Identity Management in PUbLic SErvices

D2.4 IMPULSE requirements specification V3

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Deliverable nature:	Report (R)
Dissemination level: (Confidentiality)	Public (PU)
Delivery date:	31-01-2023
Version:	1.0
Total number of pages:	44
Keywords:	Software requirements, co-creative design, electronic identity, pilot test

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004459

Executive summary

This deliverable is the third version of IMPULSE requirements specification that culminates the co-creative requirements elicitation process in the project by validating the results of previous iterations (D2.2 and D2.3) with the findings from the first pilot round. These findings present the feedback, needs, and opinions of the end-users from six case studies based on their experiences from testing the electronic identification (eID) solution in controlled settings. The input is gathered with the help of different techniques general in respect to different pilot sites and their unique testing environments. The feedback is complemented with the expertise of the technical partners from the Consortium with the aim of aligning the visions of the IMPULSE technology and advance the eID solution for the second pilot round.

Document information

Grant agreement No.	**101004459**	**Acronym**	**IMPULSE**
Full title	**Identity Management in PUbLic SErvices**		
Call	DT-TRANSFORMATIONS-02-2020		
Project URL	https://www.impulse-h2020.eu/		
EU project officer	Giorgio CONSTANTINO		

Deliverable	**Number**	D2.4	**Title**	IMPULSE requirements specification V3
Work package	**Number**	WP2	**Title**	Co-creative design and piloting
Task	**Number**	T2.2	**Title**	Co-creative requirements elicitation scheme and piloting roadmap

Date of delivery	**Contractual**	M24	**Actual**	M24
Status	version 1.0		☐Final version	
Nature	☒Report ☐Demonstrator ☐Other ☐ORDP (Open Research Data Pilot)			
Dissemination level	☒Public ☐Confidential			

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Summary (for dissemination)	The report contains the final version of the formal general requirements for IMPULSE validated with findings after first piloting round (M21). These findings include user needs and opinions based on testing experiences that are transformed into user requirements. The deliverable presents the results of three iterations of the co-creative requirements elicitation process, complemented with the expertise of technologists to align the visions of electronic identification solution for different stakeholders.
Keywords	Software requirements, co-creative design, electronic identity, pilot test

Version Log

Issue Date	Rev. No.	Author	Change
14-12-2022	0.1	Stepan Bakhaev (LUT)	First document outline, updated requirements elicitation scheme
15-12-2022	0.2	Javier Martinez (GRAD)	Review of the V2 specifications
19-12-2022	0.3	Stepan Bakhaev (LUT)	Introduction and Background sections added
11-01-2023	0.4	Stepan Bakhaev (LUT)	Requirements elicitation process and Data collection sections added
12-01-2023	0.5	Stepan Bakhaev (LUT)	First pilot findings, Annex sections added
13-01-2023	0.6	Stepan Bakhaev (LUT)	First pilot findings section added, Pre-pilot survey and interview results
16-01-2023	0.7	Stepan Bakhaev (LUT)	First pilot findings section updated, Focus-group results
24-01-2023	0.8	Marco Vianello (UC/IC)	Deliverable review
31-01-2023	1.0	Stepan Bakhaev (LUT)	Finalised version

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Abbreviations and acronyms

AI:	Artificial Intelligence
ARH:	City of Aarhus, Denmark
CEL:	CyberEthics Lab.
DPA:	Data processing agreement
EBSI:	European Blockchain Services Infrastructure
eID:	Electronic identification
ERTZ:	Basque Government – Security Department – Ertzaintza
EU:	European Union
GIJON:	City of Gijón, Spain
ISO:	International Organization for Standardization
MOP:	Municipality of Peshtera, Bulgaria
PA:	Public administration
PKI:	Public Key Infrastructure
QES:	Qualified Electronic Signature
RVK:	City of Reykjavik, Iceland
SMS:	Short Message Service
SPID:	Sistema Pubblico di Identità Digitale (Italian national eID scheme)
SSI:	Self-Sovereign Identity
UC/IC:	Union of Italian Chambers of Commerce / InfoCamere
VC:	Verifiable Credential
WP:	Work Package (IMPULSE DoA)

Definitions

This section provides general definitions about technical terms and key concepts in the scope of electronic identification, to provide background information to the reader. These general definitions shall not be interpreted as a specification of requirements or list of features of the solutions to be piloted in IMPULSE.

Authentication

An electronic process that enables the electronic identification of a natural or legal person, or the origin and integrity of data in electronic form to be confirmed (European Parliament and the Council, 2014).

Electronic identification (eID)

The act of making an entity known, through a unique combination of attributes used for the authentication (i.e., assessing the identity) and authorization (i.e., granting permission) to electronic public or private services (Söderström, 2016; Bazarhanova, 2020).

Interoperability

The ability of one software system to use parts of another software system (Vernadat, 2009) or access the data generated by it (Giachetti, 2004).

Stakeholder

Any group or individual who can affect or is affected by the achievement of the objectives in a specific organization or project context. Stakeholder relationships are characterized by power, legitimacy, and urgency (Mitchell, Agle and Wood, 1997).

Usability

Qualitative assessment of the extent to which a novice user interacts with software, to accomplish specific goals in a given use context with relative effectiveness, efficiency, satisfaction, and overall ease-of-use as the standard of measurement (Agarwal and Venkatesh, 2002; Baker, 2009; Karkin and Janssen, 2014).

1 Introduction

1.1 Goals and objectives

The last stage of T2.2 "Co-creative requirements elicitation scheme and piloting roadmap" is culminated with the formal set of IMPULSE requirements produced from the first iteration of pilot activities. These activities allowed the end-users from six different pilot sites for engaging in testing the electronic identification (eID) solution in the controlled, yet real-life environments, and providing the feedback on their interactions with the technology. Different techniques for collecting the user needs and opinions were employed with the aim to finalize the IMPULSE general requirements by complementing and validating the results of the previous version of specification.

This deliverable presents the last iteration of the co-creative requirements elicitation scheme in IMPULSE applied to the outcomes of the first piloting round. The following research questions were guiding the process of the pilot data collection and analysis, and formalization of the general set of requirements:

- How to discover the needs of the prospective end-users of IMPULSE involved in the pilot studies?
  - What data collection techniques could support the requirements elicitation process
  - What co-creation activities (if any) should be adapted to each specific pilot context and how?
- What are the requirements for the eID solution validated with findings from the pilot studies?
  - What are the similarities/contrasts between the requirements stated by end-users and experts?

The remainder of this deliverable is structured as follows. First, it provides the background and summary description of the first IMPULSE pilot arrangements. It also presents with the updated co-creative requirements elicitation scheme regarding the final iteration of the T2.2 project task. Next, the deliverable describes the approach for collecting and transforming the user needs and feedback from pilots into requirements according to the adopted software quality model. Thereafter, the findings from pilot activities are being presented with the qualitative cross-case analysis. Finally, the deliverable presents the results of the requirements elicitation process in IMPULSE in a form of the general specification for electronic identification solution.

1.2 Background

In Autumn 2022 period (M19-M21) the project entered the first pilot round for testing the basic version of IMPULSE eID solution in the selected case study sites. This version of IMPULSE eID system was built upon the results of the first two iterations of the co-creative requirements elicitation process (D2.2 and D2.4) that were produced from the joint workshop sessions together with the Consortium partners and the prospective end-users, respectively. The refined set of general requirements guided the development of the eID solution throughout the period of pilot preparations. This allowed for adapting IMPULSE eID system to the specifics of the case studies, each of which are presented with the unique testing environments, including the target users, use cases, and the maturity level of the extant eID schemes.

Prior to the beginning of the end-user phase, the technical partners coordinating the IMPULSE development process (GRAD) initiated the preliminary testing of the system involving the Consortium members. The trial use of the IMPULSE application by experts facilitated the roll out and deployment of the system in the pilot sites while envisioning the user interactions prompted the research team (LUT) to design the activities for feedback collection and analysis. These activities are described in further sections of the deliverable.

As the second version of IMPULSE requirements specifications (D2.4) provided with the requirements which reflected the specifics of the individual case studies, it also served as the basis for validating the requirements for the third version of specifications which is based on the results of the pilot tests.

1.3 Requirements elicitation process

The course of action presented in the updated version of IMPULSE pilot roadmap (D2.6) guided the pilot arrangements and design of the usability and user research activities. The third iteration of requirements elicitation in IMPULSE (Figure 1), sets the objective to validate and attest the functionalities and quality attributes of the eID solution that were formulated through the co-creation approach.

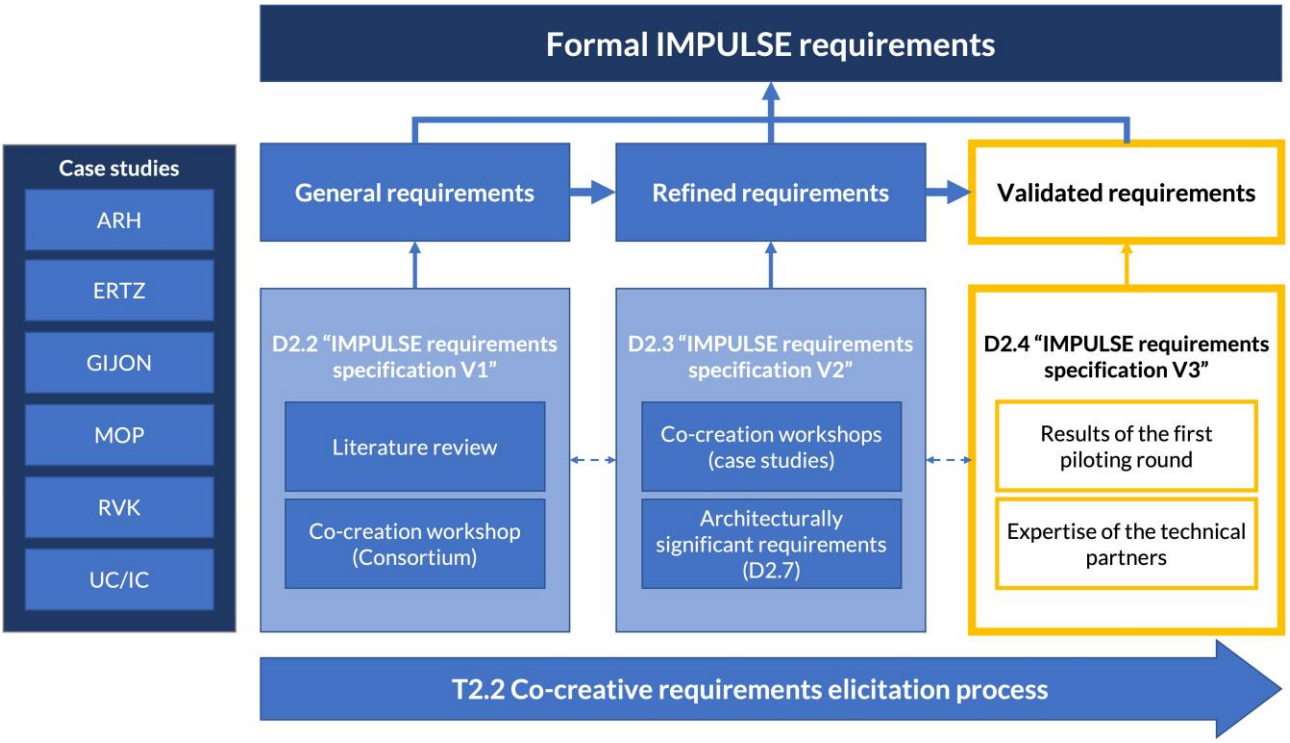

Figure 1: The third iteration of the co-creative requirements elicitation process in IMPULSE.

In the third iteration of the requirements elicitation procedure, the joint preparations by the pilot coordinators (LUT), public administrations from the selected case studies (ARH, ERTZ, GIJON, MOP, RVK, UC/IC), and the technical partners coordinating the development and integration of IMPULSE (GRAD) allowed for implementing a series of activities in pilot sites. Based on the experience of previous co-creative activities in the WP2, the language barriers and the geographical dispersion of the case studies, as well as the ethical and legal considerations, were taken into account for designing the data collection procedures. The facilitators from public administrations were provided with training on conducting the data collection activities, while the partnering organizations supported the researchers in distributing the forms among the pilot participants, data recordings and storage in their respective facilities.

2 Requirements elicitation process

2.1 Research methodology

To capture and identify user needs, and transform them into requirements for IMPULSE, the co-creation and user-centered design methodologies were adapted for the analysis of the first pilot outcomes. The model in Figure 2 presents the approach employed for the third iteration of the requirements elicitation to validate the user testing results.

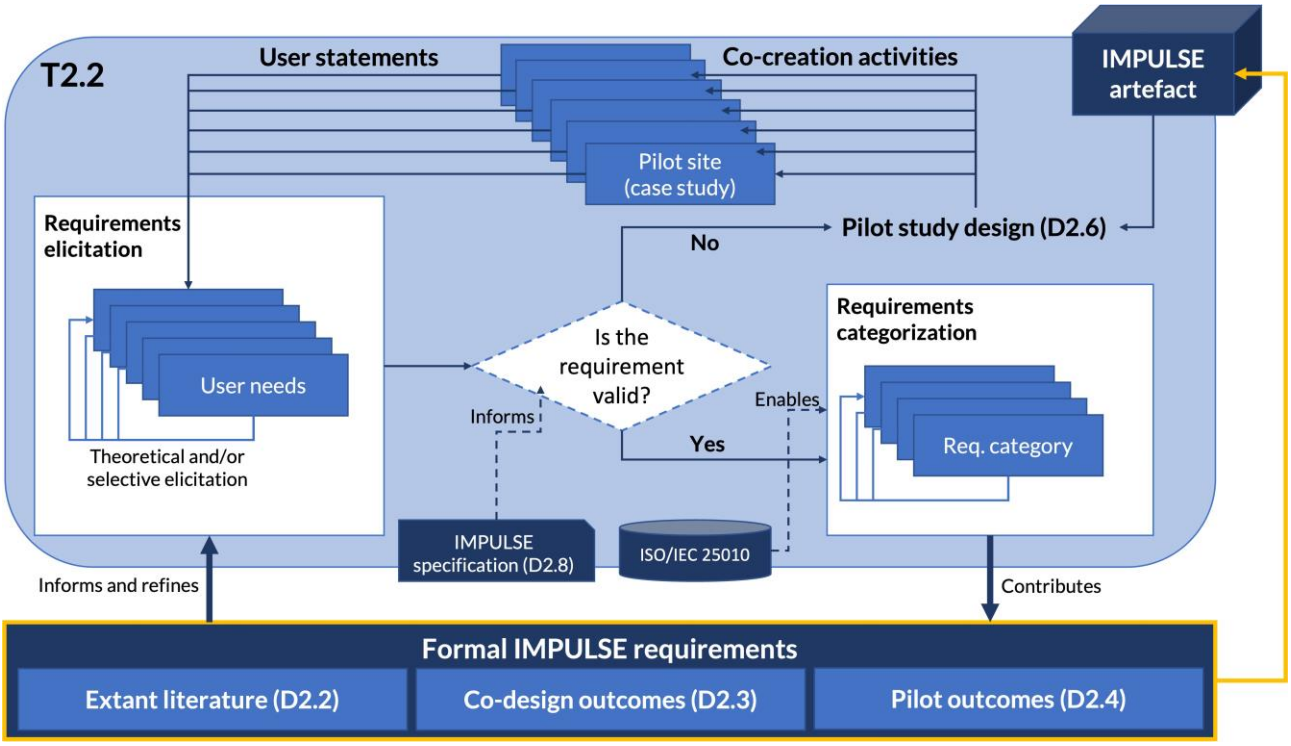

Figure 2: IMPULSE requirements validation model.

Furthermore, the quality model [1] for IMPULSE developed in the second version of specifications (Figure 3) is set to adopt the requirements derived from the analysis and enhance the specifications with new software quality dimension that the define the eID system and prepares a refined version of the system for the second round of pilots.

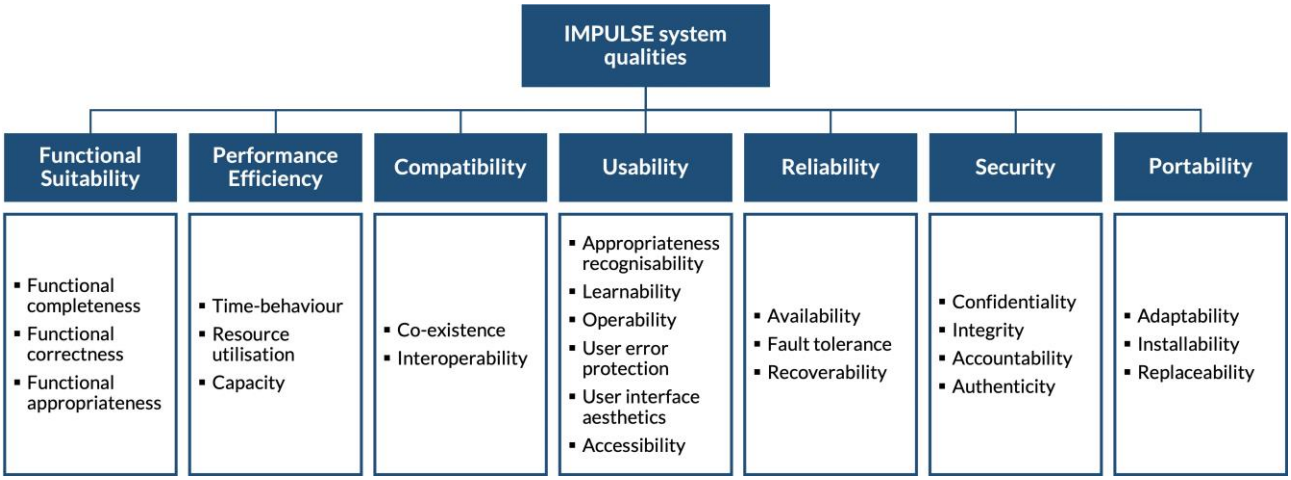

Figure 3: The IMPULSE system qualities for classifying user requirements.

The analysis of the first pilot results is aimed to validate and refine the quality dimensions originating from the user-centered perspective and subsequently align the visions of the IMPULSE eID solution with all the project stakeholders to guide the development process.

2.2 Data collection methods

The IMPULSE piloting roadmap (D2.6) informed the design of the pilot activities that employed iterative approach for distributing the workload and data collection procedures regarding different testing phases. Following the course of actions, these phases generally included:

- Pre-pilot activities – recruitment of volunteers, informed consent, training of users
- User testing – user onboarding and access to public service with IMPULSE
- Post-pilot activities – follow-up meetings and conversations of pilot participants

Each of the pilot phases defined the selection of methods for data collection from the participants representing the prospective end-users of the eID solution, that ultimately led to conducting a mixed-methods research [2]. These data allowed for gaining a complementary view about the pilot participants and the results of their interactions with the IMPULSE technology.

In the preparatory stage (the pre-pilot activities), the participants who signed the informed consent were invited to take a pre-pilot survey (Annex B.2). The aim of the survey was to discover the demographics of the end-users, their educational background, technological proficiency and preferences, as well as the level of familiarity with the electronic identification technologies [3].

Following the user testing phase, which was accompanied with the facilitators' observations and technical data collection (e.g., system logs), the participants were to fill out the post-pilot survey (Annex B.3), designed upon the system usability scale [4], and questions aimed to explore the overall views of the digital identities use, not necessarily related to the IMPULSE experiences.

To qualitatively enrich the survey data, the pilot participants were invited to the follow-up conversations and interviews for elaborating on their implications and perceptions of the proposed eID technology. For that purpose, the research team decided for splitting these activities into two formats, which included the semi-structured interviews [5] with the testers (Annex B.2) and the focus-group sessions (Annex B.4) employing certain co-creative techniques. The latter also allowed for collaborative efforts and articulation of design ideas among the end-users that could contribute to the IMPULSE overall design.

The rationale behind the focus-group format was to have an alternative qualitative data source that could potentially complement the above-mentioned techniques, i.e., the individual interviews and survey responses. In a group, the participants were invited to share their experiences and discuss their implications from the proposed eID technology, as well as the changes that they foresee with digital identities in every-day use. While the one-on-one interview format can help the participants to articulate their opinions intimately, the group discussion is prompt for a more expressive statements, as similar or contrasting experiences evoke empathy and creative thinking, as well as knowledge impart between the people of different background and skills [6]. To accomplish this, the focus-group session was designed as a semi-structured discussion with open questions and in informal format, considering the potential biases and distortions, such as group thinking or opinion dominance. The session also employed a co-design activity, Journey mapping [7], that helped keep the structure of the discussion and outline the main points stated by the participants. The Journey map presented different stages of interactions with eID technology, e.g., Onboarding, Login with IMPULSE, and Data management, and different dimensions for the discussions in relation to the stages. The latter included Feelings (the emotional state of user), Questions (implications of interactions), Pain points (negative user experiences), and Opportunities (possible solutions for addressing the Pain points and Questions). Ultimately, it was not the goal to fill out each of the dimensions and map them to the stages, as well as it was not for the group discussion reach the consensus. Rather, the main expected outcome of this activity was for the participants to sensitize to the technology and users and articulate their ideas surrounding the eID application in the public sector.

The research team and the partnering organizations prepared the protocols and questions that were adapted to the specific target audiences from the respective case studies. Due to convenience and on-site testing events in the public administration premises, the forms, preliminary translated to the local languages of the municipalities, were distributed physically to the participants. The Data Processing Agreements (DPA) signed prior the pilot phase in the project were defining the rules for data management and access for the analysis of pilot results by research organizations.

3 First pilot findings

This section presents the findings from the data collected on different stages of the first IMPULSE pilot. These results provide with the basis for identifying the user needs and experiences to transform the statements into requirements and allocate those into quality dimensions for the eID solution, subsequently enhancing the developed specifications for the system development.

3.1 Pre-pilot survey results

Prior to the actual IMPULSE testing activities, the pilot participants were invited to provide their demographics information through the developed survey that were disseminated in the local languages of the respective case studies. The responses were anonymized and for the traceability of the responses between different data collection procedures, were assigned with unique identifiers. Besides the demographics and background information, the surveys provided with more comprehensive view of the end-users in terms of their digital and technological skills, as well as their familiarity with different technologies for electronic identification.

In a summary of this activity (Table 1), we noted several characteristics featured in the pilot participants' survey responses. The average age of the users who participated in testing was 46,1 years, two of the case studies were mainly represented by female, while the rest had more male participants. Their education level was varying from completed secondary school, as presented in half of the case studies, to completed doctoral degree, which in total three participants stated in their responses. Most of the respondents completed either the bachelor level or master level higher education, while four opted out from this question.

Table 1: Summary of pilot participants demographics.

Pilot case	Average age	Representative gender	Education level (1st and 2nd most presented)
ARH	58,3	Female	Not specified
ERTZ	50	Male	Secondary and post-secondary education
GIJON	46,8	Male	Post-secondary education or higher
MOP	40,9	Female	Secondary and post-secondary education (bachelor or master)
RVK	-	-	-
UC	46,9	Male	Post-secondary and upper level

The smartphone usage behaviors varied depending on different contexts (Figure 4). Almost all the participants use their smartphones primarily for keeping in touch with their social circles, such as family and friends. Fewer use it to also stay informed about the news and events happening in their surroundings. The responses varied more significantly in using the smartphone for running a business or professional purposes. There, almost a third of the respondents stated that they use it rarely, or just sometimes. However, many users of the smartphone prefer to access and interact with the commercial services in their areas (e.g., electronic membership credentials, shopping, or transportation). Regarding the access to public services, we noted that almost a third of the respondents prefer not to use their smartphones, or do it rarely, to manage their taxes, finances via online banking, or use it for electronic voting. Still, the majority was quite often accessing their public services with a smartphone, although it also depended on availability of services in their respective area.

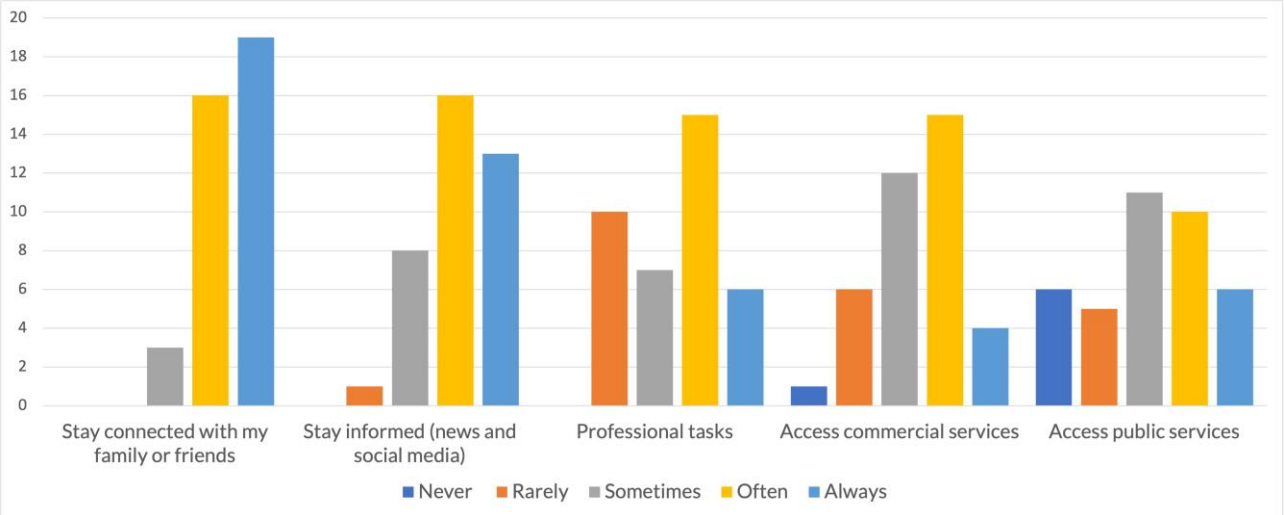

Figure 4: Pre-pilot responses on smartphone usage.

Particularly, the digital format was perceived rather appealing compared to the traditional (e.g., in municipal premises) services (Figure 5). Most of the respondents also acknowledged the digital services are relatively easy in use, although some more reserved in encouraging the authorities to transform the public sector into digital. Still, the trust in a digital landscape between the users and service providers was high on average, while experienced users expressed more skepticism. It is also worth noting that the respondents had different levels of concern about their privacy online, whereas more experienced users stated higher score.

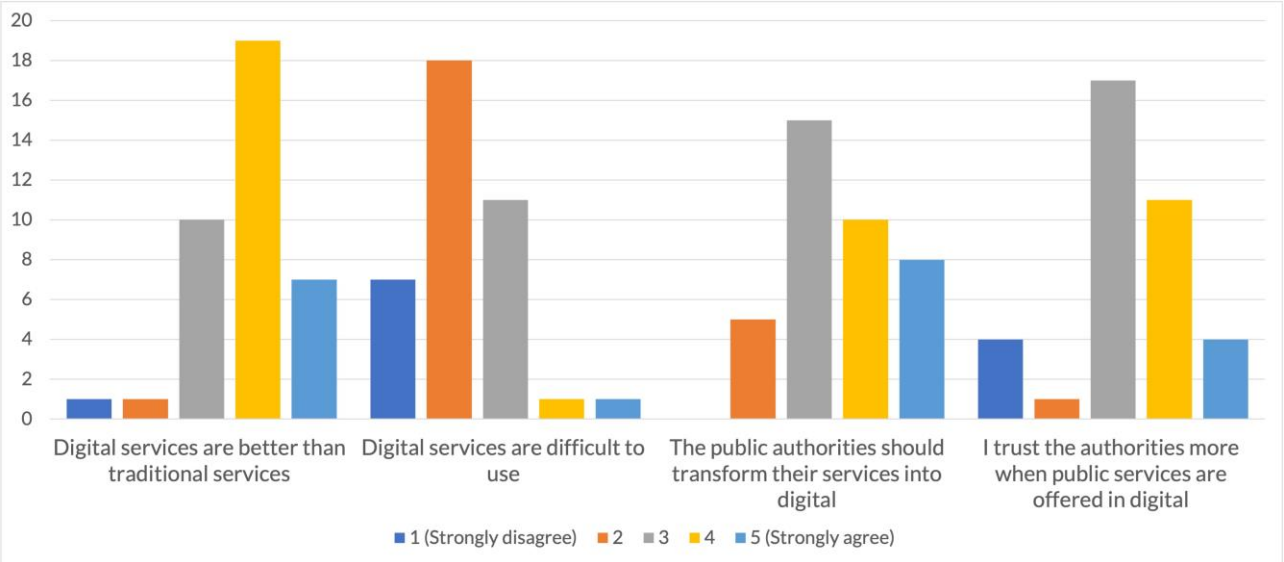

Figure 5: Perceptions of digital public services among the participants from pre-pilot survey.

The most popular technique for digital identity authentication was a “traditional” username and password credentials (Figure 6). All the participants had to use it before, while less were the users of PIN codes, one-time passwords, and smartcards. A high number of users also employ two-step authentication, such as SMS codes, or authenticator applications.

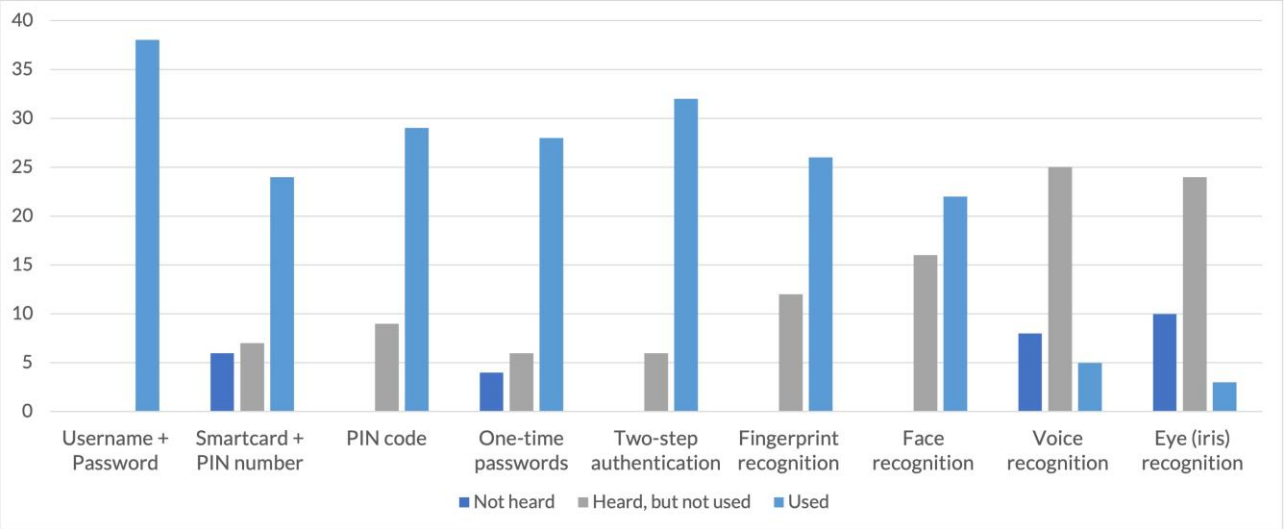

Figure 6: Pre-pilot responses on electronic identification methods experience.

Regarding the biometric authentication methods, most of the participants are the users of fingerprint and facial recognition, while almost a third only heard about it. The voice recognition or iris recognition were the least popular, but known to the respondents, with few who stated to have it used. As of the rationale for using the biometric algorithms in their identification, the respondents were praising the ease-of-use and security comparing to the passwords and PIN codes, while also stating enthusiasm in trying out the new technologies. Fewer use it in their professional tasks, comparing to the everyday use, while a third of the respondents were to adapt to using the biometrics.

3.2 End-user interview findings

The semi-structured interviews were employed as the qualitative data collection method for the follow-up meetings with the pilot participants. The interviews were aimed to connect the responses from surveys and allow the respondents to elaborate on their opinions. The questions were also aimed to explore the perception of usability and other IMPULSE system qualities based on testing experiences. Table 2 Presents with the summary of pilot participants who took part in the interview sessions with facilitators from the public administrations.

Table 2: Interviewees from pilot sites.

No.	Interviewee	Pilot study
1	G1	City of Gijón (Spain)
2	G2	City of Gijón (Spain)
3	G3	City of Gijón (Spain)
4	G4	City of Gijón (Spain)
5	M1	Municipality of Peshtera (Bulgaria)
6	M2	Municipality of Peshtera (Bulgaria)
7	M3	Municipality of Peshtera (Bulgaria)
8	M4	Municipality of Peshtera (Bulgaria)
9	U1	Union of Italian Chambers of Commerce / InfoCamere (Italy)
10	U2	Union of Italian Chambers of Commerce / InfoCamere (Italy)
11	U3	Union of Italian Chambers of Commerce / InfoCamere (Italy)
12	U4	Union of Italian Chambers of Commerce / InfoCamere (Italy)

The interviews were conducted in a local language of the respective case study with the participants who had participated in testing IMPULSE solution during the first pilot phase and positively responded to take part in the follow-up sessions. Following the signed participant consent forms, the interviews were recorded and transcribed for subsequent translation into English and distributing the transcripts for the analysis.

The qualitative cross-case analysis which included open coding technique revealed certain themes and concepts that were transformed into dimensions of these topical discussions. The summary of these dimensions discovered in the interviews are presented in Table 3 below.

Table 3: Dimensions discovered in interviews.

Dimension	Description
Biometrical authentication	Description of the perceived ease-of-use and security of biometric solutions, such as facial or fingerprint recognition
Artificial Intelligence	Description of the perceived risks/advantages associated with the use of AI and blockchain for digital services and systems
Informativeness and transparency	Descriptions of the user experiences from interacting with the IMPULSE app
Digital wallet	Descriptions of concepts related to the personal data management and tools facilitating interactions with the public authorities
Trust	Descriptions of different factors that affect user trust in technology and/or institution enabling adoption

Regarding the biometrical authentication, the facial recognition in particular, the interviewees generally agreed that the facial recognition is a fast and easy-to-use method, comparing to traditional passwords and usernames. Although, most of the respondents already had the experience of using this technology for authenticating themselves as the users (e.g., smartphone unlock), this conclusion also came from the experience of using the login with IMPULSE functionality to access the public services selected for pilots. Some of the participants were rather critical about the technology pointing to the **reliability**, **security**, and the **purpose of use** of the facial recognition in the public sector. In these terms, the participants who were also the users of other biometric authentication, such as fingerprint, were suggesting that they feel more confident with the alternatives, while the latter was mainly associated with the institution that would have approved the use of technology, e.g.:

Q: "Do you feel at ease with facial recognition? Would you feel more / less comfortable with other biometric technologies?"

A (M1): "Do not know how to answer unilaterally – I would really prefer to have other alternative biometric technologies, because they can be used if the main technology fails."

A (U2): "Yes, I'm quite confident, but I would [feel] safer by adding other mechanisms, such as fingerprint recognition."

A (G3): "It depends on the purpose behind it. In this case I feel comfortable [because] I trust the [EU] project and the facial recognition is very convenient.

The topic of institutions behind the technology was also overlapping with the facial recognition. Generally, the interviewees were cautious with the AI approval, however most perceived it as a "reliable" and "safe" technology.

Q: "Do you think that the use of A.I in electronic identity can affect your rights?"

A (G3): "When dealing with a public authority or administration, as should be the case of IMPULSE, I do not think my rights could be affected, but what could happen with them in other cases? How would they affect?"

A (M2): "Do not know. New disruptive technologies must be tested very well in regards to data protection and privacy, and if proven secure, then they should be deployed."

A (U2)" I didn't think about it, even though it is possible: for instance, I can't see how [we can] make a neural network forget, so technically the right to be forgotten can not be enforced... Generally speaking, if we are talking about an "official" electronic identity I think that there is no relevant effect on my rights."

On the positive implications from the IMPULSE experience, the interviewees praised the **login** function with the **facial recognition** being intuitive technology, while the blockchain was understood as an enabler for new interactions between citizens and the public authorities.

Q: "What is the best part of the IMPULSE solution in your opinion?"

A (G1): "It is a cutting-edge technology that could allow new ways of interaction between citizens and public administrations, at least. It is quite promising."

A (M3): "Best part is that actually it represents an alternative to the current ID solutions in Bulgaria, which are not many. Also, it includes new technologies, which can significantly improve data security and data protection."

On the other hand, the **transparency** of the **onboarding** process, as well as navigating the application and **managing the verifiable credentials** appeared as the main drawback from the participants' experience. The interviewees were advocating for increasing the user support and guidance which can keep the user informed about the status of their onboarding. Furthermore, the questions were regarding the data processing by the system which were not clearly explained to the users.

Q: "What is the worst part of the IMPULSE solution in your opinion?"

A (G3): "I felt lost, I was doing things I did not fully understand, and as I had some problems the test was a quite annoyed experience."

A (M1): The process of initial registration – it takes time, and I have to introduce by myself a lot of data, numbers, letters, etc. This is annoying and sometimes I [feel like I] can make an unintentional mistake.

Finally, the interviewees were offered to propose their visions of IMPULSE in future, and the improvements which could direct the eID solution to the desired state, along with the other needs for enhancing the user experience.

Q: "Would you consider using the IMPULSE solution in the future? How would you improve the IMPULSE solution?"

A (G1):" I think the application needs to provide a lot more of information because one might feel lost and so does not trust the application. The user should know how the registration and login processes are, the meaning of each step. […] I like the new ways of relationship between the citizens and public organizations that IMPULSE could mean in the near future, the confidential use of data when dealing with the administration. You would just need a mobile phone."

A (M3): "I would add more features to this App. For example, to use it as a wallet, to connect it to e-banking systems and use it for online banking and to pay with credit cards, etc. Yes, I like the app, because it can be an alternative to the currently existing ID solutions. Maybe I can use Impulse solution in the future, but it depends on the cost."

Overall, the statements that the users gave point to the IMPULSE requirements related to the **usability**, **functional appropriateness**, and **transparency** of the data processing by the system. These are the key factors mentioned regarding user trust in technology and, as implied, adoption of the proposed eID solution in the public sector. The means that help leverage trust in technology are the institutions and the user experience. The latter is especially within the scope of the IMPULSE development and the efforts to enhance the usability of the system through the increased transparency and user support should be in focus in preparing the eID system for the second piloting round.

3.3 Focus-group results

The last user study activity in the pilot phases was designed as a group discussion about the implications and experiences from using IMPULSE system, involving different stakeholders to share their perspectives and visions on different interactions with the eID solution. Similarly to the interviews, the focus-groups were a

follow-up sessions with the testers and therefore, their participation was voluntarily. The number of participants varied from 3 to 6 people, depending on the pilot site. The informal discussion included the co-creative Journey mapping activity that informed with the structure and allowed for keeping the records of the key statements and opinions that the participants offered in their debates. The conversations were also transcribed and translated from the local languages into English to enable cross-case qualitative analysis which would complement the above-mentioned findings.

The Journey mapping, as the group exercise, helped the participants direct their discussions and reflect upon their interactions with IMPULSE considering different stages and dimensions that were predefined in the template (Annex B.4). To provide their input, the participants could optionally write down a statement on a sticky note, that would contain some of the findings from the ongoing debates and put the note on the flipchart or a whiteboard to the corresponding area which is the cross of the stage and dimension. The stages were to include different steps of the users' interactions with IMPULSE that they have taken to accomplish their goals with the eID system. For example, the Onboarding might have included downloading the IMPULSE app, installation, of enter of the personal information to create a VC. The dimensions included Feelings (emotional responses by user on different steps), Questions (uncertainties or interests evoked), Pain poin (the negative experiences, frustrations, i.e., the weaknesses of the system), Opportunities (ideas for solving the Pain points or desired features to improve the user experience). An example of the Journey map from the UnionCamere/InfoCamere pilot case is shown in Figure 7 below.

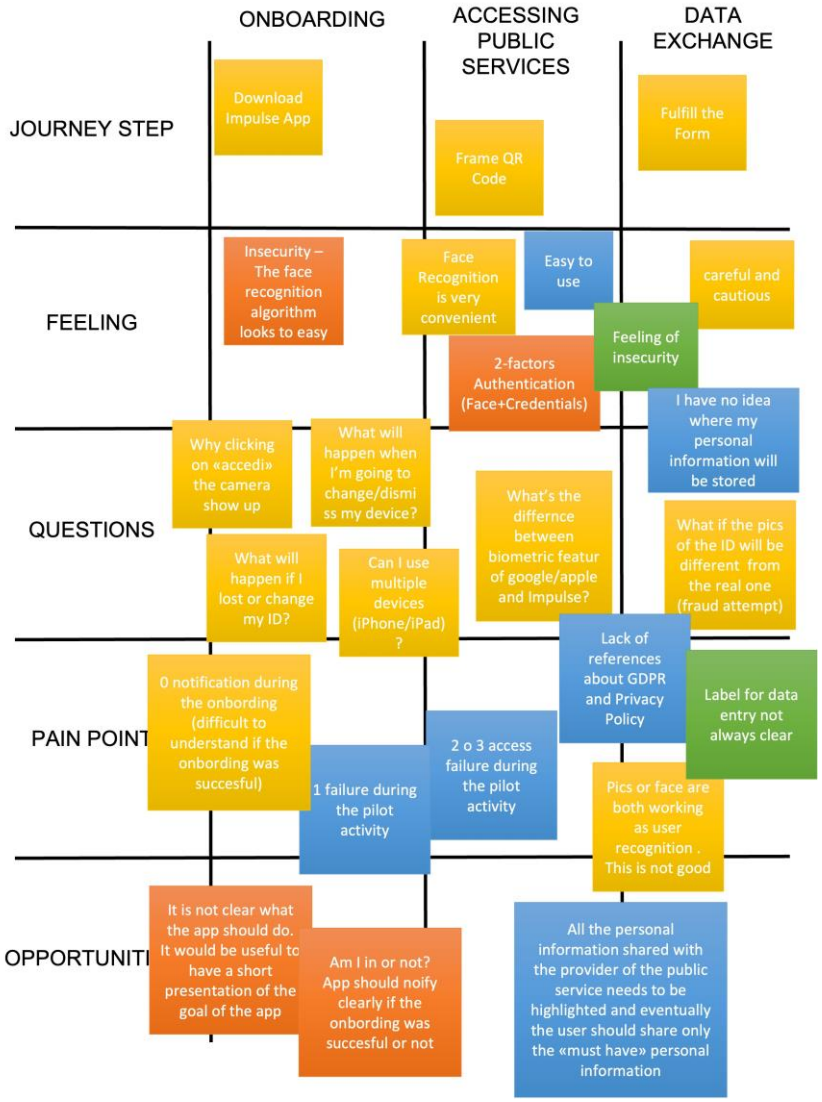

Figure 7: Journey map from the UC/IC focus-group session.

The informal setting and an open format following the predefined set of questions, which the Moderator were free to arrange depending on the discourse, were the key enablers for the results of this group activity. The open coding and analysis of the users' discussions was done along with the interviews, and therefore reinforced with the set of dimensions for transforming the user statements into requirements for IMPULSE presented in the previous section (Table 3).

Figure 8: Focus-group session in UC/IC pilot site.

In all the focus-group sessions, the participants stated they faced several issues on the **Onboarding** stage. There, the users were having some difficulties issues with finding the IMPULSE app on the application store. This might have been caused by the technical limitations with the deployment of the system at its early stage of development. The other confusions were primarily linked to the **interface** of the system and its **informativeness**. The users found it misleading and unintuitive the application presented with the "Login" button, while with their first access and launch of the application they were expecting to see the "Register" button instead. In the Onboarding stage, the participants shared and agreed that the system did not provide sufficient **guidance** for entering their personal information, e.g., *"Some people got confused with the registration/login buttons, or frustrated because they did not get the confirmation, then some questions rose: What should I do now? How long should I wait for the confirmation? Did I do something wrong? Do I try to login anyway? Some of them did it and "surprisingly" worked." (Gijon focus-group)*. While the process itself was quite intuitive for many, the purpose of collecting the credentials was not clear to the users.

There were also questions about the document scan and the manual input of the credentials, e.g., *"Some were asking why it is needed to introduce manually some details of the ID card, while at a later stage the ID card is being photographed and images of both sides are sent to the app – this creates some confusion". (The Bulgarian focus-group)*. They therefore suggested that the document scanning could substitute the

manual process of entering the personal information, which would improve the experience. However, an informed consent should be provided at first.

Other participants have considered the experiences of the target users in respect to the case study, e.g., *"[…] vulnerable citizens, I think they would have jumped off halfway through because it was complicated. They don't have a lot of patience." (The Danish focus-group).* For this reason, the solution might be to provide a clear **guidance in the UI** of the system, to keep the user informed, e.g., "*In my opinion it would also be great if you had some more overview during the whole process. This could be done inserting some horizontal pillar in the top or the bottom of the screen saying, for example: "You are now at step 2 out of 8" and so on, so that the user knows how long he/she is in the process. So, if you are an inpatient individual, you know how far you are, and would maybe not jump off halfway through." (The Danish focus-group).*

The participants continued discussing the **informativeness** of **transparency** of the IMPULSE system, switching to Login stage. After the successful onboarding, many users did not know how to proceed with using the VC for login, as the generated record was presented as a string: *"There is specifically one step that should be enhanced: After scanning the QR code for log-in, you get a blue screen on the smartphone with some white line of code – a lot of letters and numbers combined." (The Danish focus-group). "Some mentioned the strange string which needs to be selected – that is not user-friendly, as noted by most of the citizens." (The Bulgarian focus-group). "Some people did not get why the credentials looks "so odd", a long credential code is not intuitive at all, and suggested something more friendly, for example name and surname." (Gijon focus-group).* However, the login process itself was quite fast, and some praised the overall experience of accessing the public service with IMPULSE: *"I like to use a QRCode as a way to login [with IMPULSE]... I think it's something that allow me to "connect" my identity in the Mobile to something "outside my mobile" quite easily.. the QRCode can be on a website, or on a digital display of an appliance, a smart-card, a paper or whatever... very easy to integrate." (The Italian focus-group).* Others also liked the guiding interface for taking a live photo of their face to login, such as the photo frames: *"I agree! And I would even say that it might be necessary to have these frames. Otherwise, you wouldn't have known from which angle and perspective to take the pictures." (The Danish focus-group).*

Overall, the participants in all the focus-group sessions agreed, that while the login with IMPULSE was a satisfying experience, the main drawback of the current version was the lack of transparency and guidance present within the app. For many users it was not clear how the VC management is enabled with the DLT technology, and therefore they required the application to **provide reassurance for GDPR compliance**, as well as to **enhance user support with the UI** for securing their autonomy in identity onboarding. The participants acknowledged this as a critical factor defining their trust in eID technology.

4 Formal IMPULSE requirements

The requirements validated with findings from the first pilot round helped refine the specifications developed in prior versions. The results of the pilot tests revealed the importance of the user support and guidance provided with the UI, as transparency, informativeness, and the usability were much debated topics for improving the overall experience for the users. The reliability of the services was mainly associated with the technical performance which is aimed for the improvement in the next pilot phase. The IMPULSE requirements specification with the reference to the pilots and system's quality model dimensions are presented in Table 4 below.

Table 4: Requirements specification of IMPULSE

Req. ID	Description	System quality
1	The IMPULSE system shall keep users' personal data and location confidential	Data protection, Security
2	The IMPULSE system shall be able to coexist with other legacy (national) e-ID schemes already in place	Compatibility
3	The IMPULSE system shall allow reusing VC in the ecosystem	Compatibility
4	The IMPULSE system shall inform users about the processing of their data	Transparency, Security
5	The IMPULSE system shall prevent unauthorised access and processing of user data	Data protection, Security
6	The IMPULSE system shall provide users with informed consent in a legal language and accessible with dedicated icons	Transparency, Usability
7	The IMPULSE system shall allow users to control their data in a self-sovereign manner	Security
8	The IMPULSE system shall reduce cognitive burden (remembering many user accounts and passwords) for users	Authentication, Usability
9	The system should provide simple and well-guided user actions when collecting image samples for face recognition	Onboarding, Usability
10	The IMPULSE system shall provide users with spoken and visual guidance and descriptions of the interface in their native language	Usability
11	The IMPULSE system shall provide users with support and troubleshooting mechanisms available in their native language	Usability
12	The IMPULSE system shall detect forged or tampered information uploaded during the digital onboarding	Security
13	The system shall be able to recognise faces captured from images with different resolutions and illumination	Face verification, Usability, Reliability
14	The system shall be able to recognise text from images of identity cards or passports of varying quality, illumination, resolution, and focus	Document verification, Usability, Reliability

Req. ID	Description	System quality
15	The IMPULSE system shall remind users if the VC is getting expired in a near time due to long idle and therefore offer them to perform the onboarding to obtain a renewed VC (e.g., face appearance changes affect True Positive Rate)	Management of VCs, Usability, Reliability
16	The IMPULSE system shall improve their AI-based facial recognition models over time to adapt to better adapt the user	Face verification, Performance Efficiency, Usability, Reliability
17	The IMPULSE system shall have reduced data usage so that it optimises network use via cellular and WiFi connection	Performance Efficiency
18	The IMPULSE system shall verify that the user who is trying to authenticate is the owner of the VC	Authentication, Functional Suitability, Reliability
19	The IMPULSE system shall send an authorization request to the public administration in charge of the requested online service	Authentication, Security
20	The IMPULSE system shall store user's VC and the public-private key pair in the user's control in their own device to maximize the user sovereignity over their own data.	Management of VCs, Functional suitability
21	The IMPULSE system shall be available on different interfaces for accessing the public service on-site	Management of VCs, Authentication, Portability, Usability
22	The IMPULSE system shall have integrated ACL mechanism to use a particular e-ID if multiple VCs are stored on the user device for accessing a public service	Management of VCs, Functional suitability, Security, Usability
23	Biometrics and other personal identity data introduced by the user should be deleted from device storage after being processed. VCs, DIDs, and the biometric profile that protects the VCs should be stored encrypted. The private/public keys should be stored in a secure keystore	Data protection, Security

5 Conclusions

The first iteration of the IMPULSE requirements specification (D2.2) included the results of the literature review and the first co-creation workshop involving the members of the Consortium. This provided the basis for the general requirements for the eID solution that was evolving throughout the phases prior to the first round of pilots.

The second version of specifications included the refined set of IMPULSE requirements produced from the co-creation workshops with the prospective end-users from the selected case studies with the aim to reflect the specifics of each pilot site. This approach allowed for the uptake of the co-design practices in the requirements elicitation process and upscale the user-centred design approach to the six case studies. The partnering organizations adopted the framework for executing the co-creation activities, along with the volunteers recruitment, digital tools and techniques for engaging with the end-users from their respective locations, and prepared for the arrangements necessary for pilot tests.

The third, final iteration was set with the objective to validate the results of the previous outcomes in IMPULSE co-creative requirement elicitation process with findings of the first pilot round. It concludes with the refined general set of formal IMPULSE requirements that align the visions of the eID solution for public services for all the involved stakeholders to guide the further development of the system in its preparation for the second pilot round.

5.1 Limitations and future considerations

Prior to the beginning of the pilot phase in the project, the European Blockchain Services Infrastructure (EBSI) underwent maintenance works for updating its infrastructural components. As a critical element integrated with the IMPULSE system for generating and managing the VC of the users, this could potentially overlap with the testing phase by the pilot participants. Therefore, to alleviate the risks of disrupting the tests, the pilot events were shortened from the initial two weeks to one week of the actual system testing. The data collection activities, originally designed to be the intermediate events in the pilot were postponed for the period following the user testing. In a way, this resulted in time deviations between the tests (user-system interactions) and the feedback collection that could affect the relevance of the results and the impressions of the end-users.

The pilot arrangements occurred with the logistical issues, particularly with the volunteer's recruitment in the Danish case. The technical difficulties with the IMPULSE implementation on-site (case study in Aarhus includes integrating the eID system with the physical lockers as an external interface for vulnerable citizens) caused time deviations with the pilot preparations and challenges for attending the target audience of the solution. Due to the pilot designs, the participants pool included the workers from the partnering organizations indirectly working with the vulnerable citizens. Considering the course of events as the risks for the second pilot round, the Consortium partners agreed to improve the efforts in pilot preparations for the recruitment and training of the volunteers involved in IMPULSE tests.

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Annex A Pilot recruitment materials

A.1 Invitation letter

Invite for IMPULSE app pilot test

[Dear person (if known)],

We hereby would like to inform you about the initiative of [public administration] to participate in the research conducted by the consortium members of the project "Identity Management in PUbLic Services" (hereinafter "IMPULSE" or "Project"). It is a 36-month research project funded by the Horizon 2020 Programme of the European Commission.

IMPULSE focuses on two most promising and disruptive technologies nowadays – Artificial Intelligence and Blockchain – to build a secure and privacy-preserving electronic identification service.

Citizens and organisations can take advantage of such technologies in public services conveniently running it on their devices and controlling their data provided to public authorities across all European countries. For example, sending an online complaint to the police department or requesting a tax card from the office by simply showing the face and ID document on the smartphone camera.

To enable trust and confidence in this service and make it appealing to use, IMPULSE intends to design its electronic identification solution together with the prospective users, i.e., citizens and organisations, in a series of co-creation activities organised within the scope of the research project.

[Public administration] being a member of the IMPULSE project consortium is delighted to invite you to join the first pilot test of an electronic identity solution which will take place [date, October 3rd-28th] in the municipal premises.

Objectives

The objective of the pilot is to allow the prospective users for trying out IMPULSE application, testing and evaluating its features in different scenarios and conditions.

You are invited to share and discuss your expectations of what the IMPULSE app should be like to make it more trustworthy, comfortable, and effective from the user's perspective.

Your participation and valuable feedback will guide the technical partners of IMPULSE consortium and contribute to the design of the future solution.

Structure

> **Format:** Meetings and testing the IMPULSE app
>
> **Location:** Online, at premises, and at home
>
> **Duration:** 20 days

In this pilot test, you will be introduced to the IMPULSE solution and what are the technologies behind its implementation.

First you will have a kick-off meeting organised by [public administration], where the app will be introduced to the pilot participants, and you receive support on installing it on your mobile device.

After this meeting, you are invited to test the app at your accommodation and share your thoughts in the form of a user diary and feedback surveys.

An intermediate meeting will take place after 10 days of testing and you are invited to participate in a group discussion as well as short one-on-one interview sessions with the pilot facilitators. These activities will help to flesh out features and share different opinions on how they can make IMPULSE solution more appealing.

If you are interested in taking a part in IMPULSE app testing, please reply to this email and we will send you the registration instructions along with the consent form and pilot agenda. An invite to the sessions arranged on-site will be sent nearer the time.

For further information please contact [organiser's email].

Agenda

dd/mm/yyyy hh:mm – Kick-off meeting

- Welcome, aims of the piloting
- Pre-pilot survey
- On-boarding to IMPULSE
- The IMPULSE project and application

- Introduction of the IMPULSE prototype

dd/mm/yyyy - dd/mm/yyyy – First testing period

Test the IMPULSE app at home and keep a simple user diary, where you can write down your thoughts, positive experiences, issues, and concerns that arise while using the app. During this period, you may also fill out a survey regarding the IMPULSE application.

dd/mm/yyyy hh:mm – Intermediate meeting

Focus group discussions and one-to-one interviews:

- Exchange experiences and implications with the other pilot participants
- Provide feedback and ideas on how to make IMPULSE app better for its users
- Create journey map of user experiences to find potential weaknesses and strengths of IMPULSE app

dd/mm/yyyy - dd/mm/yyyy – Second testing period

Test the IMPULSE solution at home and keep a simple user diary, where you can write down your thoughts, positive experiences, issues, and concerns that arise while using the app.

dd/mm/yyyy hh:mm – Wrap-up meeting for pilot

A.2 Pilot participant consent form

IMPULSE pilot test participant registration and consent form

Dear participant, to enrol for the pilot test event, please, fill out the registration form below and familiarise with the terms of data collection and processing before giving your consent on the final page of the present document.

Name

Contact email

Job title/Occupation

Age group

18-34 35-54 55-64 65+ Prefer not to answer

Gender

Female Male Diverse Prefer not to answer

Permission for the follow-up contact *

Yes No

1. **Contact information**

Data Protection Officer (PA)	**Ethical Manager (IMPULSE)**
Name	Francesca Morpurgo
Email	f.morpurgo@cyberethicslab.com
Phone	

2. Aim and goals of the research project

This research is conducted by the team members of the project "Identity Management in PUbLic Services" (hereinafter "IMPULSE" or "Project") www.impulse-h2020.eu . IMPULSE is a 36-month research project funded by the Horizon 2020 Programme of the European Union. The Project is composed by 16 European partners (hereinafter the "Consortium") and its goals are:

1. Understanding the landscape of existing eID solutions in different European countries. eID refers to the different ways a person may prove their identity to access and use online services.

2. Evaluating the adoption and impact of eID solutions based on Artificial Intelligence (AI) and Blockchain (BC). AI and BC are two different types of technology proposed to make eID safer and more trustworthy for people.

To achieve these research goals, the Consortium will study 6 pilot cases in the following countries: Bulgaria, Denmark, Iceland, Italy, and Spain. Each case will be designed using the data from questionnaires, interviews, and workshops.

3. Rights of the participant

We would like to emphasise that:

- your participation is entirely voluntary.
- you are free to withdraw at any time.
- you can review the data we collect from you and request its deletion anytime.

The data collected during the pilot test will remain anonymous, so it cannot be traced directly or indirectly back to you. It may be discussed with the members of our study research group, or in case an external quality assessment takes place, with evaluators under the same confidentiality conditions. Pilot test sessions' excerpts which include **written notes** and **transcriptions of oral discussions** of the participants from the **audio and screen recordings** and key concepts may become part of one or more publications, but no personal data such as names will be included, unless you explicitly authorise it.

4. Data Controller

The Data Controller of Personal Data is [public administration].

Personal Data processing and lawful basis

The Controller will only process the Personal Data that you will voluntarily and directly decide to provide and/or disclose to the same Controller in connection and/or related to the workshop and that you agreed to answer by granting your consent via the Information Sheet. The Controller will collect and process Personal Data such as, for example, some of your data concerning your name, contact information, etc. The lawful basis pursuant to which the Controller will process your Personal Data shall be your freely and informed consent to the data processing itself given by you by ticking the "consent boxes" provided at the end of the present form. Please note that you are free to give your consent as well as to deny it.

Purpose of the data processing

The Processing of your Personal Data will be limited to the extent necessary to perform the research activities indicated in the Information Sheet you were presented on the previous page, and for which you gave your freely and voluntary consent. Any other further processing of your Personal Data will be excluded without your previous consent.

Recipients of Personal Data and Personal Data transfer

Your Personal Data may be shared, for the purposes referred to section "Personal Data processing and lawful basis" above mentioned, with:

- Subjects, bodies, or authorities to which the Consortium and/or its partners are obliged to communicate their personal data pursuant to any applicable law.
- We may also share your information with the European Commission or with competent legal and/or fiscal authorities for legitimate reasons.

- Your Personal Data will not be shared with countries outside the European Economic Area.

Data Retention and Data Security

Those Personal Data processed for the purposes set out in section "Purposes of the data processing" will be kept for the time strictly necessary to achieve the purposes stated therein. In any case, we will delete your Personal Data at the end of the Project. In any case, to ensure the best level of protection of your Personal Data we will apply all the best physical and logical security measures internally, and our servers are subscribed from the most established cloud providers and protected through state-of-the-art security measures.

Data Subject rights

Pursuant to Chapter 3 of the GDPR, you have the following rights concerning your Personal Data:

- The right to be informed

- The right of access to data concerning the data subject (article 15)
- The right to rectification of data (article 16)
- The right to erasure of data (article 17). The right to erasure shall not apply if the processing is necessary for archiving purposes if the right to erasure prevents or significantly hinders the data processing
- The right to restrict processing (article 18)
- The right to data portability (article 20)

- The right to lodge a complaint
- The right to withdraw consent
- The right to object to processing

If you wish to exercise any of these rights, or you wish to be provided with more information in this respect, please contact our Data Protection Officer using the contact details set out above.

5. Informed consent

By signing this document, the participant gives consent to [public administration] to use for this research project the collected data, audio and video recordings, and written transcripts from the pilot test sessions, processed in compliance with the EU General Data Protection Regulation no. 2016/679 ("GDPR"). The participant grants permission to use this material in future scientific publications. The data will always be treated as confidential and personal information will never be made public. The information will be securely stored and retained for the duration of the project and safely deleted afterwards.

I confirm that I have read and understood the project aim.

I understand that my participation is voluntary and free-of-charge.

I agree to take part in the above research activities.

I agree to the use of anonymised quotes in publications.

I agree to being audio/video recorded for later analysis and transcription of the discussions, as well as for assessing the effectiveness of the research methods.

6. Agreement

By signing here, I declare to have read the information above and accept participating in the IMPULSE pilot test event in the context of the project "Identity Management in PUbLic SErvices (IMPULSE)". By doing so, I grant permission to use the data collected from the registration form and during pilot test sessions and to summarise the results anonymously in scientific publications.

I have had the opportunity to have all my questions answered to my satisfaction. At any moment, it is possible to withdraw my agreement, without any consequences or having to account for my decision.

I agree to be kept updated with IMPULSE project activities and results through my contact below (optional):

e-mail _____

A dated copy of the information sheet and this signed consent form will be given to the signee.

Date (day/month/year):_____

Name and signature of the participant: Name and signature of the organiser:

_____ _____

Annex B End-user pilot activities

B.1 Pre-pilot survey

Introduction

This survey is part of the end-user pilot testing executed by the IMPULSE project team. The survey is meant for all participants to fill. The survey will be anonymous.

This is the pre-pilot survey, which has background questions related to you, and your current opinions and knowledge regarding digital services. There will be another survey after the testing of the IMPULSE solution, asking of your experiences and opinions.

Participant identifier (given by the local public administrator)

_____

This identifier will only be used to be able to combine the pre-pilot and post-pilot surveys together when examining the answers. Remember to use the same identifier in both surveys.

1. **How old are you?**

Please input your age in years _____

2. **What is your gender?**

- Male
- Female
- Diverse
- Prefer not to answer

- Prefer to self-describe as _____

3. **What is your highest level of education?**

- Not completed primary school
- Completed primary school

- Completed secondary school
- Completed post-secondary vocational studies, or higher education to bachelor level or equivalent
- Completed upper level of education to master level or equivalent

- Completed doctoral degree
- Prefer not to answer
- Other _____

4. I use smartphone to…

	Never	Rarely	Sometimes	Often	Always
Stay connected with my family / friends (phone, SMS, messaging, etc.)					
Stay informed about what is happening around me (news, social media)					
Run my business / do my work tasks (email, phone)					
Use services in my area (shopping, taxi, membership app, bonus card, public transport)					
Interact with the public services (tax management, library card, online banking, electronic voting)					

5. What do you think of digital services?

	1 Strongly disagree	2	3	4	5 Strongly agree
Digital services are better than traditional services					
Digital services are difficult to use					
The government (authorities) should transform public services into digital					
I trust the authorities more when public services are offered in digital					

6. I am concerned about privacy when accessing services over the internet

Strongly disagree 1 2 3 4 5 Strongly agree

7. Which of the following digital identity technologies have you used or heard about?

	I have not heard of this technology	I have heard of this technology	I have used this technology
Username + Password			
Smartcard + PIN number			
PIN			
One-time passwords / codes			
Two-step authentication (SMS codes, Google authenticator, etc.)			
Fingerprint recognition			
Face recognition			
Voice recognition			
Eye (iris) recognition			

8. If you have used biometric (facial, fingerprint, voice, eye recognition) technologies, why have you used them? Please select all that apply.

- I was interested in new technology to try it out
- I was convinced it is more secure and reliable

- I had no choice but to use the device with biometrics
- I use biometric technologies for work
- I use biometric technologies on my free time
- It is easier / more convenient than passwords or PIN codes

B.2 Interview questions

Interview questions for pilot participants

This document contains the interview questions for pilot participants. The interview should be done in 1:1 setting. It would be recommended to have at least 4 participants interviewed. All questions (and possible follow ups) are recommended to be asked.

The interviewer can ask additional questions not given in the list if

- The answers given by the participant would encourage additional follow up questions (use your own judgement)
- The case owner has additional questions they would want to ask from the participant that are not included in the list.

The interview answers should be recorded in as much detail as possible. A transcription of the interview would be the best solution but if that is not possible, writing the answers manually with as much detail as possible is also viable.

Participant id _____ (the same participant ID used for the survey answers)

1. **Do you feel at ease with facial recognition?**
    1. Why yes / why not
    2. **Follow up:**
    Would you feel more / less comfortable with other biometric technologies (such as fingerprint recognition)?

2. **Do you think that the use of A.I in electronic identity can affect your rights?**
    1. How would they affect?
    2. **Follow up:**
    Would this be a dealbreaker for you in using a solution such as IMPULSE?

3. **What is the best part of the IMPULSE solution in your opinion?**
    1. Please describe why

4. **What is the worst part of the IMPULSE solution in your opinion?**

    1. Please describe why

    2. If the answer is “only works on Android”, please ask the participant to name something else.

5. **Regarding your personal data, do you think that they are more protected with IMPULSE than with other digital identity solutions?**

    1. Why yes / why not?

    2. **Follow up:**
    How would you want your personal data be protected?

6. **Is there anything you would NOT change in the IMPULSE solution?**

    1. If there is, please describe why you would not change it or why it is important not to change it.

7. **How would you improve the IMPULSE solution?**

    1. Features, bugs, different use-case, etc.

8. **Would you consider using the IMPULSE solution in the future?**

    1. Why yes / why not?

        1. If not, what if the solution was further improved? Is there anything that would make you change your mind and consider using IMPULSE?

9. **Is there anything you would want to comment on regarding the IMPULSE solution or the pilot activities?**

10. **Would you be interested in participating in similar activities in the future with the IMPULSE solution?**

B.3 Post-pilot survey

Introduction

This survey is part of the end-user pilot testing executed by the IMPULSE project team. The survey is meant for all participants to fill. The survey will be anonymous.

This is the post-pilot survey, which will ask your opinions regarding the IMPULSE solution.

User identifier (given by the local public administrator) _____

This identifier will only be used to be able to combine the pre-pilot and post-pilot surveys together when examining the answers. Remember to use the same identifier in both surveys.

1. **How likely would you be to use the IMPULSE solution instead of the digital identity (log in) systems you currently use (username/password, smartcard, PIN, etc.)?**

Not at all likely	1	2	3	4	5	Very likely

2. **Answer the following only if you answered 4 or 5 to the first question:**
Why would you use the IMPULSE solution? Tick only the most important ones for you (maximum of 4)

- It is intuitive to use
- It makes assessing online services faster / more convenient
- It is modern and interesting
- It gives me control over my data
- It is secure
- It does not require a passwords
- With facial recognition, I am less worried about hackers
- Other reason (please specify) _____

3. **Answer the following only if you answered 1 or 2 to the first question: Why would you not use the IMPULSE solution? Tick only the most important ones for you (maximum of four)**

- I do not want to depend on my smartphone

- I do not have a smartphone
- I am worried about what happens if I lose my smartphone, or it is stolen
- I am worried about facial recognition technology
- It is too complicated
- I use too few online services to make IMPULSE worthwhile

- I am worried about hackers and identity theft
- Switching to a new system is too much hassle
- Other reason (please specify) _____

4. **For which online services do you think the IMPULSE solution would be the most suitable? Please select no more than three.**

- Online banking
- eHealth (e.g., electronic communication with a doctor to get a prescription instead of going in person)
- Digital vaccination certificate for Covid or other diseases
- Social media
- e-Commerce (e.g., Amazon, AirBnB)
- Completing tax returns online
- Registering for social services online
- None
- Other (please specify) _____

5. **Please circle all of the following words and phrases that you feel describe IMPULSE.**

	Unnecessary	Privacy-friendly
Convenient	Dangerous	Not useful
Complicated	Easy-to-use	Weird
Surveillance	With IMPULSE I can decide who gets my data	Safe
Makes signing up for services easier	Saves time	Makes login process easier
Creepy	IMPULSE gives me control over my data	Boring

6. **Please share your opinion on the following:**

	Strongly disagree 1	2	3	4	Strongly agree 5
I found the IMPULSE solution unnecessarily complex					
The IMPULSE solution reduce/simplifies the number of steps in accessing PA services					
I think that I would need technical support to be able to use the IMPULSE solution					
I feel comfortable using the IMPULSE solution					
Overall, I find the IMPULSE solution useful					
I would recommend the IMPULSE solution to other people					

7. **People may need to share documents and certificates online, like their driver's license, university degree, or CV.**
If the IMPULSE solution would let you store and share verified digital copies of your documents, would you likely use this feature?

- Yes
- No

8. **Would you prefer a universal digital identity (based on your identity card) that works for any online service or have different digital identities for each service you use?**

- Different digital identities for each service
- Digital version of identity card, a universal digital identity

B.4 Focus-group facilitation guide

IMPULSE focus group activity

Document summary

Use: To prepare and run focus group session with the objective to collect user feedback
Who should use it: Partnering Lead and Focus Group Moderator
Tool type: Guidance
How to use it: Reference for running the focus-group session

1. Scope and purpose

Focus group

- **Duration:** 1-2 hours (depending on accessibility of participants)
- **Tools required:** Notebook, voice recorder, video recorder, sticky notes and marker pens, flip-chart paper or whiteboard, participant consent forms
- **Participants:** 6-8 people who tested IMPULSE app
- **Expected outputs:** Text (transcript, notes), audio recordings, video recordings, photos

Focus group is a user research method aimed at understanding opinions and attitudes towards specific topic through an **informal group discussion** with the invited users.

Focus-group sessions are conducted as a part of pilot activities after end-users interact with IMPULSE software to test its features.

Focus-group session is run by **Moderator** who guides a group through a set of questions.

The role of Moderator:

- ensure the session is run following preplanned script
- encourage participants to contribute to the group discussion
- avoid situation where one participant's opinion is dominating
- facilitate the group discussion for all participants

The focus group **discussion is recorded** for data collection and analysis in project and research related tasks.

The remainder of this document describes the structure of IMPULSE focus group script.

2. Structure

2.1 Preparations

The focus-group session is organised by the partnering public administrations in the municipal premises of their respective pilot site.

A venue should be convenient enough for the participants and suitable for the tools' setup to run a group session and record the discussions.

Before the session begins, Moderator must ensure that:

- all the **participants are informed** that their discussion can be recorded in audio/video formats and the recordings are used for research and project related purposes as described in Participant consent form
- the results of the group discussion will be **anonymised and cannot be traced** back to participants individually
- should any participant refuse to give their consent they are **free to withdraw** from the session at any time
- tools for **audio/video recording** of the session are in place and functioning, along with the template for Journey Mapping exercise

If appropriate, incentives can be offered to the invited participants, such as coffee and snacks.

The focus group should be carried in **informal setting** to stimulate non-judgmental environment and make the participants feel free to discuss the given topics.

2.2 Introduction

Focus group introduction

In the beginning of session, Moderator:

- Welcomes participants
- Introduces hosts of the session (IMPULSE Consortium and public administration)
- Explains the goal, format, and expected outcomes
- Informs the participants that the session will be recorded and results anonymised

The session begins with short introduction on goal, format, and expected outcomes of the group session.

The **topic of the discussion** is "*IMPULSE technologies for accessing online public services*". The topic sets to explore **user experiences and opinions** about IMPULSE after testing the software. It is therefore structured around the questions such as:

- *"How was your interaction with IMPULSE?",*
- *"Did you find IMPULSE promising for your every-day use? Why and why not?",*
- *"What could make IMPULSE more appealing?".*

Moderator reminds the participants that the objective of the focus group is not about finding a consensus, but more about **understanding different perspectives**.

2.3 Journey Mapping activity

ⓘ Journey Map summary

- Is supplementary, **not the key** activity of the focus group session
- Can **facilitate the discussion** offering different views to reflect on
- Serves to **outline participants' statements** and collect summaries of their experiences

The discussion is supplemented with the exercise activity called Journey Mapping. It should help participants **outline their key statements and visualise the process** of interacting with IMPULSE software.

The Journey Map is present in pre-defined template on a flip-chart paper or whiteboard (see Figure 1). The template can be easily replicated in a drawn format.

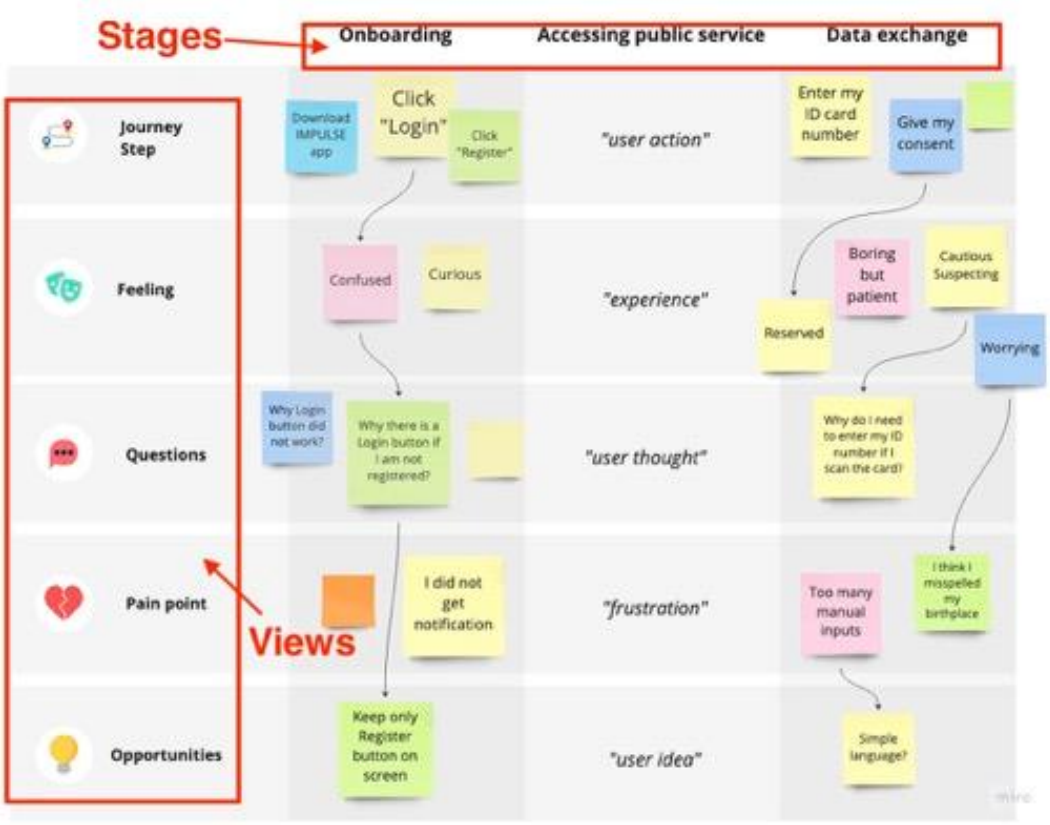

Figure 1. Journey Map template.

There are **three high-level stages** that generally describe IMPULSE functionality from the user's perspective:

- *Onboarding* - first use of the app, from downloading to registration process
- *Accessing public service* - actions taken after registration was complete (i.e., login with IMPULSE)
- *Data exchange* - reflections on sharing personal data and app's informativeness

The stages are highly aggregated to give participants flexibility and space for their thinking about taken actions. It's up to the participants to define **how specific the action** was, as long as they can make **meaningful reflections** on them.

There are **five views** corresponding to different stages of interacting with IMPULSE application:

- *Journey Step* - **any** actions that users took while testing the app
- *Feeling* - experiences and reactions evoked at the stage by the app
- *Questions* - thoughts or uncertainties the users had regarding the app

- *Pain point* - malfunctions the app that raised frustrations or negative reactions
- *Opportunities* - ideas on what and how the app should work to improve the experiences

The views can help **guide the participants in their reflections** while discussing the topic. Participants or Moderator can write down their key **statements on a sticky note** and place it in the Journey Map field which corresponds their view and the stage.

By doing so, participants share their experiences, preferences, and frustrations to keep the discussion on track and further stimulate the exchange of opinions.

The statements can be **connected with the lines** drawn between the sticky notes on different view levels. For example, the *action* "Register in IMPULSE" could evoke the *feeling* of "Confusion" as some misleading button was present on the app's screen. Further, the *opportunity* could be to "Leave the Register button as the only option on screen".

The sticky notes can also be **freely moved** vertically or horizontally, and the **statements can be repeated**. Ideally, the statements' outline should follow **left-to-right** direction to help visualise the overall IMPULSE workflow.

Moderator can initiate the exercise with the first action that was required to use IMPULSE, "Download the IMPULSE app". After that, the participants can be asked the questions, such as "*How easy was it for you to find the app in store?*", "*How long did it take for the app to download/install?*".

Further *actions* should be stated by the participants while Moderator can write them down on sticky notes to facilitate the activity.

If necessary, Moderator can stimulate the participants' thinking by asking the questions:

- "*What was the following action you took with IMPULSE?*"
- "*How did find the registration process?*"
- "*Did you try to click on Login button first?*"

Another technique to stimulate the discussion is asking "*What if...?*" questions, which can add new perspectives on the topic.

There is **no strict framing nor completion goal** for the exercise. Rather, it should guide the discussion and help participant reflect on their testing experiences.

3. Closing focus-group session

Once time of the session is up and participants finish sharing their meaningful comments, Moderator can wrap-up the discussion. This could be the final questions to participants, such as:

- "*Would you recommend using IMPULSE app to other people*?"
- "*Do you think it is a good idea to use IMPULSE in future?*"
- "*Would you see yourself using IMPULSE app regularly?*"

Moderator reminds the participants, that taking part in this group discussion they **contribute to the design** of future technology.

Moderator thanks the participants for their **time and commitment** and invites to follow up the IMPULSE project for future updates and events.

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