Identity Management in PUbLic SErvices

D2.6 IMPULSE piloting roadmap V2

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Executive summary

The main goal of the work package 2 is to create a co-design methodology and facilitate the co-creation process for the whole IMPULSE project. The final co-creation task is the T2.5 “End-user pilots” which serves as the first point of contact between end-users and the IMPULSE solution. IMPULSE piloting roadmaps are meant to provide an overview of the activities related to the end-user pilots.

This deliverable is the second version of the piloting roadmap. The first version (D2.2) describes the pre-piloting stage (M1-M18) in detail while only showing the start and end dates of the end-user pilots. The second version of the piloting roadmap focuses more on the activities of the end-user pilots and shows when these activities take place. The main objective of this deliverable is to provide a more in-depth view of the end-user piloting process and detail the interactions with pilot activities for eliciting and responding to feedback.

Document information

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Summary (for dissemination)	This deliverable depicts the general plan of the end-user pilots and describes the activities performed during the pilots. The end-user pilots are the central goal of the co-creation activities performed within the WP2. The plan takes into account the key performance indicators proposed within the project and assesses some of the identified risks associated with the end-user pilots. The end-user pilots are divided into two rounds and while this deliverable is designed with both rounds in mind, the second round of pilots may undergo some changes based on the experiences of the first round.
Keywords	piloting roadmap, pre-piloting stage, piloting activities, pilot experiments

Version Log

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07-16-2022	0.2	Jiri Musto (LUT)	Intermediate check-up, adjusting the outline and contents.
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29-07-2022	1.0	Jiri Musto (LUT)	Deliverable finalized based on review

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Abbreviations and acronyms

- **ADR:** Action design research
- **ARH:** City of Aarhus, Denmark
- **BIE**: Building, intervention, evaluation
- **CEL:** CyberEthics Lab.
- **DPA:** Data processing agreement
- **eID:** Electronic identification
- **ERTZ:** Basque Government – Security Department – Ertzaintza
- **GDPR:** General Data Protection Regulation
- **GIJON:** City of Gijón, Spain
- **KPI:** Key performance indicator
- **MOP:** Municipality of Peshtera, Bulgaria
- **PA:** Public administration
- **PAS:** Public administration server
- **RVK:** City of Reykjavik, Iceland
- **SO:** Specific objective (IMPULSE DoA)
- **UC/IC:** Union of Italian Chambers of Commerce / InfoCamere
- **WP:** Work package (IMPULSE DoA)

1 Introduction

Work package (WP) 2 focuses on the co-creation activities of IMPULSE that aim to include different stakeholders in the design of the electronic identification (eID) solution. WP2 is the pivotal point of the whole project and works in conjunction with other WPs. The main goal of WP2 is to involve end-users in the development process through different activities, such as workshops and interviews. Task 2.5 "End-user pilots" is the culmination of the WP2 where participants interact with a functioning IMPULSE solution.

The pilot experiments aim to improve and evaluate IMPULSE by assessing the diverse aspects of the proposed eID solution. Multiple key performance indicators (KPI) presented in WP7 are designed to be evaluated during the end-user pilots. The different KPIs pose imitations and requirements to the activities of the end-user pilots. With the pilots, different technical, operational, and ethical aspects of IMPULSE are to be examined. Task 2.5 is set to last until the end of the whole WP2.

End-user pilots are divided into two rounds with six months in-between them, where the input from the first piloting round will be assessed and used to refine the IMPULSE solution before the second round. After the second round, the IMPULSE solution will be finalized in the scope of this project.

1.1 Aim of the deliverable

The deliverable D2.6 is an updated version of the deliverable D2.5. The first report provided a preliminary plan and schedule for piloting while focusing on the pre-piloting stage (M1-M18) and only specifying the timeline for the pilot rounds. The pre-piloting stage paved the way for the end-user pilots and provided valuable feedback from users and public administrators (PA) regarding the organization of co-creation activities. This deliverable aims to describe the pilots more in-depth to provide the overall plan of how the pilots are managed, general activities done in the pilots, and the expected outcomes. The deliverable will also consider some possible success metrics and risk assessment of the end-user pilots based on the KPIs and insights gained during the pre-piloting stage.

The IMPULSE solution is to be tested and validated in six different sites where IMPULSE has been integrated to work with the platforms of local PAs. The selected locations are described in more detail in the deliverable D2.1. Similarly to D2.5, this deliverable aligns with Goal 1 of the IMPULSE project, particularly the specific objective SO1.4 set to specify the requirements, acceptance, and impact on the use of the eID solution through a series of tests conducted in in six different case studies.

1.2 Stages of the co-creative process

The end-user pilots are the next step in the co-creative process initially presented in the D2.5. The entire co-creation process consists of four stages: pre-piloting stage, the first round of pilots, revision of the solution, and the second, final piloting round. Figure 1 visually depicts further details of the roadmap, providing an overview of the activities in the first round of pilots.

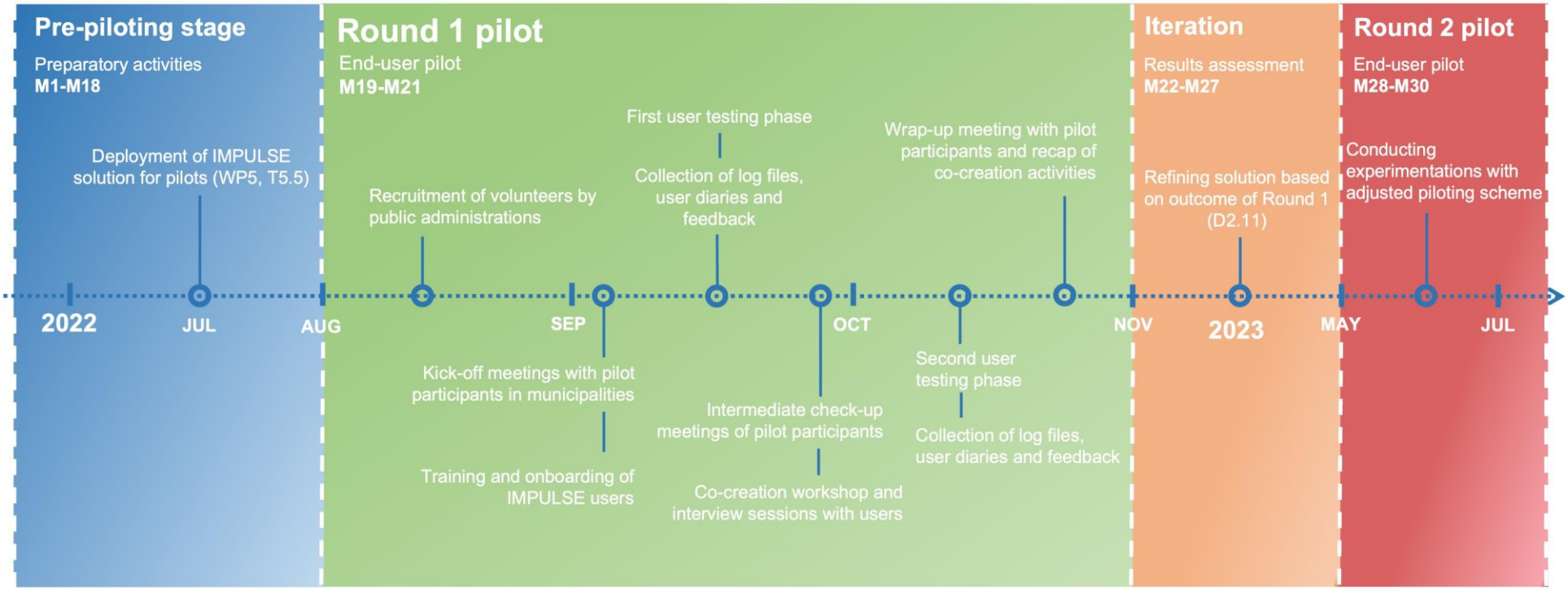

Figure 1. Piloting roadmap: first round of pilots.

The outline of the pilot activities sets forth the general course of actions aimed to guide the pilot teams instead of firm deadlines providing with an overview of the entire pilot process along with the time estimations to execute these activities. The estimations were given based on the experiences of PAs in organizing the co-creation sessions during the pre-piloting stage. For example, based on the preparations of co-creation workshops with the citizens, recruiting volunteers is expected to take two to three weeks on average.

The first round of pilots starts in August 2022 (M19). However, given the limited availability of the PAs during the holiday season, the actual recruitment of participants will take place in the middle of the month. After the recruitment period, there will be a kick-off meeting where the participants get to know the IMPULSE solution and what is expected of them during the piloting. The users are given two weeks to test the solution, during which they are expected to provide their feedback on the use of the eID solution in different scenarios and contexts which will be collected in different forms depending on the methods applied, e.g., technical logs and user diaries. The intermediate check-up is intended for users to share their experiences and have a group discussion which will unfold in a structured way around co-creation activities. There will be a second round of IMPULSE testing, which will also last two weeks. Finally, the wrap-up meeting will end the whole piloting round.

2 Overview of the research approach

Various user-centered design approaches imply involving the end-users in product and service development. The methods allowing for the involvement include but are not limited to beta testing, pilot testing, focus groups, usability testing, questionnaires, interviews, and many others. In co-creation, users participate in designing and developing a product or service that is shaped to better serve their needs. In an optimal case, users are equal in the decision-making process (Kujala, 2008) with some limitations to the context. For example, users can give feedback on what features a product should have, but the methods of actually implementing the feature will go outside their expertise and, thus, will not be something users can decide. As described in D2.5, the co-creation methodology follows the action design research (ADR) methodology that is useful for open-ended information systems research (Sein et al. 2011). The ADR supports iterative approach of artifact building, intervention and evaluation. Figure 2, taken from D2.5, provides a descriptive model of the ADR process adapted for the IMPULSE WP2 co-creative design and pilot implementation.

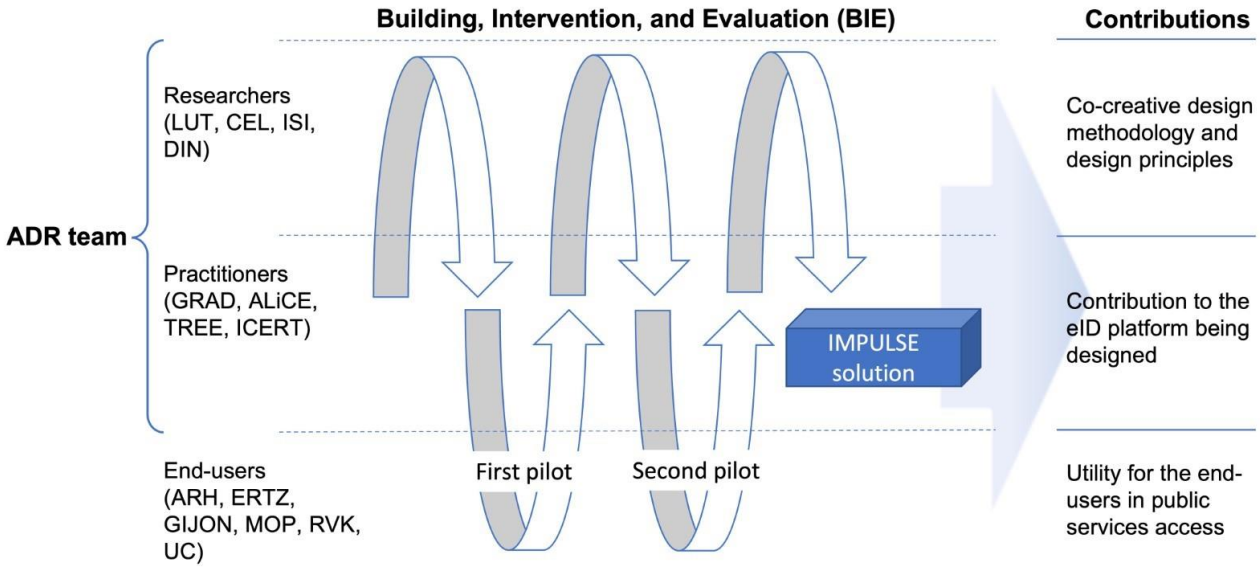

Figure 2. ADR methodology at the core of the IMPULSE co-creative process.

As the Figure 1 shows, the co-creation process is launched by the practitioners and researchers and the process cycles back and forth between the ADR team and end-users. The piloting is divided into two parts to be able to improve the IMPULSE solution in-between the piloting rounds. During these phases, user feedback is gathered from the six case studies for the ADR team to assess the efficiency and effectiveness of the proposed eID solution and subsequently evaluate its impact from multiple perspectives. Based on the feedback of the first piloting round, the existing requirement set (see D2.3 and D2.7) for IMPULSE will be refined, and the practitioners will improve the eID solution to accommodate the changes. During the second piloting round, the improved version of IMPULSE will be tested, and the solution will be finalized based on the analysis of the user feedback.

From the co-creative activities implemented on pre-piloting stage (D2.3), the pilots adopt the methodological framework suitable for public services' environment (Figure 3).

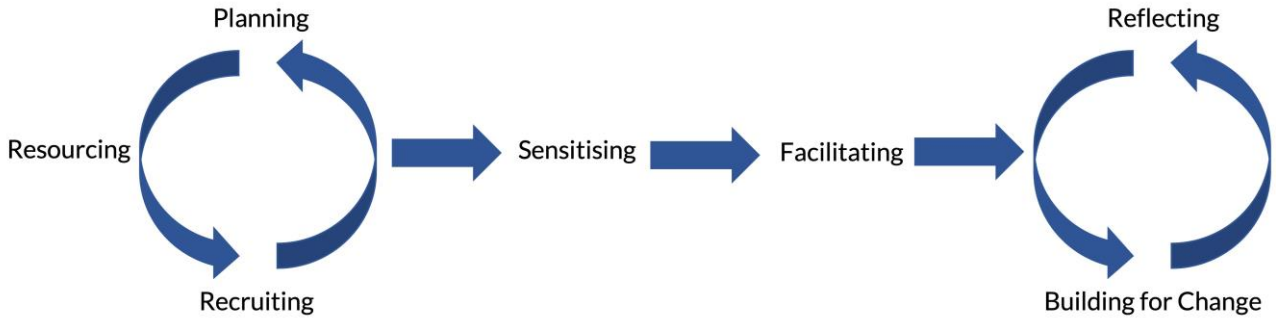

Figure 3. A co-design framework for public service design (Trischler et al., 2019).

The framework is intended to guide the PAs, Case Owners, in executing the IMPULSE co-creation process involving the end-users on-site. It also allows for continuous improvement of the co-design practices based on the feedback from participants and experiences of planning and organizing the joint activities for various stakeholders.

3 End-user pilots

In the project schedule, pilots are given three months to complete between August and October 2022. The pilots are designed to be extended experiments involving different activities so that the research partners can gather more data and information on the user experiences from IMPULSE eID solution. The pilots would engage the participants for 20 to 30 days.

There are multiple things to consider during the pilots, and some of the listed considerations pose limitations to the pilots as well as requirements that need to be fulfilled:

- **KPIs:** There are KPIs within the IMPULSE project, such as usability, that need to be evaluated during the end-user pilots. The pilot actions need to be designed to accommodate the evaluation of the desired KPIs, such as creating a survey that explicitly evaluates the KPI.
- **Requirements & feedback**: The primary goal of the pilots is to validate the requirements for the IMPULSE solution described in deliverables D2.3 and D2.7 and gather the new requirements during the joint sessions with the end-users. In addition, information of the devices used during the testing is collected to evaluate the functionality of IMPULSE and its technical performance.
- **Equipment**: The pilot methodology is designed around the available equipment. Some pilot activities can be held physically, so it would be possible to record the sessions if such equipment is available. Currently, IMPULSE solution is designed to work with the Android operating system as described in D2.7 and D5.3. This poses a technical limitation for the recruitment: if users do not have an Android smartphone, they cannot participate unless the PAs distribute their devices.
- **Time limitations**: The pilots are scheduled for August-October 2022 (M19-M21). Other limiting factors are holidays and the availability of PAs and citizens along with other involved stakeholders to participate in the pilot activities.
- **Overworking**: The pilot participants should not be overworked with different tasks they have to perform. To alleviate the risks of overloading with numerous activities, the research teams align their objectives together to design the pilot activities with diverse purposes.
- **Participation motivation**: The number of participants recommended for the end-user pilots is larger than in the pre-piloting workshops (D2.3), so motivating participation is vital. The lack of participants may cause the results to be unusable or biased. To motivate people to participate, the usage of some incentives is considered. Using incentives in the research activities has its benefits and drawbacks, such as bringing more participants but also bias (Hsieh and Kocielnik, 2016, Singer and Bossarte, 2006).

The second round of pilots scheduled for May-July 2023 (M28-M30) is planned to follow the same structure, schedule, and activities as the first round of pilots. However, the plan is a subject to adjustments based on the feedback from the partners and users in the first pilot phase.

3.1 Pilot scope and objectives

The scope of the first pilot round is to evaluate the initial version of IMPULSE deployed on the PAs' local sites. The eID solution is expected to have all the most crucial functionalities and features, while some of the less essential functionalities are still under development for the second pilot. These functionalities are described in D2.7 and the user requirements are elaborated in the set of IMPULSE specifications. After the first round, the results are disseminated for assessment, and the IMPULSE solution is refined based on the findings.

There are several objectives for the first round of pilots:

1. Test the deployed solution on the PAs site
2. Test the deployed solution with end-user devices and operating systems
3. Gather technical feedback from end-users' devices
4. Gather user feedback from end-users
5. Ensure the IMPULSE design meets the PAs’ requirements
6. Test if the eID solution works appropriately in a real-life environment
7. Gather information on usability, acceptance, and accessibility

As the end-user pilots are the first real test of IMPULSE involving external stakeholders on the local sites of the case studies, gathering technical information is vital to ensure that the solution is compatible with the targeted devices. The technical information of the local instantiation is also essential to know if IMPULSE works as intended.

The feedback from users will help researchers to evaluate the existing requirements written in D2.7 as well as creating new requirements based on the user feedback. The user feedback will overlap with gathering information on usability and acceptance as these are extracted from the user feedback or gathered via specific questions. Gathering information on accessibility will be performed separately from the users by the technical partners.

The service tied to the IMPULSE is not the evaluation target, and all issues and feedback unrelated to the eID solution are out of the pilots' scope for evaluation. However, the applicability of IMPULSE to the service can be evaluated, e.g., how reasonable it is to use IMPULSE with the specific service and whether it would be better to use it elsewhere.

3.2 Key resources for the pilot

The pilots will require internal and external human resources from the project. Table 1, presents the participants of the pilots based on the stakeholder analysis conducted in D2.1 who all have a role in the end-user pilots.

Table 1. Pilot participants and stakeholders

Stakeholder	Piloting role	Description
Responsibles (Execution)/Political	Case owners	Oversee the system throughout its lifecycle phases, coordinate pilot experimentations locally on-site, control the data collected in piloting, and support recruitment for the case study.
Functional	Publics (regular users)	Interact with the IMPULSE solution during the pilot experiments. Complete the tasks based on the test cases using the device for onboarding their identity and accessing the relevant public service in their case study region.
Developers (Technical)	Technologists	Technical partners of the IMPULSE consortium and external third-party IT vendors directly involved in the system development, instantiation, and integration with local services. Solve technical problems that occur during pilot activities.
Hired consultants	Trainers	Provide training to the pilot participants and guidance on interacting with IMPULSE in test cases.
Hired consultants	Facilitators	Conduct the workshop sessions supporting participants with operational and technical issues. Facilitate pilot activities following the common pilot scheme.
Advisors and experts	Researchers	Have deep knowledge about the project domain, and provide a co-creation methodology for designing pilots and their evaluation. Assess the experiments based on data collected in case studies.

Activities during the pilot will involve multiple stakeholders at once. As citizens are the pilot's core, they are directly tied to most of the activities. The project researchers provide the design and template for the whole pilot but are not directly in contact with publics during the piloting activities. These design activities will involve multiple people and institutions from the project's researchers. Facilitators and trainers work in-between publics and researchers/technologists. Most pilot activities will be held in the local language and as such, the case owners and facilitators are responsible of ensuring that the necessary documents are in their local language.

3.3 Pilot scheme

There are three months given to execute each piloting round which is why the pilot schedule is free of specific dates and times. Figure 4 shows the pilots scheme which includes the activities that are to be implemented during each of the pilot phase. This is the general outline for the pilots and is subject to adjustments based on individual cases for the future iteration of testing as well as the activities are not limited to the selected methods. The pilot activities would take 20 to 30 days to complete.

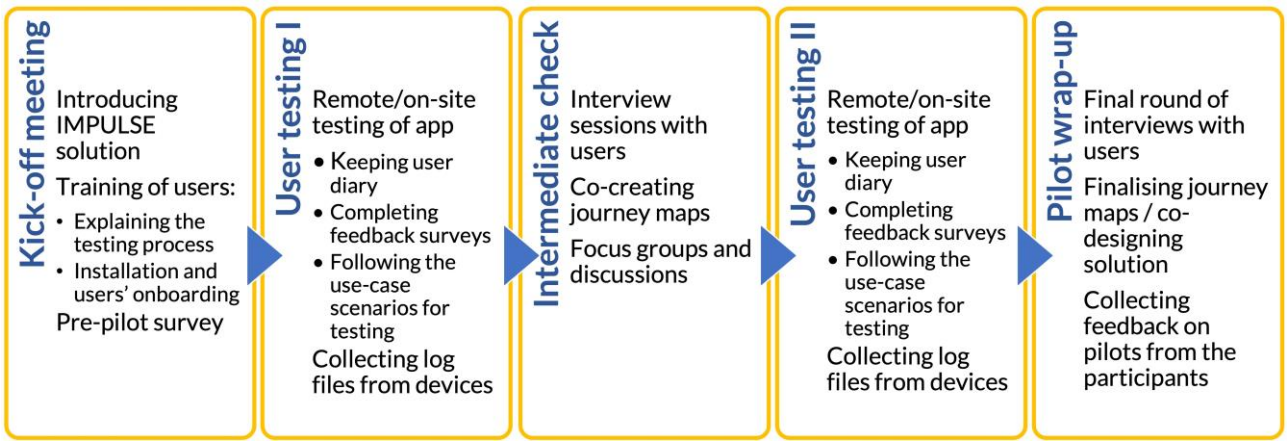

Figure 4. Pilot scheme and activities.

Each activity serves a different purpose for data collection. The surveys and interviews can gather information regarding participants' demographics and measure KPIs with standardized questionnaires. These are designed to be different so that the participants do not have to answer the same questions multiple times. During the two testing phases, users are expected to write down their experiences and implications on how IMPULSE solution has performed and if any issues have come up.

There are three meetings for the piloting round that are meant to be physical meetings. Facilitators show how IMPULSE works during the kick-off meeting and perform the necessary onboarding of the participants. Without the onboarding, the user would not be able to participate in the end-user pilot. In the intermediate check, the participants can gather to share their experiences with IMPULSE and engage in activities such as journey mapping, focus groups, and semi-structured interviews. The final meeting is meant to wrap up the piloting round, gather the possible user diaries and perform the last group activities with the participants.

3.4 Pilot success criteria and metrics

To evaluate the success of the pilots, some criteria and metrics need to be defined. The project KPIs can be used to assess the IMPULSE solution during the pilots but there needs to be specific criteria to evaluate the pilots themselves. To evaluate the pilots, the number of participants participating and the number of participants retained are considered to be important metrics. Table 2 presents some of the metrics used to assess the success and failure of the pilots and the IMPULSE solution itself.

Table 2. Pilot metrics

Type	KPI / KSI	Measured how	Success criteria	Measured when
Outcome	Usability	Survey/ interview	usability rate (>70%)	Post-pilot
Outcome	Accessibility	Automatic assessment tool	accessibility rate (>70%)	Post-pilot
Outcome	Acceptance	Survey/ interview	acceptance rate (>70%)	Post-pilot
Participation	No. Stakeholders involved	Participants	Over 100 participants in total	Pre-pilot, post-pilot

Type	KPI / KSI	Measured how	Success criteria	Measured when
Participation	No. Stakeholders involved	Participants	Over 20 participants per pilot	Pre-pilot, post-pilot
Participation	Participant retention	Participants	Over 50 % participants from start to finish	Pre-pilot, post-pilot
Outcome	Requisites	Survey / Interview	Refined (and new) requisites WP2(>35%)	Post-pilot
Outcome	Solution readiness	Comparison of completed / designed requisites	(1 or 2) stage (>50% and >90)	Pre-pilots

3.5 Identified risks

During the pre-piloting stage, different events took place, causing distress to the project and the delay of activities. Some were not foreseen and could not be mitigated, and others were difficult to alleviate. For the end-user pilots, a more exhaustive list of risks is developed, and different mitigation plans are taken to ensure there would not be a similar delay in the project activities as during the pre-piloting stage.

Table 3 presents the identified risks, their likelihood and impact, and a mitigation plan.

Table 3. Pilot risks

Risk	Likelihood	Impact	Overall	Mitigation plan
Not enough participants	Medium	High	High	Start sending invitations early so that the recruitment time is extended. Keep the schedule flexible to allow users to participate and if there are not enough end-users, have the PAs participate.
Low participant retention	Medium	High	High	Use intermediate meetings to actively involve participants and devise incentive mechanisms to bolster retention.
Participant invitations are sent late	Low	Medium	Medium	The delay of invitations will impact the beginning of the pilot on-site, but the pilot schedule is flexible and minor delays do not cause an issue. The PA initiate the recruitment campaigns in advance to ensure the required number of participants is met.
The end-user pilot begins late	Low	Low	Low	The pilots are designed to be flexible, and the start is planned early enough not to cause any issues, even when delayed.
The end-user pilot ends late	Low	Low	Low	The pilots are designed to be flexible, and the start is planned early enough not to cause any issues, even when delayed.
End-user pilot activities cannot be performed	Low	Low	Low	There are multiple options designed for the pilot activities if some cannot be performed. Leading the co-creation process, LUT will provide the PA with guidance on different methods of user testing and co-design practices to ensure the inputs and feedback from the end-users.
Devices being lost or broken	Low	Medium	Medium	Have users inform if the device is lost or broken. If the users use their own devices, the likelihood of devices being lost is low. The

Risk	Likelihood	Impact	Overall	Mitigation plan
				active involvement of the users in testing ensures the device is operating normally.
IMPULSE solution not working properly	Low	Medium	Medium	Start testing the IMPULSE solution's local instantiation early to ensure everything is running correctly. Have the technical partners actively help the PAs in case of problems. Prior to the pilots, the project partners are invited to test the application on their own devices to assess the performance.
IMPULSE cannot be instantiated on pilot site	Medium	Medium	Medium	As a backup plan, have GRAD set up a generic testing environment in case the pilot site instantiation fails.
A hacking attack on the local PAs site	Low	High	Medium	A hacking attack could cause the disruption of pilot. If systems go offline, have users participate in physical activities in the PAs' facilities (e.g., living lab, workshop sessions).
The local site goes offline	Low	Medium	Medium	If systems go offline, have users participate in physical activities in the PAs' facilities.

As shown in Table 3, most risks are of low or medium impact that can be mitigated quite easily. The number of participants and participant retention are the most significant risks that can cause the whole pilot to be invalid. As a backup plan for the number of participants, the PAs can contact their internal networks to have their employees participate in the pilots, however this will result in producing some biased results, thus making this option not preferable.

Another concern, especially for the first round of pilots, is the instantiation of the IMPULSE solution. As this will be the initial instantiation of the solution, some issues are to be expected but it is not possible to foresee how difficult and time consuming the instantiation will be. As a possible backup plan, instead of having the IMPULSE solution reside on the PAs server, the technical partners would host the IMPULSE solution and provide a generic testing environment for the users.

3.6 Cross-case preparations

The public administrations from selected case studies have signed a bilateral Data Processing Agreements (DPA) for end-user pilots with LUT enabling data management and processing of the findings. PAs are designated as the data controller responsible for managing and storing the data collected from pilots, while LUT as the data processor disseminates the results through the project reports. In addition to the DPAs, each participant has to sign a consent form before participating in pilot activities to enable the collection and dissemination of data. D1.3 has provided a data management framework describing data collection, storage, and sharing procedures. The pilots will follow the developed framework.

The technical partners have developed the initial version of the IMPULSE solution, and the instantiation documents along with technical specifications have been delivered to the PAs. Each PA is responsible for procuring the necessary devices and services to set up IMPULSE on their local service. IMPULSE solution is designed to work with smartphones using an Android operating system. The users need to have such a device to be able to participate in the end-user pilot. The participants are expected to use their devices or devices distributed by the PA if such are available. IMPULSE solution can be connected to a live or a dummy version of the intended service platform and this decision is left to the PAs, individually.

The pilot activities are held in the local language of each case study, respectively. This means that all necessary materials need to be translated from English to the local languages. Researchers provide all the required documents, templates, and instructions in English, and it is up to the case owners or facilitators to translate the provided resources when necessary. Case owners are responsible for translating the gathered data to English for the research team to disseminate. In addition, all user feedback and results will be gathered in their local language.

The kick-off meeting, intermediate check and pilot wrap-up shown in Figure 4 are planned to be held physically. The physical meetings can be recorded with audio or video devices if the participants' consent and the PAs have the necessary equipment. If the meetings are held online, the PAs can utilize the online tools,

such as Miro, for any co-creative activities. The Miro whiteboard can also be used in physical sessions, but pen and paper will simplify the arrangements.

The surveys given to the participants will be done online, and participants can respond to them at their convenient time and place. Each survey needs to be translated into the local language for the participants to answer. The possible interviews can be held online or physically, depending on the PA and the participants' availability. Each PA will be given a script to follow during the interview, and the interview audio should be recorded if possible. If an audio recording is not feasible, the interviewee should write a proper transcript of the answers.

3.7 Case-specific considerations

Each case in IMPULSE has its own service and platform tied to the eID solution. Most cases are relatively similar to each other and require no special conditions, but some need to be specifically mentioned in Table 4.

Table 4. Case-specific activities

No.	Activities	Description	Related partner(s)
1.	IMPULSE instantiation	The Municipality of Aarhus integrates the IMPULSE eID solution with a physical object (locker) that should allow users to store and retrieve items after identifying themselves. This requires additional steps to be made by the technical experts of Aarhus.	ARH
2.	Participating volunteers	Erztaintza prefers to have internal participants from their workforce to protect their security and privacy.	ERTZ
3.	Participating volunteers	Due to a hacking attack, the PA may be hesitant to involve external stakeholders considering the risks of data breach.	GIJON
4.	Testing devices	InfoCamere aims to provide Android devices to some participants who do not own one.	UC/IC
5.	Access restrictions	InfoCamere has IMPULSE running in Intranet for security reasons and accessing the solution outside of the network may be restricted.	UC/IC

4 Conclusions

This deliverable aimed to provide a more detailed outline of the first piloting round of T2.5. The deliverable presents a general scheme for the pilot activities that are executed in each case study. If there are alterations to the general scheme, the case-specific considerations have been taken into account. As each case study will have their own instantiation of the IMPULSE solution, there can be some degree of variance to how the specific pilot activities can be executed. Some public administrations will provide the equipment to the participants if necessary but this can cause issues with the testing of the solution as the devices should not leave their premises.

In addition to the piloting scheme, this deliverable considers the success' metrics and risks associated with the pilots. During the pre-piloting stage, it became evident that gathering participants may be demanding and can pose a considerable risk of producing poor quality results. On the contrary to the pre-piloting, participant retention will also play a role as the pilot is not a one-day event and lasts more than twenty days and some participants may be inclined to leave. For success metrics, there are KPIs that should be measured during the pilots and will provide criteria that the activities should fulfil. The number of participants is another key indicator for the pilots to evaluate the success.

Deliverable D2.5 provided an outline to the pre-piloting activities as well and set up the general tone for the end-user pilots. The main emphasis of these pilots is the co-design of IMPULSE and all activities are designed around the co-creation process. Deliverable D2.6 follows the same ideology and the activities are expected to provide valuable insight on how the eID solution functions based on the users' perspective. With the help of the users, the solution can be improved for the second round of pilots.

The future iteration of pilots is planned to follow the same general scheme as the first round but is subject to change based on observations and feedback after the initial pilot is complete. The success criteria for the pilots will be evaluated for both rounds, respectively, however the KPIs are important to be achieved after the second round of pilots is over.

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