because of the representative nature of this prototype**. The fact that most functionalities of CoME were in a very initial phase for this first prototype made that the questionnaires were focused on the experiences and feelings of the users with the platform and wearable devices rather than functionalities. Thus, different questionnaires were designed by each partner in order to catch the specific economic, gender and social conditions of people in Spain, Hungary and The Netherlands that could affect the way in which they perceive CoME.

For the upcoming prototypes, unified questionnaires were adopted by all end-user organizations based on the experiences that the consortium gathered during the testing process of the first prototype of CoME, agreed among all partners. These questionnaires have evolved along trials to adapt to the functionalities of each prototype, following a **quasi-experimental process**, with pre-post interventions to assess the direct impact of the CoME platform and how the variable answer changes before and after the exposure of the subject to the experimental intervention.

Although CON did not originally participate and act in the project as an end-user organization (they only worked with some informal caregivers in the need analysis phase), they also performed some tests in this first prototype with a small group of seniors in order to gather first-hand experiences from them. This way, the organization had a better insight in the end-user needs in order to tailor the services properly to them. CON was also involved and contributing to the results of the measurement performed mainly by the end-user organizations (IRBLL and PBN) at the same time.

4. The evaluation process in the first prototype in Lleida - Spain

In the following sections, the results from the testing of the first prototype in IRBLL are gathered. As shown above, IRBLL worked with the highest number of seniors.

Users		Seniors		Informal caregivers	Formal caregivers	TOTAL
Test period		non-MCI	with MCI			
First prototype	First sprint	30		15	15	60
	Second sprint	30 (same ones than in the previous sprint)		15 (same ones than in the previous sprint)	15 (same ones than in the previous sprint)	60

4.1. Seniors data

Regarding the seniors, 30 seniors over 65 years participated in the first trial. Following some statistical data about their socio-demographic, ICT use and health status perceived; in order to have an overview of the testing population.

4.1.1. Socio-demographic data

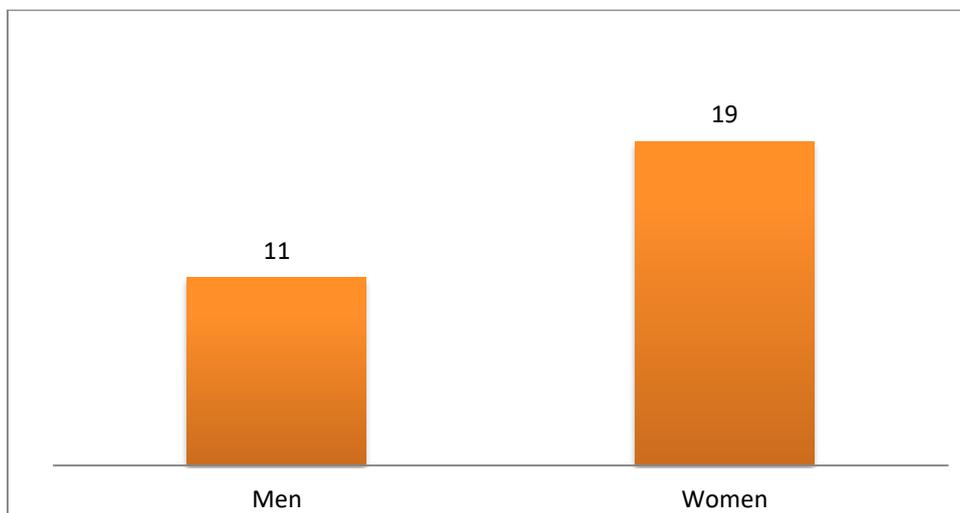


Figure 3 Gender Distribution

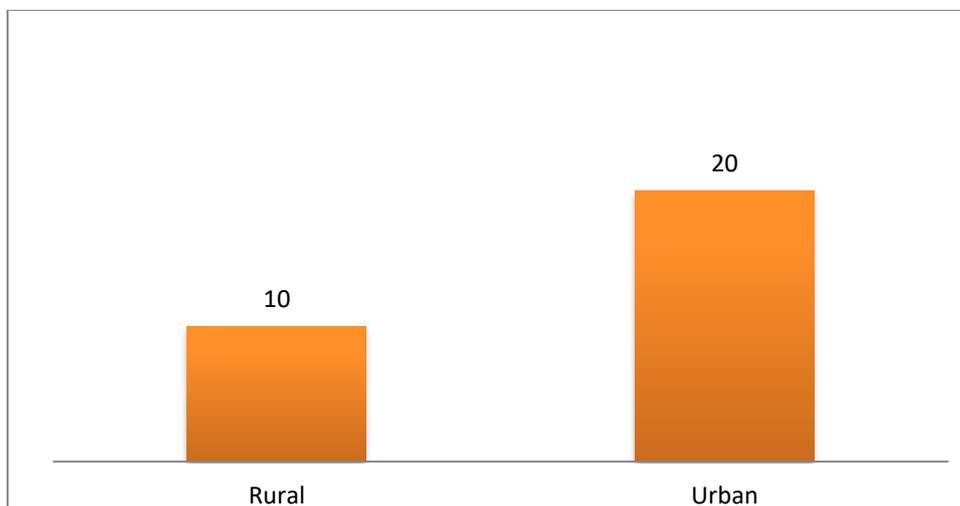


Figure 4 Environment Distribution

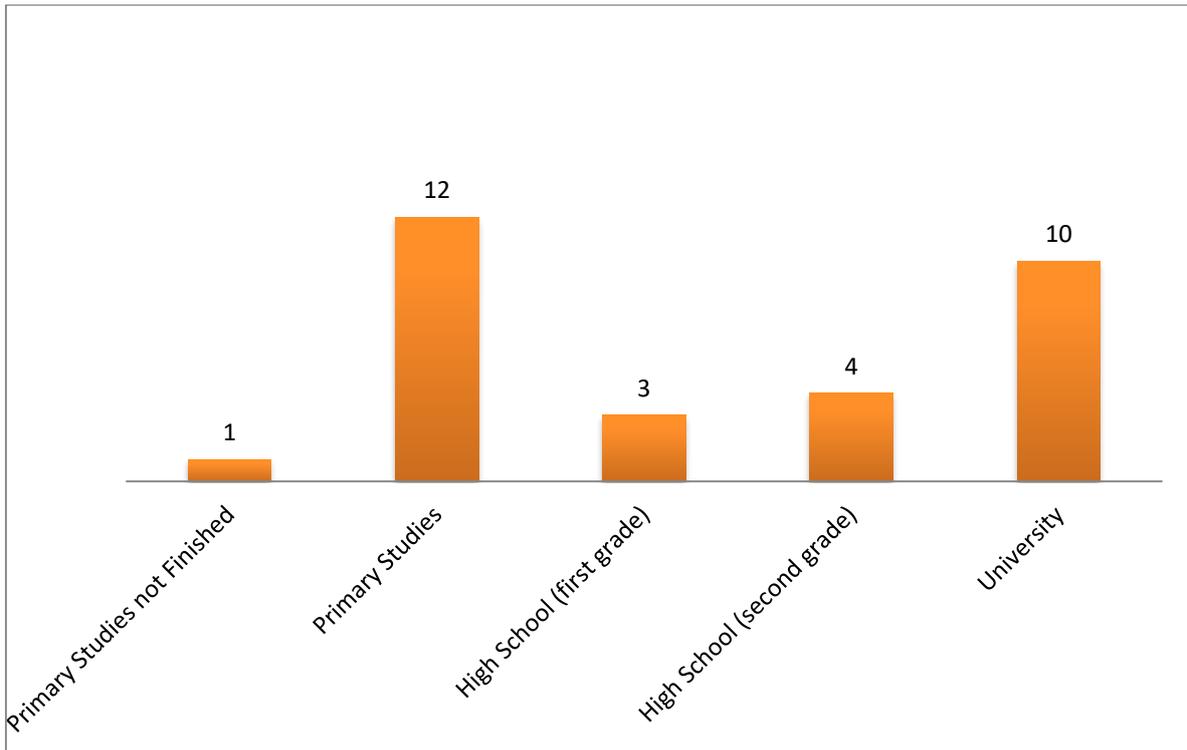


Figure 5 Education Distribution

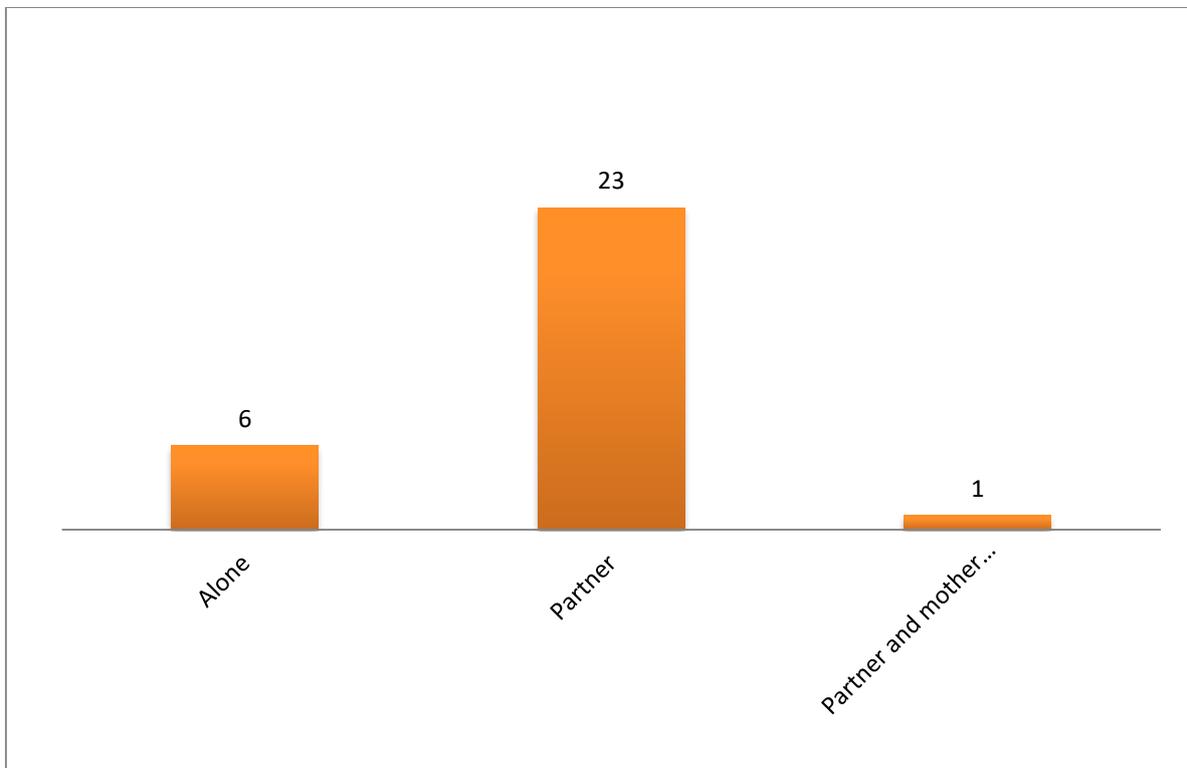


Figure 6 Living Conditions

4.1.2. ICT Use

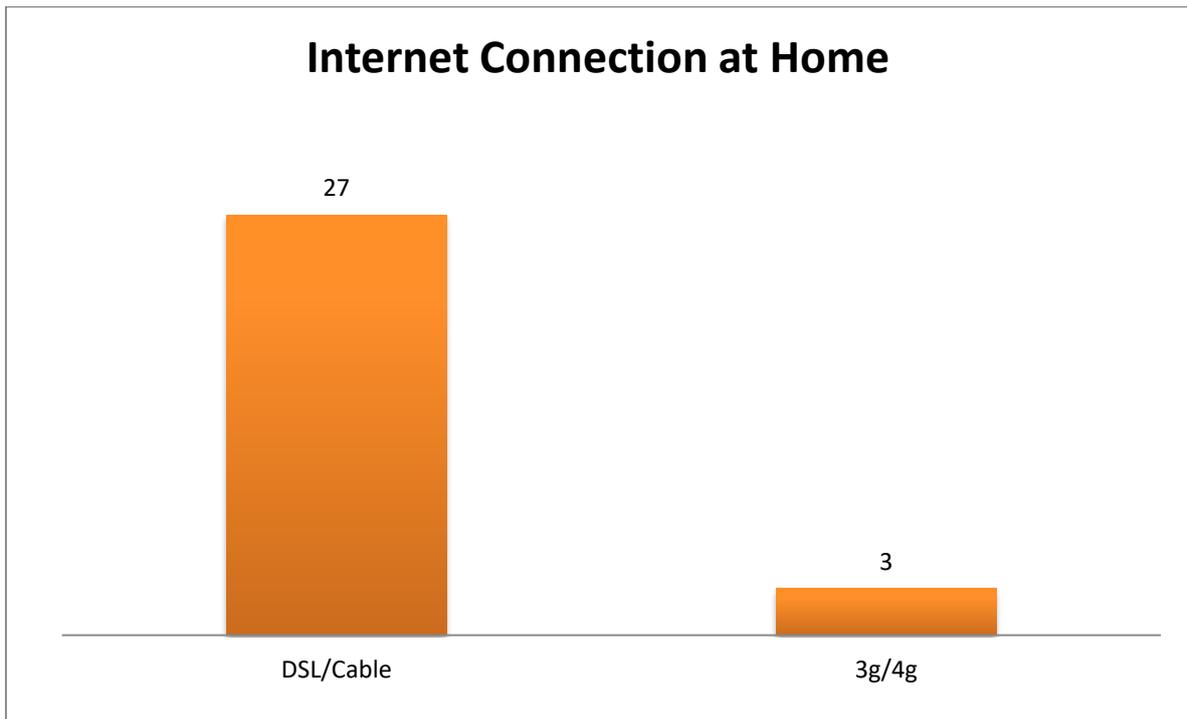


Figure 7 Internet Connection at Home

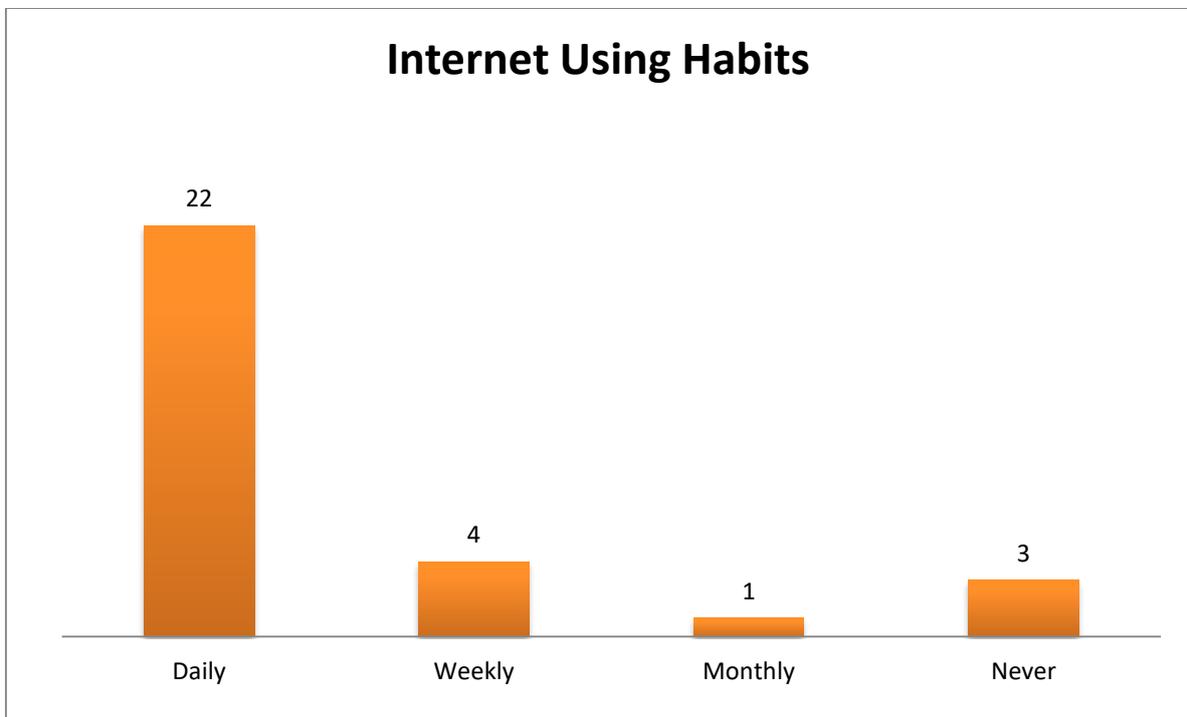


Figure 8 Internet Using Habits

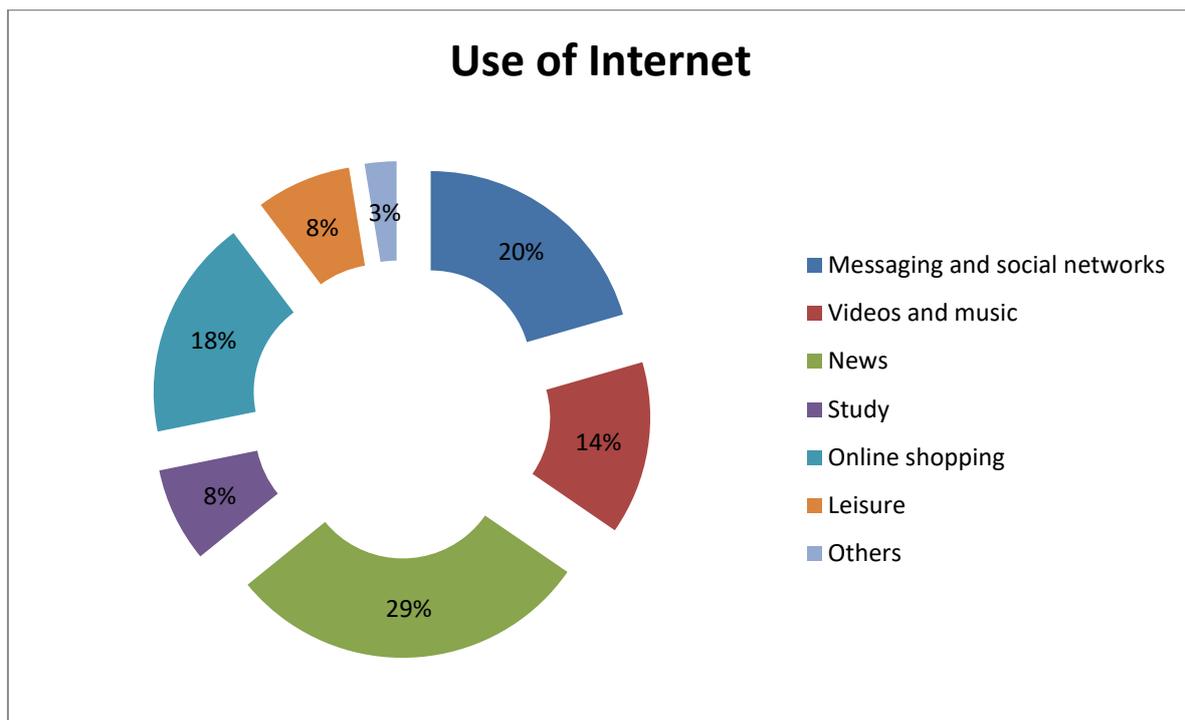


Figure 9 Use of Internet

4.1.3. Health status self-assessment

- 28 of 30 seniors considered themselves as healthy people.
- 27 of 30 thought that they could achieve health goals.
- 26 of 30 thought that they had knowledge to achieve this healthy lifestyle.

To the question about **what they needed to achieve this healthy lifestyle**, their answers were **motivation, tranquility** and **have more time** in most of the cases.

4.1.4. Pre-trial phase evaluation

Trials in IRBLL followed a **quasi-experimental approach**, where pre and post interventions were performed to assess the direct impact of CoME. These interventions are based on the measurement and **comparison of the variable answer before and after the exposure of the subject to the experimental intervention**.

Summarizing the results of the end users:

- the registration process seems to be clear for most of them, but it took quite a long time for a lot of them to change the language settings to their mother language, possibility of not remembering their passwords is relatively high,
- after the registration process, most of them expected to enter in the platform, not to login,
- the overall impression of the homepage was fine, some of the seniors expressed that it was a bit empty, but clear (in accordance with the aim of the project, which is to make the application as clear and easy to handle as possible); colors were well received,

- pairing process with the Fitbit account was not smooth in most of the cases, seniors needed help,
- in the homepage they found easily how to set a health goal, but most of them did not realize, that they could create their own goals.

In summary the first impression of the end-users with the CoME platform was that they liked the design of the platform and that it seemed easy to use, but still many features are missing so not many options to play with the platform. Wearable connection is not an easy process the first time, maybe guidance should be provided, like tips, from the CoME platform.

Following the questionnaires used and the results obtained:

4.1.4.1. *Did the user experience any difficulties registering?*

Most of the users experienced difficulties in the registering process due to language problems. English could be a barrier; they spent more time than they should to change the language and register.

The configuration of the default language of the country in the platform should be easier, but we have to say that despite this barrier, the registration process was easy.

Use of the Gmail or Facebook account to register should be considered in order to avoid so many passwords.

4.1.4.2. *Were there any unexpected/unclear screens or buttons?*

No, all the process was like as expected.

4.1.4.3. *Did the participant experience any issues during the flow?*

No, only the issues related to language. They had to change the language settings in the registration page and then one more time in the logged in page.

Once registered, most of them expected to enter in the platform, not to login.

The login page returns an error message in case the username or password was wrong. Some of the seniors had mistakes in the username when they registered, but they thought, that the problem was with the password, so the error message should directly point out, which data was the wrongly typed one.

4.1.4.4. *What is your first impression of the homepage? Why?*

The overall impression of the homepage was fine, not bad, but fine. Some of the seniors said, that was a bit empty, but clear (in accordance with the aim of the project, which is to make the application as clear and easy to handle as possible).

4.1.4.5. *What do you think of the layout and colours used in the application?*

The colors were well received, although some of the seniors asked for more vivid colors.

4.1.4.6. *What did you like or dislike?*

Nothing in particular, but once again they ask for more vivid colors, “*we need something that makes us happy*”.

4.1.4.7. *Adapt the personal profile and pairing*

Most of the seniors did not know how to change their personal profile; it was not self-evident that clicking on their name leads them to their personal profile.

In the personal profile, they did not change anything of the layout, neither the font size or font type.

Most of the seniors needed help in the process of pairing the Fitbit devices with the CoME accounts. One of the main problems was related with passwords, they do not remember the password for their Fitbit accounts.

4.1.4.8. *Set a health goal*

The process to come back to the homepage should be easier; some seniors did not know that they should click on the CoME logo to do it. Also the back button of the browser can lead the user to the logged out platform.

In the homepage they found easily how to set a health goal, but most of them did not realize, that they could create their own goals.

Predefining more health goals and configuring the own goals through some guided process should be tested.

4.1.5. *Post-trial phase evaluation*

The overall impression of the platform was that it was useful, although more information would be needed to be present in the platform. This expectancy was more tied to what the researchers told the participants when they enrolled at the project.

Seniors expected more information and data about their health status, objective data that could help them to be more autonomous and more confident. At the same time, they expected that they could use that data to detect some health problems and ask about them their physicians.

Seniors would even recommend the platform, but some of them said that only when it was fully operable.

Most of them were confident that with some practicing under their belt, they could handle the platform quite easily.

In summary the platform created good expectations, although just a first stage of the development so it was difficult to provide a full feedback on it. They wanted to have since the beginning the whole features of the platform.

The detailed post-trials questionnaires used for seniors in Lleida and the answers are explained in the subsequent sections.

4.1.5.1. *Performance Expectancy*

4.1.5.1.1. *Do you find the platform useful? Why?*

The overall impression of the platform was that it is useful, although more information would be needed to be present in the platform. This expectancy was more tied to what the researchers told the participants when they enrolled at the project.

Seniors expected more information and data about their health status, objective data that could help them to be more autonomous and more confident. At the same time, they expected that they could use that data to detect some health problems and ask about them their physicians.

4.1.5.1.2. Would you recommend the platform? If yes, to whom and why? If not, why not?

All the seniors would recommend the platform, but some of them said that only when it was fully operable. They would need this information and easier handling of the site.

4.1.5.1.3. Do you think the platform can be helpful to create and achieve health goals? Why?

Seniors thought, that it could be helpful, but the impression was that they would like to be happier, not only to worry about their health status. They would like, in addition, that the platform added something that motivated and helped them to achieve a healthier lifestyle in a more cheerful way.

They thought that the main aim of the platform was present along it - it provides information about health and can be helpful to achieve health goals.

4.1.5.1.4. Do you think the platform will help you to increase your health self-reliance? Why?

Yes, because most of seniors said, that objective data could be useful. However, they expected much more concrete data regarding the information they told earlier, during the recruitment process.

4.1.5.1.5. How often would you use the platform? Why?

At this point, seniors were not sure about how often - some of them said when they wanted to check their data, others said once a week.

In IRBLL's opinion, our opinion, seniors should be engaged in the platform based on different functionalities offered in the future, like memory games or communication tools.

4.1.5.1.6. Do you think the platform will help you to act on any health trends when necessary?

Absolutely yes, in the case of all seniors.

4.1.5.2. Effort Expectancy

4.1.5.2.1. Are you able to find the right health information that you would like? Why?

At this moment more information was needed in the platform, for now, it was hard to give a valuable answer about this.

4.1.5.2.2. Do you think it is easy to navigate on the platform? Why?

Seniors found easy to navigate in the platform, but a guided tour or some help agent would be needed, especially at the first time.

4.1.5.2.3. *Do you find the platform easy to use? Why?*

Yes, after explained the way it worked for the first time.

4.1.5.2.4. *Do you think you can easily learn to use the platform? Why?*

After a first introduction, yes, as mentioned in the question above.

4.1.5.3. **Social Influence**

4.1.5.3.1. *Would you use the platform if a friend or family member would recommend it? Why?*

Yes, all seniors trusted their family members that much.

4.1.5.3.2. *Would you use the platform if your doctor or care professional would recommend it to you? Why?*

Yes, all seniors stressed the fact, that the most important factor for them about their health status was the recommendations by the health professionals they were in contact with.

4.1.5.3.3. *Would you use the platform if a well-known trusted organization would recommend it to you (e.g. consumer organization)? Why?*

Yes, but this point was the less influential.

4.1.5.4. **Facilitating Conditions**

4.1.5.4.1. *Are you ready to use the platform? If not, what do you need?*

At this moment, all seniors were ready to use the platform.

4.1.5.4.2. *Do you have the necessary knowledge to use the platform?*

All seniors answered that they had the knowledge to use the platform, although they needed time and stayed focused to reach all the functionalities

4.1.5.4.3. *Do you have the needed skills to use the platform?*

All seniors believed that they had the skills to use the platform, due all of them are using smartphones.

4.2. **Informal caregivers**

Most of the interviews and workshops with the seniors took place with at least the presence of one informal caregiver. Because of this, the impression and feedback provided by them was provided together with the seniors' one. In summary they pointed out that there was a lot of potential in the platform, they liked the goals possibilities and the risk detection of problems; but as these features were not currently available in the platform at this stage of the evaluation, it was difficult evaluate them, according to them, the platform looked nice and clear.

4.3. Formal caregivers

The trials with the formal caregivers were carried out in common workshops due to the nature of the functionalities of the platform.

Formal caregivers, mainly nurses, gave valuable points of view of the platform, based on their daily relationship with seniors and provide useful feedback about improvements in the features of the platform.

4.3.1. Pre-trial phase evaluation

Formal caregivers thought that the process of registration was quick and fluid, although in their opinion, some fields could lead to a misinterpretation (e.g. history), maybe tooltips would be welcome to avoid the misunderstanding.

The way of switching between languages could be a barrier, not for them but for the seniors.

Regarding to their opinion, the colors were pleasant, but the homepage would need something more to add. They indicated that it seemed like too empty now. Some of them stressed the functional design as a good point.

They expressed that more information would be needed about the real objectives of the platform, e.g. a welcome screen, where you can find the main aims of the site and a guided tour afterwards. This tour should be optional for the potential end user.

In the case of formal caregivers, there were no problems to adapt their personal profiles, but they believed, that some of the seniors would ask for help, not really because there would be any problem with the platform, but because the general lack of ICT knowledge in that age.

In general terms they suggest providing a guide for the seniors to use the platform in a form of tooltips, FAQ or user manual; but they think this guidance would be very helpful for the seniors.

Following the questionnaires and answers provided:

4.3.1.1. *Did the user experience any difficulties registering?*

Formal caregivers thought that the process of registration was quick and fluid, although in their opinion, some fields could lead to a misinterpretation (e.g. history).

The way of switching between languages could be a barrier, not for them but for the seniors.

4.3.1.2. *Were there any unexpected/unclear screens or buttons?*

Nobody found unexpected buttons or unclear screens.

4.3.1.3. *Did the participant experience any issues during the flow?*

No, not in the case of formal caregivers.

4.3.1.4. *What is your first impression of the homepage? Why?*

Formal caregivers said that the colors were pleasant, but the homepage would need something more to add. They indicated that it seemed like too empty now. Some of them stressed the functional design as a good point.

More information was needed about the real objectives of the platform, e.g. a welcome screen, where you can find the main aims of the site and a guided tour afterwards. This tour should be optional for the potential end user.

4.3.1.5. *What do you think of the layout and colors used in the platform?*

Almost all the formal caregivers thought that they were pleasant and not vibrant.

4.3.1.6. *What did you like or dislike?*

They liked the clarity and the easy-to-use nature of the platform and there were nothing particular to complain about.

4.3.1.7. *Adapt the personal profile and pairing*

In the case of formal caregivers, there were no problems to adapt their personal profiles, but they believed, that some of the seniors would ask for help, not really because there would be any problem with the platform, but because the general lack of ICT knowledge in that age.

4.3.1.8. *Set a health goal*

They thought that it was quite easy to set a health goal on the page.

4.3.2. *Post-trial phase evaluation*

All formal caregivers stressed that the future of the sanitary health systems was health prevention in a global perspective, carrying out a healthier lifestyle. "Helping professionals in this task is important!"

They thought that the platform facilitated well the interaction between seniors-formal caregivers-informal caregivers, building up healthier habits and correcting the bad ones quite effectively.

In summary a tool that monitored the main aspects related to a healthier behavior like CoME would be really helpful. Also the option of sharing information with the chosen ones that could help seniors to achieve health goals and therefore to have a healthier lifestyle could help increase the health self-reliance of elderly.

Following the questionnaires used for this phase:

4.3.2.1. *Performance Expectancy*

4.3.2.1.1. *Do you find the platform useful? Why?*

Yes, and all of them stressed that the future of the sanitary health systems was health prevention in a global perspective, carrying out a healthier lifestyle. Helping professionals in this task is important!

4.3.2.1.2. *Would you recommend the platform? If yes, to whom and why? If no, why not?*

Yes, they thought that was easy to use.

4.3.2.1.3. *Do you think the platform can be helpful to create and achieve health goals? Why?*

They thought that the platform facilitated well the interaction between seniors-formal caregivers-informal caregivers, building up healthier habits and correcting the bad ones quite effectively.

They thought that it could be helpful for formal caregivers in order to have more objective patterns and to help seniors based on the objective data.

4.3.2.1.4. *Do you think the platform will help you to increase your health self-reliance? Why?*

Yes, most of them believed in it. They thought that a tool that monitors these aspects and share the information with the chosen ones could help seniors to achieve healthy goals and therefore have a healthier lifestyle

4.3.2.1.5. *How often would you use the platform? Why?*

They stressed that this would depend on the specific situation of the senior.

4.3.2.1.6. *Do you think the platform will help you to act on any health trends when necessary?*

All of them said yes, because formal caregivers could know basic trends of activity of seniors. Depending on the seniors the most valuable information could be the heart-rate, the physical activity or sleep patterns.

4.3.2.2. **Effort Expectancy**

4.3.2.2.1. *Are you able to find the right health information that you would like? Why?*

Yes, when the platform would have all the information all the formal caregivers think that it could be easy to find

4.3.2.2.2. *Do you think it is easy to navigate on the platform? Why?*

Yes, was easy for seniors, colors were adapted to them and the navigation was clear.

4.3.2.2.3. *Do you find the platform easy to use? Why?*

Yes, all the screens were clear

4.3.2.2.4. *Do you think you can easily learn to use the platform? Why?*

Yes, the options were the needed ones and were clear

4.3.2.3. Social Influence

4.3.2.3.1. *Would you use the platform if a friend or family member would recommend it? Why?*

Yes, they would try it or at least take a look. They pointed out that it is interesting a tool that could serve as intervention and that allowed to monitor basic health trends.

4.3.2.3.2. *Would you use the platform if another doctor or care professional would recommend it to you? Why?*

Yes, this was the most important point, health professionals were health agents.

4.3.2.3.3. *Would you use the platform if a well-known trusted organization would recommend it to you (e.g. consumer 29organization)? Why?*

All of them said that probably yes because they were used to use tools of well-known and trusted organizations to help them in their daily work

4.3.2.4. Facilitating Conditions

4.3.2.4.1. *Are you ready to use the platform? If not, what do you need?*

All of them answered that yes, because they had the knowledge to use it

4.3.2.4.2. *Do you have the necessary knowledge to use the platform?*

Yes, they were used to use ICTs in their workplaces.

4.3.2.4.3. *Do you have the needed skills to use the platform?*

Yes, they were used to use ICTs in their workplaces.

5. The evaluation process in the first prototype in Szombathely - Hungary

Because of the representative nature of the set of useful functionalities that CoME has, PBN applied a different approach and created a bit different questionnaire than IRBLL. It was more focused on the measuring part with the specificity of the wearable devices and the possible health improvement during the trial and only contained a few questions about the platform itself.

PBN organized workshops for interesting end users, especially seniors, in order to present them what the planned CoME platform could provide them.

In the frame of these workshops, the questionnaires of the Need Analysis phase were filled in by the participants to have a closer insight on their needs regarding to a platform like CoME. The original numbers of participants who filled them in were: 8 seniors, 8 informal caregivers and 5 formal caregivers. However, as the Hungarian National Funding Agency indicated, this sample was smaller than the purpose of the survey would need it in their opinion. Because of this, PBN organized another workshop with more end-users in 2017 where the main aim was to broaden

the previous sample in order to get significant results that gave a more complete picture of these users' needs. As the result of this additional workshop, the final number of filled in questionnaires from Hungary were: 20 from seniors, 20 from informal caregivers and 5 from formal caregivers.

After the Need Analysis phase, PBN held presentations in local retired federation events and in elderly homes aiming to recruit seniors (and their informal caregivers), who were interested in participating in the testing phase(s) for the evaluation of CoME.



Figure 10 PBN recruiting process in the Retired Federation Meeting

The interested seniors recruited by PBN joined to the testing of CoME and attended three joint sessions organized by PBN with their informal caregivers (PBN asked them to attend with at least the presence of one of their informal caregivers) in order to involve them also in the CoME evaluation and share their experiences together. Specialized feedback questionnaires were filled in together with the seniors, who were present at the meetings.

Those seniors that could not attend the joint meetings were interviewed individually.

For the setting up of the Fitbit trackers and initial use cases simulation, in order to get used to the platform, one to one meetings were carried among PBN's co-workers, seniors and informal caregivers.

Formal caregivers were also attended by PBN's employees in separate workshops in order to gather their appreciated feedbacks regarding to the platform and the needs of the seniors they know and treat.

The final numbers of users testing the first prototype are the following:

Users		Seniors		Informal caregivers	Formal caregivers	TOTAL
Test period		non-MCI	with MCI			
First prototype	First sprint	13		13	5	31
	Second sprint	13 (same ones than in the previous sprint)		13 (same ones than in the previous sprint)	5 (same ones than in the previous sprint)	31 (same ones than in the previous sprint)

5.1. Seniors data

5.1.1. Socio-demographic data

Regarding the seniors, 13 seniors over 65 years participated in the first trial.

- Gender: 7 women, 6 men
- Living: 12 urban, 1 rural. Only 2 of them live alone, all the others live with their partners together.
- Studies:
 - 2 seniors with professional or doctorate degree
 - 7 seniors with bachelor's or master's degree
 - 4 seniors with trade/technical/vocational training
- Internet using habits:

All of the participants from Hungary had Internet connection at home and used the Internet on a daily basis or sometimes only weekly. Their experiences about using the modern technology were quite well compared to their age group, but some of them had some difficulties, when it came to make a concrete process and to remember their passwords - they usually used the 'Remember me' option.

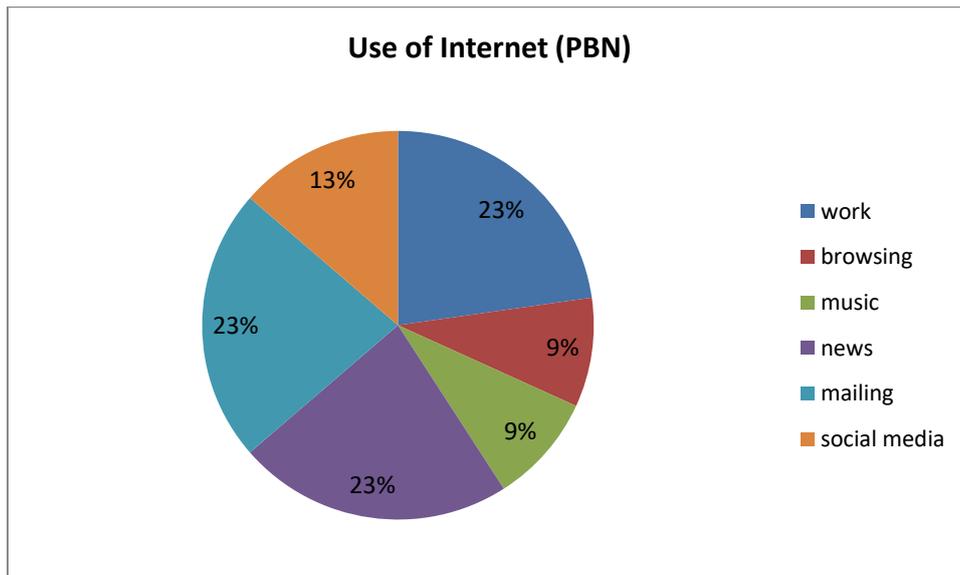


Figure 11 Use of Internet (PBN)

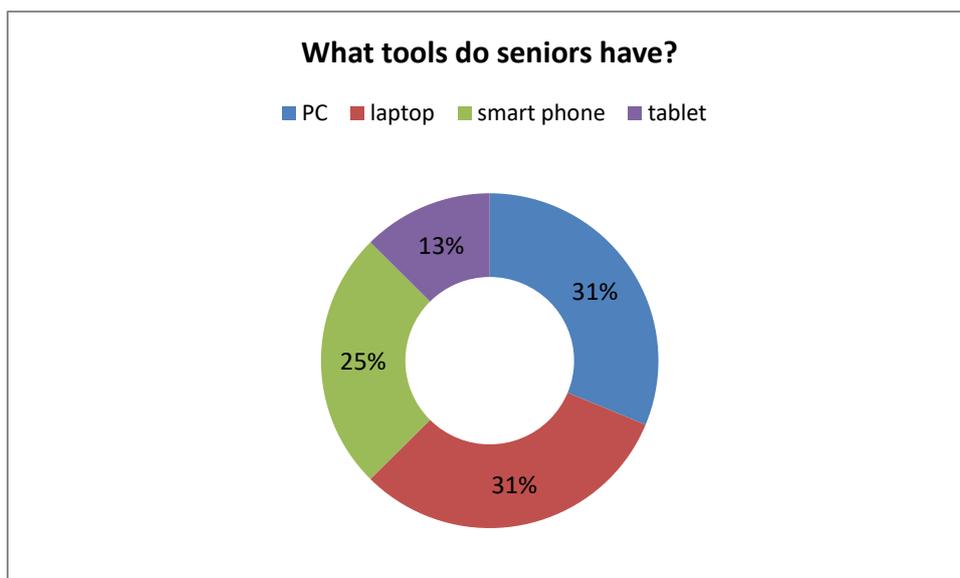


Figure 12 What tools do seniors have?

5.1.2. Pre-trials phase evaluation

For the pre-trial phase, evaluation workshops were organized in which seniors could interact and provide feedback on the CoME objectives. The platform was explained to them and initial use cases were shown as examples and in order to start familiarizing with the platform.

In this first approach to the platform they generally liked the design of the platform, but they agreed that the home page was still very empty. Also they pointed out that wearable connection seemed to be challenging for the seniors, so guidance would be welcome.

5.1.3. Post-trials phase evaluation

The questionnaire prepared by PBN for the post-trial evaluation was, as already mentioned, different from the ones used by IRBLL in Spanish trials since it consisted of seven questions specifically designed for the first prototype of CoME. For the following prototypes the same questionnaires and approaches were followed in all the trial sites.

In summary seniors had identified a top 3 of measures that for sure wanted to see in CoME platform: sleep quality and length, steps and heart rate. Initially they felt really motivated about using the platform.

Following the questionnaires and answers provided

5.1.3.1. Please rank the following parameters below that Fitbit bracelets measure, in order of importance! (The most important is 1, the less important is 8)

- steps taken per day
- distance taken a day (by walking, running and riding a bike)
- floors taken per day
- active minutes per day
- calories burned per day
- heart rate
- tracking the sport activities
- sleep length and quality

	Steps	Distance taken by activities	Calories burned	Floors taken	Active minutes	Heart rate	Tracking (sport)activities	Sleep analysis
1. place	6	1			1		3	1
2. place	3	1	1		1	1	3	2
3. place	2	3				1	2	4
4. place	1	1	1			3	1	2
5. place		2	3			1	3	2
6. place		1	2		1	4		3
7. place		1	3		4			2
8. place		1			6	1		1

Table 1 The number of places each activity reached

The scoring system used to determine the final ranking results is the following:

1. place – 8 points
2. place – 7 points
3. place – 6 points

etc.

The results obtained from this evaluation will help the consortium to prioritize the information to be shown in the platform:

- | | | |
|----------|------------------------------|-----------|
| 1. place | steps | 82 points |
| 2. place | heart rate | 74 points |
| 3. place | sleep analysis | 60 points |
| 4. place | distance taken by activities | 52 points |

5.	place	active minutes	45 points
6.	place	calories burned	36 points
7.	place	floors taken	32 points
		tracking (sport) activities	32 points

In summary, “must” measures that should appear in the CoME platform are: steps, heart rate and sleep analysis.

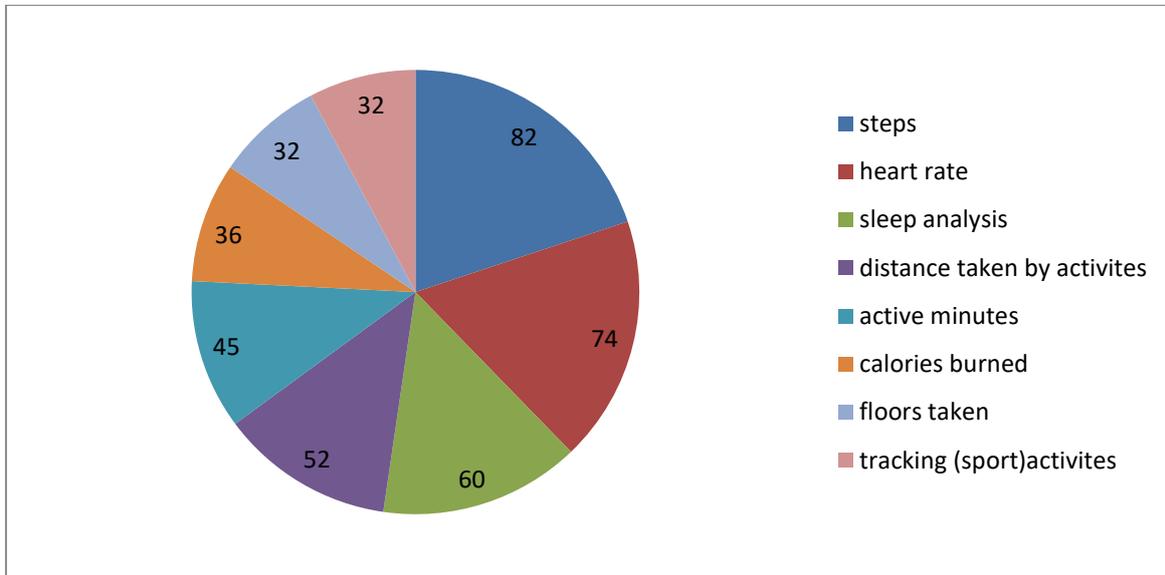


Figure 13 Senior preferences about the measurement by the wearable devices

5.1.3.2. Are you more motivated to be physically active since you started wearing the bracelet?

- absolutely not
- a bit
- partly
- totally

The results:

- 1 senior selected ‘a bit’ option
- 3 seniors selected the ‘partly’ option
- 8 seniors selected the ‘totally’ option
- 1 senior did not answer

Most of Hungarian seniors got really motivated by wearing the measuring device. Almost all of them were very enthusiastic and wanted to stay in testing process for the whole lifetime of it.

PBN made a research about the realistic goals that seniors over 65 should reach in order to achieve a generally healthy lifestyle, this research was taken into consideration in the platform as general recommendation to the users of the platform. Those targeted numbers were defined by the follows (with the approval of 2 doctors):

- 6,000-7,000 steps/day
- heart rate between 60-100 bpm in average situations

- 6-8 hours of sleeping time/day (in this age, it could be normal, if no deep sleep is present)

Thanks to the aforementioned enthusiasm of the Hungarian participating seniors and the relatively good shape they were usually in, most of them even over-achieved these initial numbers:

- a lot of them had over 10.000 steps multiple times a week and had a way higher average than the 6-7000 area,
- the heart rate was in the healthy area in the cases of all of them,
- the sleeping time usually was in the healthy area in the cases of all of them, even with spending quite a lot of time from the night with deep sleep (between 1-2 hours or even more in some of the cases, which was a higher rate than the benchmark consists provided by Fitbit).

5.1.3.3. *If you did not choose the “absolutely not” answer for the second question, do you feel better since you started to achieve a healthier lifestyle?*

- I have not experienced any changes yet
- partly
- way better

The result (4 seniors did not answer):

- 2 seniors did not experience any changes yet
- 6 seniors selected ‘partly’
- 1 senior feels way better

5.1.3.4. *Do you think CoME application is easy to handle?*

- yes
- no
- there are some points, that should be more clear

The result (one senior did not answer):

- 10 seniors selected yes
- 1 senior selected no
- 1 senior selected the third option

5.1.3.5. *If you did not choose the “yes” option for the fourth question, please point out below, what are the problematic points, and if you have a potential solution, please also share it with us.*

Two seniors wrote answers to this optional question.

1. *“It is not clear how I could reach the pairing the devices option and setting up the visualization by clicking on my name in starting page”.*
2. *“Without showing the trends, it does not really make sense (for now, I know later the data going to be there)”.*

5.1.3.6. *Is the appearance of the CoME application suitable for the needs of people in your age? What is your opinion?*

- yes
- no
- partly, there are some parts to be changed

The result:

- 10 seniors selected yes
- none of the seniors selected no
- 2 seniors selected the third answer
- 1 senior did not answer

5.1.3.7. *Generally, what would you change and how?*

One senior wrote answer to this optional question.

“The timeline part was a bit hard to understand, it was strange (I know this platform supposed to be easy, but maybe this is too easy/simple)”.

5.2. *Informal caregivers*

A total sample of 13 informal caregivers (one belongs to every 13 seniors) answered to the questionnaire prepared by PBN.

5.2.1. *Pre-trials phase evaluation*

Workshops carried for the pre-trials evaluation integrated seniors and informal caregivers together, so their impressions about the platform were the same ones as the provided by the seniors in the previous section.

5.2.2. *Post-trials phase evaluation*

In summary informal caregivers agreed on the same top 3 measures that might appear in CoME: heart rate, sleep and steps. They felt their seniors got really motivated about using the platform, and at least the perceived feeling was that they felt healthier, as they tried to follow the goals and hints provided by CoME.

Some recommendations about improvements were provided by them such as improve the menu system; but in general they were expecting the new prototype in order to check the features promises for the final prototype and that currently were not there.

Following the questionnaires used for the post-trial evaluations in Hungary:

5.2.2.1. Do you know the results of the measurement by the bracelet worn by your relative/friend/partner?

- yes
- no
- some of them

The result:

- 7 informal caregivers answered with yes
- one answered with no
- 5 answered with ‘some of them’

5.2.2.2. What are the 3 most important parameters to measure in your opinion? (Please underline)

- Steps taken per day
- Distance taken a day (by walking, running and riding a bike)
- Floors taken per day
- Active minutes per day
- Calories burned per day
- Heart Rate
- Tracking the sport activities
- Sleep length and quality

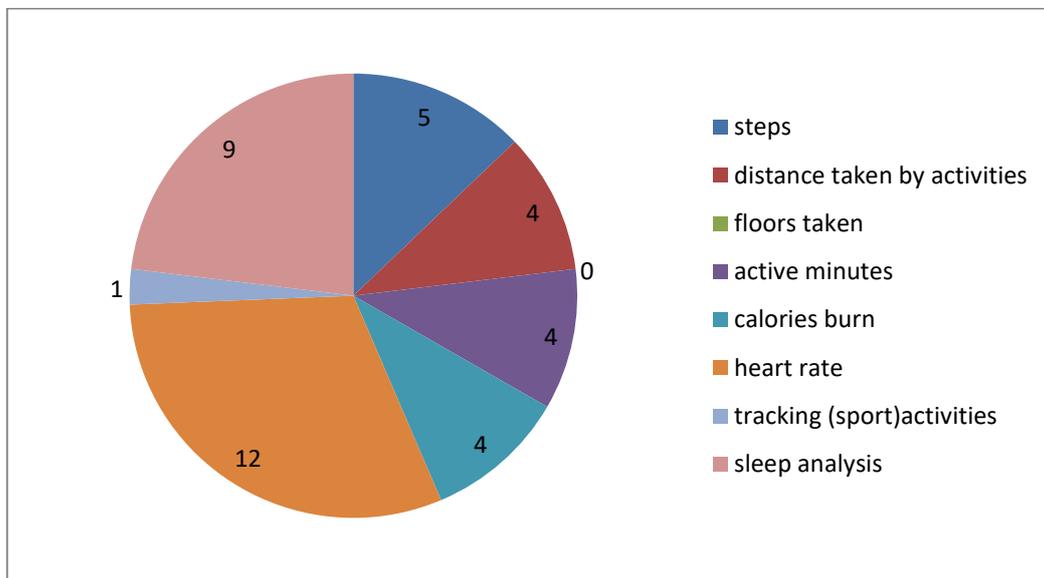


Figure 14 Informal caregivers’ ranking about the measured parameters

These results showed high level of similarity between the opinion of the seniors and the informal caregivers regarding to the importance of the measured parameters. Of course, the rankings were not exactly the same, but the top 3 remains unchanged.

Seniors got motivated regarding their daily activities; which might be the reason they found the steps count important information to know and see their progress.

Informal caregivers were, of course, somewhat worried about their older loved ones, probably that was why they focused mainly on the heart rate.

In general, people did not have too significant knowledge about the sleeping patterns in detail. That could be the reason why they were curious about the sleep analysis that the bracelets provide.

5.2.2.3. Which 3 of them are the most exciting and useful to know for your senior in your opinion? Please write them down below:

Here are the results below:

	steps	distance taken by activities	floors taken	active minutes	burned calories	heart rate	tracking (sport)activities	sleep analysis
1. place	3					7		3
2. place					2	4		7
3. place	4	3		3		2		1

A scoring system was created here too, as earlier in the case of a similar type of question like this one, the basic conception was the same, the only difference was that here only 3 places are available:

1. place – 3 points
2. place – 2 points
3. place – 1 point

The results obtained based on the above scoring system show again that the top 3 remains: heart rate, sleep analysis and steps.

- | | | |
|----------|------------------------------|-----------|
| 1. place | heart rate | 31 points |
| 2. place | sleep analysis | 24 points |
| 3. place | steps | 13 points |
| 4. place | calories burned | 4 points |
| 5. place | distance taken by activities | 3 points |
| | active minutes | 3 points |

5.2.2.4. What do you think, did your senior get more motivated to be healthier than he/she was before?

- Yes

- No
- He/she is trying, but has ways to go

The result:

- 7 informal caregivers answered with yes
- none of them answered with no
- 6 answered with ‘he/she is trying, but has ways to go

5.2.2.5. Does he/she seem to be healthier?

- yes
- no

The result:

- 5 informal caregivers answered with yes
- 8 with no

5.2.2.6. Did he/she talk to you about his/her condition since started testing? What did he/she experience?

- yes
- no

The result:

- 11 informal caregivers answered with yes
- 2 with no

Some added comments by the caregivers:

1. *“More active lifestyle is what I see and big improvement in the quality of sleeping, maybe because of the changed and more active lifestyle”.*
2. *“Very big motivation in our case!”*
3. *“My senior is really glad that the watch measures her heart rate, because she can keep it that way in the range, where fat burning is the most efficient.”*
4. *“My senior thinks that this process will motivate him enough to make a big change and the results will also come with time.”*

5.2.2.7. Do you think CoME application is easy to handle?

- yes
- no
- there are some points that should be clearer

The result:

- 6 informal caregivers answered with yes
- none of the answered with no
- 7 answered with ‘there are some points, that should be clearer’

5.2.2.8. *If you did not choose the “yes” option for the fourth question, please point out below, what are the problematic points, and if you have a potential solution, please also write it down!*

6 informal caregivers answered to this question.

1. “Faulty translations!”
2. “It is not clear, how CoME would like to offer more than Fitbit already gives. We were told about what are the plans about the functions of the application, but it is not too useful for now as we could not see them.”
3. “It is ok that no data available in the ‘Trends’ menu point in this stage of the platform, but it should be seen, that which kind of data and in what kind of details will be available in later phases.”
4. “The menu system is not clear enough.”
5. “For now, a lot of planned functions are not transparent (trends, the avatar on the right side, etc.); hopefully it will get better with time.”
6. “It is strange that seniors would have to click on their names in the left top to reach a part of the menu system.”

5.2.2.9. *Does the appearance of the CoME application suit well for the needs of the elderly, what is your opinion?*

- yes
- no
- partly, there are some parts to be changed

The result:

- 9 informal caregivers answered with yes
- none of them answered with no
- 4 answered with ‘partly, there are some parts to be changed’

5.2.2.10. *What would you change and how?*

3 informal caregivers answered to that question.

1. For now, nothing.
2. A better appearance would definitely help.
3. A more clear-out menu system would be needed.

6. The evaluation process in the first prototype in Arnhem (CON)

Due to the reduced number of test users in The Netherlands the way of showing the results was different, as here it could be detailed by user.

Below there is a short summary from testing with 3 seniors from Netherlands.

6.1. *Tracked data, in order of importance:*

Senior 1

1. steps
2. stairs
3. sleep analysis
4. heart rate
5. tracking (sport)activities (biking)

The senior had a heart condition, but had always had a very active lifestyle. Recently retired, had problems with sleeping.

Senior 2

1. steps
2. floors taken
3. heart rate
4. calories

The senior had a knee injury and was recovering from an operation. He wanted to lose some weight.

Senior 3

1. heart rate
2. steps

The senior had a heart condition and wanted to find out how she could be active without putting too much strain on her heart.

In summary steps are the most wanted parameter to be seen in the platform.

6.2. *Motivation*

The Fitbit motivated all three to be more active!! They all noted that they did not want to take it off to charge it, since it would miss the steps they took in the meantime. Also, they admitted that they only went for a walk in the evenings to make their goals and achieve more steps. This did not lead to any changes in how healthy they feel (yet). Thus the CoME platform has great potential in motivating users and changing their health behavior.

6.3. *Opinion about CoME*

The registration on the CoME application posed already problems that they could not solve themselves. This caused them to give up on that part of the trial and stick to the Fitbit application (even though that application is in English). One of the problems may stem from the confusion of having two applications side-by-side, with two registration processes.

They all pointed out, that the use of the languages on the site should be improved. The language is not consistently Dutch which caused in some cases for confusions. At first sight the timeline was not clear, since it was empty at first. Though, much of this kind of confusions now stemmed from the prototype only functioning partially, it did not seem to respond in some places, probably because of the aforementioned reason about functioning. There were no comments on the appearance of the platform. However, the notebook with goals was not perceived as a notebook.

Finally, they were all very, very enthusiastic about the wearable and the idea of the CoME platform. One of them even asked for it as a birthday present to her child!

7. The evaluation process for the second prototype

The testing of the second prototype of the CoME platform involved four different sections just as in the case of the first one. Two sprints were created for the technical partners to implement the changes and develop the platform based on the comments and questionnaires filled in by the end-users in the previous periods. After these parts, the testing periods followed, where end-user organizations started to cooperate strongly with their target groups again in order to help them acquire the proper knowledge to handle the new functionalities (or even to handle the platform in the case of newly incoming end-users) and to gather their feedback with applying pre-post intervention method.

Also, due to during the mid-term review that was held in June 2017, reviewers recommended to involve users already diagnosed with MCI, both PBN and IRBLL made a considerable effort in order to include this target group. The unfeasibility of targeting CoME to this kind of population was highly demonstrated from the results gathered in this phase.

Finally, since after the first mid-term review held in Brussels, the AAL-CMU also requested to arrange an additional mid-term review in Madrid in February 2018, the testing and evaluating period lasted somewhat longer in this way than it was planned originally by the partnership. The aim was to provide review members with a complete picture about the platform implementing the changes, which were referring to the actual opinion of the participating end-users.

The official timeframe of the testing of this prototype:

1st trials: 15th of December 2017 – 15th of January 2018

2nd trials: 5th of February 2018 – 28th of February 2018

7.1. *Unified methodology applied by the partners*

7.1.1. Need analysis phase

During the need analysis phase, the end-user organizations followed the same common basis applying guidelines from the earlier mentioned UTAUT model, but with an essential difference – the involvement of seniors with MCI in order to determine the feasibility of targeting CoME to this population. The methodology followed during the evaluation of the second prototype is characterized by:

1. IRBLL and CON conducted interviews with end-users applied a qualitative approach to measure their health condition and IT literacy mainly, also asking them about their living situation.

2. PBN prepared a closed questionnaire asking end-users quantitatively based on the joint approach in the same topics mentioned above.

7.1.2. First Sprint

In the case of the first sprint, a unified protocol (see 2.4 Setup of the trials) was applied by the end-user organizations in order to harmonize the whole testing process and to ease the summary of the gathered data from different countries. Also, unified questionnaires were created to further strengthen the unity between results from various participating countries; however, partners still experienced some differences between the techniques applied for gathering feedback.

1. IRBLL conducted the trials in 1 on 1 session with seniors and in joint sessions with formal caregivers. Data was gathered taking into account the answers of the seniors and the observations of the researchers.
2. PBN distributed the questionnaires in joint meetings with their seniors or in the frame of 1on1 meetings and asked to fill them in, but before the conversation would have started between the end-users in the case of joint sessions to be able to collect answers without any influence by other participants quantitatively. After this process, general impressions could be recorded based on the conversation of the participating end-users.

7.1.3. Second Sprint

Arriving to the second sprint, the partnership decided to try to totally centralize and unify the testing and evaluating process with working out questionnaires together not only involving the end-user organizations, but with providing the chance for technical partners to actively commenting on them.

In this way, the development of the platform could be more practical and dynamic, since with directly added/recommended questions by technical partners, there would be decreased need to draw conclusions from other questions not that much concentrating on site development.

Summarizing this section, the partnership cooperated stronger and stronger as time and periods passed so far reaching a stage, where they could support not only each other and the data-gathering process more effectively, but to contribute better to the original plan worked out before the project started about how to develop the platform from sprint to sprint.

7.2. Pre-trials

We already presented the flow of the end user involvement to the testing, but here below you can find a short protocol also about how the CoME partners worked together to test the newly developed prototype of the platform and set up the trials:

1. Delivery of the new prototype (based on the experiences gathered earlier);
2. Platform was tested for a week by end-users' partners to get to know its changes and new functionalities;
3. Bugs and translation issues were reported by end-users' partners to technical partners;
4. Pre and Post-Questionnaires were updated and compiled (taking into account the new functionalities)
5. Final version of questionnaires were translated to every test countries' languages

6. Distribution of the questionnaires among end-users (results to be sent to PBN later)

7. Results were sent to PBN, in charge of gathering both in D4.4

In the annexes, all the questionnaires can be found; here below there is a short summary about the topics involved in them.

Newly joining end-users:

- socio-demographic data and living situation,
- internet-using habits,
- health status and motivation (seniors),
- first impressions from the platform (use case scenarios),
- CoME functionalities.

Already participating end-users:

- health status and motivation,
- experiences with the platform,
- CoME functionalities,
- use case scenarios.

7.3. The evaluation process for the second prototype in Lleida – Spain

In the following sections, the results from the testing of the second prototype in IRBLL are gathered.

The number of users managed by IRBLL in this phase is summarized in the below table:

7.4. The evaluation process for the second prototype in Lleida – Spain

In the following sections, the results from the testing of the second prototype in IRBLL are gathered.

The number of users managed by IRBLL in this phase is summarized in the below table:

Users		Seniors		Informal caregivers	Formal caregivers
Test period		non-MCI	with MCI		
Second prototype	First sprint	8	4	12	4
	Second sprint	12	-	12 (same ones than in the previous sprint)	4 (same ones than in the previous sprint)

7.4.1. Pre-trial results from Spain (IRBLL)

IRBLL conducted interviews with:

- 24 newly joined seniors (12 per sprint). 4 seniors with MCI who they were not able to answer the questionnaire neither performing the tasks for themselves.
- 4 already participating formal caregivers,
- Informal caregivers were involved in the evaluation, but no interviews were conducted with them due to the fact that they were present with the seniors who are they caring along the interviews. They expressed that it carried more importance to develop the senior interface, so they would like to contribute mainly to that part, they were satisfied in general with the side of the platform that was created for them.

7.4.1.1. Results from seniors

The results after the evaluation of the pre-trial results with seniors in Spain are shown below:

Socio-demographic data and living situation:

- 9 male, 15 female participants,
- aged between 60-86,
- 4 diagnosed already with MCI,
- 4 live alone, the others with their partner or other family members (children).

Internet-using habits:

- all 24 of them have access to internet
- they use it quite permanently (only one of them answered, that she never uses it),
- 20 of the 24 seniors use the internet mainly for messaging, chat and social networks.

Health status:

- for 21 seniors to keep their health is very important, the other 3 did not answer,
- most of them picked walking and to eat in the right way to stay as healthy as possible, also swimming and biking was popular,
- 13 of the 24 seniors were not satisfied with their state of memory (despite striving for a healthier lifestyle),
- half of the seniors tried to produce special activities in order to improve/keep their memory,
- more than half of them had concrete goals to improve their health,
- very big percent of them thought that they had enough knowledge to achieve a healthier lifestyle, but most of them would appreciate personalized recommendations and diet tips.

First impressions from the platform (use case scenarios):

- 13 of the 24 seniors did not experience any difficulty while registering to the platform, the others had problems, like: in some cases, their IT literacy was very low, that caused difficulties and slowed down the process; a senior tried to login without registration with her email address; verification email arrived to spam; some seniors did not remember their email addresses and passwords correctly.

- Guiding to the menu where they could change the language was needed in some cases. 22 of the testers were positive about the outlook and working of the homepage, one senior thought that it is complicated and one that it is boring; colors of it were welcome.
- About the registration process, most of them expressed that it was fine and similar to other registrations. 6 of the seniors (with usually lower IT skills) told that it was difficult to do it (verification mail sometimes caused misunderstanding).
The presence and messages of the avatar was well received by the seniors, but still they needed some help and guiding when they first used the platform, after some practice together, most of them (especially with quality IT literacy) said it was clear for them to navigate.
- The most crucial point seemed to be the pairing of the Fitbit/Nokia accounts to CoME. Only 4 of the seniors managed to do it successfully by their own, all the others needed help and they found it difficult.
- Navigating between the menus seems to be no problem for the group, but 8 of them were a bit unsure when changing menus.
- Only one user was not able to set a health goal, the rest liked this option that was well received by users. Without participating in the tests, only a bit more than half of them would set such goals for themselves. Around 2/3 of them preferred their own goals to set.
- Regarding to the questions of the avatar, most of the seniors liked the function and appreciated the questions asked by 'Eva'. They found them interesting and more than 80 % percent of would be interested to track their mood from time to time.
- The idea of creating their own care network was supported by most of them, only a quarter of the group thought that they did not need it now. The outlook of the page created for it was a surprise for them, they told that they felt like it was not the part of the CoME website, it looked like another webpage. Permanent connection via it with their loved ones was not needed, the whole group agreed on this.
- Around 1/3 of the group expressed that they liked the idea of the integration of MyGuardian to CoME, but most of the group did not need it now, since they were in a pretty good health condition and prevention was the main point of view for them. They liked the system of it, but said that it was much more different regarding to its outlook than CoME. Only one of the participants had problems with handling it, for the others it was even very easy.
- Games: 22 of the 24 seniors noticed that CoME provided manuals for the games it involves and they thought it could be useful, but more than half of them told us that they did not need it, since the games were very easy to understand how to play them. In addition, the idea to provide games via the platform was very welcome by all of them, but the biggest part of the group would appreciate more games, which could be more detailed ones also. Sudoku and crosswords were mentioned by half of the team as possible welcomed options to add.

- Below are the 3 most useful functionalities of CoME voted by the group:
 1. Avatar that provides guiding help via messages and notifications;
 2. Validated self-reports with results to assess health status;
 3. Recommendations provided by formal caregiver team;
 4. (Addition of Nokia blood pressure monitor was also welcome and the possibility to let caregivers know the seniors' health parameters)

7.4.1.2. Results from formals

The results after the evaluation of the pre-trial results with formals in Spain are shown below:

Socio-demographic data and living situation:

- 3 females, 1 male participants,
- aged between 21-46,
-

Internet-using habits:

- all 4 of them using internet daily,
- for all possible/reasonable purposes mainly (messaging, news, work, studies, online shopping, etc.)

First impressions from the platform (use case scenarios):

- registering was easy;
- no unexpected screens or buttons observed;
- first impressions of the homepage were positive, simple, orderly, looks good, only one of them said it was a bit too many options involved in it;
- colors were welcome by all of them;
- positive about the platform: learning materials, simplicity, colors used, negative: first impression about the homepage;
- navigation on the platform and between the menus was correct and adequate, one of them had problems with changing pages;
- they stressed the importance of up-to-date data from the health parameters of the seniors and also the alerts in an easy way;
- the informal caregivers could contribute to the wellbeing of their seniors with much less effort;
- the use of internet in the seniors' health care was a good idea basically, but two of the formals stressed the importance of regulating data protection properly and of them mentioned the simplicity of the platform as the most key element.

7.4.2. Post-trial results from Spain

The following section summarizes the results gathered after the post-trial evaluation of the users already involved in the pre-trial validation of this second prototype in Spain.

7.4.2.1. Results from seniors

7.4.2.1.1. *In a scale from 1 to 5 (where 1 means poor and 5 means excellent) how would you rate your IT knowledge?*

Average from the 20 responses was 3,6, which was a quite high number. Maybe it did not reflect well to the state of all the seniors in IT skills, but could cover the ones, who are health conscious and open-minded regarding to the use of modern technology.

7.4.2.1.2. *In a scale from 1 to 5 (where 1 means absolutely not and 5 means totally) how easy do you think is to handle the CoME platform?*

The average is the same here than in the case of the first question, value of 3,6, so the platform seemed to be fitting to the needs of the elderly involved to the project.

7.4.2.1.3. *Are you ready to use the platform? If not, what kind of change(s) could help you regarding to the CoME platform? Yes/No/Not Sure*

Only 2 seniors responded with 'not sure', the ones with the lowest IT literacy, the other 18 felt enough confidence.

7.4.2.1.4. *Did you get help from your informal caregiver(s), if it was needed? Yes/No*

75 % of the seniors were provided with help by their informal caregivers.

7.4.2.1.5. *Was it easy for him/her to solve your problem? Yes/No/I do not know*

Same rate here again, for 75 % of the informals it was easy to help and solve the possible problems.

7.4.2.1.6. *Do you find the platform useful? Yes/No Why?*

Most of them find it useful although they are waiting for the final version with the complete set of features in order to decide about its usefulness.

7.4.2.1.7. *Are you able to find the right health information that you would like in the CoME platform? Yes/No/More or Less*

In general seniors were able to find the information they needed in CoME, although they would like to have an app in their smartphones for accessing to the information in an easier way. Moreover they are still waiting for additional information to be included in future prototypes such as recommendations.

7.4.2.1.8. *Did you experience any barrier(s) when you were using the CoME platform? Yes/ No. If yes, what was it and what would you change to make it more comfortable and usable?*

80 % of the seniors did not meet with any mentionable barriers while using CoME. Better access would be appreciated from smartphones and the language could be automatically set to the preference selected on the registration/login page.

7.4.2.1.9. Would you use the platform if a friend or family member would recommend it? Why?

Only 2 of them would reject the recommendation from family members, the others trusted deeply in them and would give CoME a try; also the motivation for being more active is an important viewpoint.

7.4.2.1.10. Would you use the platform if a well-known and trusted organisation (e.g. consumer organisation would recommend it to you or a doctor/care professional)? Why?

All of them would welcome a recommendation (one senior did not answer), but 2 seniors stressed that it would depend on the recommending organization's profile too.

7.4.2.1.11. Which 3 functionalities of CoME do you find the most useful?

1. seniors: Self-Reports (possibility to assess your health-status via questionnaires)
2. informal caregivers: Possibility of monitoring the seniors under your care (access to the data allowed by the senior)
3. formals: Access to data of seniors in the platform

7.4.2.1.12. Do you have any idea about what kind of additional functionality would be appreciated by you and your age group? If yes, what?

90 % of the seniors did not mention anything, 2 said that they would gladly accept more data about their sleeping habits.

7.4.2.1.13. The avatar Eva asked you about how you were doing and gave you tips in the last couple of weeks. What do you think of the questions and messages asked by Eva?

Most of the seniors like the presence of Eva in the platform, just 6 of them expressed their neutrality about it.

7.4.2.1.14. Would you be interested to receive questions every day to track your life and activities daily? Yes/No

Only 3 of them would appreciate answers that often.

7.4.2.1.15. How often would you like to receive messages from Eva? Daily/ Few Times a Week/ Weekly/ Less

18 answers for weekly, 2 voted for less.

7.4.2.1.16. In addition to the Heart Rate, Sleep Patterns, Steps, Distance and Calorie, is there any pattern you would be also interested to monitor and visualize in CoME? Yes/No If yes, which?

In general they are satisfied with the patterns information available in the platform, although some of them would appreciate blood tension and blood sugar to be measured.

7.4.2.1.17. What do you think of the improvement of the platform so far? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

In general they are still waiting for some important features such as self-reports results and formal tips.

7.4.2.1.18. Do you find the new functionalities useful? Which ones and why? If not, why not? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

Most of them like the new functionalities, no further explanations were provided.

7.4.2.1.19. Did you check your progress during the last month? Yes/No

All answered with yes.

If yes, were you satisfied?

They were all satisfied, but some of them expected even better results.

7.4.2.1.20. Did you manage to achieve your health goal in this month? Yes/No

Most of them answered that they almost achieved their health goals in CoME in this month. Some of them, especially those without tablet, indicated that they did not connect to CoME every day so they forgot about goals sometimes.

7.4.2.2. Results from formals

The results from the post-trial questionnaires conducted by IRBLL to formal caregivers previously involved in the pre-trial validation of CoME are summarized below. The average age of these users was 29 years old.

7.4.2.2.1. In a scale from 1 to 5 (where 1 means absolutely not and 5 means totally) how easy do you think to handle the CoME platform?

Average value is 4,5, so very high, which is not a surprise due to their ages and profession.

7.4.2.2.2. Are you ready to use the platform? If not, what kind of change(s) could help you regarding to the CoME platform? Yes/No/ Not Sure

3 are totally confident, one of them is not sure.

7.4.2.2.3. Do you find the platform useful? Yes/No

Yes, because of the possibility to keep tracking seniors' health data permanently remotely.

7.4.2.2.4. Would you recommend the platform? If yes, to whom and why? If no, why not?

Yes, 3 of them would recommend it to another health professional, because it is a convenient and fast solution for both sides and a safer option for seniors; one would recommend it to everyone.

7.4.2.2.5. How often would you use the platform, if it would be fully operable, what do you think? Daily/Weekly/Monthly/Never

3 selected weekly, one daily.

7.4.2.2.6. Did you experience any barrier(s) when you were using the CoME platform? Yes/No

No barriers were observed by them.

7.4.2.2.7. Which 3 functionalities of CoME do you find the most useful?

Seniors:

1. Avatar - Introduction explaining how CoME works, new messages to be shown by the avatar, possibility of receiving some messages by mail and message history where previous notifications are stored.
2. Self-Reports (possibility to assess your health-status via questionnaires).
3. New devices (Nokia sets), which allow to measure blood pressure in the homes of the seniors.

Informals:

1. Possibility of monitoring the seniors under your care (access to the data allowed by the senior).
2. Possibility of contacting with occasional caregivers to take care of you.
3. Possibility of downloading and updating data for learning (learning material).

Formals:

1. Possibility of creating Reports to be delivering to seniors.
2. Learning Material (the same as for informals)
3. Alerts - e.g. more than a week without sending a report to a certain senior.

7.4.2.2.8. Do you have any idea about what kind of additional functionality would be appreciated by the seniors? If yes, what?

More interaction from the avatar could be welcome regarding to one of them.

7.4.2.2.9. In addition to the Heart Rate, Sleep Patterns, Steps, Distance and Calories, is there any pattern you think your senior would be interested to monitor and visualize in CoME? Yes/No

2 answered yes: medication data and blood sugar.

7.4.2.2.10. Which 3 parameters are the most important in general for a senior to improve or keep his/her health condition in your opinion?

1. Sleeping patterns

2. Steps

3. Heart rate

4. Diet

Formal caregivers were mainly interested in those factors that can be monitored and that, according to them, are key to have a healthy diet.

7.5. *The evaluation process in the second prototype in Szombathely (Hungary)*

In the following sections, the results from the testing of the second prototype in Hungary are gathered.

The number of users managed by Hungary in this phase is summarized in the below table:

Users		Seniors		Informal caregivers	Formal caregivers
Test period		non-MCI	with MCI		
Second prototype	First sprint	16 (3 new)	1 (new)	17 (4 new)	7 (2 new)
	Second sprint	20 (4 new)	2 (1 new) (1 quit)	20 (3 new)	7 (same)

7.5.1. Pre-trial results from Hungary

PBN conducted interviews with:

- 13 already participating seniors,
- 9 newly joined seniors,
- 13 already participating informal caregivers,
- 7 newly joined informal caregivers,
- 2 already involved formal caregivers.

Due to the tight schedules of the formal caregivers, PBN was only able to interview 2 formal caregivers from the 7 they involved totally to the testing of the CoME platform; also 2 informal caregivers were hard to reach because of staying abroad for longer periods and because of its refusal to complete the interviews via phone or email.



Figure 15. Hungarian joint session for sharing thoughts about CoME

7.5.1.1. Results from already involved seniors

Since these 13 seniors were already participating in the testing of the first prototype of CoME, please see their socio-demographic data, living situation, health status and internet using habits in the section 5.1.

Feedback about the platform development

- All of the seniors said that they got more motivated since joining to the tests of CoME, 10 of them 'totally', 3 'partly'.
- All 13 seniors think it was important to keep or achieve a healthy lifestyle, 8 answered with 'very important', 5 answered simply 'important'.
- Most of them already decided how to reach their goals in order to improve their health status.
- Some of the goals they shared through questionnaires are: biking in weekly basis, even more walking instead of using car, reach more qualitative sleep with raising physical activity, weight loss.
- 10 of them expressed their need for additional special advices and health information presented on the CoME platform. The most welcome ones would be the monitoring of blood pressure results and the reports from formal caregiver team, which will be available later.
- Most of the seniors liked the way how CoME presents this kind of data, although some of them would like to have more detailed information. They said CoME should indicate their goals set up in the graphs.
- All of them liked the look and feel of the platform and also the changes that were implemented in the meantime since they joined, colors are 'friendly' and well selected for their needs.

- Regarding to the answers given about the 3 most useful functionalities of CoME, they mentioned the follows below (5 of them are listed and some of them obtained the same score):
 1. Possibility of getting feedback about health status from self-reports
 2. Feedback from professional formal caregiver team
 3. Health self-monitoring with smart devices
 4. Possibility of building their own care network
 5. Reminders (MyGuardian) and goals
- Navigation on the website was comfortable for most of them, but some practice needed from time to time, because they said that it is easy to forget to use some functionalities and find some pages (remember that most of them has low ICT skills). After some practice together with their informals or with PBN staff members, it was easier for them.
- Some unexpected errors appear during the trials, although it is understandable as the platform is still in testing phase.
- To sync the health data from bracelet to a device was easy while they can follow the same process that they have already learned. But under changes because of updates in the software related with the hardware seniors could get confused and help would be needed (due to the lack of English knowledge and IT literacy).

7.5.1.2. Results from newly joined seniors

The results from the interviews performed with newly joined seniors in this phase are shown below:

Socio-demographic data and living situation:

- 2 male, 7 female participants,
- aged between 59-83,
- 2 diagnosed already with MCI,
- 2 live alone, the others with their partner or other family members (children).

Internet-using habits:

- 7 of 9 has internet access,
- all 7 who has access use it permanently, but not with high self-confidence usually,
- they use the internet mainly for messaging, chat, news and for leisure activities.

Health status:

- for 6 seniors to keep their health was very important, one did not answer, two said it is neutral for them,
- walking was the most mentioned activity that are willing to do and also usually did, but 2 of them had problems with mobility due to disability, biking was also popular,

- 6 of them were fine with their state of memory, 3 would like to improve it or at least keep it,
- around half of them had concrete goals to improve their health,
- they were all glad to join CoME and gather more and more knowledge about how could they keep their health, but 2 of them were a bit negative due to their current health status.

First impressions from the platform (use case scenarios):

- Although most of the seniors need assistance for the first time registration due to their low ICT skills, for the 2 of them with MCI was difficult even after the first success time. Their informal caregivers offered to sync their data from the smart devices at least weekly, the others were quite independent in the process.
- In order to change the language the first time all of them needed help because of the lack of English knowledge.
- The look and feel of the platform was welcome by most of them.
- The biggest problem with the registration was that 1/3 of the group did not remember their password used for their email accounts, so they need help in order to recover them.
- The presence and messages of the avatar were appreciated by the seniors, but some additional help was needed for some tasks from the interviewer.
- Pairing of the accounts could only be done independently by one of them, all the others needed help. They said that since it is usually a one-time action, it would be better for them in a real-life situation, if (one of) their informal caregivers would do it instead of themselves.
- Navigating between the menus seemed to be easy for them.
- Setting up a health goal was simple regarding to their opinion; even the 2 seniors with MCI thought it was easy after showing them how to do it. In fact 6 of them had health goals even in advance of participating to the project.
- Tracking their mood was welcome, but only once in a day maximum. Half of them stressed that it will be interesting to monitor it in the long run.
- The idea of creating their care network was supported by 7 of them, but 2 of them would not like to share all of their data. Alerts to the members of it were gladly accepted, but they to understand how it will work exactly.

- MyGuardian booked as a good initiative, but most of them would prefer to send messages in the usual ways via internet or to just call their informals via phone, although 4 of them would use MyGuardian feature in their everyday lives.
- The group liked the games and the basic idea to integrate them in the platform, they will be willing in fact to have more games included. The manual was not really needed, but could be useful for the first time.

Below are the 3 most useful functionalities of CoME voted by the group:

1. Monitoring of health parameters with smart devices
2. Validated self-reports with results to assess health status
3. Formal caregiver team's advices
4. Avatar

7.5.1.3. *Results from already participating informal caregivers*

Informal caregivers were the same here than in the case of the first prototype in Hungary.

Answers from them about their seniors' motivation and health status:

- 9 of them thought that the senior they took care of, got more motivated by joining to CoME testing, 4 said 'partly'.
- 8 of them selected the 'very important' answer, when they were asked about how important is for their seniors to stay/get healthy, 4 said 'important', one replied with 'neutral'.
- More than half of the group supports their loved ones to stay motivated to achieve a healthier lifestyle. The others answered that they do not have enough time to do that.
- They all support the functionality that offered tips from professionals and around half of them also like thematic help to diseases/illnesses.
- Only around half of them follow the health parameters uploaded by the seniors. In the other cases seniors are totally independent.
- They are satisfied with the visualization of data on the platform (graphs, only daily and monthly option).
- The platform looked good and friendly regarding to them, even it was a bit too clean by the opinion of 4 of them. Usability is fine for them, but seniors could have more guiding. Avatar is a good idea, but bigger role should be given to it.
- The 3 most useful functionalities regarding to informals:

1. Data monitoring
2. Professionals' advices
3. Possibility to access to seniors' data and mood



Figure 16. Christmas meeting with Hungarian seniors (2017)

7.5.1.4. *Results from newly joined informal caregivers*

Socio-demographic data and living situation:

- 5 female, 2 male,
- 22-59 years old,
- variable education levels and jobs, only one has reference to healthcare.

Internet-using habits:

- all of them have internet access,
- daily use in all cases,
- messaging, news, social media, multimedia, etc.

Relationship with seniors:

- children of them mainly or other relatives,
- weekly/daily contact with the seniors.

First impressions from the platform (use case scenarios):

- Registering was easy for almost all of them, the older members of the group asked for some help, one of them tried to directly login with his email address and password.
- They did not really understand why does a picture needed to be uploaded in the registration.

- Both sides of the platform (for them and for seniors) seemed to be easy to handle, but English language at login was again a problem. They needed the help of PBN's co-workers to change it first.
- It is clear how to add seniors, but they expect the search function to work without clicking the 'Add' button.
- The look and feel is pleasant and very simple, good selection for seniors.
- Pairing of the accounts was shown to them to possibly help seniors in the process, they think it is useful to introduce it to informals, because of the low IT literacy of seniors and the creation of Fitbit/Nokia accounts too.
- They mentioned as the 3 most useful functionalities in advance the monitoring of health data and the connection, which provides them access to the data. Also the self-reports and formal team's help was really appreciated by them.

7.5.1.5. Results from already participating formal caregivers

2 formal caregivers filled in questionnaires as the part of the interviews with them. They are also representing the elderly too, because they are aged 67 and 69 years old.

Feedback about the platform:

- As also seniors, they have a unique point of view.
- Registration was clear, they were explained earlier how to, but it would be easy anyway they expressed. They asked what location is for, after it was discussed, they liked the idea to provide occasional caregivers too from the nearest areas and different diseases could be more common in some given areas, which could facilitate to recognize them.
- Verification email could be a hindering element, because seniors often do not check their messages and also validity of 24 hours of it could be too short.
- Navigation on the platform was easy and clear.
- Although health parameters were appreciated to be monitored and forwarded to them, the smartwatches were not medical instruments, so they cannot be 100 % trusted. However, since the CoME platform was mainly for prevention and to motivate seniors towards a healthier lifestyle with more physical activity, it was a nice start and support for GPs and etc.
- Addition of blood pressure monitor and smart weigh scale were welcome; they could provide a more complete picture.
- Seniors should be motivated and taught to sync regularly.

7.5.2. Post-trial in Hungary

PBN conducted interviews with:

- 20 seniors,
- 20 informal caregivers,
- 2 formal caregivers (as mentioned, from the 7 formals only 2 were interviewed).

One senior decided to quit after the end of the testing of the second prototype; she and her informal caregiver did not answer to the questions.

7.5.2.1. Results from seniors

7.5.2.1.1. *In a scale from 1 to 5 (where 1 means poor and 5 means excellent) how would you rate your IT knowledge?*

Average result was 3, which was quite high compared to the average of Hungary in that age group, urban population - as most of the participating seniors are from Hungary – is more skilled usually.

7.5.2.1.2. *In a scale from 1 to 5 (where 1 means absolutely not and 5 means totally) how easy do you think is to handle the CoME platform?*

The final cumulated value was 3,0 so seniors accepted CoME as a easier platform to handle.

7.5.2.1.3. *Are you ready to use the platform? If not, what kind of change(s) could help you regarding to the CoME platform? Yes/No*

Most of them are ready to use the platform as they think they will have no problem with handling the platform and its functionalities. For other although it seemed to be really easy, they thought they would not be confident without the presence of an informal caregiver.

7.5.2.1.4. *Did you get help from your informal caregiver(s), if it was needed? Yes/No*

14 of 20 seniors were helped permanently by their loved ones, others rarely or not. They really think it is motivating to involve them too while realizing their goals.

7.5.2.1.5. *Was it easy for him/her to solve your problem? Yes/No*

For 80 % of the informal caregivers it was easy to support the activities of their seniors on CoME, but mostly the problem was to synchronize the devices correctly and reach permanent data flow.

7.5.2.1.6. *Do you find the platform useful? Yes/No*

They think the platform would be very useful once it is fully operating. Moreover they find the platform was already useful because of the extra motivation and prevention it provided

7.5.2.1.7. *Are you able to find the right health information that you would like in the CoME platform? Yes/No*

The 90 % of the group knew that they only had to click on the Trends option to check their data and it was acceptable in the way it was. They were really waiting for other kind of health information, like self-report results and feedback from formals' team.

*7.5.2.1.8. Did you experience any barrier(s) when you were using the CoME platform?
Yes/No*

If yes, what was it and what would you change to make it more comfortable and usable?

Not many barriers were detected by them. Setting the language was an issue for the first time without help and some of the members expressed their needs for only one integrated menu.

7.5.2.1.9. Would you use the platform if a friend or family member would recommend it? Why?

Only 1 senior would not accept the advice; others would be glad to have an offer like this from their loved ones.

7.5.2.1.10. Would you use the platform if a well-known and trusted organisation (e.g. consumer organisation would recommend it to you or a doctor/care professional)? Why?

Mostly, it depended on the nature of the organization, but if they seemed to be reliable, yes, all of them would live with the chance.

7.5.2.1.11. Which 3 functionalities of CoME do you find the most useful?

1. Measuring and tracking health data
2. Tips and advices from formals
3. Self-report results

7.5.2.1.12. Do you have any idea about what kind of additional functionality would be appreciated by you and your age group? If yes, what?

Blood sugar monitoring was mentioned by 3. Also, steps toward upstairs was mentioned by two of them.

7.5.2.1.13. The avatar Eva asked you about how you were doing and gave you tips in the last couple of weeks.

What do you think of the questions and messages asked by Eva?

Most of them appreciate them, 2 of them thought the avatar was a bit 'childish', but could be useful in a lot of situations.

7.5.2.1.14. Would you be interested to receive questions every day to track your life and activities daily? Yes/No

30 % of the seniors would appreciate it that often.

7.5.2.1.15. How often would you like to receive messages from Eva? Daily/ Few Times a Week/ Weekly/Less

6 answers for daily, 12 for weekly, 2 selected less.

7.5.2.1.16. In addition to the Heart Rate, Sleep Patterns, Steps, Distance and Calorie, is there any pattern you would be also interested to monitor and visualize in CoME? Yes/No

Blood sugar by 3 of them as already mentioned.

7.5.2.1.17. What do you think of the improvement of the platform so far? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

13 seniors answered that they liked the platform in general, but that it would be more useful with full operation since they would use it much more often than now. Outlook was fine.

7.5.2.1.18. Do you find the new functionalities useful? Which ones and why? If not, why not? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

They found all of them useful; but 3 of them would appreciate it more if the reminders would be available directly from CoME, not in the MyGuardian part of the site.

7.5.2.1.19. Did you check your progress during the last month? Yes/No

3 answered with no, 17 yes.

If yes, were you satisfied?

They were all satisfied when checking their data; although they would still like to improve their conditions in general.

7.5.2.1.20. Did you manage to achieve your health goal in this month? Yes/No

60 % of the group achieved their goals, sometimes with very highly set numbers.



Figure 17. Seniors in PBN office filling in questionnaires

7.5.2.2. Results from informal caregivers

PBN conducted interviews with 20 informal caregivers in the post-trial part of the testing of the second prototype in the project.

7.5.2.2.1. In a scale from 1 to 5 (where 1 means poor and 5 means excellent) how would you rate your senior's IT knowledge?

The average result is 3,2, which was slightly higher than the seniors rated themselves.

7.5.2.2.2. In a scale from 1 to 5 (where 1 means absolutely not and 5 means totally) how easy do you think is to handle the CoME platform?

For seniors: 3, for them: 3,8. They were younger, around 35-40 was their average age, so this difference could be expected.

7.5.2.2.3. Are you ready to use the platform? If not, what kind of change(s) could help you regarding to the CoME platform? Yes/No

Most of them thought that the platform looked really simple to use,.

7.5.2.2.4. Does your senior seem like he/she is handling the CoME platform confidently? Yes/No

If no, or not really, what kind of change(s) could help in your opinion?

Most of them were positive about their seniors managing the platform without relevant issues.

7.5.2.2.5. Do you find the platform useful? Yes/No

75 % of the group found the platform very useful. Unsurprisingly, the most stressed element because of CoME's usefulness was the possibility to remotely check their seniors' health data and mood from time to time.

7.5.2.2.6. Would you recommend the platform? If yes, to whom and why? If no, why not?

13 of them would recommend the platform, once it was totally . They would mainly offer it for other informals caregivers, whose senior lives alone and that do not have too much time to attend him/her. Also, they would recommend it for the seniors, who would like to raise their physical activities with extra motivation because of whatever reason.

7.5.2.2.7. How often would you use the platform, if it would be fully operable, what do you think? Daily/ Weekly/ Monthly/ Never

80 % of them answered with weekly, one informal with monthly, others with daily.

7.5.2.2.8. Did your senior provide you access to his/her health data? Yes/No

6 of them answered with yes, others were not registered so far so only checked the platform on joint meetings of their senior. There were 2 members, that usually login right into their senior's account to check their data.

If yes, were you able to easily find the data? Yes/No

All of them who are provided access (6+2 from the previous answer) expressed that it is easy to find the data, only one click.

7.5.2.2.9. Did you experience any barrier(s) when you were using the CoME platform? Yes/No

Most of them experience no barriers, the ones experience some of them said that it could handle easily alone.

If yes, what was it and what would you change to make it more comfortable and usable?

No specific feature was provided.

7.5.2.2.10. Would you consider buy/offer a subscription to CoME to your senior, if a friend or family member would recommend it? Why?

More than half of the group would do it, after a first try.

7.5.2.2.11. Would you consider buy/offer a subscription to CoME to your senior, if his/her doctor or care professional would recommend it to you? Why?

13 of them would consider it.

7.5.2.2.12. Would you consider buy/offer a subscription to CoME to your senior, if a well-known and trusted organisation would recommend it to you (e.g. consumer organisation)? Why?

Similar rate, 12 of them would accept the advice in this case, but it would depend on the type of the organization (even though it is well-known and trusted).

7.5.2.2.13. Which 3 functionalities of CoME do you find the most useful?

1. Possibility to access to seniors' health data and mood
2. Tracking health information
3. Self-reports and formal team advices

7.5.2.2.14. Do you have any idea about what kind of additional functionality would be appreciated by your senior? If yes, what?

Blood pressure monitoring and tracking in the long run was very appreciated by the group; also a smartwatch with a kind of 'alert' button was mentioned by some of them.

7.5.2.2.15. In addition to the Heart Rate, Sleep Patterns, Steps, Distance and Calories, is there any pattern you think your senior would be interested to monitor and visualize in CoME? Yes/No

Blood sugar was the most popular selection with 6 mentions; also current location of the smartwatch was an option with accessibility for the informal to this data.

7.5.2.2.16. What do you think of the improvement of the platform so far? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

All of them were satisfied with the developments.

7.5.2.2.17. Do you find the new functionalities useful? Which ones and why? If not, why not? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

They would be useful, once the platform was fully operating, especially the reports and alerts from formal team and self-report results.

7.5.2.3. Results from formals

The 2 formals who were interviewed are the same that were participating and answering in the pre-trial.

7.5.2.3.1. In a scale from 1 to 5 (where 1 means poor and 5 means excellent) how would you rate your older patient's IT knowledge?

Both of them answered with a 2 rate.

7.5.2.3.2. In a scale from 1 to 5 (where 1 means absolutely not and 5 means totally) how easy do you think to handle the CoME platform?

For seniors would be 3, for them was 5 they thought, but since some functionalities were not yet operating that could change once they will.

7.5.2.3.3. Are you ready to use the platform? If not, what kind of change(s) could help you regarding to the CoME platform? Yes/No

Both were ready to use it.

7.5.2.3.4. Do you find the platform useful? Yes/No

Yes, useful, due to it reduced the time that should be spent with taking care of seniors and provided permanent sense of security.

7.5.2.3.5. Would you recommend the platform? If yes, to whom and why? If no, why not?

Yes, for healthcare institutions once it is fully operating and also for worried family members, seniors in Hungary sometimes were not too open, but mainly because of the IT literacy they thought, they were eager to achieve a better health condition. However, in a lot of cases, they believed in solutions that seemed to be easier, like to take variable pills and buy special healthcare machines or so, instead of simply raising their physical activity and live in a more conscious way.

7.5.2.3.6. How often would you use the platform, if it would be fully operable, what do you think? Daily/Weekly/Monthly/Never

Both selected 'weekly'.

7.5.2.3.7. Did you experience any barrier(s) when you were using the CoME platform? Yes/No

No barriers were mentioned, only some translation issues.

7.5.2.3.8. Which 3 functionalities of CoME do you find the most useful?

1. Possibility of accessing to seniors' data for formals and informals
2. Shareable learning materials and experiences
3. Care distribution function for informals

7.5.2.3.9. Do you have any idea about what kind of additional functionality would be appreciated by the seniors? If yes, what?

Possibility of measuring blood pressure for every senior.

7.5.2.3.10. In addition to the Heart Rate, Sleep Patterns, Steps, Distance and Calories, is there any pattern you think your senior would be interested to monitor and visualize in CoME? Yes/No

Same as above.

7.5.2.3.11. Which 3 parameters are the most important in general for a senior to improve or keep his/her health condition in your opinion?

1. Heart rate
2. Sleeping patterns
3. Steps
4. Could be blood pressure and blood sugar

7.5.2.3.12. What do you think of the improvement of the platform so far? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

The platform was fine, all interfaces of it, but it would be better once it will be fully functioning.

7.5.2.3.13. Do you find the new functionalities useful? Which ones and why? If not, why not? (Please only answer this question, if you were already involved in earlier test phases, thanks!)

Any functionality to be added is welcome, it could only be better than without them.

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7.6. The evaluation process for the second prototype in The Netherlands

In the following sections, the results from the testing of the second prototype in CON are gathered.

The number of users managed by CON in this phase is summarized in the below table:

Users		Seniors		Informal caregivers	Formal caregivers
Test period		non-MCI	with MCI		
Second prototype	First sprint	4 new	-	1 new	-
	Second sprint	4 (same)	-	1(same)	-

7.6.1. Pre-trial results from the Netherlands

CON conducted interviews with:

- 4 newly joined seniors,
- 1 newly joined informal caregiver.

7.6.1.1. *Results from seniors*

Socio-demographic data and living situation:

- 2 male, 2 female participants,
- 3 of them are between the age of 65 and 70, 1 is between 70 and 75,
- 2 of them attended university/college, 1 has higher professional education and 1 with high school graduation,
- jobs: mechanical engineer, school principal, health care therapist, hospitality employee,
- 2 of them live with their partners, 2 alone.

Internet-using habits:

- all 4 of them had access to the Internet,
- 3 use it daily, 1 weekly,
- main purposes of the use of it are for messaging, social media, leisure
- activity, news and online shopping.

Health status:

- it was important for all 4 of them to be healthy, 2 of them were very engaged;
- 3 of them stressed that they pay attention about their diet to stay healthy, 3 of them were active in sports still and the other senior was walking a lot with her dog;
- all 4 of them thought that they had a good memory;
- to maintain their memory, 2 of them read a lot, they tried to stay active physically and one of them has her own techniques (repeating words, also quizzes and puzzles);
- all 4 of them had their own goals to improve their health and they thought they had enough knowledge to achieve a healthier lifestyle and to be able to keep their good memory;
- 3 of them would appreciate additional healthcare information.

First impressions from the platform (use case scenarios):

- All 4 them experienced some difficulties with the registration process:
 1. Sign up button was not recognized by him.
 2. He was missing some tips regarding to important illnesses (why is it important) and the 'Location' was confusing (current should be typed in or the constant).
 3. Bad name was given by her when registering and could not change it (initials).
 4. Picked 'Login' instead of 'Register'.
- Finding the sign up button meant a problem for all of them.
- Once they found the right page everything was quite clear, but one of them got confused because of the messages of the avatar, she wanted to login and pair her Fitbit smartwatch right away, but the Avatar guided her to somewhere else.
- The outlook of the platform is good and acceptable regarding to them, but some parts and functions are hard to find first, for example change the language (serious

issue), one of them picked the 'Info' menu, but it is not for general information that is confusing.

- The colors are fine, the homepage is simple, one of them expressed that it is even a bit outdated.
- Positive about the platform: short and 'sweet', informative
- Negative: limited information and the introductory tour is too long and at the end, you could forget important information, getting back to the homepage is hard for the first time.
- 2 of them liked the registration process, 2 not, it took pretty long for the verification email to arrive and it was in the spam.
- All of them experienced problems in reaching the personal profile page, they try to search for it in a lot of other pages before found it (in the information page mainly).
- Changing their settings as a problem also shared a group to a half-half rate.
- 3 of them had problems with connecting their Fitbit accounts to their CoME accounts.
- The process of the connection of the smartwatches should be shortened for example integrating login with Facebook, Google or so.
- The CoME logo should be fixed to the top of the page in every case says one of them, he thinks that for people in his age, it is hard to find it, because every time they have to scroll back up to reach it.
- 2 of them had problem with setting up a health goal, they did not click on the plus sign, but they think it is useful and could work generally.
- All of them would create their own goals in order to say healthy without participating in the project, but maybe not in a 'written' form. All of them prefer personalized goals.
- Avatar: they all think that it is clear how it is working, they liked to be asked by their mood, could be interesting in the long run to evaluate the process.
- Regarding to a creation of an own care network, 3 of them support the idea, but they are not sure that they would share their data with all of the members of it (the platform offers this chance anyway to select personally).
- MyGuardian platform was not to actively commented by them, one of them expressed that he got a bit lost there, he did not know what page is he attending now CoME or not. Besides that, it is simple to use for first. 2 of them would be interested to use it, both of them would recommend the platform to their loved ones.
- Games were welcome, only one of them thought they are too simple and boring. 3 of them did not notice at first, that CoME offers manuals for games, but they think it is useful and a good idea to provide them. They would appreciate the inclusion of Tetris.

7.6.1.2. *Results from informal caregiver*

Socio-demographic data and living situation:

- female,
- 60-70 years old,
- higher professional education,

- teacher.

Internet-using habits:

- had internet access,
- daily use,
- messaging, news, social media, multimedia, etc.

Relationship with her senior:

- daughter of a senior,
- daily contact with the senior,
- worried about the senior, because of high age.

First impressions from the platform (use case scenarios):

- Registering was hard for her:
 1. Wanted to login at first with typing in her email address and password.
 2. Image to upload was confusing, also the system for giving her birth date.
 3. Important illnesses makes no sense in the case of informal caregivers, still she had to fill it in.
 4. 'Current location' part was not working properly.
 5. Password only had to be typed in once and there was no option to visualize its characters.
- Homepage: the avatar was not functioning well, after clicking on it everything disappeared, only the return button stayed available to go back.
- Colors were fine, but some advanced guiding from the platform is missing.
- The bar at the bottom was appreciated, helps a lot in successful navigation on the page.
- The point of the bar that the user clicked on should be signed somehow to help orientation.

Regarding to the usefulness, she does not think she would use it, only would call her dad to talk to him.

7.6.2. Post-trial in the Netherlands

The two seniors from the Netherlands possessed medium IT skills and they both thought it was pretty easy to handle the CoME platform (4/5 on a scale of easiness).

They were ready to use the platform, but one said the platform is not.

One of them got help from an informal caregiver and the senior thinks it was quite easy for his caregiver to navigate on the platform.

Both of them thought that the platform was really useful and they both shared with the interviewer that the preventive nature of it is the best part to keep them active and motivated. It was interesting to check back your daily activities permanently also.

They would clearly recommend the platform for their loved ones, one of them indeed already did that for her sister, because it was very motivating to self-monitor yourself and also it could be even more motivating, if your loved ones could follow your activities too via CoME. Health self-reliance could also be developed effectively this way.

Daily use of the platform would be expected from their side, if CoME would be already operating fully, but they somewhat struggled to find the right health information they searched for on CoME due to the page is still not finalized. One of them would appreciate some kind of support from the site to quit smoking and help in weight loss.

They met with no serious barriers while using the platform, but they think that the trends menu is reliable enough and sometimes slow to show their numbers.

Recommendation of the platform would convince them to start using it, regardless who recommends it: loved ones, health professionals or well-trusted organizations, but in the case of the last one, it depends on what organization is it.

They would like, if CoME would reward them somehow, when they reach their goals and a smartphone app should be generated.

Avatar was fine, but one of them would not need it. They both would be interested to be asked about their mood and track it, but there was a big difference between them in the wished periodicity, daily – even less often than weekly.

Measuring of blood pressure and blood sugar would be well received, just as reminders to take medicines, also the monitoring of food intake in an easier way.

They both permanently checked their progress via both Fitbit and CoME, but because of the app form smartphone, Fitbit seemed to be easier and faster. All goals were achieved by them except one, which is maybe the hardest, to stop smoking.

8. The Evaluation process for the third prototype

The third and final testing period was realized in Szombathely, Hungary by PBN and in LLeida, Spain by IRBLL. The additional active participation of CON placed in Arnhem, The Netherlands ended in this period due to the organization's tasks regarding to the platform development supported with the useful first-hand experience they obtained with working together older adults and also informal caregivers in the earlier periods.

The consortium continued the testing with the unified methodology they built along the second prototype together with applying the pre-post method again to measure the developments both regarding to the usability of the platform and the physiological effects too.

The members of the testing group were excitedly waiting for this closing period to be able to see their results provided by the MCI risk assessment module that was finalized by the technical partners with the lead of UniGe.

The testing started in June 2018 and lasted till the end of the project, which was dated in the end of November 2018.

The validation of this third prototype constitute the most important of the project due to from which we will be able to extract the degree of satisfaction of users and based on them, properly define the market strategy for CoME as well as the level of success of the project. Because of this, the post-trial questionnaires defined in this last phase of the project have a remarkable commercial approach, with quantitative and qualitative metrics that aim to measure the impact of CoME project. This metrics were defined in D4.1 and are then shown at the end of this section.

8.1. The evaluation process in the third prototype in Szombathely (Hungary)

The testing of the third prototype in Szombathely (Hungary) involved the following participation:

Users		Seniors		Informal caregivers	Formal caregivers	TOTAL
Test period		non-MCI	with MCI			
Third Prototype	First sprint	20	1 (same)	20	7 (same)	60
	Second sprint	20 (same)	1 (same)	27 (7 new)	8 (1 new)	60

8.1.1. Pre-trial results from Hungary

PBN conducted interviews with:

- 21 already participating seniors,
- 20 already participating informal caregivers.

In this phase, PBN did not organized any interviews with formal caregivers, because there were no need for implementing any new changes in the interface created for them inside the CoME platform (the MCI risk assessment module was only added along the post-trial phase as the evaluation is done with historical data).

8.1.1.1. Results from already involved seniors

8.1.1.1.1. Did you get more motivated to change your lifestyle by joining to the tests of CoME so far? Yes/No

15 seniors answered with yes, 6 with partly. The group kept its motivation that could be experienced along the earlier trials. They all expressed their satisfaction with the main aim of the platform to get more active and monitor their health data permanently. Along the joint sessions, they shared their stories with each other, like they even go for a walk at night without any reason, but to achieve their health goals.

8.1.1.1.2. How important is it for you, to become healthier?

very important neutral not important

Most of them (18) answered it is very important, the other were neutral. Even those members admitted the importance of achieving a healthier lifestyle.

8.1.1.1.3. *Was this importance on the same level before you joined CoME?*

yes no

11 of the asked seniors had also interest before joining CoME; others experienced higher need to get in better shape and to be able to avoid MCI symptoms after joining.

8.1.1.1.4. *Do you have any special goals to improve your health?*

yes no I have my ideas, but only for later

11 end-users answered yes, 8 of them have their own ideas to improve their wellbeing and 2 of the seniors provide no answer.

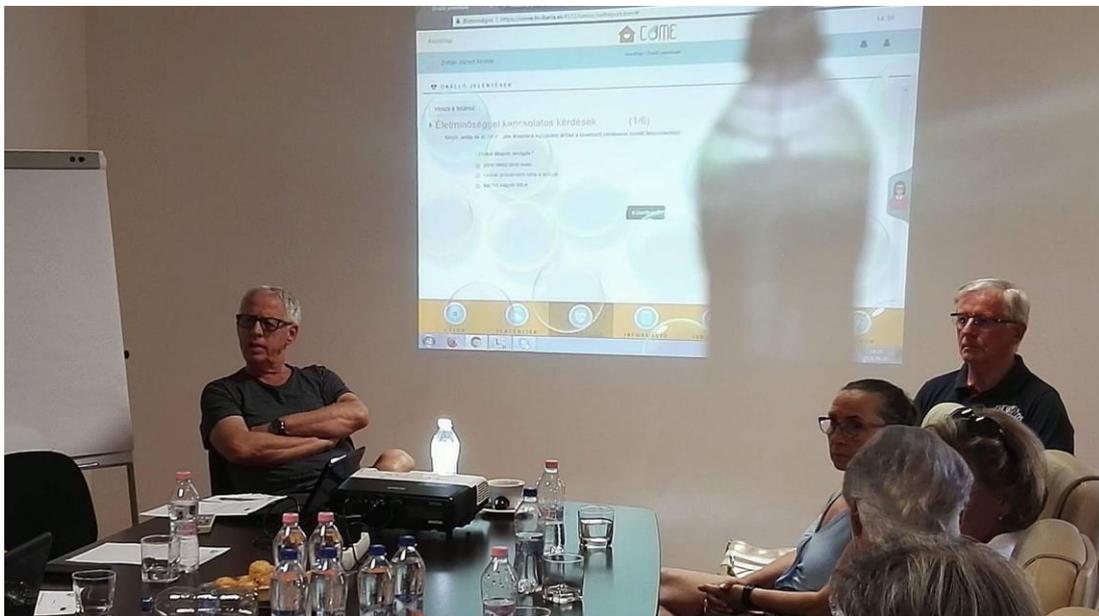


Figure 18. Joint session at PBN's office with older adults

8.1.1.1.5. *Is there any special information or advice you need in order to improve your health? (E.g. a special diet for a personal purpose like diabetes and etc., recommended physical activity in a special condition and so on)*

yes no

8 seniors responded with yes, all the others with no. In general, they possess the needed information about how to get in better shape, but they would appreciate some practical, lifelike advices, for example how to follow a diet with various meals to eat and etc.

8.1.1.1.6. *What do you think of the health information/trends that has CoME provided you so far? Do you like the way of it? Are they in line with what you see on your fitness bracelet?*

yes no partly I used only the Fitbit/Nokia app to check them

They are happy with the trends information provided to them, they like very much the idea of wearing a bracelet and tracking their wellness data.

8.1.1.1.7. *Do you like the look and feel of the platform?*

yes no partly

All of them were satisfied with the look and feel. Most of them think that is easy to navigate and pages are clear-cut, but there were some faults detected, like for example in the cases of some pages (MyGuardian, menu items in the top right corner) the yellow bottom bar disappears and you have to go back to the homepage to reach them again.

8.1.2. Result from already involved informal caregivers

8.1.2.1.1. *What do you think of the idea of knowing how your loved one is doing in general?*

All of the informal caregivers expressed their appreciation towards such a preventive and supporting program like CoME. Most of them do not mind their care-giving activities, but the reasons why it could help and spend more time with their loved ones and friends. However, they would gladly spend more qualitative time together with their seniors and that is where CoME could contribute best.

8.1.2.1.2. *Do you think that your loved one got more motivated by using CoME and joining the tests? (optional question depending on do you have a connection with a senior participating in the test of CoME or not)*

yes no partly

Most of them agreed on the motivation of their loving ones thank to CoME. Seniors were even motivating each other in the frame of joint sessions.

8.1.2.1.3. *How important is it for him/her to get healthier?*

very important neutral not important

10 informals selected very important, 9 neutral and 1 not important. To stay independent and spend more time with their family and grandchildren is the biggest motivation for the participants they believe.

8.1.2.1.4. *Do you help your loved one regularly to stay motivated and to achieve his/her goals? (If you have no seniors participating in CoME tests, please think about your everyday life regarding to helping your older loved one, if you have any)*

yes no partly

10 yes replies came in, 4 partly and 3 no.

If your answer is no than why not?

not enough time**I do not like the platform****I am not that engaged to him/her****other:**

Mostly because they do not have enough time for this support.

8.1.2.1.5. Is there any special information or advice your loved one (or you) would need in order to improve his/her health? (E.g. a special diet for a personal purpose like diabetes and etc., recommended physical activity in a special condition and so on)

yes no

5 of them did not really know their senior's preferences, 9 think that this kind of support would be useful, 6 of them do not believe this. Quite a lot of them mentioned, that their older loved were very worried about health issues and they read a lot about it.

8.1.2.1.6. What do you think of the health information/trends that CoME provided to your loved one so far? Do you like the process? Are they in line with what your senior sees on his/her fitness bracelet?

yes no partly we used only the Fitbit app to check them

Some of them do not follow the health trends of their seniors permanently.

However, users did really like the simplified way how CoME shows data with its graphs; to have a general picture of their seniors' wellbeing it is even better than the native bracelets apps.

8.1.2.1.7. Do you like the look and feel of the platform?

yes no partly

All of them liked the outlook of the platform, but some of them mentioned that it is a bit too childish and simple, but that is acceptable taken into account that this is a platform tailored to older adults with lower IT literacy.

8.1.3. Post-trial results from Hungary

PBN conducted interviews with:

- 22 seniors (24 tested actively, 2 was not available along the feedback period),
- 27 informals,
- 7 formals (8 participated, 1 did not answer to the questionnaire due to unavailability).

Users felt really motivated when they had the devices since they liked being monitored. This was even increased when it was linked to health goals and self-reports. So, this is a very positive and encouraging sign for CoME; some doubts arose regarding the involvement of users without monitoring devices, thus, people in Lleida was also asked to involve this kind of users in order to

know their level of satisfaction in this case, since monitoring with devices and checking of health data was very interesting feature for seniors. According to them, this makes the whole preventive process more fun and interesting for them.

8.1.3.1. *Results from seniors*

8.1.3.1.1. *Are you satisfied with the platform in general?*

yes (14 answers) no (8 answers)

Why?/ Why not?

As per the general opinion of the group, it is useful and they are satisfied with the solution, however, they would like more functionalities to be included like monitoring of other measures such as blood pressure or sugar level.

8.1.3.1.2. *Did you experience any barriers while using it?*

yes (12 answers) no (10 answers)

If yes, which were them?

A frequent problem is that the verification e-mail arrives too late (sometimes even 10-15 minutes needed) and till seniors do not get it, they cannot enter to the platform and this situation makes them nervous. Also seniors are sometimes simply not patient enough to enter to their email accounts too, so this process should be made easier. For example, a notification should be applied in the registration page that you may need some help from your relatives/friends to perform this registration and you will have to login to your email account, please be sure that you are able to do so now and you can afford the needed time. This way, seniors would only finish the process once they have time and all the needed credentials. Also the platform could send the user to Fitbit/Nokia websites in the 'Wearable devices' section to make things clear, if possible, right into the registration/login part.

Self-reports are sometimes very hard to fill them in properly; like they were validated questionnaires, they had several questions so, sometimes, seniors felt bored and they quitted without ending. However, they liked the feedback they received after the evaluation although they indicated that they would like it to be more detailed.



Figure 19. Christmas meeting with seniors in Hungary (2018)

8.1.3.1.3. Would you rather use CoME than other tools of health monitoring like the Fitbit or Nokia app?

yes (12 answers) no (10 answers)

Why?

With the new functionalities, yes, they would pick CoME in general for a reasonable price.

8.1.3.1.4. On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is it for you to handle the CoME platform?

1 2 3 (4 answers) 4 (13 answers) 5 (5 answers)

8.1.3.1.5. Were there any actions you wanted to do, but you could not finish?

Yes (18, self-reports) More or less (2) No (2)

If yes, which?

Self-reports (18) were difficult to fully completed, although we explained them their based in scientific literature and all the answers should be provided to obtain valid date they consider them too long.

8.1.3.1.6. Did you experience any difficulties with the displaying of information in any page?

Yes (4) More or less (3) No (15)

If “Yes” or “More or less”, explain where and why and describe some possible ways of clarification.

Yes: Nokia trends cannot be seen.

More or less: end-users expected more feedback from the formal caregivers, but this is not a problem of the platform but of the limited available time of the formals involved during trial period.

8.1.3.1.7. Do you think that the appearance of the platform fits for your age group?

yes (19) more or less (2) no (1)

If no, why not?

Too simple and childish.

8.1.3.1.8. How often would you use CoME?

daily (16 answers) 2-5 days a week (4 answers) weekly (2 answers)

monthly other

8.1.3.1.9. Do you think that CoME presents enough functionalities to motivate you towards a healthier lifestyle?

Yes (16 answers) No (6 answers)

If not, what do you propose to be added?

Fluent feedbacks from formals would be enough. A report of blood drawn should be available to fill in with the most important components consisted by it in an infinitely repeatable way to cover all seniors' needs regardless how many times they have to go to this kind of examination.

8.1.3.1.10. Do you think that you would trust the recommendations provided for a healthier lifestyle by formal caregivers (others than your trusted general practitioner) in CoME?

Yes (15 answers) No (7 answers)

8.1.3.1.11. Would you willing to follow the recommendations provided periodically by formal caregivers?

Yes (14 answers) No (8 answers)

Why?

It depends also on my current life situations.

8.1.3.1.12. Would you recommend the platform?

yes (15 answers) no (7 answers)

8.1.3.1.13. Who would have to recommend you CoME in order to encourage you to join: trusted friend, family member or a trusted organization?

Yes, both (14 answers) Yes, but only family/friends (3 answers) Yes, only a trusted organization (4 answers) None (1 answer)

8.1.3.1.14. Were you able to reach your health goals with the support of CoME?

Yes (10 answers) Most times (8 answers) Sometimes (4 answers) No

What could be the reason of it?

Most of the seniors motivated each other, but the ones, who did not attend the joint meetings fluently produced on a lower level. Social participation is very important for this age group clearly.

8.1.3.1.15. Finally, please write down the 3 most positive and negative things about CoME:

Positive:

Health monitoring

Formal support

Platform available in Hungarian

Negative:

More games would be welcome

Verifying email arrives slowly

8.1.3.1.16. Would you pay for CoME if you had 24/7 professional support?

yes, obviously (8 answers)

maybe, it depends on the price (8 answers)

after a successful free trial, yes (5 answers)

no (1 answer)

If yes, how much?

5 € or less (5 answers)

5-10 € (14 answers)

more than 10 € (3 answers)



Figure 20. Seniors attending PBN's I4.0 based Digital Innovation HUB

8.1.3.1.17. Would you prefer a monthly or annual fee?

monthly (19 answers)

annual (2 answers)

(one would not pay)

8.1.3.1.18. Do you think that the provision of a service like CoME would be a determining factor for you to choose/switch an insurance company?

yes (16 answers) no (6 answers)

8.1.3.2. Results from informals

8.1.3.2.1. Are you satisfied with the platform in general?

yes (21 answers) no (6 answers)

Why?

The outlook is fine, but there are some 'hidden' menus on the elderly side. Informal one is fine.

8.1.3.2.2. Did you experience any barriers while using it?

yes (17 answers) no (10 answers)

If yes, which were them?

Most of the pages are fine totally, but they are very simple, sometimes even too simple.

8.1.3.2.3. What do you think about the interface for informal caregivers in CoME (look and feel, usability, etc., if you have experience with it)?

Very simple and fine.

8.1.3.2.4. On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is to handle the CoME platform for you?

1 2 3 (1 answer) 4 (18 answers) 5 (8 answers)

How easy do you think it was for your senior (if you have experience about this topic)?

1 2 3 (4 answers) 4 (18 answers) 5 (4 answers)

8.1.3.2.5. How often would you use CoME?

daily (2 answers) 2-5 days a week (18 answers) weekly (6 answers)

monthly (1 answer)

8.1.3.2.6. Would you recommend the platform?

yes (24 answers) no (3 answers)

If yes, to whom? If not, why not?

To every motivated people that cares about their health, not only for seniors.

8.1.3.2.7. Who would have to recommend you CoME in order to encourage you to join: trusted friend, family member or a trusted organization?

Yes, both (10 answers) Yes, but only family/friends (5 answers) Yes, only a trusted organization (10 answers) None (2 answers)

8.1.3.2.8. Did you notice any improvement on your senior's health condition so far?

yes (12 answers) a little (8 answers) no (2 answers) no, but he/she seems to be motivated (5 answers)

8.1.3.2.9. Do you usually follow your senior's data?

yes (8 answers) more or less (10 answers) not at all (9 answers)

Why?

A lot of informal caregivers think that their seniors can care about themselves. Others expressed their curiosity and would like support and follow their seniors' process.

8.1.3.2.10. Do you help him/her to handle the platform and/or achieve his/her health goals?

yes (7 answers) platform handling only (5 answers) goal support only (4 answers)
no (11 answers)

Why?

Some of them told that they would not like to intervene into their seniors' life.

8.1.3.2.11. Please write down the 3 most positive and negative things about CoME:

Positive:

Fast and accessible data

Formal support

Real motivation to move

Negative:

MCI risk assessment does not provide enough information.

Nokia devices does not sync properly

but as a general monitoring system, it would be very useful. However, the main importance is the preventative factor it carries in itself and the motivation for a healthier lifestyle in an interested and co-operative way.

8.1.3.3.3. *Would you willing to produce reports as part of your daily work activities?*

yes (6 answers) no (1 answers)

Why?

If it would result in an extra effort, I would like to be paid for it said 5 of them. If not, because the number of attending seniors would be decreased, it could be even added to their tasks as a free service.

8.1.3.3.4. *How often would you be willing to use CoME?*

daily (2 answers) 2-5 days a week (4 answers) weekly (1 answers) monthly

8.1.3.3.5. *Did you experience any barriers while using it?*

yes (5 answers) no (2 answers)

If yes, which were them?

Login and devices sync.

8.1.3.3.6. *What do you think about the interface for formal caregivers in CoME (outlook, handling of it, etc., if you have experience with it)?*

It is really basic, but nice and easy to use, everything is simple and logical. Some separation could be needed between seniors per age groups, per possible diseases or so (if more of them will be registered on the platform not only to test it).

8.1.3.3.7. *On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is to handle the CoME platform for you?*

1 2 3 4 (5 answers) 5 (2 answers)

8.1.3.3.8. *In case you have seen the app of the senior, how easy is it for seniors to use regarding to your opinion?*

1 2 3 (2 answers) 4 (3 answers) 5 (1 answer)

8.1.3.3.9. *Would you recommend the platform?*

yes (7 answers) no

If yes, to whom? If not, why not?

To seniors who would like to be fit or who should move more to keep their health, so for example in sport classes with older adults. Also to insurance companies and elderly care organizations.

8.1.3.3.10. *If one of your colleagues or another organization with similar profile as yours would recommend you to use CoME, would you do so?*

yes (3 answers) maybe, depends on... (4 answers) no other:

(It depends on the head of their institutions.)

8.1.3.3.11. *In your experience, do the seniors you work with usually reach their health goals?*

yes, usually (3 answers) half of them (4 answers) low percent of them

no, not really

They mentioned that a lot of seniors asked them personally about useful tips and they really seem to be motivated to stay in good shape and to have a fresh mind till as long as it is possible.

8.1.3.3.12. *Were you able to support satisfactorily the seniors under your care based on the data CoME provided to you?*

yes more or less (3 answers) not really (4 answers)

The trends could not be reached sometimes and also not all of them filled in the self-reports too. Mood should be also added daily by them, if possible, to see that if the more physical activity they produce makes them happier and balanced or not.

8.1.3.3.13. *Please write down the 3 most positive and negative things about CoME:*

Positive:

fast and accessible data

presence of informals on the platform too

spare of time and longer life possibly

Negative:

not punctual functions

slow verification email

self-report problems

8.1.3.3.14. Do you think it would be useful for healthcare financing institutions to acquire come?

yes (6 answers) no (1 answer)

Why/Why not?

If the seniors that they are planning to offer CoME would like the whole concept, yes. However, some seniors cannot be motivated enough towards a healthier lifestyle regardless CoME's program.

8.1.3.3.15. Would you want to work with CoMe if your healthcare financing institutions would acquire it?

yes (7 answers) no

8.1.3.3.16. Do you think your organization will be willing to pay for acquiring CoME and customizing it to its specific needs (layout, functionalities it is interested in, etc.)?

yes (4 answers) no (3 answers)

(Very heavily depending on the price and the opinion of the leaders of the institutions!)

If yes, which amount do you think is reasonable?

10k€ (1 answers) 25 k€ 50 k€ other (other did not respond)

Why?

Should be involved in the contract that it depends on the number of registering seniors and the type of subscriptions they would buy.

8.1.3.3.17. Do you think your organization would be willing to pay a monthly fee for maintenance and support in the CoME platform?

yes (2 answers) no (5 answers)

If yes, which amount do you think is reasonable to pay monthly per user?

0.5€ 1€ (3 answers) 2€ (4 answers) other:

8.2. The evaluation process of the third prototype in IRBLL(Spain)

Because of the importance that this phase has when defining the commercial strategy for CoME and due to the B2B has been defined as the approach to follow for the exploitation of CoME, during this phase IRBLL, who has contact with research organizations and hospitals in Lleida, was asked to include meaningful amount of formal caregivers.

The numbers of users involved in this phase in IRBLL are gathered in the below table:

Users		Seniors		Informal caregivers	Formal caregivers
Test period		non-MCI	with MCI		
Third Prototype	First sprint	-	-	-	-
	Second sprint	30 (new)	-	50 (new)	54 (new)

8.2.1. Pre-trial results from Spain (IRBLL)

Due to the fact that most people involved in previous trials in IRBLL were on holidays during summer it was no longer possible to reach them so IRBLL had to made a great effort in order to involved new seniors, formal and informal caregivers in this final phase of the project. Although this could be as a disadvantage, it really provides light to the results of the project, since it reduced the biased view that people involved in previous phase of the project could have.

However, and because of the proximity to end of the project, it was not possible by IRBLL to conduct pre-trial questionnaires over these new users so the results shown for this phase in Spain shows only the results from the post-trial phase with them.

8.2.2. Post-trial results from Spain (IRBLL)

IRBLL conducted interviews with:

- 30 seniors, mostly in one-to-one interviews. 15 interviews were conducted without wearable device (Fitbit or Nokia) in order to reach out an evaluation of the platform without any device, testing the value that CoME can provide for users who do not wear sensors.
- 54 formal caregivers to test the final version of the platform with health professionals.
- 50 informal caregivers.

8.2.2.1. Results from seniors

During this pos-trial phase, 30 seniors were interviewed: from them, 15 participants were not wearing any sensor device. The aim was evaluating the value that the platform could add to users who decide not to wear these devices.

In order to provide some statistics, during this phase, the platform was tested by 20 women and 10 men, average age of 72,26. Any of them MCI diagnosed.

8.2.2.1.1. *Are you satisfied with the platform in general?*

2 seniors answered: No 6,67%

28 seniors answered: Yes 93,33%

Why? / Why not?

In general, most of the seniors liked the platform; especially, they were attracted by the fact of getting know their habits and learning more about healthier lifestyle. They encountered the platform usable and motivational (one said that the platform activated him to do physical activity.)

8.2.2.1.2. *Did you experience any barriers while using it?*

21 seniors answered: No 70%

9 seniors answered: Yes 30%

If yes, which were them?

Although most of them did not find any barrier, the main limitations came from the process of registration, sign in and pairing of the wearable device.

8.2.2.1.3. *Would you rather use CoME than other tools of health monitoring like the Fitbit or Nokia app?*

10 seniors answered: No 33%

20 seniors answered: Yes 67%

Why?

In general, the people answered yes because they found to have more information and more tools at the CoME platform. They liked the fact that the platform is connected with their caregivers and mainly they liked the connection with the health caregiver (professionals).

Also, some of them also recommended to have CoME as a mobile app, since this would allow them to connect CoME anytime.

8.2.2.1.4. *On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is it for you to handle the CoME platform?*

5: 9 seniors 30%

4: 12 seniors 40%

3: 6 seniors 20%

2: 0 seniors 0%

1: 3 seniors 10%

As extracted, most partners agreed that CoME is easy to handle. Although some tasks such as the pairing of devices entailed some difficulties for them, in general they agreed that CoME is easy to handle.

8.2.2.1.5. *Were there any actions you wanted to do, but you could not finish?*

Yes: 3 seniors 10%

More or less: 10 seniors 33,33%

No: 17 seniors 56,67 %

If yes, which?

The mayor problem the seniors had was during the process of pairing the device; 9 from the 13 participants who reported that they could not finish an action, pointed out the process of connection between platform and device as main action they could not finish.

8.2.2.1.6. *Did you experience any difficulties with the displaying of information in any page?*

Yes: 3 seniors 10%

More or less: 4 seniors 13,33%

No: 23 seniors 76,67%

If “Yes” or “More or less”, explain where and why and describe some possible ways of clarification.

Most people answered that they had had some problems when visualization the information about their care that was available in the MyGuardian section since the view of the page varied somewhat from the rest of the platform.

8.2.2.1.7. *Do you think that the appearance of the platform fits for your age group?*

Yes: 22 seniors 73,33%

more or less: 7 seniors 23,33%

no: 1 senior 3,33%

If no, why not?

Most people thought that the platform fitted their age group. Main reason why people disagreed where because some buttons like “Likes” and “Comments” in the goals section where difficult to touch in the tablet.

8.2.2.1.8. *How often would you use CoME?*

Daily: 0 seniors 43,33%

2-5 days a week: 3 seniors 10%

Weekly: 13 seniors 0%

Monthly: 11 seniors 36,67%

Other: 3 seniors 10%

Most people were enthusiastic about using daily CoME in order to properly monitor their health status.

8.2.2.1.9. Do you think that CoME presents enough functionalities to motivate you towards a healthier lifestyle?

Yes: 83,33%

No: 16,67%

If not, what do you propose to be added?

Most them said yes and those who said no, indicated that they would like to have more games or a Social Network where their formal caregivers are involved.

8.2.2.1.10. Do you think that you would trust the recommendations provided for a healthier lifestyle by formal caregivers (others than your trusted general practitioner) in CoME?

Yes: 28 seniors 93,33%

No: 2 seniors 6,67%

Why?

All the participants answered they trust the recommendations because they were delivered by professionals. Those who said No indicated that they did not trust recommendations when they are not provided by their close formal caregiver.

8.2.2.1.11. Would you willing to follow the recommendations provided periodically by formal caregivers?

Yes: 30 seniors 100%

No: 0 seniors 0%

Why?

The main answer was that they trust the professionals or that the recommendations could be useful to improve their current lifestyle.

8.2.2.1.12. Would you recommend the platform?

Yes: 23 seniors 76,67%

No: 7 seniors 23,33%

If yes, to whom? If not, why not?

Those who would recommend the platform said that they mainly would recommend it to family, friends or older people who live alone.

Those who would not recommend the platform indicated that they were happy with their lifestyle and that they do not think that they need to be monitored daily by their caregivers.

8.2.2.1.13. *Who would have to recommend you CoME in order to encourage you to join: trusted friend, family member or a trusted organization?*

Yes, both: 12 seniors 40%

Yes, but only family/friends: 0 seniors 0%

Yes, only a trusted organization: 17 seniors 56,67%

None: 1 senior 3,33%

Why?

Most participants trust more in health professionals than in friends or family. An explanation could be that the Spanish public health system is free and provides all patients from qualitative health care professionals. The participants who answered “both” were willing to learn more about their health and how to prevent diseases, regardless who recommended it.

8.2.2.1.14. *Were you able to reach your health goals with the support of CoME?*

Yes: 5 seniors 16,67%

Most times: 8 seniors 26,67%

Sometimes: 10 seniors 33,33%

No: 7 seniors 23,33%

What could be the reason of it?

Most partners indicated that “Sometimes”. This was derived from the fact that they did not have tablet so they did not access CoME on a daily basis and they forgot about goals.

8.2.2.1.15. *Finally, please write down the 3 most positive and negative things about CoME:*

Positive: The majority of the users evaluate positively the fact that health care professionals are involved in the platform. It helps them to be more conscious about their health habits and they like to be able to follow their activity. They feel encouraged to do more physical activities and most of the users like the memory games.

Negative: The main negative findings came from those who did not have table and had to enter periodically to the website.

8.2.2.1.16. *Would you pay for CoME if you had 24/7 professional support?*

yes, obviously: 0 seniors 0%

maybe, it depends on the price: 15 seniors 50%

after a successful free trial, yes: 4 seniors 13,33%

no: 11 seniors 36,67%

If yes, how much?

5 € or less: 19 seniors 73,08%

5-10 €: 1 senior 3,85%

more than 10 €: 1 senior 3,85%

other: 5 seniors 19,23%

8.2.2.1.17. *Would you prefer a monthly or annual fee?*

Monthly: 19 seniors 70,37%

Annual: 8 seniors 29,63%

8.2.2.1.18. *Do you think that the provision of a service like CoME would be a determining factor for you to choose/switch an insurance company?*

Yes: 0 seniors 0%

No: 30 seniors 100%

Why/ Why not?

All of them told that they would consider it if the price is reasonable.

8.2.2.2. *Results from informal caregivers*

50 informal caregivers were interviewed in joint sessions.

For statistical purposes, 16 of them were men and 34 women; the average age was 48,26

8.2.2.2.1. *Are you satisfied with the platform in general? Why?*

90% of interviewed were satisfied with the platform. The main reasons were the ease of use as well as the possibility to know the patterns and habits of seniors, especially those related to risks associated with health habits. Those who were not satisfied indicated that they usually visit their seniors, so they did not see the reason to daily connect the platform to see the progress of their seniors.

8.2.2.2.2. *Did you experience any barriers while using it? If yes, which were them?*

86% did not experience any barriers. Most barriers came in the registration process for those who are not used to work with technological devices.

8.2.2.2.3. *What do you think about the interface for informal caregivers in CoME (look and feel, usability, etc., if you have experience with it)?*

The look & feel was well received from informal caregivers, who said that was intuitive and easy to use.

8.2.2.2.4. *On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is to handle the CoME platform for you?*

1: 1 informal caregiver 0%

2: 3 informal caregivers 6%

3: 3 informal caregivers 6%

4: 23 informal caregivers 46%

5: 20 informal caregivers 22%

Related to the previous question, most of them think that the platform was intuitive and easy to use. Those who voted “2” said that they would like the platform to have less functionalities, since they were a bit “overwhelmed” for the high set of functionalities that the platform provided.

8.2.2.2.5. *How easy do you think it was for your senior (if you have experience about this topic)?*

1: 4 informal caregivers 0%

2: 6 informal caregivers 12,50%

3: 20 informal caregivers 41,67%

4: 14 informal caregivers 29,17%

5: 4 informal caregivers 16,66%

Most of them indicated that it was a bit difficult because of the fear seniors have with new technologies. They usually asked to them, however, they were able to cope most tasks without help.

8.2.2.2.6. *How often would you use CoME?*

Daily: 6 informal caregivers 12%

2-5 days a week: 17 informal caregivers 34%

Weekly: 22 informal caregivers 44%

Monthly: 5 informal caregivers: 5%

Other: None

As indicated below, some of them usually visit their seniors so they do not feel the need to use it on a daily basis.

8.2.2.2.7. *Would you recommend the platform?*

yes **no**

If yes, to whom? If not, why not?

94% of informal caregivers would recommend the platform, mainly to family members, friends and some people that they know and that sometimes feel bad because they cannot take care of their parents as long as they would like. Those who would not recommend the platform said that most people have daily contact with their parents so there is no need to recommend the platform.

8.2.2.2.8. *Who would have to recommend you CoME in order to encourage you to join: trusted friend, family member or a trusted organization?*

Yes, both: 29 informal caregivers 58%

Yes, but only family/friends: 14 informal caregivers 28%

Yes, only a trusted organization: 5 informal caregivers 10%

None: 2 informal caregivers 4%

Why?

The reason to recommend the platform exposed by informal caregivers is mainly based on the trust they have with their friends and health professionals. They trust in the experience as users (family and friends) and in the professional experience (health professionals)

8.2.2.2.9. *Did you notice any improvement on your senior's health condition so far?*

Yes: 2 informal caregivers 4,08%

A little: 23 informal caregivers 46,94%

No: 15 informal caregivers 30,61%

No, but he/she seems to be motivated: 10 informal caregivers, 9%

8.2.2.2.10. *Do you usually follow your senior's data?*

Yes: 18 informal caregivers 36,73%

More or less: 22 informal caregivers 42,86%

Not at all: 10 informal caregivers 20,41%

Why?

People who do not live near from their seniors said "Yes". Those who said "No" were those informal caregivers people who live close to the seniors they care.

8.2.2.2.11. Do you help him/her to handle the platform and/or achieve his/her health goals?

Yes: 33 informal caregivers 64,58%

Platform handling only: 7 informal caregivers 14,58%

Goal support only: 3 informal caregivers 6,25%

No: 7 informal caregivers 14,58%

As explained below, some seniors had fear when interacting with the platform so they usually asked informal caregivers for help; however, according to informal caregivers, seniors knew how to properly use the application alone but when they (informal caregivers) were with them, they directly asked them instead of thinking how to do it.

8.2.2.2.12. Please write down the 3 most positive and negative things about CoME:

Positive:

The main positive things that informal caregivers reported are: Follow up of the health habits of the senior, access to information provided by formal caregivers and Simplicity.

Negative

Most indicated that they would like to monitor other patterns such as blood pressure or sugar level.

8.2.2.2.13. Would you pay for CoME to provide 24/7 professional support for your senior?

Yes, obviously: 7 informal caregivers 14,29%

Maybe, it depends on the price: 24 informal caregivers 67,35%

After a successful free trial, yes: 3 informal caregivers 6,12%

No: 6 informal caregivers 12,24%

Those who answered “No” said that they are happy with the help they received from social institutions so they do not need to pay for an application that supports them.

8.2.2.2.14. Do you think your senior would pay for such a 24/7 professional support?

Yes, obviously: 3 informal caregivers 6,12%

Maybe, it depends on the price: 40 informal caregivers 81,63%

After a successful free trial, yes: 1 informal caregiver 2,04%

No: 5 informal caregivers 10,20%

8.2.2.2.15. If yes, how much per month? (please underline your selection and circle the answer for your senior)

5 € or less: 15 informal caregivers 34,88%

5-10 €: 20 informal caregivers 46,51%

More than 10 €: 4 informal caregivers 9,30%

Other: 4 informal caregivers 9,30%

8.2.2.2.16. Would you prefer a monthly or annual fee?

Monthly: 37 informal caregivers 82,22%

Annual: 8 informal caregivers 17,78%

8.2.2.2.17. Do you think that the provision of a service like CoME would be a determining factor for you to choose/switch an insurance company?

Yes: 19 informal caregivers 38,78%

No: 30 informal caregivers 61,22%

Why/ Why not?

Most informal caregivers trust in the public health system, so they do not feel the need to take out insurance, even although it offered a service like CoME.

8.2.2.3. Results from formal caregivers

54 formal caregivers were interviewed in joint sessions, 13 men and 41 women and an average age of 38,62

8.2.2.3.1. Are you satisfied with the platform in general?

9 formals answered: No 16,67%

45 formals answered: Yes 83,33%

Why? / Why not?

The majority were satisfied with the platform because it appeared them easy to use, attractive, useful and practical, so they felt motivated to used daily in their work with patients. Those who answered “No”, indicated that they would like to have more reliable information available in the section of learning material. Also, the possibility of exporting data from CoME as part of the patient record could be very useful.

8.2.2.3.2. Would you willing to periodically monitor trends of seniors in CoME?

10 formals answered: No 19,23%

42 formals answered: Yes 80,77%

Why?

Mainly health care professionals are positive with respect to using the platform. They would consider monitor seniors through the platform because they see an opportunity to reduce medical visits and to have more control over the patient; thus, most of them see CoME as a tool to

empower patients in their health care process due to it gives them continuous information about their patients so they can respond better to the needs of their clients.

Those who answered “No” indicated that they see the platform as extra work so they do not want to work more.

8.2.2.3.3. *Would you willing to produce reports as part of your daily work activities?*

10 formals answered: No 19,23%

42 formals answered: Yes 80,77%

Why?

The majority were positive to produce reports during their daily work activities. They found it practical and easy to handle; also, they indicated that it helps to give an individual approach to their patient because they are provided with more specific information and it helps perform and adequate follow-up, avoiding unnecessary consults.

Those who answered No indicated that this would require more work.

8.2.2.3.4. *How often would you be willing to use CoME?*

6 formals answered: every day 12,24%

18 formals answered: 2 to 5 days a week 36,73%

25 formals answered: weekly 51,02 %

More than a half indicated that if CoME is not part of their daily work, they will not use it too often (maybe weekly). The rest indicated that they would feel very motivated if they could provide personalized care to their patients, so they would use it almost 3 times a week.

8.2.2.3.5. *Did you experience any barriers while using it?*

Yes: 14 formals 26,92%

No: 38 formals 73,08 %

If yes, which were them?

Overall, the formals did not experience any barrier. Some of them had difficulties when understanding the functioning of MyGuardian because they did not understand its functionality and they were a bit confused during the login process (external to CoME platform).

8.2.2.3.6. *What do you think about the interface for formal caregivers in CoME (outlook, handling of it, etc., if you have experience with it)?*

In general, the formals did like the interface of the platform and they thought it was easy to handle.

8.2.2.3.7. *On a scale from 1 to 5 (where 1 means very hard and 5 means very easy) how easy is to handle the CoME platform for you?*

1: 3 formals 0%

2: 5 formals 9,09%

3: 8 formals 14,55%

4: 29 formals 58,18%

5: 10 formals 18,18%

As was extracted from question 5, most of them found the platform easy to handle, despite some barriers were faced with MyGuardian.

8.2.2.3.8. *In case you have seen the app of the senior, how easy is it for seniors to use regarding to your opinion?*

1: 3 formals 6,98%

2: 4 formals 9,30%

3: 19 formals 44,19%

4: 13 formals 30,23%

5: 4 formals 9,30%

Most of them indicated that most of the seniors they have are not familiarized with technology so it is possible that they could face some problems, e.g. during the registration, the access to the verification mail, etc.

8.2.2.3.9. *Would you recommend the platform?*

Yes: 47 formals 88,68%

no: 6 formal 11,32%

If yes, to whom? If not, why not?

Most of the formals would recommend the platform because they perceive it as very useful. They would recommend it to family, friends and co-workers. The formals who would not recommend it indicated that they would like to have the solution more integrated into their current systems before recommend it to other colleagues.

8.2.2.3.10. *If one of your colleagues or another organization with similar profile as yours would recommend you to use CoME, would you do so?*

Yes: 32 formals 57,14%

Maybe, depends on: 20 formals 35,71%

No: 3 formals 5,36%

Other: 1 formal 1,79%

They indicated that they trust their colleagues so it is possible that they would get CoME if recommended by colleagues or another organization.

8.2.2.3.11. *In your experience, do the seniors you work with usually reach their health goals?*

Yes, usually: 9 formals 16,07%

Half of them: 22 formals 39,29%

Low percent of them: 20 formals 35,71%

No, not really: 5 formals 8,93%

A low percentage pointed out “Yes” so most of them highlighted the need to have tools that enable to monitor users to reach their health goals.

8.2.2.3.12. Were you able to support satisfactorily the seniors under your care based on the data CoME provided to you?

Yes: 19 formals 35,85%

More or less: 23 formals 43,40%

Not really: 11 formals 20,75%

Most of them said “Yes”. Those who said “No” indicated that they would like to link CoME with patient records in order to be able to provide satisfactory support.

8.2.2.3.13. Please write down the 3 most positive and negative things about CoME:

Positive: The majority of the formals likes the design of the platform, they assess positively its easiness to manage the platform and usability. They like that they can follow up their patients continuously with real data and that it facilitates their consultations. They see it as a motivator for older people to work together on a better and healthier lifestyle.

Negative: The main negative things because they would like to have CoME properly integrated with other tools they use in their current work such as patient records, in order to provide proper work.

8.2.2.3.14. Do you think it would be useful for healthcare financing institutions to acquire come?

Yes: 47 formals 85,45%

No: 8 formals 14,55%

Why/ Why Not?

Mainly, they see the platform as something that can improve the health care of the seniors since it provides them with continuous information and the fact of tracking the senior through CoME could avoid unnecessary visits to the hospital. Those who said no pointed out that this would require extra-work, especially in the case where CoME is not properly integrated into their system.

8.2.2.3.15. Would you want to work with CoMe if your healthcare financing institutions would acquire come?

Yes: 47 formals 85,45%

No: 8 formals 14,55%

Why/ Why Not?

Answers from previous question were extrapolated to this one.

8.2.2.3.16. Do you think your organization will be willing to pay for acquiring CoME and customizing it to its specific needs (layout, functionalities it is interested in, etc.)?

Yes: 40 formals 74,07%

No: 14 formals 25,93%

They considered this customization as key for the work performance of CoME in their organization.

If yes, which amount do you think is reasonable?

10k: 9 formals 25,71%

25k: 6 formals 17,14%

50k: 0 formals 0%

Other: 20 formals 57,14%

Why?

The most formals responded that they don't think their institution would pay, as this is mainly for wellbeing and healthier focus, and not health focus which could be of more interest or their organisations.

8.2.2.3.17. Do you think your organization would be willing to pay a monthly fee for maintenance and support in the CoME platform?

Yes: 36 formals 69,23%

No: 16 formals 30,77%

if yes, which amount do you think is reasonable to pay monthly per user?

0,5€: 8 formals 25,71%

1€: 9 formals 22,86%

2€: 3 formals 8,57%

Other: 15 42,86%

Why?

Most of them indicated that their organization would be willing to pay but that some evidence and customization is required before. Based on other products their organizations currently have, they indicated that 0,5€ is a good price but that they would like to see the final version of the product to take a proper decision.

9. Final Validation of CoME

As gathered in D4.1 Validation Metrics, the validation of the last prototype of CoME is one of the most relevant parts of the project due to it is the last chance to get feedback from users before the commercialization phase.

With this purpose, we considered that for this phase it was really important to use the validation metrics defined in D4.1 to define the success of the project according to the following parameters:

- **Insights and Satisfaction** related to the users' feedback about the services and functionalities proposed by CoME.
- **Brand Awareness and Exposure.** Brand Awareness and Exposure are key values for the success of the platform so this is the reason why CoME strategy has aimed to create and maintain a positive image among users and to assess their impressions about the proposed services.
- **Reach and interaction with users.** It is important to communicate with users to understand their preferences and the improvements or changes they would like to suggest for the CoME platform.
- **Web traffic analytics and Engagement.** Web traffic analytics to the website and the CoME platform; give us the possibility to assess the number of users interested in CoME as well as the number of already registered people and the actions they perform.
- **Platform Reliability and Profitability.** The assessment of the platform reliability is useful to improve the maintenance effectiveness and efficiency. The identification of the issues causing maintenance effects helps to select the right strategy to reduce risk and improve operational performance due to technological solutions with the least resources and time.

With the purpose of adequately measuring these parameters, several actions were performed by partners along the project; these actions have been performed more intensively in this latest phase of the project, where:

- End-users' organizations made a great effort in order to involve a significant amount of formal caregivers, that are the ones that better insights can provide regarding the success of CoME when commercializing it according to B2B approach defined in the project;
- Post-trial questionnaires for this final prototype were designed according to the validation metrics defined in D4.1 since they were used as the main tool to get insights supporting the operationalization of CoME;
- Some scripts were created and executed in order to get quantitative data from the database that could be used for determining the level of engagement of users with the platform.
- Some statistics from Google Analytics.

The results from these evaluations are gathered in the following table:

Key Performance Indicator (KPI)	Metrics	Results	Source
Insights and Satisfaction	Total number of users	Total number of seniors : 117 Total number of informal caregivers : 105 Total number of formal caregivers : 81	Reports provided by end-users' organizations
	Number of users satisfied with CoME platform	Total number of seniors : Yes (81%), No (19%) Total number of informal caregivers : Yes (86%), No (14%) Total number of formal caregivers : Yes (82%), No (18%)	Post-trial questionnaires in the last prototype of the project
	User satisfaction with the platform	The main reason of satisfaction was that the platform is easy to use and also the continuous support provided thanks to the formal caregiver. The MCI risk tool as well as the support this module provides formal caregivers when taking decisions was also good received.	Post-trial questionnaires in the last prototype of the project
	Number of users satisfied with the facilities provided by CoME regarding health support	As explained previously, 83% of the users involved in trials are satisfied with the functionalities provided by CoME and most of them stressed that if CoME has not improved their health status, at least they are more motivated to follow a healthier lifestyle.	Post-trial questionnaires in the last prototype of the project
	Number of users who prefer CoME again other apps such as the one provided by Fitbit.	This measure was applied only to seniors since they are the ones with the monitoring app: Yes (81%) No (19%)	Post-trial questionnaires in the last prototype of the project

	Types of suggestion and recommendations	<p>Positive things about the platform were: The possibility of monitoring health, the support provided by formals and the real motivation to move it provides to seniors</p> <p>Negative things about the platform were: some problems with self-reports, more detailed description in the case of MCI risk and the process of mail verification</p>	Post-trial questionnaires in the last prototype of the project
	Sentiment: positive, neutral or negative of the users	<p>As extracted from end-users' organization, at least 80% of users feel positive with CoME however, they think that the platform would require to provide more information to users when conducting self-reports or when they are at risk of MCI.</p> <p>Improvements in this area are key for the success in the market of CoME.</p>	Post-trial questionnaires in the last prototype of the project
	Influence, i.e., how user's behaviour can change due to the use of the CoME platform	<p>At least 84% are willing to follow the recommendations provided periodically by formal caregivers in CoME.</p> <p>Also, 74% stressed that they had changed their behaviour to a healthier trend as those who had not, were motivated to do it.</p>	Post-trial questionnaires in the last prototype of the project
Overall brand Awareness and Exposure	Number of overall registered users on the platform	<p>Total number of seniors: 117</p> <p>Total number of informal caregivers: 105</p> <p>Total number of formal caregivers: 81</p>	HIB Script in the database
	Number of new registered users on the platform (e.g., /month)	These measure is difficult to estimate due to the platform has not been tested on a real basis	HIB Script in the database
	Duration/Time spent by users using the web platform	The average time spent by the users in the web platform is 13 minutes and 33 seconds	Google Analytics

	<p>Degree of involvement (e.g., number of visits, and when visiting: number of pages visited)</p>	<p>The total number of sessions in the platform (visits) has been 4.578. The number of pages visited is 4 in average, the total number of pages viewed has been 46.914 (the most visited ones are login, home, trends and self-reports in this order)</p>	<p>Google analytics</p>
	<p>Number of health goals set vs number of health goals achieved (e.g., /month)</p>	<p>The number of goals set as achieved per user in 85% of the total of goals It is important that periodicity has not been consider; in addition, it is possible that this is based on trials and it does not show reality</p>	<p>Scripts in the database</p>
<p>Reach and interaction with users</p>	<p>Post-trial questionnaire for seniors</p> <ul style="list-style-type: none"> • Level of understanding of the application • Level of Usability and accessibility • Level of satisfaction to recommend the platform to other people. Level of satisfaction regarding the increase of health self-reliance • Level of operability • Level of achievement of preferences for each of the pages in the platform 	<ul style="list-style-type: none"> ➤ Barriers or level of understanding <ul style="list-style-type: none"> • Seniors: No (75%), Yes (25%) • Informals: No (80%), Yes (20%) • Formals: No (80%), Yes (20%) ➤ Usability and Accessibility <ul style="list-style-type: none"> • Seniors: No (5%), Yes (95%) ➤ Recommend the platform to other people <ul style="list-style-type: none"> • Seniors: No (27%), Yes (73%) • Informals: No (10%), Yes (90%) • Formals: No (10%), Yes (90%) ➤ Satisfaction based on increase of health self-reliance <ul style="list-style-type: none"> • Seniors: No (26%), Yes (74%) ➤ Satisfaction with the recommendations provided by formals <ul style="list-style-type: none"> • Seniors: No (12%), Yes (88%) <p>Informals satisfied with improvement in seniors</p> <ul style="list-style-type: none"> • Informals: No (15%), Yes (85%) 	<p>PBN, IRBLL, CON Post-Trial questionnaires</p>

		<p>Formals’ satisfaction on how CoME helps to support seniors</p> <ul style="list-style-type: none"> • Formals: No(21%), Yes(79%) ➤ Level of operability: the platform had an operability of 99,99% ➤ Level of achievement of health goals by seniors <ul style="list-style-type: none"> • Seniors: No (12%), Yes (78%) ➤ Level of achievement of health goals perceived by informals <ul style="list-style-type: none"> • Informals: No (13%), Yes (77%) ➤ Level of achievement of health goals perceived by formals <ul style="list-style-type: none"> • Formals: No (9%), Yes (91%) 	
Details on traffic analytics and engagement	<p>Google Analytics (project web: http://come-aal.eu/)</p> <p>Number of visitor to the site (e.g., daily)</p> <p>Number of new visitors to the site</p> <p>Visitors segment</p> <p>Actions performed by visitors</p>	<p>Number of visitor to the site (e.g., daily) – 4.578 sessions and 807 users.</p> <p>Number of new visitors to the site – 18%</p> <p>Actions performed by visitors –the flow of pages follow for the most of the users is login, home, trends and self-reports</p> <p>The average time spent by the users in the web platform is 13 minutes and 33 seconds</p> <p>The total number of pages viewed has been 46.914</p>	Google Analytics
	<p>Engagement for seniors</p> <p>Registered seniors</p> <p>The number of active/inactive</p> <p>The age and gender</p> <p>The category of users</p>	<p>Seniors = 117</p> <p>Active seniors in the last phase= 54</p> <p>Average age: around 73 years old</p> <p>Age and Gender: around 60% women and 40% men</p> <p>Category: non-MCI and MCI diagnosed seniors</p>	Combination among profile of users involved in the trials of final prototype + HIB Analytics

	<p>The location</p> <p>The time spent by users using the platform</p> <p>The number of pages visited in CoME platform</p> <p>Engagement (low)</p> <ul style="list-style-type: none"> Complete/Not completed profile Health and exercises goals Pairing the wearable device with the platform <p>Engagement (medium)</p> <ul style="list-style-type: none"> Data for trends Integration with MyGuardian Achieved health goals Informal caregivers <p>Engagement (high)</p> <ul style="list-style-type: none"> Preferences & Privacy Settings update Reports from formal caregivers Games Self-reports performed 	<p>Location: urban and rural areas in Spain, Hungary and The Netherlands</p> <p>Time Spent: half an hour is the average time spent by seniors</p> <p>High engagement: they usually visit all the pages in the platform</p>	
	<p>Engagement for informal caregivers</p> <ul style="list-style-type: none"> Registered informal caregivers The number of active/inactive The age and gender The location The time spent using the platform The number of pages visited in CoME platform 	<p>Seniors = 105</p> <p>Active seniors in the last phase= 77</p> <p>Average age: around 73 years old</p> <p>Age and Gender: around 70% women and 30% men</p> <p>Category: people usually taking care of relatives</p> <p>Location: urban and rural areas in Spain, Hungary and The Netherlands</p>	<p>Combination among profile of users involved in the trials of final prototype + HIB Analytics</p>

	<p>Engagement (low) Complete/Not completed profile</p> <p>Engagement (medium) Preferences and privacy settings updated</p> <p>Integration with MyGuardian Participation in Forums</p> <p>Engagement (high) Amount of information/content uploaded Amount of AR content uploaded Amount of occasional caregivers contacted Number of help requests from elderly satisfied by an informal caregiver</p>	<p>Time Spent: half an hour is the average time spent by seniors</p> <p>High engagement: they usually visit all the pages in the platform</p>	
	<p>Engagement for formal caregivers Registered informal caregivers The number of active/inactive The age and gender The location The time spent using the platform The number of pages visited in CoME platform</p> <p>Engagement (low) Complete/Not completed profile Alarms processed</p> <p>Engagement (medium)</p>	<p>Seniors = 81 Active seniors in the last phase= 62 Average age: around 40 year old Age and Gender: around 70% women and 30% men Category: professionals and general practitioners Location: urban areas in Spain, Hungary and The Netherlands Time Spent: half an hour is the average time spent by seniors High engagement: they usually visit all the pages in the platform</p>	<p>Combination among profile of users involved in the trials of final prototype + HIB Analytics</p>

	<p>Amount of information/content uploaded</p> <p>Number of threads on discussions/topics in the forum</p> <p>Integration with MyGuardian</p> <p>Number of notifications read</p> <p>Engagement (high)</p> <p>Number of reports sent to seniors</p>		
<p>Platform Reliability and Profitability</p>	<p>Prices of the service</p>	<ul style="list-style-type: none"> • Seniors <p>There are different results in Spain and Hungary.</p> <p>In Hungary, most of users would be willing to pay for a 24/7 service like CoME and most of them pointed out that a service like CoME would be a determining factor when choosing/switching and insurance company.</p> <p>In Spain, most of users will not be willing to pay more than 5€/month for a service like CoME and they indicated that for sure this is not a determining factor when deciding if switching or choosing an insurance company.</p> <ul style="list-style-type: none"> • Informals <p>Most informals will be willing to pay for a service like CoME. Regarding if CoME would be a determining factor when choosing/switching an insurance company, 50% indicated yes and the other said no.</p> <ul style="list-style-type: none"> • Formals <p>Formals from both Hungary and Spain would be willing to produce reports as part of their daily work. In addition, most of them think that it would be useful</p>	<p>Post-trial questionnaires and from D5.2 Business Model</p>

		if their health institution acquired CoME. Also, they indicated that their organization would be willing to pay although they are not able to know the price.	
	The Return On Investment (ROI) The Net Present Value (NPV) The Internal Rate of Return (IRR) Discount rate	ROI = 18.3 NPV = 1.365.782€ IRR = 79% Discount Rate = 10%	

10. Conclusions (per prototypes)

10.1. *Second prototype conclusions*

10.1.1. Pre-trial observations and recommendations from end-users and partners

The registration process would be worth to shorten regarding to the feedback of mainly the seniors from all three testing countries, but also informal and formal caregivers mentioned some causeless elements about it and also some hindering ones. The verification email caused some disruptions, because seniors sometimes do not remember their passwords to their email addresses and another meeting was needed to finish their registration. Also it took sometimes quite a longer time form the email to arrive and it often lands in them spam folder. Case sensitivity is also questionable in the case of senior, especially in the cases where they live alone.

Pairing the Fitbit/Nokia accounts is the most crucial point it looks like, it should be managed more directly, like for example providing links via the avatar to the Fitbit/Nokia platform and involve a concrete description what and how to do.

The language should be the one inside the platform at first that you select in the registration/login page, especially because Spanish knowledge of the seniors (which is setup as basic language) is usually even lower than English, help was needed for this change in most of the times.

The presence of Eva the avatar is very welcome, but most of the end-users would appreciate more intervention from her, but also not too much at first in order for the seniors to be able to remember everything they taught.

Menus are clear for the majority of the groups, but still they could be more unified and sometimes renamed, 'Info' named menu point placed in the bar at the bottom for example was deceptive for quite a lot of end-users, who expected general help like FAQ.

Motivation of the seniors kept alive and stayed quite on the high level it was in the first prototype, but drop outs happened in every end-user's organizations, mainly in Spain, where the most end-users are testing, so it is not a surprise at all. The Hungarian core team of the 13 seniors seems to be stable and hopefully they will keep their engagement till the end of the project and with the additional devices, involvement of new actively testing seniors is possible to raise the number of feedbacks too. In the Netherlands, CON was testing with seniors there per prototype to be able to provide feedbacks based on multiple viewpoints despite of the low number of seniors from there.

First connections were made between the three different groups to share health data and mood information, which is really interesting for all groups and they are waiting for further improvements.

10.1.2. Post-trial observations and recommendations

Efforts taken to adjust the platform to the needs of the elderly were successful enough regarding to the feedbacks from all the end-user groups. Most of the end-users seem to be confident enough to use the platform in their everyday lives, even the majority seniors, for formals it is very easy to navigate, also for informals is not a challenge usually. No major barriers were present, only some minor ones, an integrated and unified menu system could help in some cases. The lower bar should be fixed, because sometimes subtitles disappear from it and it would be useful to fix the CoME logo on the top in order to get back to the homepage regardless where the user is on the page, for example scrolled down to somewhere etc.

The motivation from the seniors' side is still there and they keep realizing their goals, however, they are really waiting for the functionalities that will appear only in the 3rd prototype of CoME, like self-reports and results, formal reports and etc.

Recommendation of the platform would be quite well received from all key players (loved ones, GPs and bigger organizations) and they would also suggest others to use it, but only in the case when the platform will be ready and fully operating with every of its expected functionalities implemented.

Measuring of the blood pressure is a desire element regarding to all the end-user groups, a lot of them mentioned it. Nokia sets are functioning for this issue as a solution but this would convert CoME in a health solution and CoME objective is healthier lifestyle.

Avatar is well received, but daily periodicity of tracking the seniors' mood could be annoying. The ones, who liked the idea of even daily answering, were really glad to check their progress in the long run. Also informals really appreciated this function to be tracked by them too.

The outlook of the platform is still satisfying, also the developments implemented so far, but seniors are really waiting for a completed version of the website to assess its real value in practice.

10.2. Third prototype conclusions

End-users had the chance to try the most complete form of the CoME platform along this prototype.

The ones, who participated in earlier periods of testing already kept their motivation and they were very curious about the MCI risk assessment module, which was implemented till the end of the project and testing.

They were a bit disappointed as they expected a more detailed feedback about the explanations of the risk of MCI or not. Another disappointed fact was the need of completing the whole self-reports in order to obtain feedback, and their length.

However, they all felt better themselves in general and would like to continue the more active lifestyle they achieved while participating in CoME's testing. Also the formal and informal caregivers were satisfied with their seniors' health and they were really happy to be able to check their health functions from time-to-time even remotely.

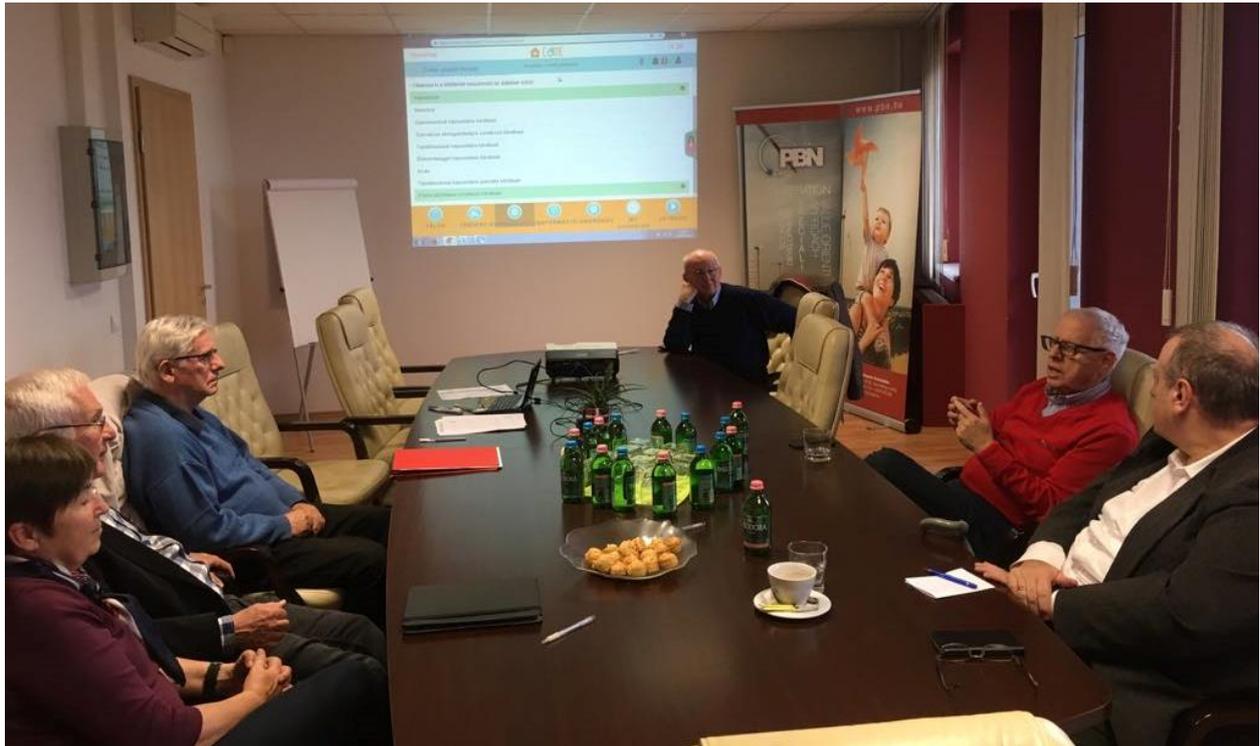


Figure 21. PBN users at the final discussion meeting

10.2.1. Pre-trial observations and recommendations

In general end-users were still motivated and were waiting for the last pack of functionalities to appear and work efficiently.

The two most exciting and welcomed ones were the MCI risk assessment module and the fluent feedbacks from the formal team of CoME.

The biggest problems they faced were the following ones below:

- Visibility problems: even with selecting the biggest font size some seniors have problems to clearly read the pages,
- Formals cannot build on too much the data they get (not decent syncing and feedbacks from seniors in some cases).
- Explanations and feedback provided should be more detailed.

These issues should be solved in the last developing sprint and additional forums would be much appreciated, but not only by diseases, but other topics, like interest towards sports, hobbies or so.

10.2.2. Post-trial observations and recommendations

CoME presented all the promised functionalities it offered and that was much appreciated by the sides of all types of end-users.

However, they still expressed some concerns and the platforms looks incomplete for them. The testers that are participating from earlier periods witnessed more patience towards CoME and they told that knowing that this was only a testing period, the achievements are acceptable and well-received. Other joined freshly were a bit more unsatisfied in some case as they wish more detailed feedback and additional more health related information (although they were initially informed that CoME is a healthier lifestyle platform and not a health one), but the general idea of CoME was popular and they were happy to be able to join and start a healthier lifestyle.

Please see more in the next section summarizing the whole testing of CoME that lasted longer than a year in three testing countries!

10.3. Summary

As it can be seen separately per end-user types in the section 2.3, 303 end-users participated in the testing of the CoME platform along the whole project lifetime.

CoME is basically a much appreciated idea expressed by all types of end-users, but some of its functionalities should be improved such as more avatar interaction, more detailed feedback, additional sensors, etc. in the future to make it really attractive and useful on the market.

Based on a table market research prepared in April 2017, there were no real competition could be found on the market. 14 applications were selected based on the health topic that more or less targeting the silver market, but none of them offered an as complex service as CoME. Most of them targeting general health monitoring, medicine taking, motivation towards a more active lifestyle, but professional formal support was not offered by them.

Also CoME strives to be more marketable with offering a service for a monthly or annual fee than to just sell it once when the registration happens. Another important advantage to build on is that CoME is also suitable for the B2B model and could draw the attention of insurance companies and health care organizations, which could potentially buy its rights to apply it with providing the service to their clients.

Summing the experiences of the end-users CoME is really able to reach its preventive natured goals and really made seniors motivated towards a healthier lifestyle to reach and keep. The participation in social life is also very important for them, so they stressed the importance of creating forums made available for all types of end-users and even added that it would worth by the side of CoME's employees to push them even harder to get and stay active. The proposed functionalities would be enough in general for end users to subscribe to CoME for a reasonable fee, where monthly was selected as the most preferred option around between 5 and 15 € per month depending on the implemented functionalities.

Formal and informal caregivers also confirmed their appreciation towards the CoME platform and they see its value mainly in sparing time and have always up-to-date data, especially if a senior is forced to live alone. They would even offer the use of it to other end-users that has goals regarding to their health status to improve or keep.

Most of the participating end-users reported perceptible improvement in their health condition only in this short period of time, but what is even more important is that they finally felt the motivation inside most of them that lacked for so long before to do for their health.

Annex 1: Answers from the review

The following section gathers the main recommendations provided by reviewers during the second review meeting of the project and how we have overcome them:

- **Validation with end-users. “Instead of control groups, pre-post trial questionnaires, tailored to each user group, were used. The reviewers still have some doubts about the resulting impact CoME will be able to demonstrate within the given project timescales.”**

To assess the impact of this type of intervention on the study participants the optimal design is a field trial, but we should face some important problems when we apply the design to the reality. In a Randomized Controlled Trial (RCT), we would recruit the double number of CoME users to include them in 1) the experimental group (users enrolled in the CoME platform) and in 2) the control group (users of the placebo group). Both groups would have to be the most equal as possible, so we cannot include an MCI group and a non-MCI group.

As we assume that the trials should run with the non-MCI population we have a very important issue to consider with regard to the control group. Namely, due the nature of the project we could not give to CoME users a ‘placebo solution’. On the one hand, ethically this is not viable, because when conducting an intervention, you cannot leave a user group without the possible benefits of what is being investigated. On the other hand, designing a ‘placebo CoME’ solution would have proved to be really hard – for example, what would the ‘placebo’ wearable be? What would the placebo CoME interface look like? Given these considerations, we have rolled out the CoME intervention-placebo design choice.

Additionally, given the CoME as an intervention, we needed to decide how the user sample is composed (city, province, centre, etc.) and taking into account the inclusion criteria (65+, have smartphone and not institutionalized), we have faced some important questions:

- We had a limited number of wearable devices;
- Each user must have a wearable a device: some of them were using Fitbit and other, Nokia/Withings;
- IRBLL had access to users from the sanitary region of Lleida through their contacts within the research group, but they could not access to the other sanitary records (privacy and ethics);
- We had to deal with different Android versions in order to install the Fitbit/Nokia app;
- We did not know if the user is involved in any other health education program to avoid bias

This is why the partners of the CoME Project decided to use a more pragmatic solution to assess the outcomes of the CoME platform with a quasi-experimental design pre-post intervention with paired data, where each user was his own control. Namely, the same user was evaluated before the intervention and after the intervention, therefore we could see what were the changes in the same user, assuming the changes could be explained by means of use of CoME. The advantages of this design were that the variability and the sample size requirements were more reduced. The sample in this design was an intentional sample taking into account the inclusion and exclusion criteria. The minimum intentional sample required was 30 (with no drop-outs), as equal as possible, and always newly involved, i.e., not previously involved within CoME research, to avoid bias

- **Validation with end-users.** “Little focus has been given at this stage on what is important for formal caregivers operationally doing their job. The small number of formal caregivers involved in the project have in the main been interviewed as to what is important for the end-user, but to extend the CoME value proposition, there is a need for alignment with health and social care professionals needs to ensure the platform is adopted.”

As already explained, because of the B2B approach followed in CoME that assumes that health organizations or insurance companies will be the ones paying for CoME service, special attention has been put to the formal caregivers in the last validation of CoME project.

We have increased in more than a 50% the number of formal caregivers involved in this phase with respect to the numbers that were managed in the validation of the first and second prototype. This comes from the fact that, the main value proposition that CoME provides them – MCI Risk Tool, was not expected to be delivered till this final prototype so it was vital to keep them involved and get significant insights on how this tool can support them in their daily decision-taking processes.

Also, as people who really know the operation of health organizations, insurance companies or social services, they are an important source of information when designing the commercialization approach to be followed in CoME since they know which these organizations need and if they were willing to work with a tool like CoME or not. As shown in section 9, most formal caregivers indicated that they would like to work with CoME and that their institutions to which they belong could be interested in acquiring it. Based on these premises, the CoME consortium have seen the opportunity of this platform, creating a detailed exploitation plan that is exposed in D5.3.