



TOILET FOR ME



D2.4

Organisational models and requirements for tertiary end-users

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Abstract

This document is the deliverable D2.4 “Organisational models and requirements for tertiary end-users” of the Toilet4me2 (Study on supporting active living in (semi-) public environments by suitable toilets) project (short also “T4ME2”) within Call 2019 of the AAL Programme.

Tertiary users as primary customers will directly contribute in collecting information on behaviour and attitude of their clients, their usual purchasing and funding processes, product maintenance and service requirements, regulatory and other decision-making aspects. For this deliverable we assessed the organisational framework in different semi-public environment services in cooperation with professionals and managers, policy makers and other relevant stakeholders. The consortium organized local focus groups and informative sessions, where were passed online questionnaires and interviews with 25 relevant stakeholders. As result, co-defined optimal services were defined that may achieve outcomes-based value and efficiency. These results will feed into WP4 for exploitation and business models purposes.

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1 Executive Summary

This deliverable D2.4 Organisational models and requirements for tertiary end-users as described in the DoW "... is an outcome of task 2.3 Organisational models and requirements for tertiary end-users and assesses the organisational framework in different semi-public environment services in cooperation with professionals and managers, policymakers and other relevant stakeholders by organising, e.g. local focus groups, meetings, questionnaires and interviews with relevant stakeholders, to co-define optimal services that may achieve outcomes-based value and efficiency".

As the AAL association suggests, it seems logical to use the Lean Canvas model as a start for the development of the business model. Therefore, it seems necessary to make sure the results of the interviews with tertiary stakeholders contribute to the lean canvas model and the future market strategy.

Lean Canvas				
Designed for:		Designed by:		Date:
Version:				
Problem	Solution	Unique Value Proposition	Unfair Advantage	Customer Segments
Top 3 problems	Top 3 features	Single, clear and compelling message that states why you are different and worth buying	Can't be easily copied or bought	Target Customers
Existing Alternatives	Key Metrics		Channels	Early Adopters
List how these problems are solved today.	Key activities you measure		Path to customers	List the characteristics of your ideal customers.
Cost Structure		Revenue Structure		

Table 1 Lean canvas model

The results reported in this document will feed into WP4 for exploitation and business models purposes. This report presents, firstly, the methodology to select the relevant stakeholders and to collect their perspectives about the system. The report presents the information collected and analysed from the tertiary end-user contributions, and essays to provide a clear picture of how to include the T4ME2 system in tertiary users organisations, as a major market opportunity, so that the system is built taking their needs into account. This user engagement strategy also intends to contribute to the definition of guidelines and recommendations on how to improve practices related to the project's theme.

As the overarching result, this task intends to promote the removal of the barriers that currently prevent such ICT-based solutions from being massively deployed, so that the older adults and all other interested stakeholders can truly make the most of the outputs of the T4ME2 system.

2 Introduction

Tertiary end-users are private or public organisations that are not necessarily in contact with AAL products and services but somehow contribute to organising, paying, or empowering them¹. Tertiary users are the primary customers for the system that will be developed in Toilet for me too and we will therefore be taking their needs into account, as well as any inputs for guidelines and recommendations on how to improve practices.

Therefore, a methodology to select and cluster the stakeholders was essential to ensure the correct ones are engaged and their opinions are correctly valued, and this was thus the primary aim of this section.

Initially, and also based on the previous projects that were T4ME2 predecessors, the partners indicated, through brainstorming, the possible areas to be covered, which resulted in the following table.

Sports venues	Culture, leisure and education buildings and spaces	Municipal and/or Public buildings and spaces	Hospitality, restaurants and shops	Health and Care buildings and spaces	Other businesses and civil society organisations
Stadium	Concert halls	Government office, kiosk, or other government agencies	Hotels	Residential units and retirement homes	NGO and civil society organisations
Pools	Cinemas		Restaurants	Day care and community centres	
Gyms	Music		Cafes	Dentists	
Ski Resorts	Theatres		Shopping malls	Hospitals	
Others	Museums	Notaries	Supermarkets	Private medical clinics	Campsites
	Stadiums and pavilions	Parks and gardens	Shops	Health centres	Funeral homes
	Senior colleges		Grocery Stores		Airports
	Training organisations				Gas stations

Table 2: Toilet for me too stakeholders proposal

After reaching this clustering, the partners started to search about the potential

¹ Active Assisted Living Programme. AAL. Definition of end-users in the AAL Programme. Available at: <http://www.aal-europe.eu/ageing-well-universe/i-am-a-user-2/>

stakeholders in their regions and countries that relate to these areas and might be important for Toilet for me too exploitation. This highlighted the importance of identifying the organizations, considering local and cultural issues.

As determined in the DoW, the collection requirements aim to involve at minimum 20 stakeholders, divided in a balanced manner by the areas described. The representatives of the stakeholders involved in requirement collection needed to be decision makers, to ensure realistic measures for the exploitation.

The next step was to create or adopt a method that would help to establish a hierarchy for the information collected and after a desk research it was decided to use a Power Interest Grid.²

There was a need to identify the stakeholders through their power, influence, and interest in what the project is developing, due to the variety of stakeholders involved. This analysis was essential to propose the organizational models at the end of the evaluation. Therefore, prioritizing the contributions received was a very relevant perspective of this task.

The Power Interest Grid was developed to help with these actors' segregation³. When stakeholders are mapped on a power/interest grid, it is possible to determine who has high or low power to affect the project, and who has a high or low interest. The Power Interest Grid tool is divided by quadrants in a matrix, one side the power and on the other side the interest. It is necessary to identify if the stakeholder/s has/have high or low power and high or low interest. Depending on the place the actor is located, the actions that the project will take will be different⁴. An organization with high power needs to be kept satisfied, so their opinions must be heard and implemented, while stakeholders with high interest need to be kept informed. If the organization has both, it is necessary to manage its expectations very closely.

Taking into account the Power Interest Grid proposed by Mendelow and improved by Mindtools, the project adapted it to better fit its goals. This was then provided to be developed at each location site, to determine the degree of interest and power of each stakeholder and to be able to identify the actions that would follow, to properly manage stakeholder engagement.

² John, Prof & Bryson, John & Humphrey, Hubert. (2004). What to do when stakeholders matter: A guide to stakeholder identification and analysis techniques. Available at: https://www.researchgate.net/publication/228940014_What_to_do_when_stakeholders_matter_A_guide_to_stakeholder_identification_and_analysis_techniques/references

³ MINDTOOLS. Stakeholder Analysis. Available at: https://www.mindtools.com/pages/article/newPPM_07.htm

⁴ Mendelow, A. L., "Environmental Scanning--The Impact of the Stakeholder Concept" (1981). ICIS 1981 Proceedings. Paper 20. <http://aisel.aisnet.org/icis1981/20>



Table 3: Stakeholder analysis

This analysis was important for the first approach of requirements collection, the organisational model that will result from the requirements analysis and, in the future, it will feed into the exploitation strategy and business plan. With this matrix, it is possible to identify and start to understand the most important stakeholders.

For the first approach, the partners from 3 countries identified the following stakeholders and selected their power and interest in the project.

This previous analysis was necessary to develop open questions and to choose the approach to each stakeholder during the requirements collection methodology. The final analysis of the results is set out in chapter 5, in the organizational models.

The methods for stakeholders' selection and requirements collection are described in the following chapters.

3 Requirements collection

The purpose of this chapter is to provide a comprehensive overview of how the project proceeded with the requirements collection with tertiary end-users.

This methodology encompassed the following phases:

- Invitation of stakeholders
- Project presentation
- Video
- Open questions
- Questionnaire

3.1 Invitation of Stakeholders

The partners involved in this task invited the stakeholders to participate in an information session, after selecting them based on the Power Interest Grid. The invitation could be made by email or phone, as the following suggestion e-mail template shows:

Invitation addressed to tertiary stakeholders

Dear Madam, Dear Sir,

We would like to present you the Toilet4me2 project, which is part of the Active Assisted Living Programm (AAL). This is a European programme funding innovation that keeps people connected, healthy, active and happy into older age. Toilet4me2 wants to develop an accessible public toilet that makes it easier for older people and people living with a disability or lived experience of disability to have a more active life, e.g. visiting family, a museum or a shopping centre. The project addresses their needs as well as their carers' when using a toilet outside their homes. We envision a supportive ICT enhanced toilet that adapts to the individual user needs.

(_____ NAME OF THE PARTNER) is participating with nine more partners from various countries, building on the results of two previous projects (iToilet, whose main challenge was to create a smart toilet for older people's homes, and Toilet4me, which assessed the need to adapt the concept to public and semi-public spaces). As a result, Toilet4me2 uses the right technology to develop an accessible and easy to use toilet-system with modern functions like stand-up support, adjustable height, a shower function and several significant enhancements and services like control via voice, automatic recognition of dangerous situations (e.g. a fall), among other things.

This system will improve the quality of life and well-being of older people, people living with a disability, pregnant people, people with obesity problems, people in situations of post-fall or post-surgery. They will become even more autonomous and independent when using public restrooms and public toilets and consequently lead a more active life outside their homes.

Companies, private and public organizations and civil society institutions must collaborate to assess the needs of these potential customers. That is why we invite you to participate in a virtual group information session to hear your opinion on how we can improve our smart toilet and ultimately drive to a greater level of acceptance by the customers and the aforementioned organisations.

We suggest the day X.X.XXX at XhXX, but we can always reschedule at your convenience.

We look forward to hearing from you!

Best regards,

After the guest showed up at the session, the project partner was sending a simple private policy document (specifically designed for this session) and was asking for it to be signed before the information session.

It was not possible to bring stakeholders together in the same room, due to the current COVID-19 pandemic. For this reason, the partners contacted them virtually through video-telephone- or Web-based conference calls or online media. It was suggested that the sessions were done via videoconference, using Zoom or Microsoft Teams platforms.

In the Netherlands, individual face to face sessions with small groups of stakeholders were held. These sessions complied with the current health and safety measures.

3.2 Project presentation

Given the complexity of the topics, partners involved in the task created a video to be presented during the informative sessions, webinar style, where each partner presented the project and the requirements collection proceedings to the stakeholders. The sessions took place in different languages, according to each partner organization.

The script for the information session is as follows:

- First, the host introduces him/herself, says a few words about his/her own organization and overall project objectives.
- Then asks guests to introduce themselves.
- The next step leads to project presentation: what are the objectives, and the system features that are going to be developed. This is when the host presents the fact sheet.
- Finally, the host asks if the participants have any questions about the presentation.

This approach required good moderator skills to ensure that all voices were heard and that no one dominated the conversation. Communicating virtually is also often more difficult since our ability to pick up visual cues is limited⁵. For this reason, the host needed to have internalized all aspects of the system and the project, so that the presentation would run smoothly and be less tiring for participants.

After the query handling, the host started the video presentation, made especially for this session.

The aim of this presentation, besides attracting attention and having a provocative

⁵ Preskill H and Jones N. A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions. January 1, 2009 Publisher: Robert Wood Johnson Foundation Publication: RWJF Evaluation Series. Available at: <https://www.rwjf.org/en/library/research/2009/12/a-practical-guide-for-engaging-stakeholders-in-developing-evalua.html>.

perspective, was to showcase the project's objectives, the expected features, and the added value they could give the stakeholders, if they purchased the product in the future, as well as how the product could increase the economic and social value of the business. After the video was played, it was important to present to the stakeholders some examples of how they could connect to the needs of a family member, a friend, or even themselves (e.g. a pregnant wife who is unable to go to the bathroom; a friend with an obesity problem who does not use public bathrooms; an older relative that needs help going to the bathroom). This could easily be a situation that they have encountered in one of their services.

After the presentation of the project, stakeholders had time to provide their opinion or raise any doubts.

To gather the stakeholders' opinions, it is necessary that they understand the existing framework and the importance of the improvements that this product can bring them. Only then can we influence their business strategies and encourage them to make health-conscious decisions when acquiring new products or adapting their equipment and construction works in the socio-sanitary context. At this moment, the facilitators were able to appeal to stakeholders to realize that there are more issues besides compliance with the law, such as the increase in profits by attracting more public to their spaces; the appeal to the company's social responsibility; citizenship; and the freedom of access to culture for all citizens.

At the end of this meeting, there was time for some open questions. The moderator took note of the answers (for qualitative analysis); after that a link to a questionnaire was sent and the stakeholders were invited to answer it. The meeting was ended only when all stakeholders completed and submitted the questionnaire. The project team members were available to answer any doubt that may have arisen during all the time provided to answer the questionnaire.

3.3 Video

The video was a didactic and interesting way to show the functionalities of the system and worked as a funny teaser to introduce the topic for discussion. It was followed by a presentation of the main characteristics of the Toilet4me2 system and a section with exemplary scenarios of potential gains that stakeholders may have in the future through the purchase of the product.

Here are the video script and its link:

The Toilet For Me Too project will have four pilot sites. Poland, The Netherlands, Romania and Belgium.

How many times did someone not book a room due to the lack of adapted options for their difficulties? Rooms identified for people with disabilities may be discouraging; either for stigmatization; or maybe because a person who only has some specific difficulties, for example, due to ageing, may not want to occupy a room that could actually serve someone who needs it most; or maybe even because a disabled solution does not fit their needs.

If we could have multiple devices featured in an innovative SmartToilet and make it available and advertised in a hotel, people could book these rooms without any kind of constraint.

Cultural spaces should also serve the entire population and be accessible to all.

How about making the culture accessible to everyone without any constraint on

their trip to the bathroom?

It is not just older people who use a SmartToilet. Have we thought enough about the needs of a pregnant woman, of people with obesity, or of someone who suffered a recent fall; what about someone recovering from surgery or with a chronic disease? These people may need support in going to the bathroom and could be more autonomous and be happier outside if they had no restrictions in going to spaces like restaurants, hotels, gyms, stadiums, airports, etc.

The Toilet4me too system has several functions useful in daily living, such as tilt and height systems, auto flush and self-cleaning system, sensors and combined controls like manual and voice activated controls.

Link to the video: <https://www.youtube.com/watch?v=HzRVfIb5ldM&feature=youtu.be>

3.4 Open questions

After the video presentation, the invited stakeholders had a more precise idea about the needs of primary users, the project and the system. Therefore, the host asked an open question directed to the participants.

Depending on the participants' profile, the moderator could choose one of the questions below, which also have direct answers. These open questions could be adapted depending on the stakeholders.

- After this presentation, can you imagine that it's important that systems like T4ME2 are implemented in the interest of people living with a disability and older persons?
- Do you hear comments of your visitors about your current adapted toilet? Do they think that something is missing, or do they have complaints?
- Do you think your adapted toilet can be improved to increase the user experience? If yes, in what way? If no, why?
- Do you find the development of systems like Toilet For Me Too interesting for your business? Yes? No? Please explain.
- Do you currently experience a problem concerning the adapted toilet? Do you miss anything, wish for an improvement, have complaints about the current situation, etc.?
- How do you currently solve this problem? In what way could a T4ME2 system be a solution to your organisation?
- Do you think that you could increase your number of customers or increase the diversity in your groups of clients, if you invest in a product like this?
- Are you willing to spend extra money on the short term or long term on a system like T4ME2? Please tell us why, regardless of the answer. What is the budget/how much would you spend?
- In what conditions are you willing to invest in an adapted toilet for more than the requested minimum parameters?
- What investment are you willing to make - maximum - for the improvement of the accessibility of the adapted toilet?

The moderator took notes about these answers.

3.5 Questionnaire/ Survey

The questions were thought considering our proposed scope and the problems that we needed to solve. The one-time questionnaire was an efficient, low-cost approach to getting information from a broad range of stakeholders. Clarity and precision in the asked questions is critical to obtain useful feedback from a questionnaire. A strong understanding among respondents of the programme or initiative being evaluated was also helpful to ensure useful results⁶.

The main aim of this collection is to retrieve information on: behaviour and attitudes of the stakeholder's clients, the stakeholder's purchasing and funding procedures, product maintenance and service requirements, regulatory and other decision-making.

Link of the questionnaire:

<https://ec.europa.eu/eusurvey/runner/T4ME2Questionnaire3aryend-users>

⁶ Preskill H and Jones N. A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions. January 1, 2009 Publisher: Robert Wood Johnson Foundation Publication: RWJF Evaluation Series. Available at: <https://www.rwjf.org/en/library/research/2009/12/a-practical-guide-for-engaging-stakeholders-in-developing-evalua.html>

Toilet4me2 - Requirements for tertiary end-users

This questionnaire was developed to identify the tertiary user requirements necessary to develop a new toilet system. Toilet for me too provides supportive, autonomy-promoting, smart toilet solutions for living-well. It addresses ageing people and persons of all ages with impairments/disabilities (as well as their (in) formal caregivers) and their needs when using a toilet outside their home, in public or semi-public environments. For this reason, your opinion and contribution are very important. The questionnaire will be analysed by professionals and the extracted results will be considered as a basis for the system improvements.

Thank you very much for your participation!

Section 1: Firstly, please, let us know more about your organization and toilet facilities.

1. Organization / Institution name

2. What is the area of your organization/institution?

Sports Venue

Culture, Leisure, or Education buildings and spaces

Municipal and/or Public buildings and spaces

government agencies
notaries
parks and gardens
other

Hospitality industry

hotel
restaurant or café
shopping centre
supermarket
other

Health and Care buildings and spaces

retirement homes
day care centres
dentists
private medical clinics
health centres
other

Other business and civil society organisation

civil society organization
NGO
grocery stores
campsites
funeral homes
airports
gas stations
Parish councils
other

other, please specify:

3. Is your area part of the silver economy? (Silver economy is the system of production, distribution and consumption of goods and services aimed at using the purchasing potential of older and ageing people and satisfying their consumption, living and health needs.)

- Yes
- No
- Not yet
- I am not sure what the silver economy is

4. Do you have an accessible toilet in your facility/location?

- Yes
- No

5. What do you currently offer in terms of adjustments aimed at facilitating your customer's toilet visit (accessible/adapted)?

- Only regular toilets
- Toilet rail or wall bracket
- Smart and supportive toilet
- Self-cleaning toilet
- Automatic bathroom lock and light
- An integrated bidet (shower) function
- Toilet Lift system
- Alarm button
- Bathroom for people living with a disability

Other, namely:

6. Do your customers use the accessible toilet?

- Yes
- No
- I don't know

7. How do your customers rate the toilet?

- High value
- Neutral value
- Low value

8. Do you face any challenges with the currently accessible toilet?

- Yes
- No

9. If the answer is yes, do you think the accessible toilet needs improvement or change?

- Yes
- No
- I don't know

Please describe this improvement or change:

10. What can a smart, supportive toilet with modern functions such as a shower-WC, height and tilt lift bring to your organisation?

- more customers
- more revenue
- customer satisfaction
- PR
- it is my duty to contribute to an inclusive society
- Other

other, please specify:

11. Is an extra investment in accessible sanitary facilities a priority in your area?

- Yes on short term
- Yes, in the long term
- No, there is no investment allocated to the change of sanitary facilities
- There is an investment allocated to changing the sanitary facilities, but this does not take into consideration adapted and accessible facilities
- I don't know

12. Do you currently have any adjustments **planned** that will facilitate your clients' toilet visits? If the answer is yes, please check the box next to the adjustment:

- extra room
- support grips
- height adjustable
- shower -WC function (with dryer)
- Other
- No, I don't have any

13. Who decides on investment in adapted sanitary facilities in your organization?

- I do
- My boss
- The unit/department dedicated to investments and infrastructure
- The public service
- I don't know/It's not clear
- Other

Other, please specify:

14. Are you willing to allocate budget to an accessible toilet that exceeds the minimal requirements (a smart, supportive toilet)?

- No, never

- Yes, only within regulation
- Yes, when I am certain the return on investment is enough
- Yes, when I am certain the lives of my customers will be improved by it

Section 2: Please, help us design a product that fits your necessities and your customers' needs

15. Imagine that you could design an ideally accessible toilet for your company, can you indicate for each element how important it is to be able to adapt/modify it?

	Essential	Important	Not so important but handy to have	Not at all important
Arm support: Support next to the toilet. Removable for wheelchair user. Wide enough for bariatric users.				
Safety grab bar: Grab bars on the wall to help stand up when using the toilet				
Height Lift (vertical): Vertical adjustment of toiletseat which makes both stand-up and bowel movement easier.				
Tilt lift (diagonal): Stand-up function that helps sitting down on the toilet and standing up from the toilet.				
Shower WC: Bidet function that provides a (warm) spray of cleansing water from a nozzle underneath the toilet seat followed by a (warm) air dryer.				
Remote control: To start bidet function, move up and down. Buttons adapted for older user				
Voice control: Voice controlled by giving commands.				
Personalized setting: The smart toilet adjusts to your preferred setting: height, tilt.				
Emergency detection: Smart 3D sensor which then can sense an emergency (like falling) and send an alarm to the call system in order to receive quick help.				
Alarm system: Emergency button, call system				

16. Are there any functions or possible adjustments that we might have missed in the list above? Please comment:

17. Do you have any other ideas or suggestions for the smart toilet? Please comment:

Thank you for answering these questions. Your input will help us to design smart ToileForMe!

4 Questionnaire answers analysis

The purpose of this chapter is to provide a comprehensive overview of the results of the questionnaire, which fed the Power Interested Grid and helped us retrieve the tertiary end-users' requirements.

4.1 Open questions answers

After the teaser video viewing, stakeholders had the opportunity to express their first impressions by answering open questions. Most tertiary users consider it important to provide a pleasant experience when visiting a city or its establishments and for this reason they consider that a smart and adapted toilet should be a factor to consider.

Increase of customers

Most of the stakeholders interviewed think that a smart, adapted and affordable toilet could increase their number of customers (pay toilets). The cities think they that could be more appealing.

In the case of support devices for older persons, there is no sign of an increase in customers because people resort to them for another number of reasons. However, they can improve the user experience. If accessible toilets are in the public eye, they can bring in customers who look for them for this reason. They would consider investing in a system like Toilet4meToo because of its role in restoring the users' independence and dignity. This is the main reason cited by these entities. Although it may not bring in new customers, human resource costs would be reduced, considering that they would not have to allocate resources to accompany people to the toilet, also saving time. A system like this should bring a demonstrable increase in well-being for the user and the caregiver. And it should bring a return on investment: decrease in time spent on care.

The entities in the hotel sector do not consider that a smart toilet system would bring more customers, considering that people do not have these types of devices in their homes and therefore would not miss them.

The tertiary users also think that they could attract the attention of the media, affirming their position in the market through these accessible bathrooms. Municipalities also think that they could claim the title of more accessible city, turning the city more attractive to their visitors. In the case of the semi-public space, it can attract more customers and increase revenues, standing out from its competitors.

Some of the stakeholders point out that day care centres, nursing homes and health facilities are the main target audience.

Investment

Regarding the investment in accessible toilets, most opinions are divided, although most of them find the concept interesting, the high costs can prevent an investment from being made. The fact that there is no change in the legislation on toilets for people with disabilities can also lead to entities that only comply with the requirements of the law for this type of toilets. In the case of public toilets, there is no possibility of making a large investment, considering that the return is also low, taking into account the low value that people pay to use these public toilets, with the added problem of maintenance.

Supporting entities for older citizens would invest if the relevance, need and return on investment were proven. However, they state that the lower the price, the greater the chance of implementation. They also mention the importance of innovation as a reason to invest and that should bring a demonstrable increase in well-being for the user and caregiver. The

decrease in time spent on care and the greater availability of human resources are also an asset.

The municipalities are willing to invest because they want an accessible city and are investing in adapted toilets in public and semi-public spaces. However, in these cases, they encounter barriers such as historical buildings where they have to maintain the existing design. In the case of sports venues, they think they could increase the number of customers through accessibility. They consider that changes must be made in small steps or in opportunities such as the construction of swimming pools, municipal buildings, hotels.

Regarding the available budget, investment in public spaces and government buildings depends on business plans and government plans. For the semi-public space, the costs should not be high because they have lower budgets. The return on investment is also mentioned by the stakeholders. As a solution, they point out that there must be additional financing to sustain changes to existing toilets or to build new ones. In this way, further improvement of the toilets (beyond compliance with laws) can be granted. It is a common agreement that it must start from a governmental measure.

Cost-effectiveness is extremely important for stakeholders, however they consider that awareness is also important: making people aware that they are entitled to use adapted and intelligent sanitary facilities. One of the stakeholders believes that a good argument for investing is to know the opinion of older persons through the study of Toilet for me Too to understand their real needs.

The Toilet for me too system maintenance costs and the repairs (time and costs) are also a concern of the stakeholders. Considering the limited number of adapted toilets, the repair needs to be done very quickly. Also, reliability is important in this. The system must work in the interest of the primary end-user.

Improve accessibility

Based on the stakeholders' general opinions we may conclude, that at this moment there is a lack of public accessible toilets in most cities and public spaces. Two of the municipalities reported that to overcome the lack of adapted bathrooms, there is an incentive for semi-public spaces to open their adapted bathrooms to the public during their opening hours. This is a financial incentive that is given to hotels and restaurants. Once the incentive has reached the end, these companies maintain this policy because they do not feel any constraint with the use of their bathrooms and end up increasing their revenues. According to the participants, there is a widely used app that provides an overview of the toilets available. The government's imposition on businessmen to open their toilets (e.g. stores, hotels, restaurants), was one of the stakeholders' proposals to fill the scarce offer of adapted bathrooms.

One of the municipalities wants to make the city as accessible as possible for everyone and therefore aims to have a bathroom available every 500 meters, at most 5 minutes away. It also considers that easy access and accessible quality toilets are of concern to them. Municipalities are already doing well-founded work to increase public toilets and according to their previous research, they realize that the target audience is not only people living with a disability, but also older people, people who have had accidents and people with children, for example. It was also mentioned that even in the hospital there are young people who need adapted bathrooms and that this is a real need, so the focus should not only be on older citizens as well as these citizens. Stakeholders conclude that people living with a disability or one of the aforementioned conditions cannot continue to use standard toilets.

At the moment, there is limited supply of adapted bathrooms available to the public, as the

interviews with stakeholders confirm. Moreover, vandalism is said to be the current main concern regarding standalone accessible toilets for people with disabilities. The doors must be closed at all times, which forces somebody to be there to open the door whenever necessary. In the case of public or semi-public bathrooms, cleanliness is also an extremely important factor. Cleaning between each toilet use is mentioned as being an extremely important factor to provide a good, hygienic and safe experience.

In the case of stakeholders whose audience is older people, this type of system could help the latter restore their independence and humanity and reduce the time needed to provide them assistance when using the toilet. Older people, as a general rule, may also be recovering from illness or surgery and a shower-toilet and elevator system can foster peoples' autonomy when using the toilet.

The main advantages pointed out by respondents for a system like Toilet4meToo are the ease with which a person can use a bathroom independently, without the need for support or assistance and allowing the bathroom to be clean.

Design

It is important to know the difference in value between a standard toilet and an intelligent toilet. These must be indicated to customers before construction, according to those who plan buildings or work in construction.

The stakeholders believe that the system must have an appealing design, so as not to resemble a hospital and that it should be as similar as possible to a non-adapted toilet. The solution must be visually appealing and interesting. The design must not be stigmatizing and the system must be intuitive. People with dementia have also been identified as potential users and therefore they must also be able to use the system. Stakeholders also mentioned the need to adapt the toilets to the blind and people with low vision, as they often use bathrooms for people with disabilities. The changes can come in appropriate colour contrast and symbols in Braille. This is also a way of thinking about accessibility in a more comprehensive way and thus increasing the target audience of the Toilet4meToo system.

They ended with some suggestions, such as the integration of the remote-control system and the serious need for product validation, which is considered very important by the stakeholders.

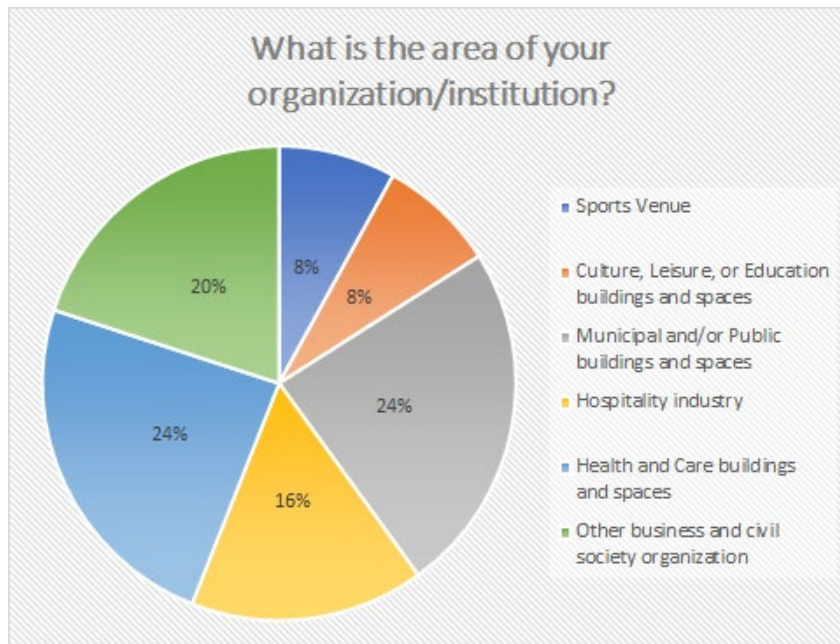
Spatial flexibility was also considered, with the possibility of adapting to different interiors and a range of possible solutions.

4.2 Online questionnaire results

The Toilet for me too - requirements for tertiary end-users' questionnaire was created using the EU survey 7 platform. The stakeholders were asked to fill it in during the information sessions. There is a total of 25 respondents and the questions and results are presented below.

Firstly, it was necessary to know what is the area of the organization/institution that was answering the questionnaire. This answer was key to the power interested grid analysis.

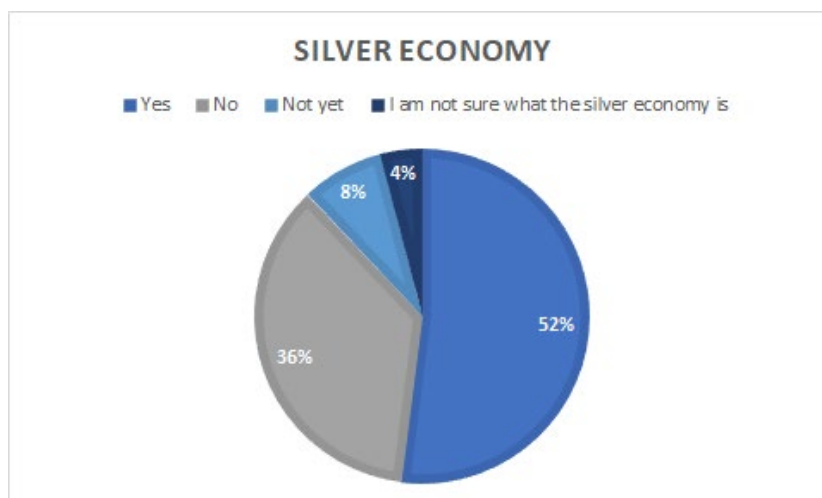
⁷ <https://ec.europa.eu/eusurvey/>



Graphic 1: respondents' field of expertise

The sports venue and culture fields were each represented by 8% of respondents. 16% of respondents worked in the hospitality industry. 20% of respondents were part of other business and civil society organization. Public buildings and municipalities together with health care buildings was the majority of the people polled with 24% each. We can conclude that the goal set in table 2 was achieved, as all stakeholders were represented in the sessions.

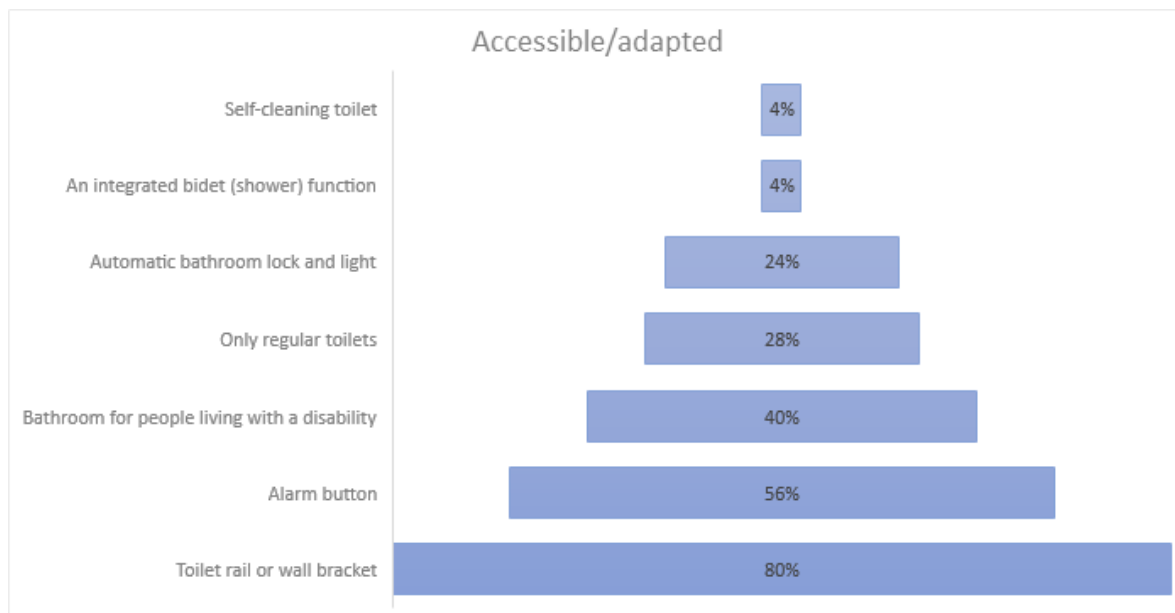
To start the questionnaire, we posed a question about silver economy. We explained that silver economy is the system of production, distribution and consumption of goods and services aimed at using the purchasing potential of older and ageing people and satisfying their consumption, living and health needs. The consortium believes it is interesting to know the importance attached by the stakeholders to this area. Most stakeholders knew the concept and their business was in this field.



Graphic 2: Silver economy

Next, we asked stakeholders if they had an accessible toilet in their facility/location. And the vast majority answered yes, only 8% of respondents don't have an accessible toilet.

In terms of accessible/adapted equipments, systems and features offered to facilitate the customer's visit, the respondents answered with the following ratio (some respondents answered with two or more options in this question):

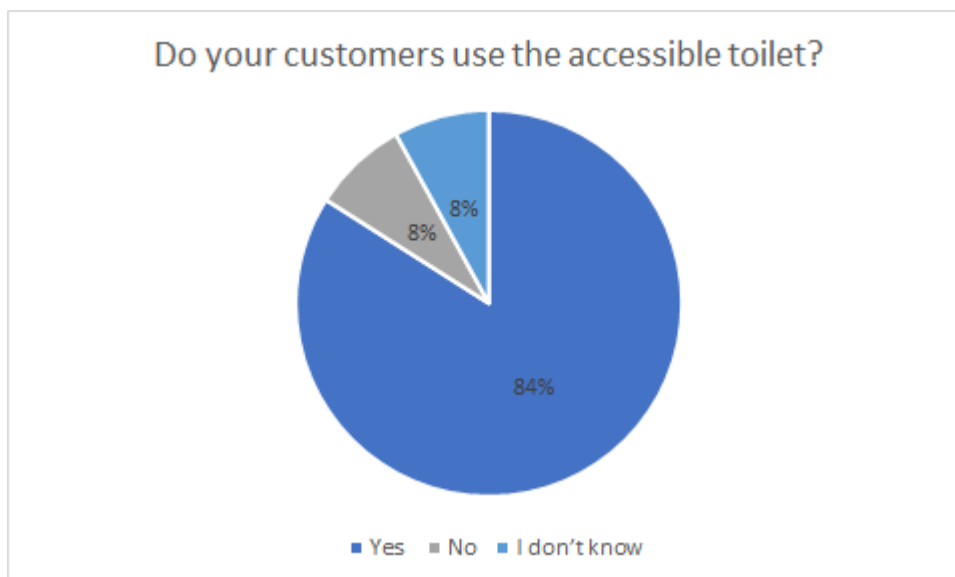


Graphic 3: Accessible/adapted toilets offered

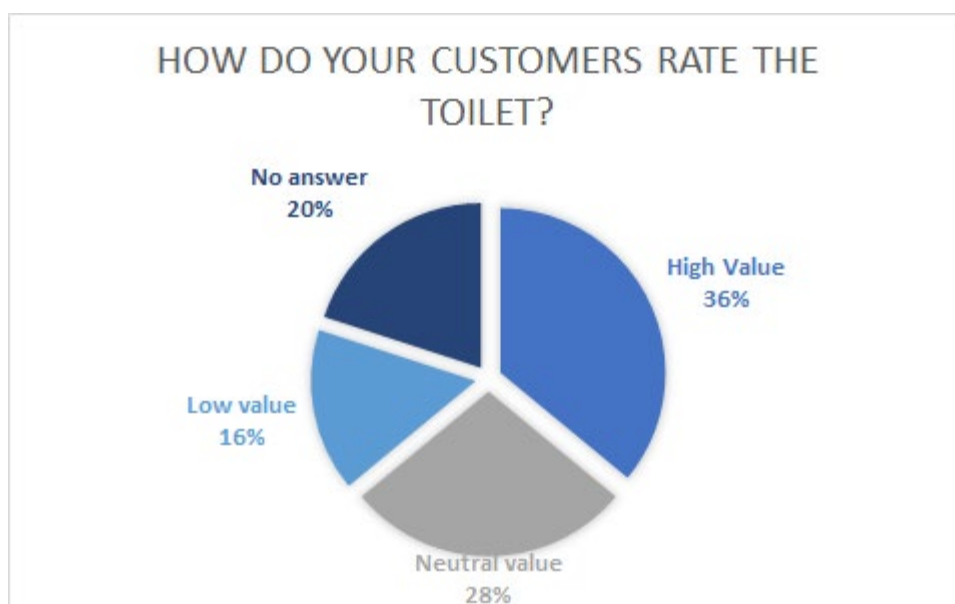
None of the respondents offer smart and supportive toilet and a toilet lift system. They currently offer the following:

- Adjusted height of fittings and buttons - 1 stakeholder answered that
- Braille signs, customized elements - toilet bowl, washbasin, customized accessories - mirror, tap - 1 stakeholder answered that
- toilet frame, wider doors, sliding doors via foot control, sometimes toilet height- 1 stakeholder answered that
- Lifted toilet seat - 1 stakeholder answered that

The consortium decided to ask about consumer's feedback. 8% of respondents don't know if the consumers use the accessible toilet. 20% of the people polled did not answer the question about how customers rate the toilet. However, 84% do confirm that customers use the accessible toilet and 36% state that consumers find the toilet to be of high value.



Graphic 4: The customers usability of accessible toilets



Graphic 5: Customers rate

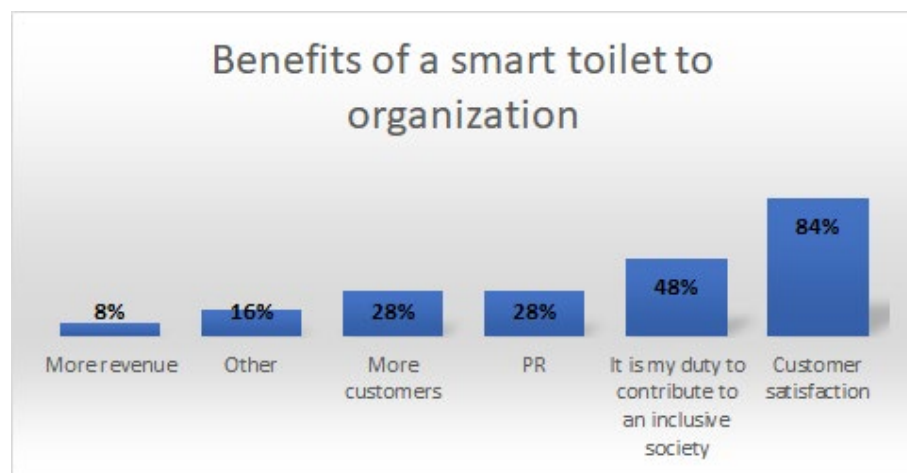
Most stakeholders (60%) have problems/challenges in terms of accessible toilets and 56% said they need improvements or changes. In such cases, they mentioned what improvements can be made:

- Automatic door, enabling free entry of a person moving in a wheelchair
- Accessible from inside, better make accessible from the outside
- Nicely designed equipment in the adapted toilets
- More toilet units in the park and the facilities,
- Adapt rooms in historic buildings to the functions of toilets for the disabled, minimalism architectural barriers related to overcoming level differences

Toilet4me2 – supporting active living in (semi-) public environments by suitable toilets

- More space to comfortably use the wheelchair, toilet seat should be lifted up and down
- More, and broader use for more sorts of handicaps
- More inclusive for different types of disability
- More uniform across points of contact.
- More extensive and more hygienic.
- A broad sense of accessibility
- A stand for a cane, ball.
- More funds to invest.

What can a smart, supportive toilet with modern functions such as a shower-WC, height and tilt lift bring to the organisation? The majority of stakeholders (84%) believe that it will improve customer satisfaction. 4% of stakeholders did not answer this question (some respondents picked two or more options in this question).



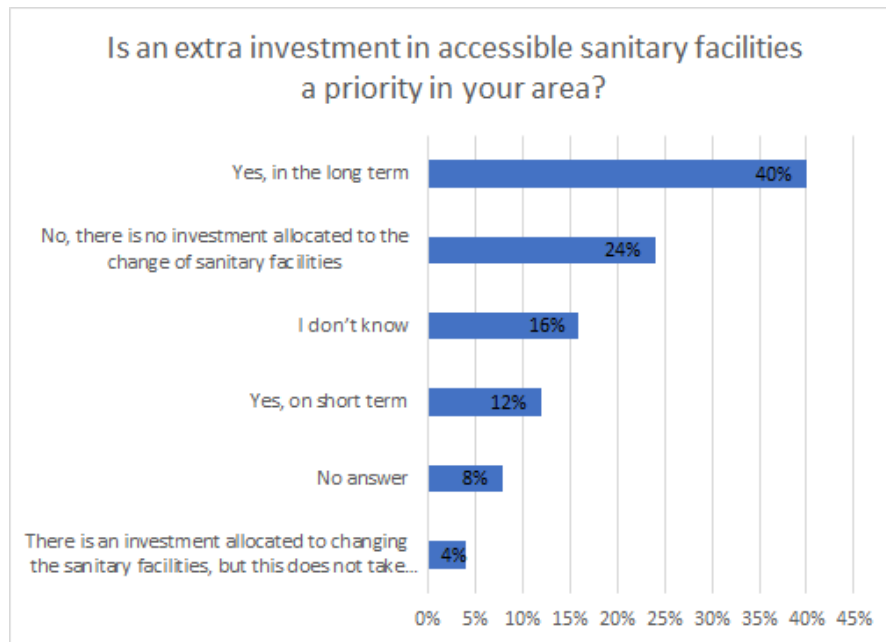
Graphic 6: Benefits of a smart toilet to organization

The stakeholders suggested other gains:

- Guests opinion and satisfaction.
- Self-support.
- Greater and better-quality access to culture, expanding audience groups.
- Improvement in personal health and well-being
- Better hygienic conditions if the toilet is self-cleaning.
- It's good that a company has social purpose. Contributing to an inclusive society is therefore certainly the intention. There are several ways to do that. This project can certainly be considered.

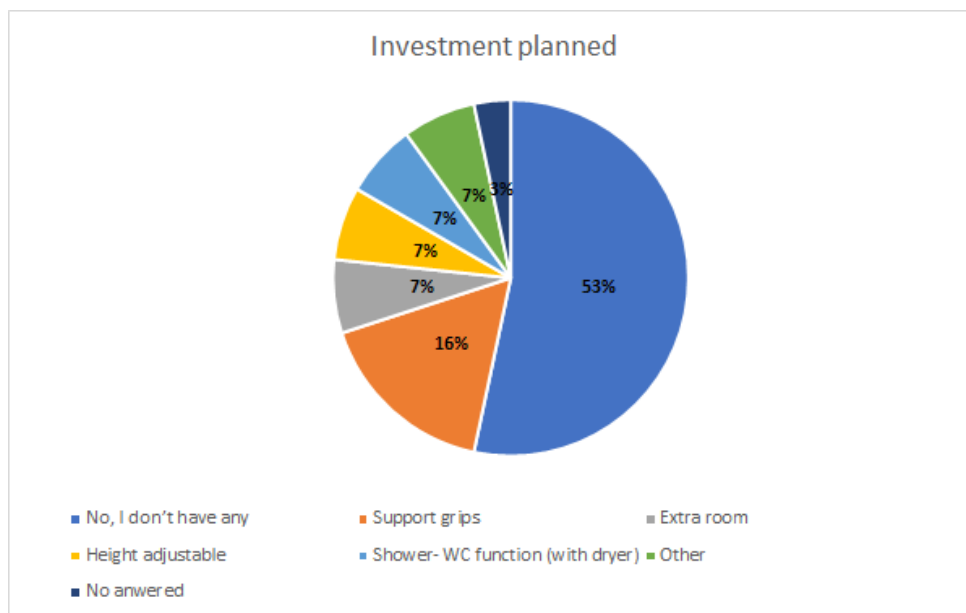
The last questions of this first session were about investment. 40% of stakeholders intend to invest in accessible sanitary in the distant future, with only 12% willing to invest in in the near future. 24% of the people polled do not have investment allocated for this category. 4% of respondents have investment allocated to the toilet but this does not consider accessible facilities. 24% of respondents do not know how to answer or did not respond. One of the respondents picked two answers here, stating that he/she will invest both in short and long

term.



Graphic 7: Investment in accessible toilets

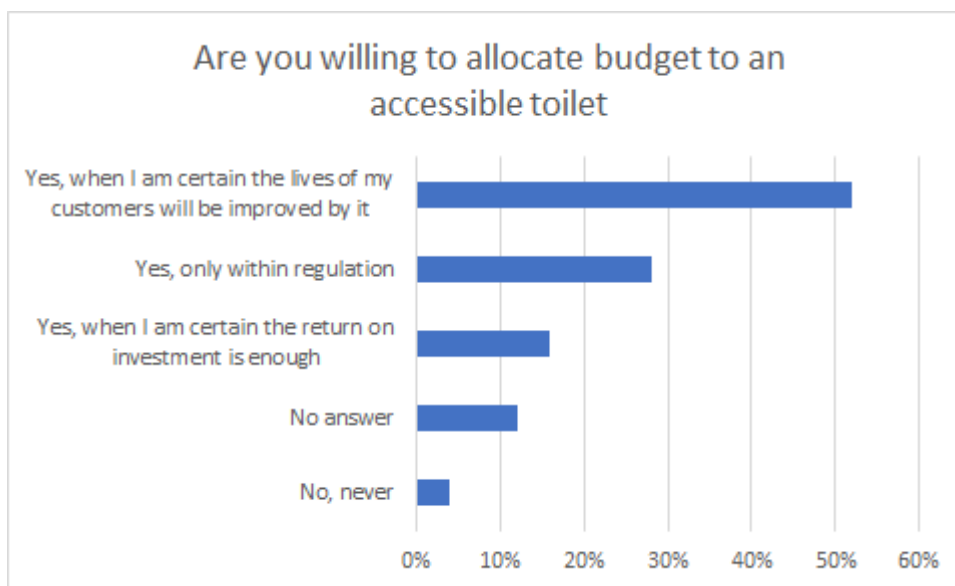
It was also important to find out about what was planned regarding investment and upcoming changes in the toilets. 53% have nothing planned in terms of investment and 16% will invest in support grids.



Graphic 8: Investment planned

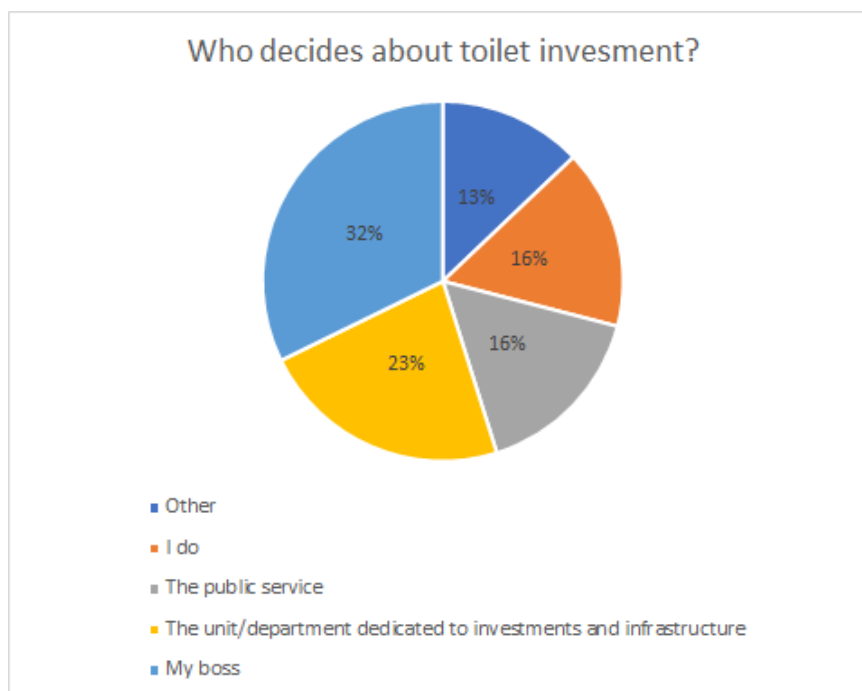
When asked about if they were willing to allocate a budget to an accessible toilet that goes beyond the minimal requirements (e.g. a smart, supportive toilet), 16% of respondents were not interested or were not sure about this. 16% were interested, if the return on investment is enough. 28% say they would do it only to comply with the law. However, it is important to highlight that the majority of respondents was interested in this investment, because their

customers' quality of life would be improved. Some stakeholders picked two answers in this question.



Graphic 9: Budget allocate to accessible toilet

Finally, who decides on investment in adapted sanitary facilities in the stakeholders' organization? In some cases, the respondents chose two options:



Graphic 10: Toilet investment decision

Other:

- Development team
- The construction of the toilet depends on the available funds as well as on obtaining

Toilet4me2 – supporting active living in (semi-) public environments by suitable toilets

approval of the project

- City council
- The owner of the building
- Management Board of the company (limited liability company)

Section 2 of the questionnaires was meant to create a joint design of toilets. This way we can provide for the stakeholders. The results are described below:

Imagine that you could design the most perfect state-of-the-art accessible toilet for your customers, visitors or clients, can you indicate for each functionality how important it is to be able to adapt/modify it?

Function	Description	Essential	Important	Not so important but handy to have	Not at all important
Arm support	Support next to the toilet. Removable for wheelchair user. Wide enough for bariatric users	64%	20%	8%	0%
Safety grab bar	Grab bars on the wall to provide assistance when using the toilet for standing up	68%	20%	4%	0%
Height (vertical) Lift	Vertical adjustment of toilet seat which makes both stand-up and bowel movement easier	24%	40%	24%	4%
Tilt (diagonal) lift	Stand-up function that helps sitting down on the toilet and standing up from the toilet	20%	36%	28%	8%
Shower WC	Bidet function that provides a (warm) spray of cleansing water from a nozzle underneath the toilet seat followed by a (warm) air dryer	24%	52%	44%	4%
Remote control	To start bidet function, move up and down. Buttons adapted for older user	12%	24%	36%	16%
Voice control	Voice controlled by giving commands	12%	16%	32%	28%
Personalized setting	The smart toilet adjusts to your	8%	20%	16%	36%

Emergency detection	preferred setting: height, tilt				
	Smart 3D sensor which can sense an emergency (like falling) and send an alarm to the call system in order to receive quick help	44%	36%	8%	4%
Alarm system	Emergency button, call system	64%	16%	8%	4%
Automatic light and door lock	The light is switched on automatically and the door is locked automatically	16%	48%	28%	0%
Clean	1. Self cleaning seat 2. Air quality 3. Auto-flush: The toilet flushes automatically after use	28%	48%	12%	4%
Beautiful/ Nice design	The look and feel of the toilet, how it is designed	32%	44%	12%	4%

Are there any functions or possible adjustments that we might have missed in the list above? Please comment:

- In public spaces, with intensive use of the toilet, remote control or automatic saving of settings or preferences will not fulfil its role, it is only useful if you have such a toilet at home or for longer stays away from home
- The door automatically unlocked by activating an alarm system
- Choice of colours and forms of a toilet
- Some solutions for children
- It is important to ensure that the toilet is serviced if it differs from the technical standard of traditional solutions
- The right size of the toilet room is essential for people using a wheelchair
- Height changing sink
- Height changing of tilting mirror
- Better facilities for bowel diseases (IBD) and incontinence i.e. disposal, cleaning, medical. Blind visitors. In short: more inclusive of all disabilities
- Music, nice odour
- The ideal is the implementation of all adaptations/aids/preconditions - however, it is currently difficult to indicate which adaptations make the difference for which users to be able to use a toilet independently or not - this will require a survey/research
- we will mainly base ourselves on what appears to be important for users in different

target groups from surveys and scientific research

- Selection of colours so that the walls do not blend in with the floor, for example
- Clarification of equipment parameters
- Simple and quick technical service in the event of a toilet failure
- Handles for crutches or sticks within easy reach, space for a walker

Do you have any other ideas or suggestions for the smart toilet? Please comment:

- With frequent use by more than one person, it is important whether the toilet would require frequent repairs and intervention by service or maintenance. An ideal toilet is one that allows people with disabilities to feel free. Older people are frightened by the excess of technology that they assume they will not cope with. Older people are overwhelmed by it and instead of enjoying it, they can quickly become alienated from the device
- It should be affordable
- The possibility of adapting the visual and aesthetic sphere to various types of interiors, including historic interiors, the greatest possible minimization of products, ease of service and maintenance, vandal resistance
- Service and maintenance support
- Medical checks urine and faeces, weight, blood pressure etc.
- Enough light. Maybe nice light conditions, to make yourself relaxed and comfortable at the toilet
- attention to (technical) reliability and (technical) after-care of the toilet. A defective adapted toilet is a major problem as there are often not many in one location and users rely on it
- Contrasting colours so that the devices are clearly visible, also colours/mats on the floor, in the shower tray, etc., so as not to create the impression of a gap.
- Shower seat
- Reliability and high-quality materials, as well as impact and pressure resistance, are very important
- Increasing functionality in small, limited space conditions

5 Organisational models

Tertiary users represent potential primary customers of the Toiletforme system, this is why they were involved in these requirements collections. This chapter aims to organize their feedback and views with regard to their organisational framework, interest and power in upcoming project results. This results stem from Section 2 of the questionnaire, which targeted a co-design process.

A new analysis of the stakeholders' power and interest was made after the sessions took place to confirm whether all the points initially described coincide with their views and responses.

After the questionnaire, we needed to update our perspective on the roles, powers, and interests of stakeholders. In some cases, we ended up realizing that stakeholders whom we thought had a lot of interest or too much power, did not actually have it. Thus, a brand-new analysis was made, factoring in the final questions of section 1 of the questionnaire, especially the investment allocation and whether they intend to invest in accessible toilets in the near or distant future. These results are present in table 6.

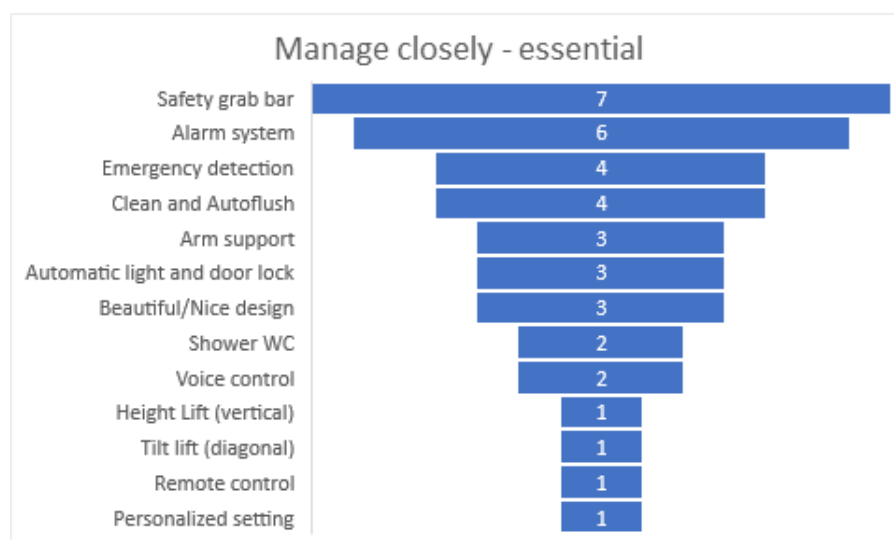
Then, each stakeholder' answer was evaluated, according to the result of the power interested grid. Only answers from section 2 of the questionnaire were considered (what are the features that tertiary users would most appreciate in a smart toilet).

As mentioned before, stakeholders with high power need to be kept satisfied, while stakeholders with high interest need to be kept informed. When a stakeholder has both, make sure you manage his or her expectations very closely. Depending on their classification, a different approach to their answers should be considered.

High power – High interest: manage closely.

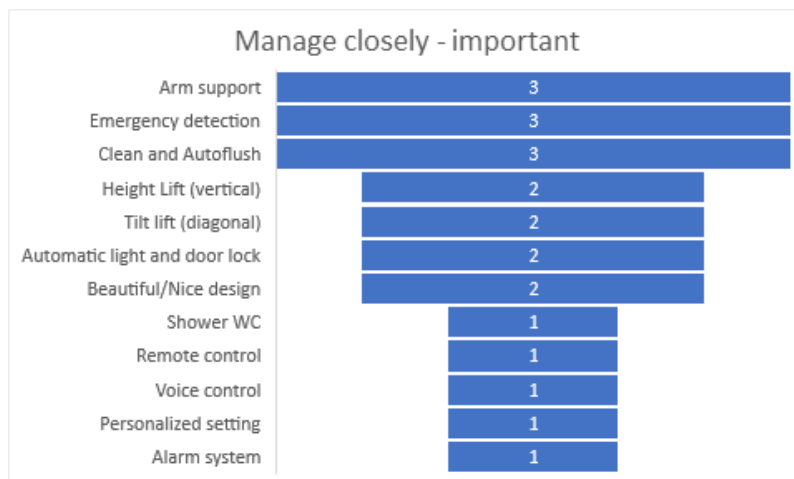
These stakeholders are likely to be decision makers and have the biggest impact on the project success. The consortium needs to keep these stakeholders close, to manage their expectations.

In this sense, statistically, these stakeholders considered essential the following elements:



Graphic 11: manage closely - essential

These same stakeholders considered important the following elements:



Graphic 12: manage closely - important

Therefore, for these stakeholders, a safety grab bar, alarm system, clean and auto-flush, automatic light and door lock play a vital role in the success of an accessible toilet.

Some of the respondents of this group even gave some suggestions, such as:

- Additional to the design it will be interesting to choose colours and forms of a toilet. The possibility of adapting the visual and aesthetic sphere to various types of interiors, including historic interiors, the greatest possible minimization of products, ease of service and maintenance, vandal resistance.
- The system could have some solutions for children. And, for sure, should be affordable.

High power – Low Interest: hear their opinions and implement them.

These stakeholders need to be kept in the loop with what is happening on the project. Even though they may not be interested in the outcome, they yield power. This type of stakeholders should be dealt with cautiously because they could use their power in a negative way if they become unsatisfied.

The consortium identified only one stakeholder with this characteristic.

In this way, this tertiary end user considers essential the following elements:

- Arm support: Support next to the toilet. Removable for wheelchair user. Wide enough for bariatric users.
- Height Lift (vertical): Vertical adjustment of toilet seat which makes both stand-up and bowel movement easier
- Shower WC: Bidet function that provides a (warm) spray of cleansing water from a nozzle underneath the toilet seat followed by a (warm) air dryer.
- Remote control: To start bidet function, move up and down. Buttons adapted for older user
- Alarm system: Emergency button, call system.
- Clean: 1. Self cleaning seat 2. Air quality 3. Auto-flush: The toilet flushes automatically after use.

And considers important the following elements:

Toilet4me2 – supporting active living in (semi-) public environments by suitable toilets

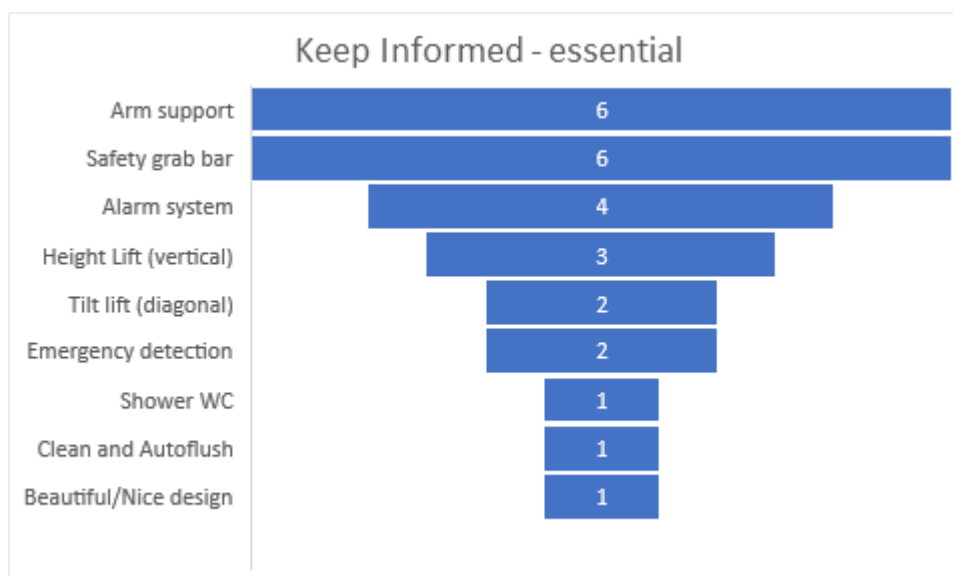
- Personalized setting: The smart toilet adjusts to your preferred setting: height, tilt.
- Emergency detection: Smart 3D sensor which then can sense an emergency (like falling) and send an alarm to the call system in order to receive quick help.
- Automatic light and door lock: The light is switched on automatically and the door is locked automatically.
- Beautiful/Nice design: The look and feel of the toilet, how it is designed.

Additional comments stated that it would be interesting if the toilet has music and a nice odour. And a nice light condition, to make the user relaxed and comfortable at the toilet.

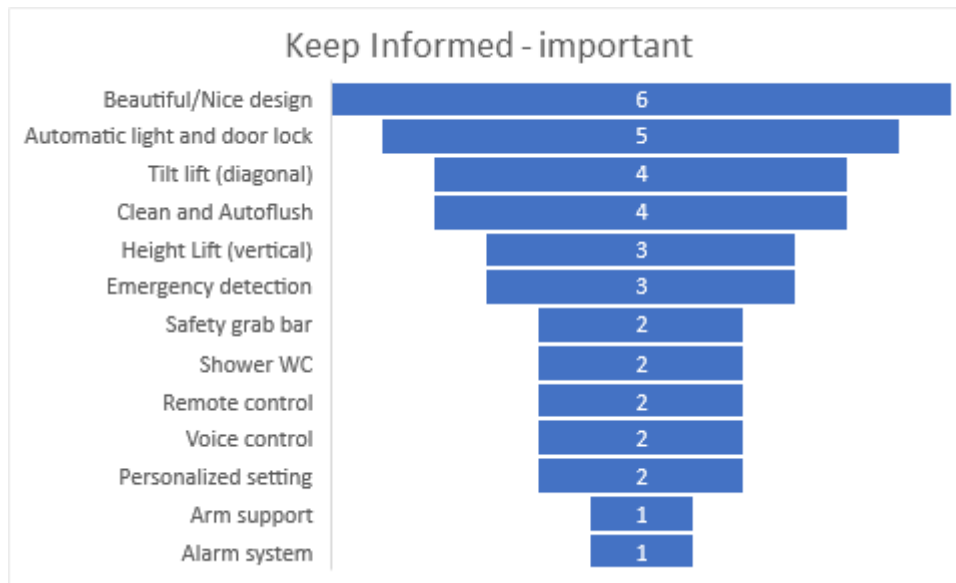
At this point, alarm system and clean and auto-flush features are the ones coinciding with the first group of stakeholders' views.

- **Low power and high interest: keep informed about what the project decided**

In these cases, the results are paradigmatic. It is clearly perceived what stakeholders understand as essential: arm support, safety grab bar and alarm system. And what they understand as important beautiful/nice design, automatic light and door lock, tilt lift (diagonal) and clean and auto flush. The results are presented in a graphic below.



Graphic 13: keep informed - essential



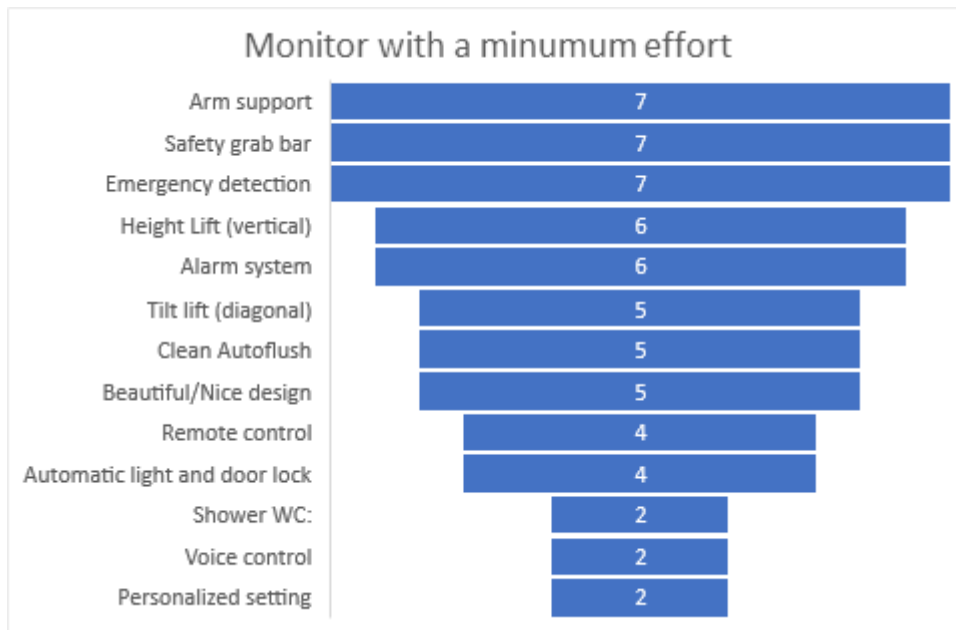
Graphic 14: keep informed - important

These stakeholders also made comments and suggestions such as:

- The devices should have contrasting colours to be clearly visible, also colours / mats on the floor, in the shower tray, so as not to create the impression of a gap.
- The device should have a shower seat
- Attention to (technical) reliability and (technical) after-care of the toilet. A defective adapted toilet is a major problem as there are often not many in one location and users rely on it.
- **Low power and low interest: monitor with a minimum effort.**

Finally, some stakeholders were considered with little power and little interest. In such cases, there is a need to monitor their opinions with minimum effort. For sure, they are valid and should be considered, but the consortium should not spend time and energy with excessive communication.

Below, a compilation of the results was made with these stakeholders' views on what is deemed essential and important. These results go in the same direction as the other cases.



Graphic 15: monitor with a minimum effort.

In resume the power interested grid, regarding the functionalities should be:

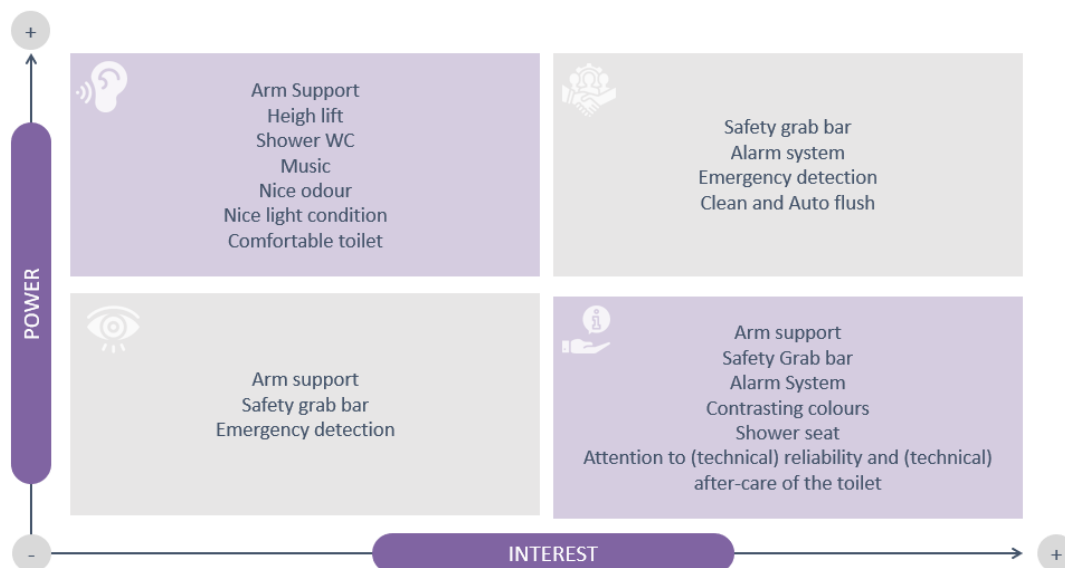


Table 4: Power interested grid - functionalities.

6 Conclusion

To conclude this task, the involved partners summarised their findings, which is very important to complete the analysis of stakeholders' requirements.

The **Belgium** partners explained that all the stakeholders that took part in their sessions found accessibility extremely important, especially those who are in direct contact with the

users. The informative sessions in groups were interesting because many partners could find inspiration from each other's stories. The reactions were honest and sincere. In general, the stakeholders were very enthusiastic about the test opportunity of a smart toilet. However, the stakeholders also indicated that the accessibility of toilets is not an obvious investment. A big difference between the private market and the public environment is noticed. In Flanders, there is still a lot of work to be done in the field of accessible toilets. *"The private market is seen as individuals who make their own care environment accessible. While the public environment is seen as outsiders making adjustments for those in need of care in semi-public and public spaces."* (quote from an interview with a Belgian stakeholder).

In **Poland** the partners were very surprised with the answers and with the statements "the price is not that big of a problem", technical, functional, and aesthetic issues are key. Policy-makers quite willingly decided to participate in the survey and online meeting, although this was much more the case with representatives of the public sector than the private one. The atmosphere during the session was very pleasant, the discussion involved even people who were sceptical at the beginning of the meeting. Responses were honest and specific, although issues related to finances and purchasing decisions caused the most problems.

Stakeholders from The **Netherlands** believe the project is very interesting and they are very aware of the chances of health technology and, in particular, T4ME2. For all partners return on investment was very important. Only, the care sector and local governments are thinking about implementing such technologies in the near future. Other parties are not that concrete yet. They have not thought how to implement them in the (near) future. They were all really inspired by our story and really see the relevance for end-users. It is very important to keep them updated about the project development to inspire them.

While this analysis already brought important insights into the requirements of tertiary users, still some concrete questions remain. As a result, after analysis of the stakeholder's input, the consortium partners see the need for an additional round of requirements collection, more directed to the task of the business plan.

Some questions for this have been already outlined, such as:

- What may a toilet for me system cost maximal?
- If the provider or stakeholder pays extra for a toilet for me system, what functions does the system than really need to have?
- Why does a shower WC not seem highly interesting to you?
- Is a portable, mobile toilet an interesting option for the stakeholders?
- If "select suitable elements" modularity option would be interesting for the stakeholders (so they can choose from the different elements, the toilet system is divided into parts).

These and other questions were therefore foreseen in the co-creation phase with stakeholders and the analysis can be found in the (internal) D2.5 report.

7 Definitions, Acronyms and Abbreviations

AAL	Active and Assisted Living / Ambient Assisted Living
BEIA	BEIA Consult International, partner in T4ME2 project
CCS	CareCenter Software GmbH, partner in T4ME2 project
CA	Consortium Agreement
CDC	Caritas de Coimbra, subcontractor of OSF
CMU	Central Management Unit
COG	cogvis software & consulting GmbH, partner in T4ME2 project
DoW	Description of Work, proposal, work description of T4ME2 project
GD	Stichting Gouden Dagen, partner in T4ME2 project
GDPR	EU General Data Protection Regulation (GDPR)
HH	Zorggroep Heilig Hart, partner in T4ME2 project
ICT	Information and Communications Technologies
iToilet	previous AAL project iToilet (supportive ICT enhanced toilet for the home market, http://www.itoilet-project.eu/)
OSF	On Site Foundation, partner in T4ME2 project
PU	Primary Users (e.g. old person, person with physical limitation)
PrM	Project Month. Starting month is PrM01 i.e. March 2020
SAN	Sanmedi bv, partner in T4ME2 project
STR	Sanitronics International B.V., partner in T4ME2 project
SIS	Santis Kft, partner in T4ME2 project, partner in T4ME2 project
SU	Secondary Users (e.g. care person)
Toilet4me2, T4ME2	Toilet for me too, supporting active living in (semi-) public environments by suitable toilets (AAL project at hand, website: http://toiletforme.com/)
Toilet4me	previous AAL project Toilet4me (was a SCP as preparation for T4ME2 for semi-public area, http://toilet4me-project.eu/)
TU	Tertiary Users (e.g. manager of day care organisation)
TUW	TU Wien (Vienna Univ. of Technology), partner and co-ordinator in T4ME2 project
WP	Work Package

8 Literature

Active Assisted Living Programme. AAL. Definition of end-users in the AAL Programme. Available at: <http://www.aal-europe.eu/ageing-well-universe/i-am-a-user-2/>

Mendelow, A. L., "Environmental Scanning--The Impact of the Stakeholder Concept" (1981). ICIS 1981 Proceedings. Paper 20. <http://aisel.aisnet.org/icis1981/20>

MINDTOOLS. Stakeholder Analysis. Available at: https://www.mindtools.com/pages/article/newPPM_07.htm

Preskill H and Jones N. A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions. January 1, 2009 Publisher: Robert Wood Johnson Foundation Publication: RWJF Evaluation Series. Available at: <https://www.rwjf.org/en/library/research/2009/12/a-practical-guide-for-engaging-stakeholders-in-developing-evalua.html>.