Creating a value-driven Digital Identity Future

Engaging multiple stakeholders in strategic dialogues to balance values in the emergent ecosystem of digital identity in Europe

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I started my master at the EU Delft to explore how we can create real change with design to create a world in which we can flourish as a whole. My time before Delft let me explore sustainability in which I embraced myself in the complexity of material design processes in regards to cradle to cradle and biomimicry. Being quite comfortable in the uncomfortable became a part of me due to that process.

However I was doubting how to make other people think about challenges in a more intuitive way and how to balance out my ‘activism’ with ‘realism’ to engage people and make actionable steps. At the TU Delft I got in contact with strategic design, systemic design ,mental models, technology and the way we can formulate futures and speculate.

Within my time at TU Delft I got fascinated by the people layers in the system and learned to understand more about why we think how we think, here I was researching the influences of current systems on our behaviour or developed tools with my two lovely friends Vicky and Neva in ‘hii’ to help students communicate rather ‘difficult topics’ in a playful way with peers they have never seen before. Those experiences made me realize that understanding change is about understanding the people within the system layers. Therefore I find it really fascinating how my whole master graduation was following the paths of people engagement, understanding and moral engagement simultaneous as I put my personality and drivers into the research and design goals. A journey of growth and learning, in which I explored, engaged, failed, stood up, revised and finished my journey at the TU Delft by integrating technology, people and a future perspective.

Within the TU Delft I found my voice and started to build on my strength to talk with people and embrace myself in the unknown by keeping true to myself. Helping myself realize that changes are created in collaboration and that I want to learn even more in this direction.

In this project I especially thank my TU Delft supervisory team Peter and Ruud for leading me back on the right track and iterating with me within the boundaries of the complexity. I really appreciate it, especially in the fluffy times, because my personality was driving me into exploring more and understanding every single piece.

Next to that a big shout to all INNOPAY’ers. You helped me to build up a part of me, to structure my thoughts into pieces and I learned and I enjoyed every second. A wonderful joined venture.

Enjoy reading!
Melissa Kramer
30-04-2023

PREFACE

Yes, we are talking about values again, but different than usual. Future Speculation, technology ethics, politics, legal, governance, reality, values, different perspectives, mental models and me in between trying to understand what is going on, by looking at different perspectives and wrap it all together.

Exploring a new field encouraged me to go beyond user values and look into the system layers. Here I learned to think like a scheme builder, user and business and this knowledge I wanted to share with other by the end of the project.
I got thrown out of the user bubble to see how systems are created and got real-life experiences in the balancing acts in every layer of the new emergent ecosystem of digital identity. In technology, you often hear exponential growth; that is precisely how I feel today.

Because I like storytelling so much, I want to introduce you to a sensitizer of my journey inspired by the artist Stereoclip. Integrating Value Sensitive Design and Mental Models within Systemic Design into a ‘song / Poem’

(Song Inspiration: How to Listen to this Album)

POEM

(How to read the report)

“On the one hand, we live in the eternal now”
Because that is all there is
So we think everything we know about is in the present
Everything we know about is here

On the other hand, we create futures today
Futures we will experience
Futures that become experiences tomorrow
Can we experience tomorrow’s future today?

The experience of future generations

Technology is a shaper of those experiences
A shaper of our believes, mental models
A catalyst of what we value when, where and how
A creator of value and pain

Different Mental Models for different contexts
For different situations
Defining how much we appreciate the experience
And also defining how secure the process should be
This changes how autonomous people want to be
This changes inclusiveness

We are creating future believes today
So we are in this together now...
And we want to build this future together
A future we will experience tomorrow

Shaping all future verification interactions for different context Physical, remote, online or via platforms
A future build on multiple perspectives and values for different parties.
Technology shapes us, and we shape technology.
Technology with moral values as the foundation

We are in the middle of an ongoing development process

eIDAS 2.0 + EUDI Wallet

eIDAS 2.0 is the revision of eIDAS Regulation. eIDAS (Regulation (EU) No 910/2014) on electronic identification and trust services created the rules for electronic transactions in the internal market. In October 2020, the European Commission came together to evaluate the current eIDAS legislation and regulatory framework to see if the needs are met (European Commission, 2022). As the evaluation showed missed objectives, the revision process aims to act on the current needs, trends and developments around technology and its usage. This involves different delegating acts to create the EU Vision of creating a architecture reference framework[4] (ARF) which makes up the EUDI Wallet to facilitate future verification processes.

EU Citizen as Holder of a Wallet

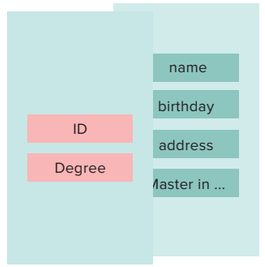


Figure 1: EU Citizen as Holder of a Wallet

ARF[4]
The framework builds the technology outline for all future wallets that are used for verification processes. The member states will be able to adapt the framework and add more security features, however the core is the same to create an interoperable ecosystem based on the architecture structure of the wallet.
This way we might end up with 100+ digital identity solutions.

EXECUTIVE SUMMARY

We live in an increasingly complex world in which policy regulations and system development must balance technology, existing regulations and all the people participating in the system . Currently, digital identities facilitate multiple verifi c ation p rocesses i n m ultiple c ontexts. F or example, to give the ability to prove their own identity to buy alcohol or verify within the work environment, for as a healthcare practitioner. Experts and the EU Commission see unmet needs and problems within the digital identity fi eld, which led to the revision process of eIDAS 2.0 to include the missed objectives of the present regulation on electronic identifi c ation a nd t rust s ervices, c reating t he r ules f or e lectronic transactions in the internal market. For example identity theft rises, privacy concerns towards big tech grow and there is little to no interoperability between sectors and borders (European Commission, 2021).

This thesis explored the ongoing development process through a systemic approach and the lens of Value Sensitive Design (VSD) (Van Den Hoven et.al., 2015). A research-by-design approach uncovers the values and uniqueness of multiple stakeholders and provides new perspectives on the emergent system dynamics of digital identity. The EU Commission Vision on the EUDI Wallet was used as starting point to explore stakeholder values (Users[1], Relying Parties[2], Experts / Oversight Perspective[3]) and engage them in the future by still acting as the experts of their own experiences.
Value tensions and risks are mapped to showcase the future implications of wrongly managed decisions in the process from a system perspective. Based on the systemic approach a vision for all coming verific ation p rocesses i s c reated a s t he d evelopment i s j ust a s tarting process for what is coming next within the wallet development fi eld.
The vision aims to help facilitate a way to include the values and mental models of diffe rent p arties i n t he c reation p rocess o f d igital i dentity verifi cation experiences.

“Creating respectful transaction mechanisms that include the values of all participants by integrating a trusted relationship in the layers behind the app”

The design provides a new value-fi nding m ethod which was created in the interview process, and a structure for strategic dialogues (Talking Across The Divide, n.d.). The strategic dialogue set up with the name “Welcome to the Common Ground” can be seen as a transition design towards ‘Design for Behaviour Change’ (Irwin, 2018), as part of an intervention to solve wicket problems (Dorst, 2015). I saw that multiple stakeholders with opposing opinions have to come together to formulate goals towards future practices in which stakeholders’ values need to be balanced by having moral values as the foundation and creating an understanding for each other’s needs for diff erent verifi cation experiences. Therefore the fi nal designs can empower INNOPAY to establish ethical technology design in consultancy practices.

Because: “If values can be imparted to technology and shape the space of actions of human beings, then we need to learn to incorporate and express shared values in the things we design and make.”
(Van Den Hoven et al., 2015).

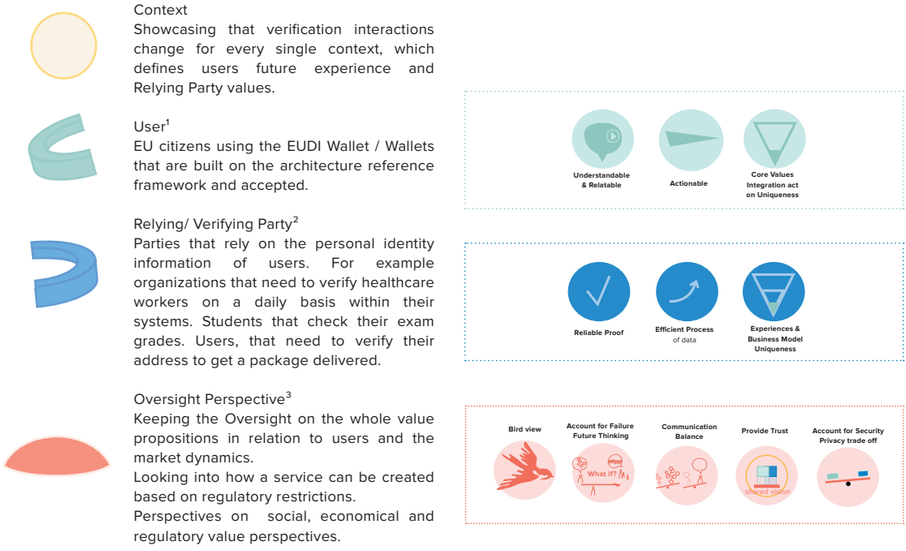


Figure 2: Balance Values in the Common Ground

TABLE OF CONTENTS

“Providing prove that you really are who you claim you are”

“Making actions possible based on the attributes that say something about you”

“You are allowed to buy alcohol your attribute is +18 and I can match it with you”

Storytelling quotes / Melissa

1. GLOSSARY & ACRONYMS

eIDAS	Regulation on Electronic Identification, Authentication and Trust Services
eIDAS 2.0	revision of eIDAS
GDPR	General Data Protection Regulation
AML	Anti Money Laundering (For Financial Crime Protection)
KYC	Know Your Customer

1. GLOSSARY

The Glossary provides the most frequently used terms in the report to explain what interaction of verification in the digital identity spaces inhales. They are more descriptive to make it more understandable. The information presented represents the knowledge gathered at INNOPAY and the assessment paper of the European Commission (2021).

Verifiable Credential

A verifiable credential is the equivalent of an ID card, the digital version of our physical documents.

Attributes

Information about a person could include details of an ID card, such as date of birth. It could also be a detail from an organisation, e.g. professional qualifications. Attributes are, therefore, related to verifiable credentials.

Identification

Interaction of two parties in which one is executing a task and the other is providing the service for the entrance based on regulatory frameworks. Two parties interact in which one wants to execute a task. Within the online environment, that process requires mainly verification before entering the platform. In the identification process, the party that wants to interact with the service provides the data needed to end up with an authenticator to use when returning the second time.

Issuer

Issuing the credentials in the right technology format so that they can further on be used for verification purposes

SSI & Federated Identities

Summary of (4.1 Digital Identity Basics). Two different digital identity models have both their pros and cons. SSI (Self-Sovereign) mostly comes in a wallet format, storing the information decentralized directly on the phone with the aim to create more autonomy and privacy for a user (Christopher Allen, 2016). Federated Identities can be used to identify different services. Two opposite examples are Google and Digid (DigiD,2022), built on different network structures. Where Google creates business models through personalization with digital identities, DigiD focuses on providing a secure public service structure.

Authentication

Authenticators enable the verification of a natural or legal person by electronic identification. In the physical world, that can be seen, for example, when a person wants to buy alcohol at a shop. In this process, they must verify that they are 18+ to be allowed to buy the product. The person on the other side is legally required to check the document. If the document fulfils the standards, the buyer is allowed to pursue the action.

Digital Identity

Digital Identity is interpreted differently by experts. Some experts say there is no real digital identity as it needs proof that the person is who they are, including the attributes. It should be valid in real time and not transferable. Within this research, I describe digital identity as a ‘facilitator’ that helps a person access and a verifying party reliable check that the person is who they claim they are about the attributes provided that are needed to make the action or service happen.

eIDAS 2.0

eIDAS 2.0 is the revision of the current regulation eIDAS on Electronic Identification, Authentication and Trust Services. The regulation facilitates secure transactions within a trusted network across sectors and borders. eIDAS 2.0 and EUDI Wallet creation are running in a parallel process

EUDI Wallet / EU Digital Identity Wallet

Podgorelec, et. al (2022) describes it as follows: “The digital identity wallet is software that operates in the remote or local environment and enables the storing, managing, and sharing of digital identity-related data. The digital identity wallet also provides secure storage for cryptographic material associated with digital identity-related data. With a digital identity wallet, the user controls and manages identity related data. That includes removing and reviewing identity related data stored in the wallet and explicitly selecting what identity-related data to store/share into/outside the wallet. Moreover, when selecting identity-related data to be shared outside the digital identity wallet, a user should be able to combine different identity-related data. Additionally, with the support of the underlying environment, a digital identity wallet can recover and back up identity-related data.”

Compliance

Companies that need to follow regulations need to ‘comply’ with the rules of regulations and standards. For example how they need to check for fraud differs per Party

What are we looking for?
A design-thinking approach to defining requirements of digital identity ecosystems

(INNOPAY Project Brief)

2. PROJECT CONTEXT & ASSIGNMENT

A thesis was created in collaboration with INNOPAY. I aimed to provide a new lens on the ongoing development and regulatory processes focusing on a multi-stakeholder perspective. Under the research question, “How might we create a well-balanced digital identity solution that includes the values of (all) stakeholders involved?” Within that process, I focused on three key stakeholders (Users, Relying Parties and Experts) to formulate a vision and create a transition design intervention. The research had two main Research Phases in which stakeholders participated from five different sectors.

2.0 PROJECT CONTEXT & ASSIGNMENT

2.1 INNOPAY / COLLABORATION

The thesis is written in collaboration with INNOPAY, a specialised consultancy for technology. First I showcase the practises of INNOPAY as a consultancy and will further on describe the collaboration.
INNOPAY specialises in digital transactions founded in 2002. The company started in Amsterdam and has grown to hold one office in Frankfurt (Germany). The core business is focused on helping other companies to establish themselves and find business opportunities in the digital era. The main areas INNOPAY operates in are digital identity, data sharing and payments. A lot of employees worked on big projects in the digital identity field and helped create solutions in that area. INNOPAY's core driver is "everything transaction" which translated into an award-winning same-titled management book by the founders (Liezenberg, Lycklama, & Nijland, 2018). Example projects for INNOPAY are the e-payment scheme for iDEAL or a significant contribution to the implementation and creation process of the OV- chipkaart. INNOPAY is one of the leading transaction consultancies in the Netherlands with expertise in banking, Fintech, insurance, logistics, mobility and public services. INNOPAY consultants worked on different projects in the area of digital identity. For example iDIN and eHerkenning are identity schemes which got created with INNOPAY. A lot of knowledge and experience comes together at one place in which 'trust' is mentioned as a core of digital transaction processes as, which is also the number one enabler of new digital innovations (Nijland & Jansen, 2019; Thomas Scharr & Pfeiffer, 2015). The four soft key values that INNOPAY has are collaboration, customer focus, forward-thinking and ownership. INNOPAY believes in growing the company bottom up by investing time in training new junior consultants and paying great attention to the company culture. Here everyone gets the chance to flourish in topics they are curious and passionate about. Training at the start of the career help to understand the ways of working as a consultant and create common ground for communicating the outcome to clients in a structured manner. This is proven to help newcomers from different study fields to speak the same language over a project. Learning and staying up to date is crucial to the business. For INNOPAY to be able to be a front-runner in this field is essential to consult other parties. Knowledge teams help everyone to stay up to date and discuss new developments. The collaboration gave me great opportunities to learn from experts in the field of study from the very start of the project. In a designer's practice collaboration and participation from specialists in research, area is really important. It helps to understand the full context and gives the possibility to validate assumptions on the spot. The collaboration was fruitful and created next to great relationships a lot of positive engagement in which I got the chance to explore the directions I felt most engaged with, but also got directed into the areas that are most interesting to explore from INNOPAY's side.

2.2 ASSIGNMENT

The central aim of this thesis was to understand if it is possible to design a EUDI Wallet from a multiple stakeholders perspective and find a well- balanced solution that facilitates the values of all stakeholders involved. The EUDI Wallet is part of the re-visioning process of the regulation eIDAS, which can be seen as the future facilitator of identity verification for multiple contexts. The EU Commission aims to harmonize the digital identity marked to make cross sector and border identity verification processes possible and requires the responsible stakeholders in the ecosystem, like member states and verifying parties to participate. As the development process is still ongoing and it seemed like not all stakeholder values are included INNOPAY was interested to gain a different lens and perspective on that process.

Project Brief of INNOPAY: What are we looking for? A design-thinking approach to defining requirements of digital identity ecosystems

1 Exploration of the purpose for which digital identity is used, 2 Requirements on digital identity ecosystems for the involved stakeholders, 3 Actual user-centric design of digital identity ecosystem

On top of the assignment technology ethics build the foundation to explore what is means to create a digital identity solution for the emergent ecosystem and it's participants

2.3 RESEARCH QUESTION

How might we create a well balanced digital identity solution that includes the values of (all) stakeholders involved?

A What are the drivers for the regulation revision
B What is the EUDI Wallet?
C Who are the stakeholders involved in the new emerging ecosystem?
D How might we find out the values of different stakeholders
E How might we balance the values in a solution
F How might we integrate technology ethics?

2.4 SCOPE

The current vision is used to explore futures and create a critical view of how the values of different stakeholders could be balanced in the ecosystem layers. An overview of the involved stakeholders in this graduation project is presented in Figure 2. Closely involved in the TU Delft supervisory team, INNOPAY as project owner and myself. Directly involved were the research participants who played a considerable role in the project. This integrates stakeholders of the first and second research phases. In the first phase, the exploration of the topics from an expert and user perspective. In the second research phase, in-depth research on value finding was facilitated with Users, Relying Parties (RP) and Experts that took an Oversight perspective on the development. In the overall project former design students helped the process in which ideas and new perspectives got generated through 1 on 1 sessions.

Five different sectors (see Table 1 - marked in blue) are included to provide the different sector perspectives and therefore showcase different contexts in which the verification process is taking place. The research can therefore not provide a full picture on the future digital identity landscape and only gives insights within that limitation.

Sectors / Relying Parties that are mandated to accept the EUDI Wallet as verification mean

Drinking Water
Education
Tele-communication
Digital Infrastructure
Social Security
Very large online platforms
Travel
Banking
Health
Energy
Financial Service
Postal Service
Public Service

Table 1: Relying Party Integration in Research Phase 2

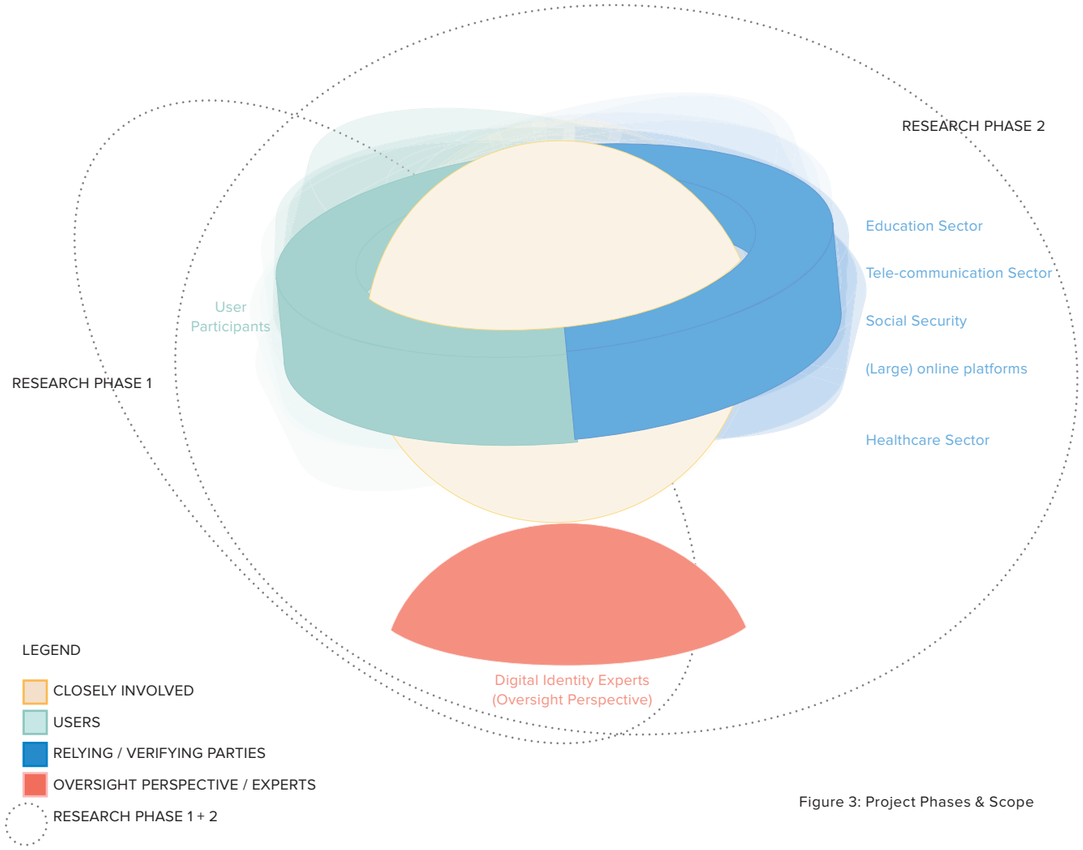


Figure 3: Project Phases & Scope

‘If values can be imparted to technology and shape the space of actions of human beings, then we need to learn to incorporate and express shared values in the things we design and make.’

(Van Den Hoven et al., 2015).

3. PROJECT APPROACH & DESIGN THEORY

In the project approach, a mix of different methods where used to understand the complexity and people within the development process of the EUDI Wallet. Value Sensitive Design is used as a driving force to understand the stakeholder’s perspectives and values and see tensions in the development and future use of the verification mean. The research-by-design approach uses ‘strategic speculations’ (own term) along the way and balances today, future and personal experiences with moral reflection. Therefore a set of other design theories were used to navigate the project, create future thinking and value reflection and help the participants to be the experts of their own experience. Within This section, I will describe how values are embedded in the research and the project approach pursuing two main research phases and a long synthesis phase and, finally, design and testing. The research did not follow a straight line as it was an iterative process, and the ongoing development process always provided new information.

3. PROJECT APPROACH & DESIGN THEORY

3.1 Project Approach

The research incorporates two core research phases. The first was about understanding the broad context in which experts play a significant role in identifying risks and expressing their ideas on how the EUDI Wallet could succeed. To gain a more in-depth understanding of how users are currently dealing with digital identity-related data in physical and digital settings, a few separate interviews helped to gain a first understanding of the complexity (see Appendix 3 / Section e.g. E&O). Phase 2 researched three participant groups in detail (Users, Relying Parties and the Oversight). The oversight provides a perspective on creating the system and mentions different approaches to moving forward based on present and past experiences in creating digital identity schemes, which are collaborative networks based on establishing services within various system actors.
The second research phase included the creation of a value-finding method in an iterative approach conducted in five iterations (see Appendix 4-8). The challenge was integrating experts' experience, meeting their mindset and aiming for moral imagination (Werhane, 2006), which creates a reflection on own values combined with a bigger picture. Within the synthesis phase, many ways to make values tangible got explored (See Appendix 8,9) to finally end up with an overview showcasing where different values can be balanced in the system (see page 81). From here, three concepts got explored, in which the final one had two iterations to end up in a strategic dialogue set up in which the values and roles of the three stakeholders present in the study are represented.

3.2 Literature Research

The literature involves relevant information on the past and present of digital identity. Using literature in the design research was an iterative process to create new awareness for different fields or to follow up on the development process to integrate new proposals from the EU Commission or social media posts in the report. Also, active participation in weekly meetings in the digital Identity Team grounded the foundation for understanding the most relevant information about the research area of the EUDI Wallet and the future of digital identity. Especially relevant legal documents, articles, podcasts, and books added more foundation to the ongoing process.

3.3 Analysis & Synthesis

In this thesis analysis and synthesis merged along the way to make sense of the complexity the thesis describes the last analysis process. Section 11 lists in the end the activities taken in order to arrive at a structure that includes all necessary element and Appendix 3 describes all methods and activities taken in a short summary which links back to the report.

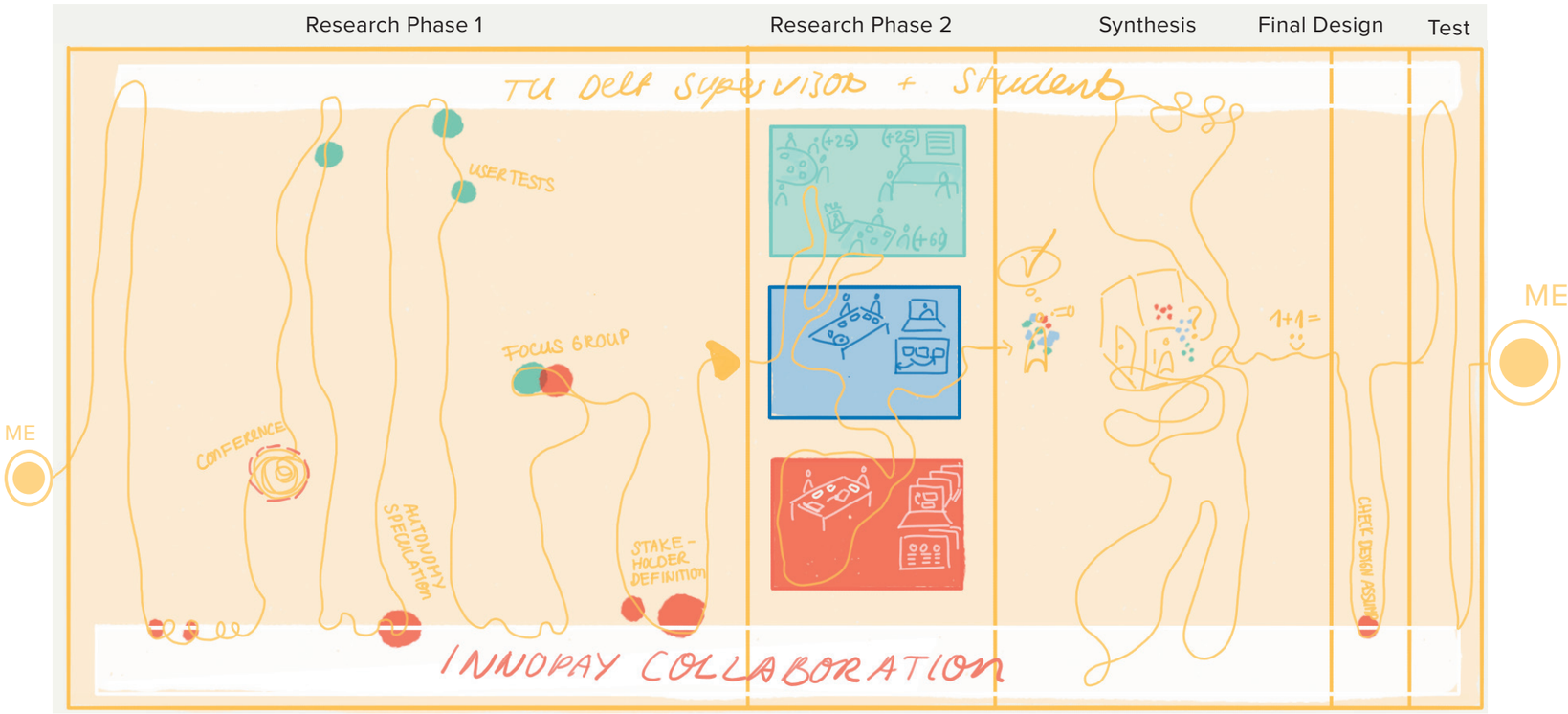


Figure 4 Project Phases and Design Activities

This research brings together different design methods to balance the values of stakeholder within present and future verification experience using digital identities.

3.3 Research by Design

The research-by-design approach was inspired by Value Sensitive Design (VSD) (Van Den Hoven et. al., 2015) as a driving force. Here empirical investigations were made to “understandings, contexts, and experiences” about the technology development and their values (Friedman and Kahn 2003). Therefore interviews, experiments, artefacts from present and future, analysis, and participant observation (See Appendix 3), were used to understand hopes, values, and concerns and create reflection.
VSD originated from the field of information technology and human-computer interaction (Friedman et al., 2002) and was therefore suited to the research as it is about designing socio-technical systems from the values of the stakeholders and a moral viewpoint to find our values and trying to understand the balancing acts within the development. Within VSD different methods are introduced to find out the implications of technology today for the future, which were practised and adapted in the fundamental research. For example, using envisioning as a tool to reflect on future implications or integrating multiple field experts to understand the development process (see Appendix 12, 13)

Next to VSD, Systemic Design, Speculative Design, Strategic Design, Creative Problem Solving Techniques, Vision in Design, Human Centred Design, and Participatory Design were used as inspiration or practice within the balancing act of creating reflection about the future within participants and also making them experts of their own experiences. I visualised Strategic Design as a balancing point to find the right balance between today and the future or personal experience with moral reflection (See Figure Strategic Speculation). As it is hard to distinguish methods from each other and claim their origin completely, the main differences are presented as an entangled package within the categories: Future thinking, Expert of their own Experiences, Reflective Practise and Navigation (see next page)

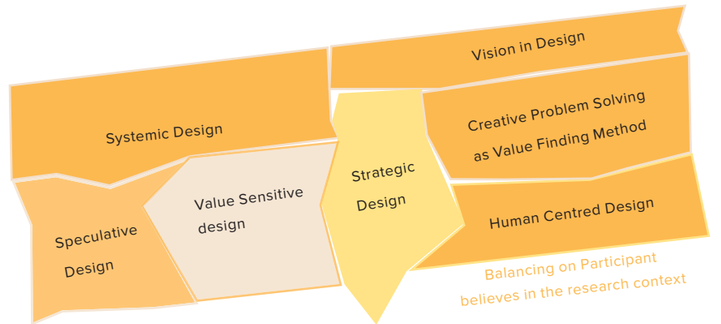


Figure 5: The art of subtle speculations balancing out today and future & experience with moral reflection

(see Appendix 3 to find the methods (A-P) in the report)

3.4 Future Thinking

(A) Autonomy Future Scenarios
(B) Prototypes from the Future
(C) Speculative Ecosystem map
(D) Envisioning Cards
(E) EUDI Wallet Prototype
(F) EU Vision Storytelling
(G) Forecasting Method
(H) Clustering the interaction Vision

I interpret future thinking as the integration of Value Sensitive Design specifically focused on technology ethics, Speculative Design and Vision in Design, which all provide new angles and perspectives for the design research. Therefore, Future thinking is the representative category of thinking about desired futures, creating critical reflection and including drivers. From Speculative Design, I focused on asking questions to generate new connections (Galloway & Caudwell, 2018). Here I prototyped artefacts for the future to see reactions, generated different speculative ecosystem maps to create participation and used storytelling in interviews and all group research sessions to help imagine the future or the possible outcomes.
Within Design, we are looking at different methods that can help us understand where we want to drive towards society as a whole. Vision in Design explores trends, developments, states and principles and brings them together to formulate future drivers for products, services and systems to create interaction vision. Within this project, Vision in Design (ViP) (Hekkert & van Dijk,2011) got used to formulate a future verification interaction vision to formulate the design goal of engaging in strategic dialogues about the EUDI Wallet from a context and multiple stakeholder viewpoints by integrating moral values. On the other hand, it was about opening up questions, as there is no straightforward answer to balancing out all values for the EUDI Wallet, as too many contexts are involved.

3.5 Navigation

(I) Stakeholder Engagement
(C) Speculative Ecosystem map
(J) Mental Models

Navigation is the combination of managing myself within a project, considering perspectives and the system layers, including the people and their beliefs. To formulate ways and actions to be taken in the project and understand the system layers. Moreover, it is about finding the right nuance in the communication to each step taken. The key here is to listen, learn, ask questions and do not give up, because nothing can be perfect,, but we can improve. Calabretta et al. (2016) define strategic design as the ability to address complex systemic challenges by redefining the problem, seeing opportunities and influencing decision-making. Within complexity, we are looking into the systemic design as the design praxis is moving into solving wicked problems that are dynamic, networked, complex and open due to many influencing factors. Wicked is described as problems in which there is little or no (1) agreement on the definition of the problem in cooperating multiple values, perceptions and perspectives (2) clear solutions to the problem due to the vast array of possible solutions and trade-offs associated with each (3) easily identified causes or authority due to the problem having multiple potential causes, jurisdictions, stakeholders and regulator or implications (Rittel & Webber 1973; summary retrieved from: https:// aese.psu.edu/)
Those problems involve multiple stakeholders with opinions, values, needs and mental models (Dorst, 2015). The digital identity domain is such a problem in which incredibly different mental models influence the development process. The theory around mental models was used in the research to grasp the complexity better and formulate a future driver, as presented in ‘Future Thinking’.
Dorst (2015) defines mental models as “the conceptual models in people’s minds that represent their understanding of how things work.” Looking at mental models within the system layers also applies to design research, as they are mentioned as leverage points for creative and sustainable change. I also saw a connection between mental models about a verification interaction about the future, as what we value today might change and is therefore also connected to the field described in future thinking. To sum it up, systemic and strategic design involves engaging with multiple stakeholders / understand them to design for the future.

3.6 Expert of their own Experiences

(K) Research Phase 2 Method Iterations
(L) INNOPAY activities
(M) Semi Structured Interviews
(N) Focus Group
.

A key element was making the participants experts of their own ‘expert of their experiences’ (Sleeswijk Visser et al., 2005). In that process, I used especially methods from Creative Problem Solving. To generate Human Centred Design (HCD) and Participatory Design. HCD includes the desire to understand human needs, experiences and desires and displays the guideline for whom the design is intended (Giacomin, 2015); this was practised in a combination of methods, as I aimed to understand the future values of stakeholders for a solution.
Participatory forms active participants in the design process (Stappers & Visser, 2007). Within Participatory design, we integrate the experiences of stakeholders as an essential part of understanding beliefs. Creative Problem Solving (Heijne & Van Der Meer, 2019) techniques were used in group settings and 1 on 1 sessions to find out values for the future using different diverging, reverging and converging techniques intuitively like converging with UALo (p.187) to get to the core of a value, the ladder of abstraction (Heijne & Van Der Meer, 2019, p.112-113) to help the participants reflect on what they really want, brainwriting (Heijne & Van Der Meer, 2019,p. 49) to get the head flowing, ‘random’ words (Heijne & Van Der Meer, 2019, p. 73) to include moral values as trigger, visual stimulation (Heijne & Van Der Meer, 2019, p.81) to generate new thought and reflect, guided fantasy (Heijne & Van Der Meer, 2019, p.85) to create a mental journey beyond the today. I learned to think like a user, Relying Party and Expert in the digital identity field within that space by engaging with many stakeholders.
A unique role played INNOPAY in that process as a collaboration partner, in which I tried to be closely involved to find out what could be valuable for them to integrate in their practices which was mostly done by using a whiteboard or Ipad as a communication object to reflect my thoughts back and generate common understandings.

3.7 Strategic Reflective Speculations

(O) Moral Card Reflection Practise
(P) Strategic Dialogue

The phrasing ‘Strategic Reflective Speculations’ summarises ‘Future Thinking’, ‘Navigation’ and ‘Expert of their own Experience’, because I realised that designing for ethics within a complex system is a balancing act involving all the parts. We can use methods from different fields to balance them out to understand the system dynamics, the people within and the future orientation. In the final research method (Method Iteration 5, p44-45) I found a method that helped the participants be the experts of their own experience but also morally reflect on their practices. As the research goal was to understand how we can create a well-balanced digital identity solution, I aimed to integrate the societal perspective.
Within the final design I aimed to bring all findings together and introduce ‘Moral imagination’ (Werhane,2006), which was triggered within the first method test within the research phase, which created a reflection on moral values (see Appendix 2: First Test of Strategic Dialogue). Werhane (2006) describes that we have to present the system and its networks of their interrelationships to grasp the interconnectedness of the system, explain what is not included in the system, by presenting the core values of each set of stakeholders and outline the core values of the system to speculate what it should be to reach a reflective process that included the values and consideration of the system participants.

Figure 6: The door of humility, describes in (Van Den Hoven et.al., 2015).

3.8 Let’s Talk About Values

Within this project, we are looking at values as’ principles, standards, and qualities that guide actions’ (Le Dantec et al., 2021) and pre-defined values (Halloran et al. ,2009) like privacy to act as a working hypothesis (JafariNaimi et al. 2015, p7). Moral values fall under the ethical design practice as ethical values to inspire current design projects (JafariNaimi et al. 2015, p3).
Different values got selected to function as working hypotheses during the study: Privacy, Inclusiveness, Autonomy, Security, Informed Consent and Transparency.

To better understand why values are important and how to communicate them, we are looking into theory. As values are the core of designers’ practice, we aim to design functional products that create a good experience. Therefore design is described as value-laden (JafariNaimi et al. 2015). However, designing for values in a complex ecosystem is rather tricky, especially regarding technology and built ecosystems, as we will see in the Research & Analysis part. This can be due to the expression of values as classified by Biskjaer et al., (2019) or our current beliefs and cultural norms and standards that influence how we think and experience (Werhane, 2006).
Also, it is hard to communicate values, and designers practise developing tools to deal with that and use visual storytelling Durrant et al. (2018) and other practices that spark imagination within the stakeholder groups. It is also established that bringing people together in a co-design process helps (Halloran et al. 2009). However, the complication in communicating values is also the difference in expressing values between technical and social terms. We can see a separation between soft and hard values, where soft values can be seen as qualitative values showing cultural relationships and mainly related to social actions. Conversely, we have hard values, which describe quantifiable values in values like energy consumption (Biskjaer et al., 2019). This got experienced during the project within the project, in which everyone talks in abbreviations, but also in the development process.

The question is how to bring the principles that guide action (Le Dantec et al., 2021) and ethical values (JafariNaimi et al. 2015, p3) together within communication disbalance and differences in cultural norms or experiences (Werhane 2006). As previously seen within the section (3.7 Strategic Reflective Speculations), we aim for reflection. However, to balance values and resolve tensions, we must look into their origin.
Value tensions within Value Sensitive Design (Van Den Hoven et.al., 2015). are described as the result of conflicting values, for example, privacy and security, as we need to make ourselves visible to go somewhere; this describes that values often need to be balanced (Van Den Hoven et al., 2015). It is also described that technology influences the way we interact with each other and therefore needs to be thought through.

“If values can be imparted to technology and shape the space of actions of human beings, then we need to learn to incorporate and express shared values in the things we design and make.” (Van Den Hoven et al., 2015).

One value balance example can be seen on the right, leading to the misconception of the experience within user groups. The door of humility is a representation of increasing security for ease. The door was made smaller to help citizens be secure, as in that time, attackers came on horses. The usefulness went down by creating a small door and got interpreted as humiliation. Le Dantec et al. points out that values must be related to a local setting in a particular context and can not be easily translated elsewhere. Therefore values are context-bound and can not always be translated elsewhere (JafariNaimi et al. 2015, p3). Within the experts, I saw much discussion about values and their different interpretations of is; this is why I wanted to create an overview or space in which people get aligned on values.

4. RESEARCH & ANALYSIS

This chapter provides the primary research outcomes. As visualized in Project Approach and Design Theory, the research followed an exploration approach with multiple research activities to understand the context and the stakeholders involved in the project. Within the research, insights were gathered through the different research activities (see Appendix 3), which are now structured to guide the reader through the exploration of the emergent ecosystem of the EUDI Wallet in Europe. Different methods are described within the storyline to provide insights into how the information was gathered and who was involved in the process.
By following a research-by-design approach, it was possible to create an overarching overview of the situation, consequences and questions about the development and an overview of three stakeholder values users, relying parties and the oversight. Be aware of the limitations of the research in which the qualitative approach could not consider every single perspective.

A ‘facilitator’ that helps parties to interact trustworthy with each other to perform different transactions, in which the person provides reliable proof of their identity in relation to the needed attributes for the context’

My own definition of Digital identity

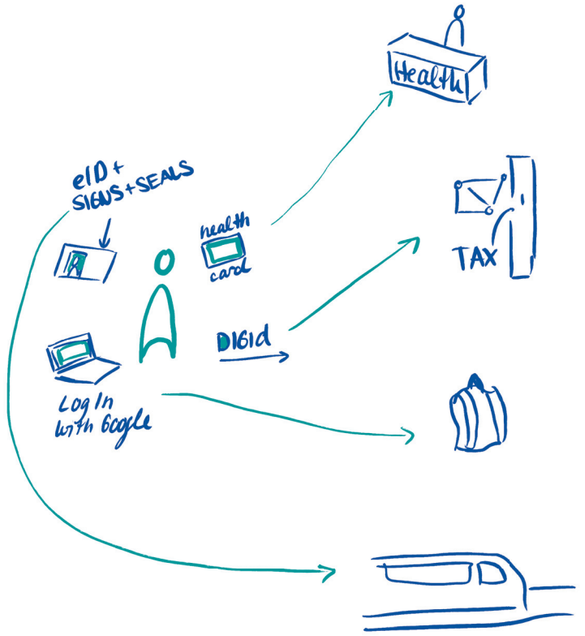


Figure 7: Digital Identity Verification Examples

4.1 Digital Identity Basics

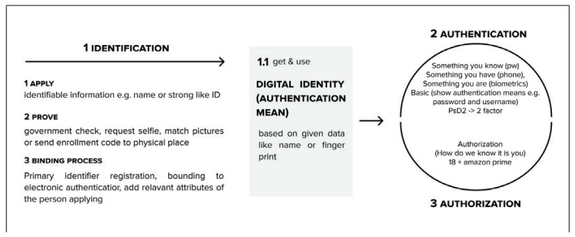
"Digital Identity can be defined as a digital representation of a human, company or object consisting of different attributes that express specific aspects of the real-life entity (e.g. name, address, date of birth), it is a standardized set of attributes representing an individual or legal the entity, used to facilitate digital transactions"

"We do not own an actual digital identity, a digital identity is persistent in time, it proves that you are you, and it can not be used by another person"

Digital Identity has many definitions by experts therefore I created my own to make sense of digital identity within the new developments. Digital Identity for me means:

A 'facilitator' that helps parties to interact trustworthy with each other to perform different transactions, in which the person provides reliable proof of their identity concerning the needed attributes for the context.'

The presented outline is on knowledge gathered within INNOAPY. Within the creation of digital identities, different processes exist in order to create a digital identity and different digital identity models are used in order to provide users with the ability to make online transactions happen. In practical terms, three steps are described for Digital Identities: Identification to claim who you are, Authentication to be able to claim who you are, when you come back and Authorization, if there are specific aspects you have to be authorized for. For example, being 18+. The Result of the identification process is: The creation of an authentication means to access services or get authorized for a task.
In the digital identity field, we can make separations into a direct model, federated model, user-centric model and SSI (Self-Soverign Identity).



The direct model provides a single key for only one organization and is argued not to be a digital identity per definition as it does not allow for a solution that can provide access to multiple purposes.
The federated model is a digital identity that can be used for multiple purposes and can be distinguished between models that are based on a scheme. For example eduID (eduID: 1 digitale identity voor studenten, 2022) to enter different systems with the identity provided by an university or DigiD (DigiD,2022) an identity provided by the Netherlands. However, we also see Google as identity provider, which is a federated identity which is not based on a trust network. They are described as having the "primary motivation on doing this is to track everything you do online" (Evernym, 2022). Now we are also experiencing SSI (Self-Soverign Identity) (Sporny et al. 2019). Self-Sovereign Identity published by Christopher Allen (2016) carries out a vision of how we can enhance the ability of digital identity to enable trust while preserving individual privacy. Here 11 principles are defined to establish a form of digital identity in which data minimization is a core element next to being in control of the identity in use, as currently there is no was to interact with a service without sharing attributes, as like shopping in a physical place. That is why Birch (2008) explored the idea of Psychic ID as a blueprint for Authentication and Authorization in which only the needed attributes of a person are explored, which are pieces of information about one person for example age. Nowadays, SSI approaches are increasing in which users can use their data for different purposes, mostly in the form of a wallet as established by INNOPAY. We can summarize that the identity models are different and see SSI approaches increasing. To make digital identity more understandable to participants, I used storytelling in my research. For the report, I will introduce the subject in the storytelling format created as part of the value-finding method.

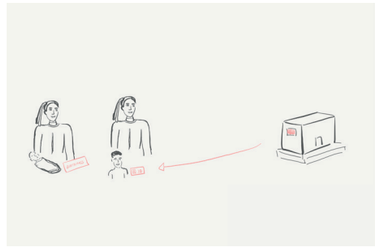
Primary Document:
ID card or birth certificate based on the country

Level Of Assurance: ID card or birth certificate based on the country

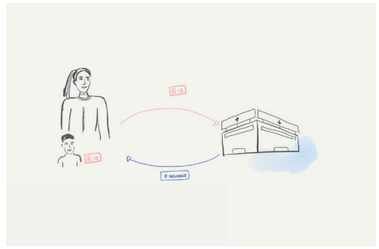
Centralized: An organization which stores the identity related data

Authenticator: Given to a person after the identification process in which a authentication mean is created with the attributes of a person on it, which got provided before

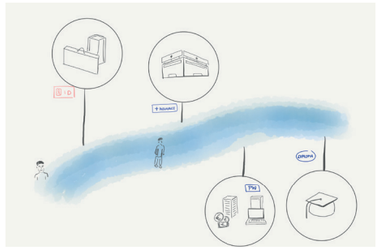
We are living in a world



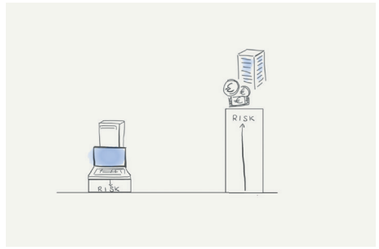
In which we, when we get lucky have out parents or legal person request our first primary identity at the municipality



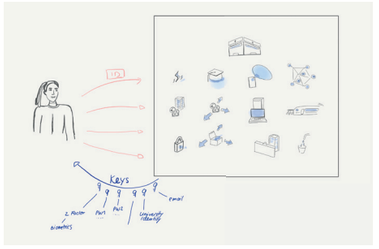
The primary identity is to used to access different services like healthcare



However going through life we enter a lot of services and not in all of them is out primary identity needed

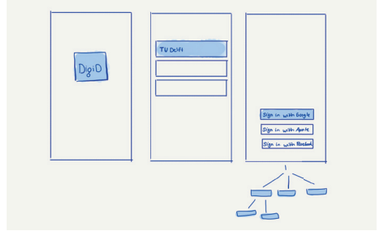


The Verifying Parties have to apply with different Levels of Assurance, For example a bank needs our core identity for fraud reasons, but the bookstore does not.

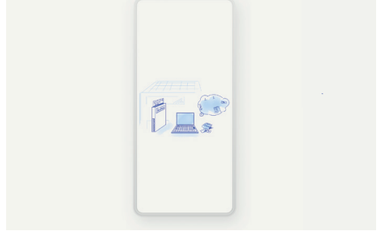


So we are ending up with multiple keys which allow us to access the service again, when we come back

We get a lot of documents which we store physical or digital. Some of them are stored centralized with our service provider, for example in healthcare

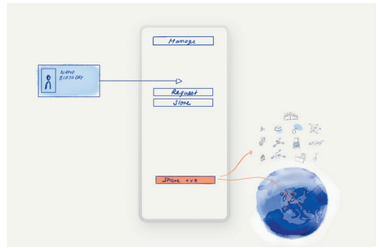


Zooming into the interaction we have for example DigiD as authenticator, in the Netherlands, TU Delft Login or Google. Some also have a digital identity wallet, like in Poland



Based on the EU Commission Vision the future could look like this, in which we have the important documents available to be useful for the authentication process

"Every time an App or website asks us to create a new digital identity or to log on via a big platform easily, we have no idea what happens to our data in reality. That is why the Commission will propose a secure European e-identity. One that we trust and that any citizen can use anywhere in Europe to do anything from paying your taxes to renting a bicycle. A technology where we can control ourselves what data is used and how."
Ursula von der Leyen, President of the European Commission, in State of the Union address, 16 September 2020



This way we will be able to interact with services using the EUDI Wallet as facilitator of the process

Figure 8: Storytelling Identity Research Phase 2
Created in January 2022

4.2 Future System Speculations and Tensions

Restrictive Market Dynamics

The EU Commission sees developments and trends as starting point to introduce the EUDI Wallet. However, the question remains: How the ecosystem will look and how the different parties will need to adapt to the developments?
Within the space of digital wallets, different approaches are generated within the digital identity wallet field. Banks are integrating wallets into their identity program. In November 2021, Rabobank launched a personal identity wallet app where users can have decentralized stored documents (Global Banking and Finance Review, 2021). In general, the digital identity wallet market is predicted to rise based on the regulation, as stated by INNOPAY. However, they need to be more adopted.
However, dues to privacy concerns around big tech and the current trends previously mentioned, a wallet is written out as a solution to digital identity problems (European Commission, 2021). Apple also announced the aim to integrate a driver's license in the next version of their wallet App and cooperate with parties to make it work (Business Insider 2021).
At this stage, in which different identity systems are questioned and a new approach is mentioned, the questions asked are how will the new ecosystem look like and which parts of it will stay where others will leave? "We don't know yet what happens with DigiD".
Sporny et al. (2019) aks in the verifiable credential and decentralized approach research, 'How will companies that collect usage data adjust to the prospective adoption of decentralized digital identities?' and 'Can regulation prevent service providers from requesting more information from users than they require?'

4.2.1 Method

Different methods were used to find out the most pressing questions and tensions within the ecosystem development. Speculative ecosystem maps in interviews and conversations allowed to see where experts see the most tensions in between differnt parties. This approach was used within INNOPAY to define the most important restrictions for the future verification experience and at interviews with different experts and Relying Parties. This way is ways to get an overview of tensions based on delegating acts of the EU Commission on different parties in the system.

Key Insights of using unfinished speculative Ecosystem Maps:
Interactive drawing with participants became a big part of the research in general to clarify own thoughts and understand the complexity itself with different participants and systems involved. The tension map overview helped me understand the most critical differences between the existing and future established parts in the ecosystem. The map was also used to find out missing puzzle pieces in the current regulations. Next to that it helped the participants to know where in the future system they might be placed, as they had to indicate their position in the map. The unfinished look of it helped participants to engage with it and make assumptions, as I also started to draw in them during the sessions, the participants were experienced as engaged in the process itself. Linking to design literature rule of thumb in helping to create engagement with research material is to make it engaging for example "the more 'finished' the materials are, the less likely people are to engaged with"(Sanders & Stappers, 2013, p. 159).

4.2.2 Stakeholders of the Future System

Based on the delegating acts written out and conversations with INNOPAY explaining the development, different overall tension points were established that showcase the overall situation. The tension points will be showcased within the following chapters more in more detail, and the overall method and stakeholder engagement will be explained.

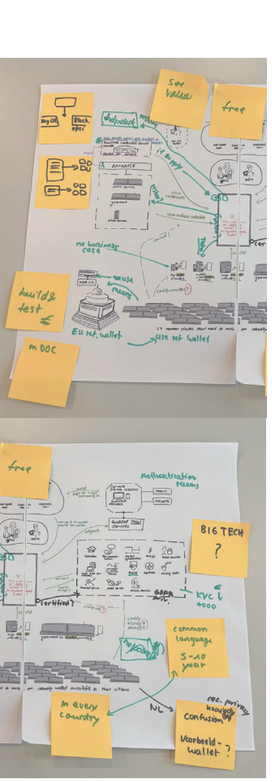


Figure 9: Speculative Ecosystem Maps

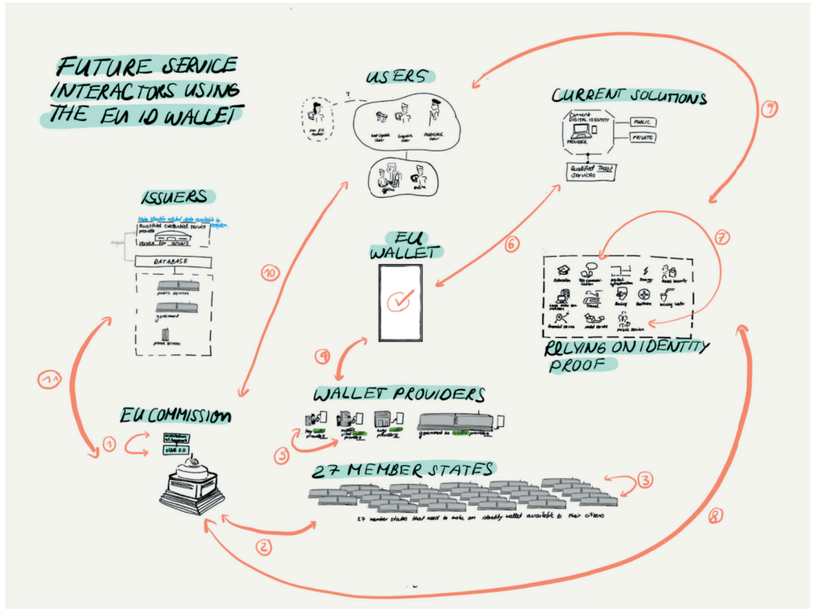


Figure 10: Speculative Ecosystem Maps 2

All quotes about the tension points will be represented in a different overview. However, this one shows the status-quo best.
1) There is a communication barrier between the regulatory development of eIDAS and the development of the architecture reference framework in which the stakeholders are using different value languages. Where the technical parties are talking in a cryptographic language, the legal parties want to see their use cases and current digital identity systems, which are in place integrated in the development (Intensi Group,2023; Section 4.8.2 F).
2) The EU Commission is writing out legislative acts towards the member states that need to start preparing the development phase, as seen in the previous slide
3) The member states are unique in their current practises
4) Experts question who will win the battle of the future existing 100+ wallets
5) The Wallet providers have different resources and probably have a difference between start-ups or big tech developing a wallet
6) The wallet is a new approach and, therefore in tension with the current systems in place in which the integration phase is questioned
7)The Relying Parties are mentioned as unique with different use cases
8) The EU Commission require 13 sectors, public and private, to accept the wallet as identification of the users
9) The Relying Parties are mentioned as not seeing the total need in the development yet
10) The EU Commission wants to avoid putting a mandatory act on the users; however, it needs them to create a functioning ecosystem. The problem here is that the trust towards the government differs.
11) The EU Commission needs the Issuers to participate otherwise, there will be no credentials

The whole development is seen as a "chicken and egg problem" in a two-sided market, as different parties with different needs want different things from the wallet in the middle. As quoted by almost all interview participants, "We have a chicken and egg problem."

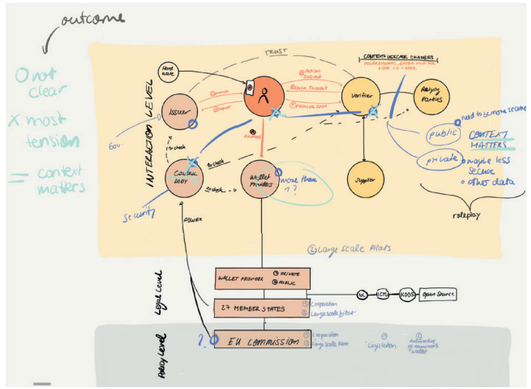


Figure 11: Speculative Ecosystem Map Participant Definition

Method:
After getting some grip on the current situation in collaboration with INNOPAY, a different speculative map was used. Three participants for the expert research were marked (light blue) as the most important to include, as they are in the interaction space and represent the most tension with each other. By marking out tensions, the goal was to resolve them later on. Therefore I wanted to find out different values and balance out beliefs for the EUDI Wallet as a solution.

4.3 EUDI Wallet as Facilitator of the emergent ecosystem

Here I will outline what the Digital Identity Wallet means for the Digital Identity domain in which different systems already exist. This starts by looking at the aim of the EU Commission to digitize Europe and act ethically.

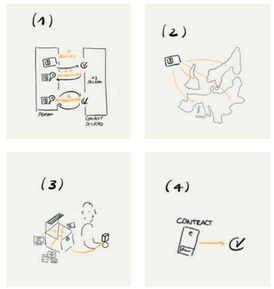
4.3.1 Digitization in Europe

The document of the EU Commission: Communication 2030 Digital Compass: The European Way for the Digital Decade (Electronic Identification, 2023) established that the EU Commission sees that the COVID-19 pandemic radically changed the perception of digitalization in society, as more services needed to move online. In that process, vulnerabilities got experienced. Vulnerabilities are seen in regards to identity theft and disinformation in Europe, as well as the disadvantage for some citizens who could not use the services. Therefore the goal is to create “human-centred, sustainable and more prosperous digital future”(Electronic Identification, 2023) to develop a high-performing digital identity ecosystem that can empower citizens’ capabilities within an educational approach. To make conscious decisions 20 million employed ICT specialists in the EU that are varying in gender to manage the level of ambitions by 2030. It is about creating the path to a digital decade and establish sovereignty of the European Union. In that process also the development of digital rights is created. To (1) Strengthen collective resilience, (2) Promote the skills of the citizens by enriching their technology knowledge, (3) Build up an infrastructure to reach more remote areas, (4) Help businesses to gain wind in using technology like AI, (4) Give everyone access to public services online, which includes seeing medical records. In an iterative process in which all member states contribute a roadmap will be created to present annual reports, address performance gaps and make adjustments on the way (Infographic - “Path to the Digital Decade”: the EU’s plan to achieve a digital Europe by 2030: Infographics, 2022). Part of the digitization process is the development of a EUDI Wallet.

4.3.2 Wallets in the digital identity field

The European commission aims to aims to make a digital identity available to all citizens in Europe to fulfil different identification, authentication and authorization functions. The aim is with the approach to reduce identity theft, created the harmonization in the market, act on privacy concerns towards big tech, make seamless verification processes possible based on having a wallet and verifiable credentials.

With a wallet he user will be able with the wallet to: (1) Identify and authenticate themselves for different transactions, (2) Can verify their identity for services throughout Europe, (3) Have secure storage for the owned verified identities that can also be presented offline (4) Can generate qualified electronic signatures and seals to sign, for example, a contract.



As wallets in the digital identity field are pretty new, literature discusses how to describe the approach as it aims to fulfil many functions simultaneously.
Podgorelec, et. al, 2022 describes wallets as “The digital identity wallet is software that operates in the remote or local environment and enables the storing, managing, and sharing of digital identity-related data. The digital identity wallet also provides secure storage for cryptographic material associated with digital identity-related data. With a digital identity wallet, the user controls and manages identity-related data. That includes removing and reviewing identity-related data stored in the wallet and explicitly selecting what identity-related data to store/share into/outside the wallet. Moreover, when selecting identity-related data to be shared outside the digital identity wallet, a user should be able to combine different identity-related data. Additionally, with the support of the underlying environment, a digital identity wallet can recover and back up identity-related data.”
Within decentralized digital identity projects, verifiable credentials are employed. In 2019, the World Wide Web Consortium (W3C) created a formal recommendation to include verifiable credentials as documents which are issued with digital signatures to make it security proof.

This is a different approach to identity management, for example, at the government-managed level. Databases in India’s Aadhaar or the data silos owned by Big Tech companies (Sporny et al. 2019). Planned by the EU Commission is the inclusion of verifiable credentials as issued by parties like the government or other parties, which will be added to a trust list (Intensi Group,2023)

The most crucial factor here is that the aim is to find a decentralized approach in which centralized silos can not be created, which are mentioned by the EU Commission to lead to privacy concerns, especially around Big Tech (European Digital Identity, 2020). Therefore the digital identity wallet can overcome the restrictions and pain points of decentralized identities and harmonize the digital identity landscape, as not all member states could create a solution that is used and adopted by their citizens. Only 14 member states are counted that have registered a digital identity scheme (European Commission, 2021).

The diagram shows how issuing and interacting with the wallet is envisioned. The User will hold a wallet in which the issuer must create the credentials (like ID, or travel documents) to put the wallet at use. As a wallet holder, the described functions (Wallets in the digital identity field). The thirteen sectors (marked in blue stripes) must accept the wallet as identification.

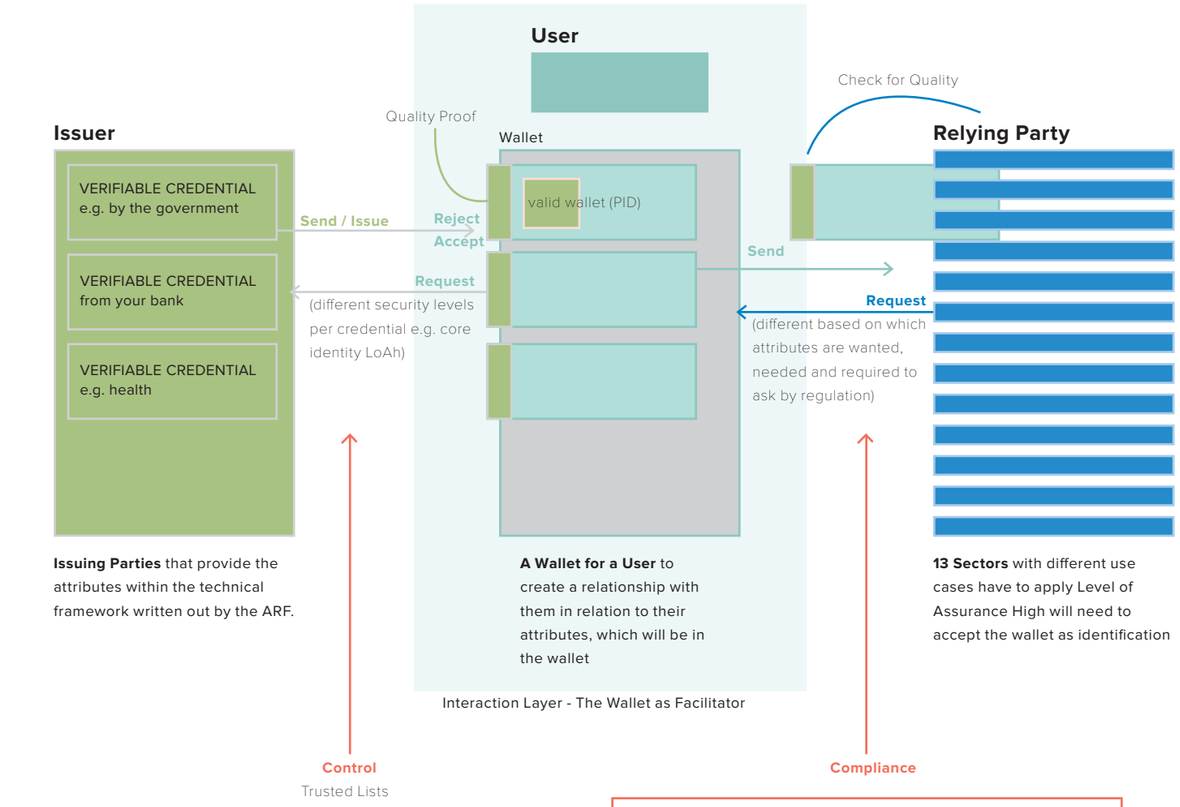


Figure 12: EUDI Wallet Mock Up based on (Intensi Group, (2023); European Commission (2021); eIDAS 2.0 - Roadmap, Toolbox, and The European Digital Identity Wallet Architecture, (2023).

eID Compliance AML:
Compliance with Anti-Money Laundering will be facilitated through eIDs under eIDAS to supply some of the required identity data (Such as name, address, date of birth, and nationality)

PSD2 & QWACs
Directive (EU) 2015/2366
On eIDAS the Payment Services Directive (PSD2) on payment services in the internal market (Directive (EU) 2015/2366) is built, which include eSeals and Qualified Website Authentication Certificates (QWACs) which are needed to identify the authenticity of websites by third-party

KYC
Know your Customer.
Onboarding procedures, KYC procedures etc. Sector Benefit: Reduced compliance costs with eiDAS 2.0, outsourced identity system

GDPR
Ensured consistency with the GDPR (General Data Protection Regulation) regulation. Sector Benefit: Reduced compliance costs with eiDAS 2.0, outsourced identity systemauthenticity of websites by third-party payment providers12
(European Commission, 2018; European Parliament, & Council of the European Union, 2015)

4.4 Development Process of the EUDI Wallet

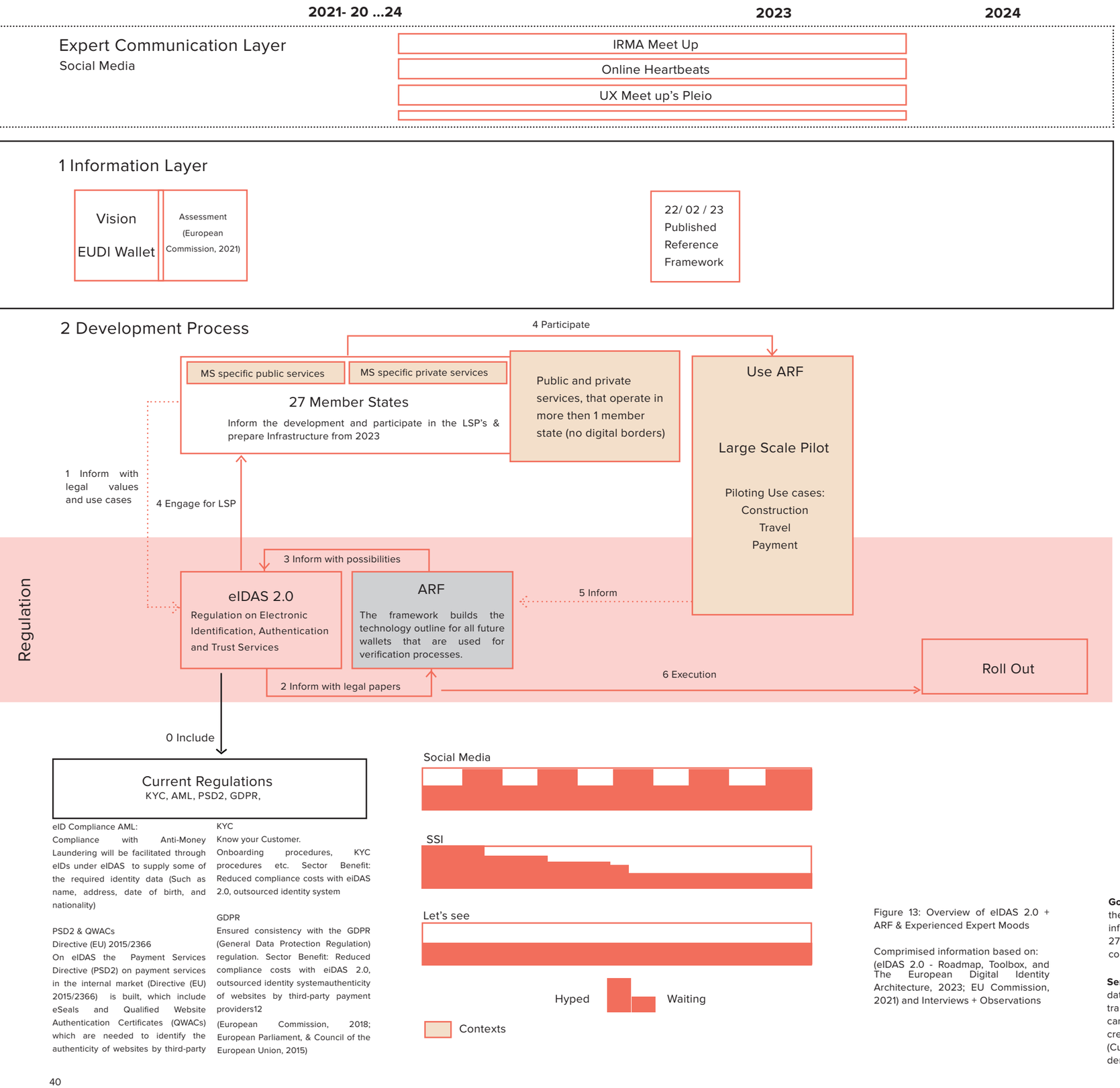


Figure 13: Overview of eIDAS 2.0 + ARF & Experienced Expert Moods

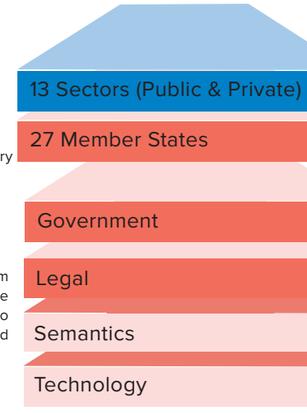
Comprimised information based on: (eIDAS 2.0 - Roadmap, Toolbox, and The European Digital Identity Architecture, 2023; EU Commission, 2021) and Interviews + Observations

As seen in the previous chapter, the EUDI Wallet is aimed to facilitate the digital identity market and plays a crucial role in developing an emergent digital identity ecosystem. The information presented here is based on the assessment paper of the EU Commission (2021), conversations within INNOPAY, interviews with experts and observations and digital identity meet-ups. It summarizes my own interpretation of the essential elements of the current development process to show the connection between stakeholder involvement and development.
The figure is categorized in 4 columns in, which we see the expert communication layer, information layer, development layer separated in Member states / Sectors and EU Commission and a 'mood' layer. The development process of the EUDI Wallet is an iterative process in which the 27 European Member States are informing the regulative process eIDAS 2.0, which is taking place in a parallel process of creating the ARF for the EUDI Wallet. The reference framework is an outline for all future wallets and comes within a toolbox that describes how the wallet should function and which cryptographic keys must be involved. It also gives recommendations to the member states to integrate the technology within their own existing solutions. The ARF will built the structure of all future wallets, to act as facilitator of the emergent ecosystem creation. Therefore technical structures are created in order to ensure security with e.g. cryptographic. To test the approach in multiple scenarios and context a call for a Large Scale Pilot (LSP) was launched in 2022 which is rolling out now in 2023 to test use cases like travel or verification of construction workers. This way, an overarching view can be created for the workability of the solution (eIDAS 2.0 - Roadmap, Toolbox, and The European Digital Identity Architecture, 2023).

To test the ARF in February 2023, a new version of an architecture reference framework was published as shown in the information layer.
A Large scale pilot is rolled out, integrating different sectors from public and private institutions to test different use cases. For example, in the construction industry, to verify the experience of craftsmen to match them with their qualifications of installing solar panels. Moreover, seamless travelling and payment are included next to other verification contexts. The Large scale pilot aims to inform the parallel development process to manage all future verification processes and find the best technical framework. Within that process, we see different communication layers within experts. As this research was established in the Netherlands, the most important communication channels are listed in the top they are not intervening in the process and just try to understand the information given. A Project Manager of developing a reference Wallet for the Netherlands mentions that the aim is to involve as many people as possible in the process to find the best solutions, saying, "How can others participate". For example, by creating an information point to engage users.

The development finds overall recognition. However, the mood differs. To summarize a notion of what is going on, the graph in the button explains how the development is perceived. This will gain more clarity in the tension analysis.

We will now have a look on the consequences of the development.



Government: Creating the path to integrate the digital identity wallets in the infrastructure, which needs to happen for all 27 member states. Moreover issuing the core identity into the wallet.

Legal: Creating a legal framework for every member state to operate in

Semantics: The interpretation of identity data of various documents that have to be transferred into a technical format in which it can be readable for the purpose of using credentials in the wallet environment. (Currently mentioned as biggest challenge, derived from an Interview see tension points)

Technology: Definition of how the system will operate in the future and the source code, that will define all future wallets to create the Emergent Ecosystem (Derived from sensitizer within the interviews)

(See Ecosystem Tension Overview)

Figure 14: Digital Identity System Layers

4.5 Participant Overview

(see complete method overview in Appendix 3)

The research was conducted in two phases in which the first phase was about getting to know the field and the second phase involved a in-depth value-finding approach to get to know the different stakeholders and understand why they project value on a future digital identity solution. Therefore users are defined as the people interacting with the wallet for verification purposes, in which the oversight represents to sides. On one side, they are expressing risks and tensions for the EU Digital Identity Development; on the other, they are acting as value creators. To distinguish the two perspectives the analysis shows the risks and tensions seen by the oversight, and on the other side, it showcases the oversight as a value creator of the system by introducing best practices that could be useful to balance out the values of different stakeholders in the system. The Relying Parties have represented interviews with participants from 5 sectors and one pilot interview in Phase 2. A complete overview of the methods used can be found in Appendix 3. I will now explain the final research method on the next slide and show the iterations made within the process of creating it. Appendix 5 shows the reflective process on the different iterations. The Research Set Up for the different iteration phases is on the right side.

Research Set Up (Also see Appendix 3)

Online:
Method Iteration 2: 4 Participants of the Healthcare sector in Figma Jam
Method Iteration 3: Teams environment in which the research took place with permanent screen sharing of the Ipad to draw together and create reflection in thee participant group
Method Iteration 4: Interview over phone with one person
Method Iteration 5: The Method got prepared in a Figma Jam Environment in which the participant could easily move around the cards used in the method in order to start reflecting. I made notes next to their cards while they where speaking in the board for immediate reflection back.

Participants physical (me online)
Method Iteration 5: The Participants printed out the material and I could facilitate from the computer and steer the discussion if it was needed and ask reflective questions

Offline:
Method Iteration 1: Physical process going from present to the future
Method Iteration 3 & 5: The Research was prepared before on paper, which included the speculative ecosystem map, sensitizers and cards. Depending on the method iteration. Post It's where used. In the process I was starting to write notes and encouraged the participant in between to do the same, but not too much, in order to make them be the person of their own experience in the best manner. (see complete method overview in Appendix 3)

USERS

User	Origin	Living in	Duration	Set Up
1U	Polish Egypt Dutch	NL	1,5h	Iteration 3
2U	German	GER	1h	Iteration4
3U	india / dubai turkish german india	NL	1,3h	Iteration 5
4U	german german german	GER +SP	1h	Iteration 5

Table 2 User Participants Research Phase 2

The whole method approach will be introduced on the next page.

OVERSIGHT /EXPERTS

Expert	Role	Origin	Duration	Set Up
1E	Policy Advisor	NL	1,5h	Physical with Drawing Tabled
2E	Broker Perspecitve	NO	1h	Online via Teams Miro Screensharing
3E	SSI Wallet Perspective in Banking	NL	1h	Online via Teams Miro Screensharing
4E	INNOPAY Perspective	NL	1h	Physical with Whiteboard Tabled
5E	Deep Fake Start Up Perspective	NL	1h	Physical with Drawing Tabled

Table 3 Semi Structured Interviews

In research Phase 1 the experts got engaged in semi- structured interview. the stakeholder were engaged in in three themes about the development.
Theme 1 - General Role in Digital Identity
Theme 2 - EUDI Wallet context (surprises, feelings, concerns, hopes)
Theme 3 - Imagine the Future (Ask for future vision and present vision for imagination)

Expert	Role	Origin	Duration	Set Up
Multiple over the research time	INNOPAY	NL + GER	30min-1,5h	collaborative conversations using whiteboards and drawing tabltes via screensharing

Table 4 INNOPAY Collaboration

Expert	Role	Origin	Duration	Set Up
1 E	INNOPAY(1)	NL	1,5h	Pilot test Iteration 1
2 E	LSP Advisor NL	NL	1,5h	Iteration 3
3 E	Digital Identity Scheme Context Education	NL	1h	Iteration 5
4 E	Banking Identity Context	NL	1h	Iteration 5
5 E	Voorbeeldwallet Policy	NL	30min	Iteration 5
6E	SSI Wallet (2)	NL	1,5h	Iteration 5
6 E	Digital Identity Scheme Context	NL	1h	Iteration 5
7 E	Digital Identity	NL	1h	Iteration 5
8 E	INNOPAY (2)	NL + GER	30min-1,5h	Iteration 5

Table 5 Research Phase 2 - Stakeholder Research Oversight Perspective

The whole method approach will be introduced on the next page.

RELYING / VERIFYING PARTY

RP	Context	Living in	Duration	Set Up
1 RP(Pilot)	Airline	NL	1,5h	Iteration 1
2RP	Issuer / RP Certification/ Construction	NL	1,5h	Iteration 3
3RP	Tele-communication	BL	1h	Iteration 3 (Online (How & Why)
4RP	Healthcare, (Practitioner itentification)	NL	1h	Iteration 3 (Online - How & Why)
5RP	Education	NL	1,5h	Iteration 5 (7Values Cards)
6RP	Commercial	NL	1h	Iteration 5 (10 Value Cards)

Table 6 RP Participants Research Phase 2

The whole method approach will be introduced on the next page.

4.6 Stakeholder Engagement and Value Finding

A Question Drivers for the Methods used:

1) Personal Experience with my student initiative hii and the work with student psychologists shows that asking for feelings first helps the answers, because “if you ask what they think first, they start thinking, ask what did you notice, everyone can answer that it is easier”

2) Personal experience with research in mental models helped me to ask for “what surprises you” early in the process. It is shown that asking for surprise reveals mental models, even though I was not completely aware of it I was doing it, because I remembered. (based on Josina Vink,2018)

B Value provided through the research for participants:
It was not only a value finding tool, but also helped the participants to reflect on their own values and what is important to them in the development process. win win.

Iteration 3, “I noticed what the real value behind the development is”; “ I had fun”

Iteration 5:
“Interesting debate we debate too little”; “I realized that we are aligned”

C Personal Reflection:
I created a strategic Dialogue process to talk about own values and moral reflection to help different stakeholders to find their voice, get aligned and listen to each other in order to understand own values. YEEEY - Research and reflection in

The aim was to find a method that facilitates the balancing act between values perceived as essential and ethical values, as described in ‘3.8 Let’s Talk About Values’.
The research method was developed in multiple iterations to find the perfect method to meet the eight method goals (see table) (see Appendix 5 for total reflection). The goal was to help the participants to think about their own practises in which they are the experts of their own ‘expert of their experiences’ (Sleeswijk Visser et al., 2005), but also find a way to make them think about moral values which got reached in the final method through prompts as used in Creative Facilitation (Heijne & Van Der Meer, 2019) and make them actively reflect on reaching moral imagination (Werhane, 2006), by creating action, as the participants had to sort moral values in order based on the future vision. The represented reflection shows the iterative process and perceived effect of each method iteration on moral reflection, having the participants as experts of their own opinion and making it as easy so it can used at INNOPAY. The difficult part was to find a method / tool that is adaptable to all stakeholders in an easy way, as I was dealing with three different groups, which all have different relations to digital identity. Therefore, a sensitizer developed iteratively throughout the phases and found a final stage at method iteration 5. After the synthesis phase the sensitizers got a final version (See Appendix 3; Section Method Iteration 5).

I noticed that all iterations had some sense of depth in iteration 5, but also elements in 3 that worked well (see Reflection Appendix 5).
During the iteration phase, the aim was to create not only a reflection on what the participants wanted but also get moral imagination started. With method iteration 3, questions about moral reflection were used in the end. However, with iteration 5 that process was already integrated in the whole process.
(Find Best practices in section Appendix 3, Method Iteration 5)

Outline of Method Iteration 5

(1) Immerse in current role & experience with a sensitizer
(2) Present the future (see 4.1 Digital Identity Basics)
(3) Let the participants explore their values around the future by making them reflect by sorting out the cards.
(7 Values where written on cards to sort in order, after one session with the oversight 10 new cards got added which enriched the discussion from moral to functional values - Ease, Reliability & Efiiciency and therefore met the needs of Relying Parties better)
(4) Express core values or draw them out

1	A method to find out the values of different stakeholders for the future.
2	A method that allows the participants to be the experts of their own experience.
3	A method that creates reflection. That aims to reflect on values as they get spontaneously expressed and change over time.
4	A method that creates a reflection on relevant moral values
5	A method that brings them in a future mindset and allows for future thinking.
6	A method that does not request too much time from the busy participant’s max 1 hour / best case scenario 30 - 45min.
7	A method that is easy to be reused from INNOPAY / A method that could be repeated in the future.
8	A method that allows to overlay values in and **see where the actual tension between the parties comes from**.

Table 7: Method Reflection Table: (see Appendix 5 for exhaustive reflection)

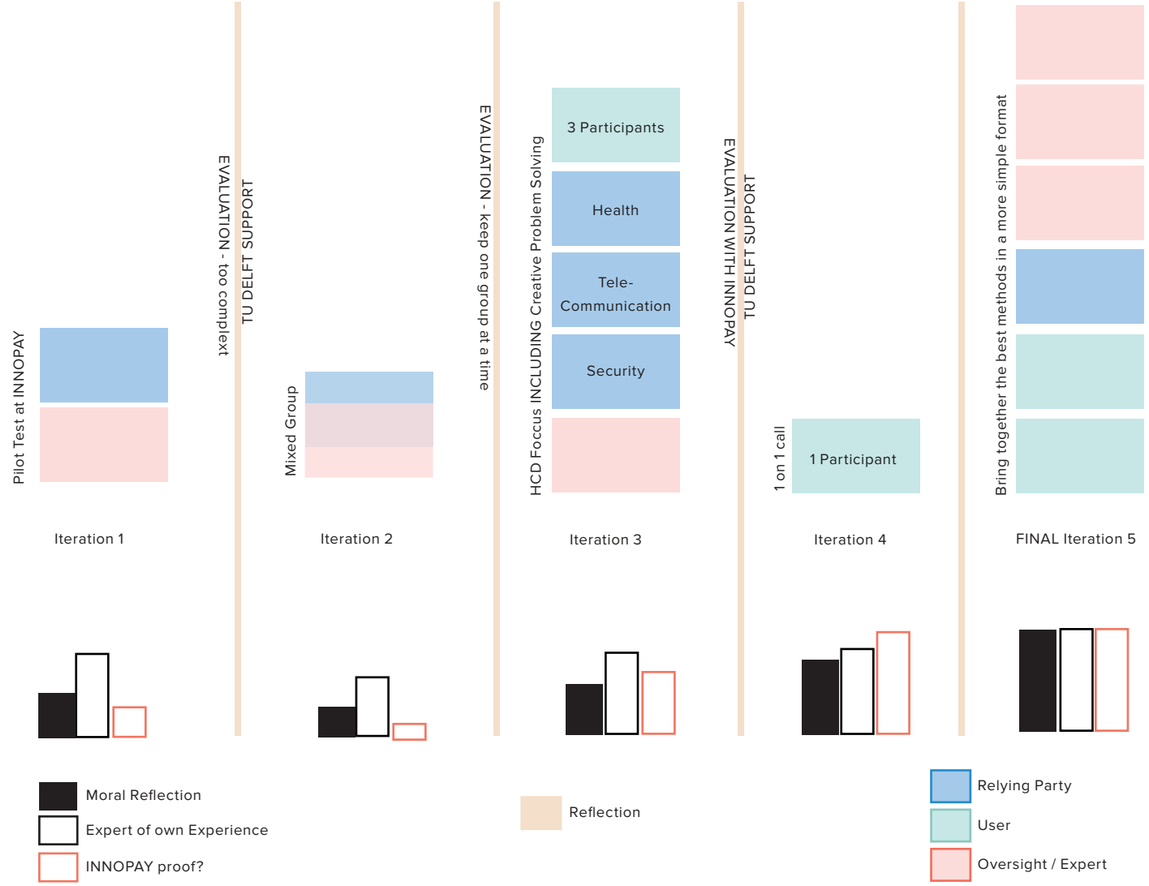
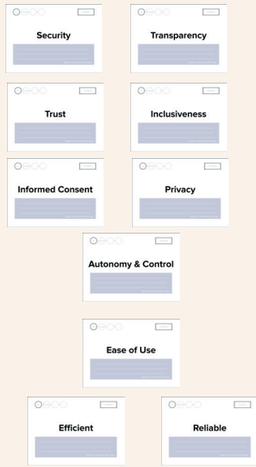


Figure 15 Moral Value Finding Method Iteration and Reflection

(1) immerse in current role & experience

(2) present the future
(see Digital Identity Basics)

(3) Sort out the value cards basd on the presented scenario



(4) Express core values or draw them out and resort cards

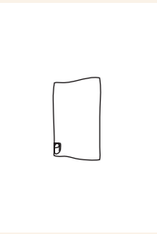


Figure 16 Final Method Material and Activities

4.7 Digital Identity Tension Overview

Here you see an overview of the tensions categorized in the system layers of the development process of the EUDI Wallet. They are presented as ‘How might we’ questions to understand better the discussions within that tension points, a method used in Creative Facilitation to start answering questions in collaboration (Heijne & Van Der Meer, 2019). The tensions are researched through interviews and observations. Social media posts and conversations. To create an overview the tensions are loosely clustered into the themes of Communication tension, Ecosystem tension, Development tension, Expert tension, Technical tension. Those categories help to distinguish the tensions from each other and create a better storyline when describing them on the next pages and are summarized in a discussion afterwards. Each tension theme has a description and covers the tensions that are discussed in each part.

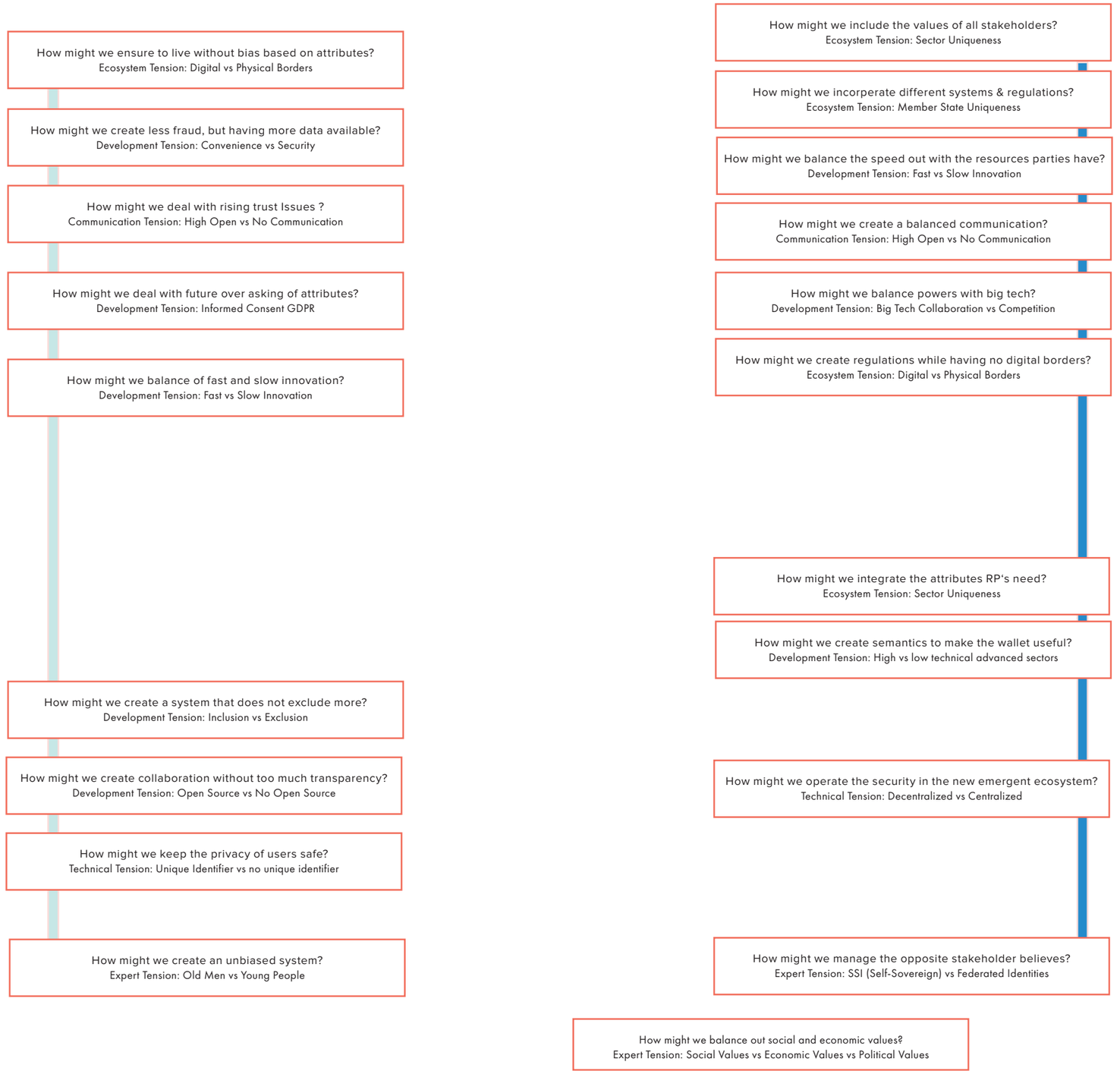


Figure 17 Tensions in Digital Identity

4.8 Tensions in Creating the Digital Identity Ecosystem

SSI BAD: “My wallet shows me that I am 18 + and 12 at the same time”; ”We can see that SSI solutions are not adopted yet”

SSI NEUTRAL: “And I think SSI if we look at it. It’s more of a philosophy than a actual model ”

FEDERATED BAD: “ primary motivation on doing this is to track everything you do online” (Evernym, 2022, July 25):

FEDERATED GOOD IN A TRUST NETWORK: “ They have to tell us which attributes they need and why” (eduID Example

AUTONOMY & INCLUSIVENESS vs PRIVACY
Social Values vs Economic Values vs Political Values
“Can we give money to users for their data?” (IDnext Conference Observation)

“Well there are also low literate people”

Old Men vs Young People
“Because I’m an optimist [...] Because I wanted to be happy, but we have to get it right [...] Other people would be more to the right, like more neutral. Yeah, but not bad.
But like just. No, I’m just not sure if we’re going to pull it off. Is anybody going to do it? I don’t see the banks moving.I see the typical 50 plus white men dominating the discussion, and I miss all other voices. I think it’s really interesting to have those different voices and opinions together in one narrative, actually [...] I want to hear all the other voices [...] talk to the people

Decentralized vs Centralized
“The cloud we’re looking now at the European cloud. European cloud is not yet operational fully, so it’s it’s a complex thing. This is a complex thing,”

“And we also want to avoid having a central authority that everyone goes to and asks, because that authority could read everything and analyze a lot of information.”

4.8.1 Expert Tensions

We see tension between the experts in the digital identity field. They are the creators, but do not agree on everything. SSI and federated identity opinions are especially misaligned .

A / SSI (Self-Sovereign) vs Federated Identities

The already established tension between SSI and federated identities in Digital Identity Background. Experts don’t see it as a reality “Self-Sovereign Identity makes me think of hillbillies on a survivalist kick” (Cameron 2018).

B / Social Values vs Economic Values vs Political Values

The analysis within the framework of Martinsuo (2020) (see Appendix 8) shows a clash of experts between social and economic values and the political decisions within eIDAS 2.0 and the wallet. In a workshop at INNOPAY and at the IDnext conference in Utrecht, possible business models were highly discussed. Possible models are mentioned in which a user could be paid for a credential. However, the clash between economical, social, and political mainly comes from autonomy and inclusiveness beliefs, where most discussion arises because people are not seen as entirely autonomous. The Vision of the EU Commission claims that every user can be autonomous (European Commission, 2020) and is allowed to be autonomous; however, experts argue that we can make mistakes and that there are criminals in the system. Ideas are generated in which a user gets paid for their credentials. However, other experts argue that privacy would only be for the rich and literate.

C / Old Men vs Young People

It is mentioned that experts do not see diversity in the discussion, which creates and unbalanced viewpoints within the development.

D / Decentralized vs Centralized

There is no alignment about creating a decentralized system or centralized solution. For example, the European Cloud is not ready yet to be used, as stated by an advisor for the Large Scale Pilots. Within SSI, decentralized means storage on the phone; however that is mentioned as a tension point with usability as a person losing their phone needs to restore it. Tension is created in when a decentralized solution comes with the risk of losing usability. The tension gets even stronger when knowing there is a process of high-level assurance in order to validate the wallet (Intensi Group, 2023). On the other hand, centralized has the downside that an organization has to be truthful about the information generated used.

SECURITY vs TRANSPARENCY
Open Source /Transparent vs No Open Source / More Secure
“Transparency is last we don’t need that”

Qualitative Values vs Quantitative Values
“On mainly on a technical basis. Yeah, when I talk to. Policymakers I try to explain to them what is social and economic benefits are. Handicapped just want to. Understand the technological part of it. So that’s not your that’s not your business”

Personal Note:
“I also had my difficulties with all the abbreviations, because how do one distinguish what it means for a value perspective” (me)

TRUST
High Open vs No Communication
“I am not happy about how much attention the topic get’s we already have digital identity”

Digital vs Physical Borders (Economic)
“The problem is that it might lead to no level playing field”

“They create a lot of competition with the regulation”;”We will have 100+ wallets”

E / Open Source /Transparent vs No Open Source / More Secure

A lot of attention is currently on the term ‘transparency’, because it defines how open and visible the technology will be and, therefore how the system operates in the future. After much discussion, the decision is made that it is now open source. Some experts fear that the openness of the system will lead to security leakages. However, after all discussion, it is now open source.

4.8.2 Communication Tension

Tension in the communication is within the development of the EUDI Wallet and within social media. In general the ‘notion’ of building the EUDI Wallet is experienced as too much transparency on social media as this will lead to trust issues within the whole ecosystem.

F / Qualitative Values vs Quantitative Values

The developer of the ARF mentions the creating process as ‘tricky’ because multiple legal frameworks and use cases have to be balanced with complexity. Also mentioned are the complications of running a parallel process (Intensi Group, 2023). The problem mentioned in the ARF development and the creation process within the Large Scale Pilots is that the communication between technical and legal people differs. This shows a clear communication barrier which was previously discussed in the value literature (3.8 Let’s Talk About Values), as it the hard-to-communicate within the barriers of quantifiable and qualitative values.

G / High Open vs No Communication

Other experts mention that they are generally not excited about how much attention the whole topic gets and would like it to be less extensive because trust is leaving digital identity in this format. On the other hand, we can observe experts wanting to know more about what is going on as the current processes do not allow understanding everything, as it is super complex and detailed. I also observed tiredness and pressure during the development process.

4.8.3 Ecosystem Tension

As already known by now: 27 member states must make a solution available to their citizens, and 13 sectors must accept it in private and public domains. Next to that, developing a digital identity solution also needs to consider that there are no borders in the web, however that comes with difficulties reagrding the non existing borders in the internet, the mix between collaboration and competition and the problem around how advanced the technolofy can be based on quniqueness

H / Digital vs Physical Borders

There are two things about digital vs physical borders. Firstly who will police the whole development if there are no digital borders? As different parties can operate in different member states. Moreover, how will the different member states and wallet providers have a level playing field, which means that if some member states have different regulations, the solution could act differently, as they do not have to apply with certain technical requirements? Also, 100+ wallets are mentioned to possibly enter the market. Next to, the economic and social factors are mentioned, as member states have different privacy understandings. Also, the role of big tech is questioned because what happens to the adoption when they enter the market?

Digital vs Physical Borders (Social) + Member State Uniqueness

“Like for instance, the rights of certain groups like the just-called them the Rainbow Group so Well their rights are are really. They’re being discriminated against. A lot of Eastern European countries like Hungary so. I think that. Could be an. The issue, but on the other hand the design will make a big difference. So if the design of the system is privacy-enhancing, then those issues could be addressed”

“We will not only have one wallet, we will have one EU digital identity wallet, but maybe per Member State and at least one. So maybe there are several right, and I think that’s a good thing because we also need competition.”

Sector Uniqueness

“We don’t see the Relying Parties moving”; “We need to create awareness within Relying Parties to participate in the Large Scale Pilot”

“Currently, schemes are built on top of regulations to create a trusted network between parties
In that process”

“I also believe that we seriously need to think about the way in which this wallet app will be used by the private sector.”

High vs low technical advanced sectors

“Main difficulty will not be the technology of the wallet, it will be the semantics because I can transfer any value to you. But if you don’t understand what. The semantics really mean. Especially within Europe, that’s going to be a. Big challenge,”
how would you describe semantics?
“This is a card. And this this is some form of identity data. How do you interpret this form of identity data as a receiver of this identity data? And this is only a small example, but if you look at your diploma or. […] And that’s going to be the real challenge. Not the transport of the data.

I / Member State Uniqueness

Only 14 member states identified an eID scheme (European Commission, 2021). A eID scheme is a network that allows for creating a digital identity and makes them available to their citizens. This way citizens can use their eID in different countries and enter online services on basis of their primary identity. However, not all member states offered a digital identity solution to their citizens yet and there is also differences in adopting a solution. Even though a scheme is built does not automatically say that there is adoption. For example there is a big difference with the adoption in the Netherlands (Using DigiD) or Germany (Elektronische Identifizierung im Zahlungsverkehr, 2020) . The uniqueness create the consequence that member states will have a different approach on creating a digital identity for their citizens. Moreover, the member state uniqueness also leads to everyone having a different understanding of privacy. Experts mention it as social risk in which new identity solutions that do not align in their attributes might not have the same acceptance layer.

J / Sector Uniqueness

Public and Private sectors have to comply with different Low Level of assurance. Within the new architecture reference framework only sectors with LoA high have to accept the wallet, which was not clear in 2022 (Intensi Group,2023). However, mentioned is that all verifying parties need different attributes to fulfil their services for example, some need a complete ID, because they need to comply with the regulation to have actual proof of the primary identity and others don’t need that. Moreover, looking at the solution layer In the current system trust is created by the organisation, which with the new approach, the question of responsibility is highly questioned. For example, what happens when a person that verified with a wallet at a party and something happens, or a certificate was fake? Especially INNOPAY questioned who would have the new responsibilities and also who would create trust within that relationship. In general, trust should be created within a platform by intermediaries as described in the book Everything Transaction (Liezenberg, Lycklama, & Nijland, 2018). Therefore a ‘proper scheme’ is proposed.

“We miss a proper scheme”

K / High vs low technical advanced sectors

This tension presents the difficulty in balancing the four pillars. Four key pillars are mentioned to create a digital identity ecosystem: Legal, Government, Technology and Semantics. Those four pillars need to be moved at the same time. Otherwise, it will fail. One expert mentions that to develop a working digital identity system, the four key pillars must be kept spinning to create adoption of the system. At the moment, a high focus is on technology but not on the actual semantics, which is the way how data can be created and read in a digital form from different documents. Moreover, the parties who need to issue the credentials have different levels of technology they are currently applying within their field. The key takeaway is that there will not be a solution without semantics development.

Big Tech Collaboration vs Competition

“I don’t love that word, but let’s say to strengthen their citizens control over their data and to limit the power of those platforms to control large ecosystems. So we need to view the itis regulation in the context of other regulatory acts including the digital markets acts or the digital services.”
“These are risks that will exist in the Apple wallet just as much as this wallet, so it feels it feels safer to be. Tackling it. From an official EU perspective than trusting Apple. To to deal with these privacy.

Fast vs Slow Innovation

“If we realize that we are now in a pandemic and we cannot easily provide any services or anything else, and alongside that, there are billions of fraud cases where companies have applied for coal subsidies or something that may not even exist, and all that has happened. So, we realize that the skyscraper has been built too high and the foundation needs to be built.”

“Then you have wallet 1, 2 ,3 and that is not very usable”

Inclusion vs Exclusion

”How do we want to HANDLE people that don’t want to participate in the digital world”

L / Big Tech Collaboration vs Competition

One reason to create a wallet was because big tech entered the wallet digital identity market. To balance powers the government sees a need to make the move into the direction to not loose identity as term in the digital space. However it is argued, that big tech is better in creating desirable products which leads to the discussion if it should be a collaboration or not, even though the initial idea was to ‘balance powers’ by investing in an own solution.
Discussion: Will Big Tech have the most adopted wallet at the end of the day?

4.8.4 Development Tensions

There is a clash between social and economic values in which we want to reach a system that does not fail, which includes fostering the participation of the different ecosystem participants and looking at the implication it might have on society in the long run. The fast development of the system could also lead to many mistakes that could not be fixed within the wallet before.

M / Fast vs Slow Innovation

Based on one participant, the problem of fast and slow development gets a new layer, as it is argued that we should focus on the foundation instead of building a skyscraper, as this would lead to problems as seen in COVID 19 were parties even applied for funds at oil companies to be able to participate in the fast development. Therefore social values are closely connected to societal at large, expanding in the ecological layers.

“We need to build the foundation and not build a skyscraper”

N / Inclusion vs Exclusion

“We could also discuss if the development is a good one at all”.
Experts do mention that the development has the risk of driving further exclusion. However, it is a debating point as creating inclusiveness makes it hard to create all the other values like privacy or security. Suggested is to design a model within the system that allows for users’ participation with a different form of help. Others think education is relevant, which is also mentioned by the EU Commission within the Path of Digital Decade (Infographic - “Path to the Digital Decade”: the EU’s plan to achieve a digital Europe by 2030: Infographics, 2022) as a goal to help the participation of users in technology more than today. However, the experts are split in some terms. For example, a panel discussion at the IDnext conference shows that some participants use the words ‘how might we handle’ people who do not want to participate. Moreover, other experts see missing autonomy as part of inclusiveness, which also includes thinking about it in terms of ‘making a mistake and accidentally clicking yes instead of no’.

Convenience vs Security
"How much do we need to give up for more convenience?...Are we not ok like this? [...] I am ok like this"

O/ Convenience vs Security
Concerns rise about the development in which the tag line is 'how much security do we need to give up for more convenience, is it not enough, what we currently have?

Informed Consent GDPR
AUTONOMY vs PRIVACY vs INFORMED CONSENT
"I am really happy that we and not yet in implementation because there are so many things to fix [...] We have to make sure that people really understand what is asked[...]Not a replacement of the current system"

P/ Informed Consent GDPR
Concerns rise in the last half year, mentioning the risk of over asking and SSI participants agreeing that it is possible to use the source code to verify their users and create their own wallet. Currently, the process of asking is described as a process in which a Relying Party that needs to prove the attributes of a person will be able to send a request that a user will need to accept. However, the problem mentioned is that everything could be asked, so experts discuss that we have to decide if we want Facebook to ask us for our BSN number or not.

"We have to decide do we want Facebook that asks for our BSN?... or are we going to make a decision and do not allow for that"

Q/ The Ecosystem or an App?
Within the development we also experience that digital identity is focused on creating and App, which includes the creation of good and bad flows within the process of verification as created by the Dutch government. Within different environments this app can be looked at and comments can be made (Designs_ Demo_NL Voorbeeld Wallet, n.d.). However it is also experienced as building a template as mentioned in an interview.

"I feel like we are creating a template rather then a working solution"; "So much is not included" (Referring to the tension Informed Consent)

"The agreement also takes into account current privacy concerns, for example, it does not include any single unique identifier, which is a very important topic."

Unique identifiers are the same as web cookies which leads to correlating online activities and linking them back to a person (Tobin, 2023).

4.8.5 Technical Tensions
Within the boundaries of technology we are looking at a privacy tensions that is created, which is the possible ability to track what a user is doing, because a identifier needs to be provided for the wallet to be secure enough

R/ Unique Identifier vs no unique identifier
Unique identifiers allow a person to perform verification services for hundreds or thousands of organisations. "Unique identifiers are the same as web cookies which leads to correlating online activities and linking them back to a person" (Tobin, 2023). The government does not seem to describe the actual way of how the identifier will be created, which creates tension. Experts claim, that the government should not be closely involved and only issue the core identity, however by doing so there is the question of how the 'PID' - Core identity will be possible to be tracked back to the entity (Intensi Group, 2021)

Discussion: Possibly the most considerable Privacy vs Security Challenge to create trust within the ecosystem and adoption?

4.8.6 Discussion

To summarize. The tension overview describes the key opposing tensions in the digital identity system. Here I describe what I see within the current development. I see that there is little alignment within the development process of the emergent ecosystem. Which mirrors back the wickedness as described in (3.1 Project Approach and Design Theory), as many actors in the system come together with different roles and believes.

The Main Insight ist:
Experts Dis-alignment > Difficulties in creating a shared vision or harmonized approach to develop the emergent ecosystem
We see expert tensions which show various crucial misalignment points, 'likely' due to the various believes of the current operating digital identity systems. For example the SSI vs Federated discussion where economical user centric approaches within the use clash with SSI approaches that have a hard time finding adoption. Both sides as described have bad and good approaches, however do not seem to be align that much as also social media shows that the approaches are explained a lot, due to misconception of how SSI is perceived. Those factors make it hard to find a common ground in which a new system might join the two together. Moreover we see many questions around the communication and transparency of the actual technology and risks are projected into the future by experts themselves. In general trust is mentioned as core element of failure and wants to be addressed by communicating what digital identity actually is. Next to that the questions are raised how fast the development should go and if focusing on the layout of an App actually helps to build an ecosystem.

4.9 Stakeholder View

In this section the ‘experts / Oversight’, are presented as value creators of the development process. The following analysis shows all three interviewed stakeholders and their roles within the system. (See Section 11 to get a full overview on how I created the terms)

4.9.1 Oversight as Value Creator

We already discovered how the experts are looking at the development, now we are looking at best practices on what the oversight would possibly do to create a well-balanced ecosystem. In that sense the oversight is here as a value creator and wants to oversee the situation and has a bird-view on the development itself. The experts interviewed within the session got analysed within a view category to showcase what their role is in the development from a bird view perspective to oversee the solution, Communication Balance to establish nuances on transparency, Account for Failure before it happens, establish a secure solution within the balance of privacy for the user, and provide trust. The outcome of this analysis is that the oversight would provide different things in order to overcome the risky points mentioned in the tensions overview. The analysis was a combination of drawing out the solutions and values the oversight came up with and cluster them into a large value board (see Appendix C) to finally establish the most essential points in a condensed way On the next page the different themes are described and show the different aspects within.

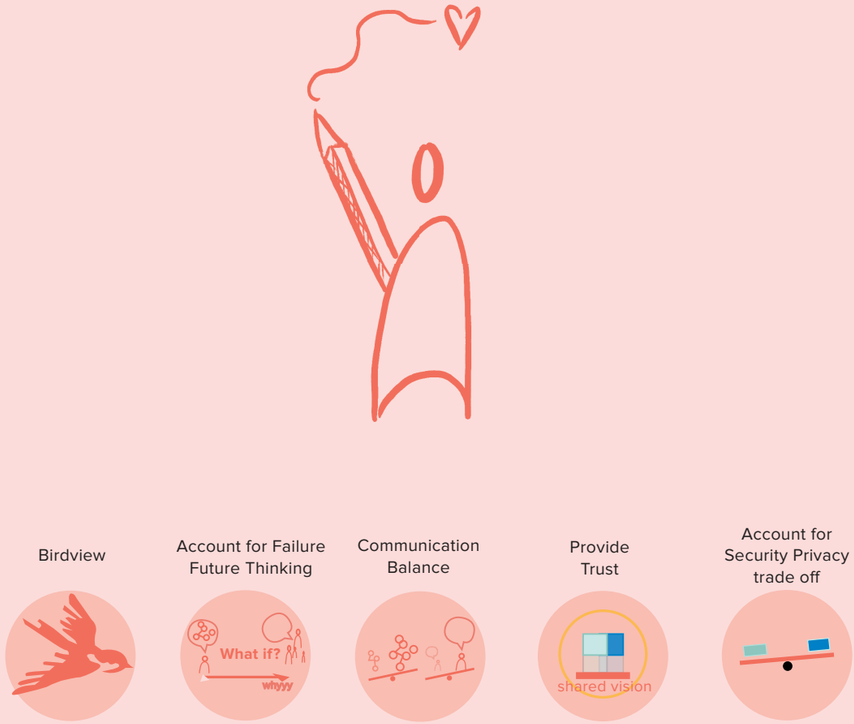


Figure: 18 Oversight Perspective

4.1 Oversight

The analysis is based on interview quotes and especially the sensitizer tool kit of the oversight (see appendix 10)

“Compromises. So privacy is not an absolute thing”

“Open research model”

“Transparency is nice, but it’s not the most important things”

“I am not comfortable how much attention the topic get”

“Transparency to create trust in the network building the solution”

“Speak to the people currently only white old men are speaking in digital identity”

“There’s people that say it cannot be that the name of relying party pops up in this wallet screen because then apparently the wallet knows where you’re where you’re sharing data. Regardless, if you have have the history. This should not be possible, so we have this debate”

“This is done by privacy by design”

“you should be able to kill the wallet”

“They have to tell us which attributes they want for example we ask them why to you want date of birth [...] send a card for the birthday, but can you not do something else?“

“In the future, you don’t make a. Copy of your identity. Data, but you show some form of 0 knowledge. Proof that it’s. You yes, I’m older than 18 in my. Case that’s very obvious. But in your case, it’s perhaps not. So we’re going to work much more with. Verifiable attestations instead of copy of identity data.”

(0) Bird view

See Tension analysis. The oversight get’s experienced as having a bird view on the situation,

(1) Account for failure before it happens

The idea is to establish an open research model in which different points of failure can be tested quickly in which developments are anticipated.

(2) Communication Balance

Transparency wants to be provided in balance from the oversight perspective (2.1) Technical Transparency Security Balance, to invite not all hackers by creating a source code that is open for everyone
(2.2) Governmental Transparency Security Balance, to shout less and collaborate more
(2.3) Transparency in general, should be balanced with security to provide the right information to the right people at the right moment in time about how the solution is created.
(2.4) Network Transparency to establish trust in the network and help each other out

(3) Establish a security solution within the Privacy value of a user

The oversight is establishing security and privacy, however they come in a balance as recognized in interviews, in which the oversight is arguing that double blindness could be introduced which is a way to not have the parties see each others name and put a broker in between. Also standards can help which should be provided and selected within the network itself that is creating the digital identity solution.

Within security different approaches are mentioned which can be clustered into (3.1) Network security (3.2) Solution Security (3.3) Solution Risk Management
(3.1) Within network security we are integrating either a police that can operate within the online environment while not having digital borders, trusted lists, define reliability, liability and who is accountable in which situation (3.2) Within solution security technical terms are discussed like cryptographic, technology neutrality, open standards (3.3) Solution risk management is about accounting for big risks and acting on them for example accounting for impersonation or external physical attacks and build in a ‘kill the wallet’ function

Privacy can be differentiated into (3.4) Privacy within use and (3.5) Privacy alignment. (3.4) Privacy within use is linked to making the wallet unlink ability so tracking to every single location is not possible to “not generate a Chinese situation”, creating an approach on how to make GDPR a success in the solution rather than a failing factor based on ‘over-asking’, generate standards that help the success (3.5) Privacy Alignment is about generating a similar understanding on attributes within the whole ecosystem including member states to generate a balanced understanding and harmony.

(4) Provide Trust

Trust wants to be built by establishing security and reliability in the solution and creating a system that cannot fail. In that sense the trust generator perspective can be seen about the network as a whole integrating perspectives of (1) users (2) Relying Parties (3) Issuers of Credentials (4) The collaborative network system, which will create the solution and on the other hand bringing in needed parties to provide security like. Therefore it can be linked to (0) Bird-view.
(1) Build in a help desk, have a legit party create the wallet, speak to them and integrate their opinions, find the communication balance and balance our security and privacy (2) Create awareness to generate participation, help to find out and build business models (3) Creating awareness and help them to facilitate the semantics process (4) see (1.3)

“Compromises. So privacy is not an absolute thing”

“we need a help desk”

“ Yeah stick to it in times of fraud”

“Our aim is to supply that form of trust. And that has to be secure that. Has to be. Safe to use, but also if this wallet is compromised”

1) “What if it fails like in Covid 19, there the government also did it and this one girl just said that she will not do it. “

“There is no shared vision”

2) “We are aiming to have more in depth user interviews as a collaborative model”
(Dutch Voorbeeldwallet at IRMA meet up)

“Those are conditions to be successful. If those conditions are in place. For me the the most important thing is to become reuse social value. Social value from a citizen’s perspective. And that’s that. I will almost say it’s it’s real value. It’s not LinkedIn, Facebook, or, but it’s it’s fairly. Coming from you. And it’s really you because the government says it’s really you can use your.”

(5) Establishing a shared vision - Collaborative Competition

Currently, “there is no shared vision” However, looking into how to create a two-sided market, it is crucial to find common goals within competitive system participants to facilitate a similar purpose.

Discussion

The experts are defining different ways of providing value to the system in which they have different technical practises that they would provide in order to make a system development work collaborative and trusted.
Within the research phase ‘Future System Speculations and Tensions’, three main stakeholders were established within the collaborative analysis of future interactions. To provide some theoretical backing, I will explain the link between designing for values and designing collaborative networked systems.

Theoretical Background - Value Creation within a scheme

Established through an in-depth conversation around designing for values at INNOPAY. Before understanding value creation, we need to understand Two-sidedness, which starts with two parties that want different things from a solution (Liezenberg, Lycklama, & Nijland, 2018). In case of the EUDI Wallet, both the user and Relying Party will need to be happy with the solution, which should serve their purposes. This means different parties with the same aim come together to establish a new solution which can be seen within iDEAL. The example is given that the iDEAL is designed from a “merchant perspective” in which the merchant got prioritized in the decision-making processes. “You could also design in from another perspective, but then you don’t prioritize for someone”.
Based on liability issues in which a bank does not want to be liable in case a product is broken or does not arrive, they did not want to be in the occasion. Designing from a merchant perspective means, that there are some “values from a user perspective that can not be created”. However, the user needs to go to the merchant when something goes wrong and there is no chance of getting the money back from the bank.
The key insights here are: We are only sometimes designing solutions with the core value of all parties in mind. Looking at how we can design a collaborative networked system underneath shows the graph (Figure 19) provides the recipe for schemes, naming Business and Governance, Application and Infrastructure. The founder mentions the tricky part of creating collaboration: “You have to open up the door; for example, we used the picture book to get them from to collaborate.”

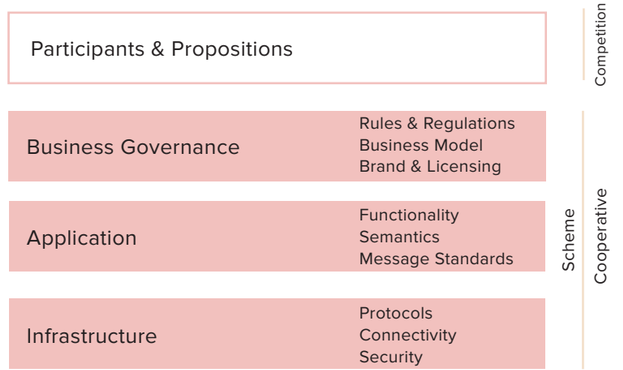


Figure 19: The build- up of networked services (Based on INNOPAY)

4.9.2 User

To establish a view from a user perspective, three groups got interviewed within Research Phase 2. The groups were chosen based on convenience and diversity in nationalities. I focused on creating a diverse group by including people from different backgrounds. Unfortunately, there was a limitation of having no users in the group that act as professionals in different fields, as that aspect was only got discovered in the analysis process.

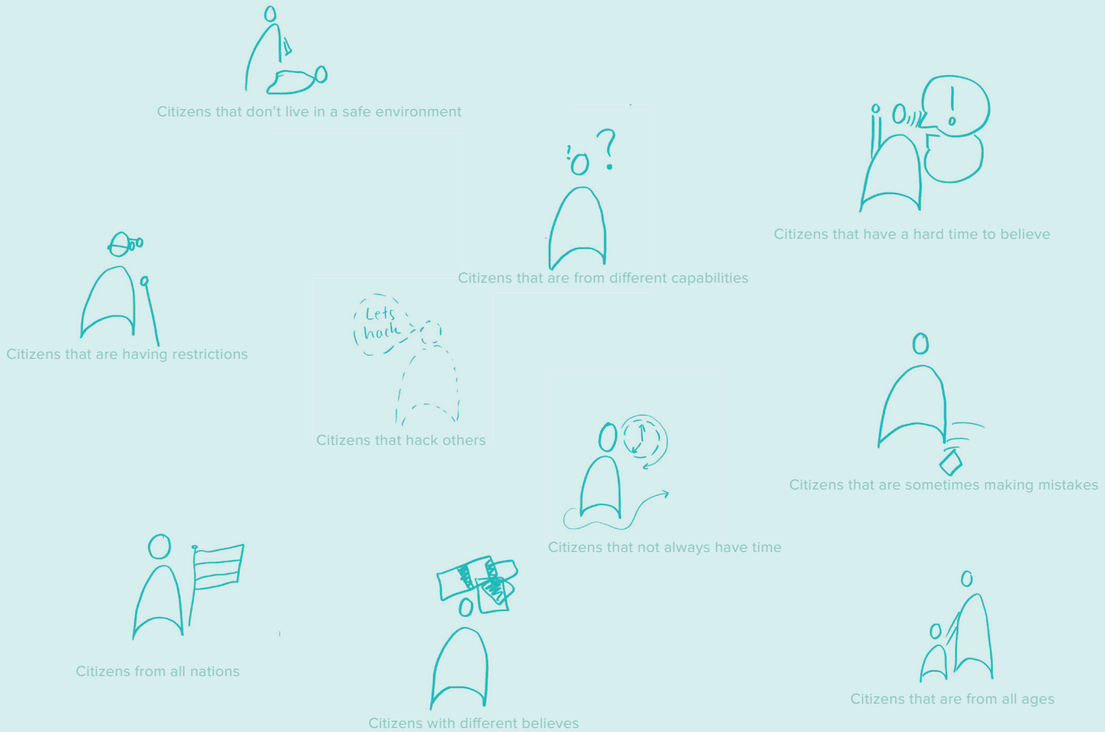
Due to that, some user perspectives got included in which Relying Parties describe the need of users in different environments. Also, the research activities of Phase 1 showcased various notions of user behaviours within identification processes, like the prototyping test of the SSI wallet (see Appendix 3 - Method Overview) or expert interviews and how they manage data.

The analysis included the various perspectives gathered and represented in one piece to summarise user perspectives. The analysis phase integrated different steps. First, the values of all users were analysed in cards as seen in (Appendix 9), and after wards, the most critical themes got uncovered within the synthesis phase (5.2 Synthesis, Mental Models)

Different clusters represent the most relevant notions of a user (1) Perceived values including underlying values, action and experience values and information values, (2)User Uniqueness is a representation of all the different users that might be in the field of digital identity using the wallet. Here all expert suggestions are integrated (3) Value Uniqueness showcases that values change and flip per persona and context relation in which reflection can change our perceptions (4) Value tensions are all tensions the user is dealing with themselves based on the information or experience provided to them for example they have a tension that they want to have privacy, however also value to be on social media, as they have a need for being in a community at the same time, which are therefore in tension with each other, (5) The solution balancing act, here the users express tension points with the solution provided to them. For example, the hurdle of security in processes, however, they also provide them with a feeling of security in some way, or the lousy consent practises which leads that they lead towards the need for better information practises from the other party (6) Value Alignment showcases the values that are mentioned that lead to trust which can be seen as a value creator for the user. For example, providing familiarity by having a bank issuing the wallet leads to trust or having clear information that suits them and the context. However, we will see in (5.2 Synthesis, Mental Models), why this outline might not be the golden rule for every action.

I will provide an overview of the mentioned themes on the next page.

(2) User Uniqueness



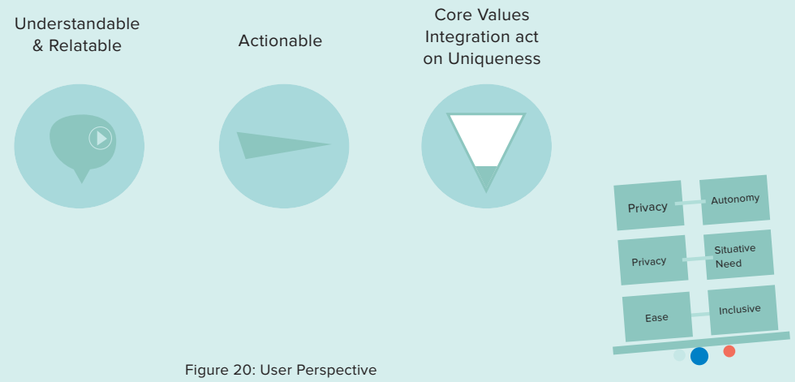


Figure 20: User Perspective

4.9.2 User

(see next page for more quotes)

“I want to revoke my data”, “I want to have better information” , “I rather wait a bit and know it is taken care of”

“It would be better if I could decide to say if I am a woman or decide to have the option”

“I take everything back I don’t care about privacy if that makes the process easier”

”you need to know what the transactions are gonna be. That’s where the transparency like what is going, how is it going to be used? That’s where transparency”; ”knowing this (Transparency) should create a trust with the wallet or with this whole idea concept. And and that leads to your sense of privacy knowing, OK, this is what is happening. So this is my privacy within this setting.”

„It should be convincing that this information is protected. So maybe right it doesn’t protect. And also that thumbs up“

“we need an all inclusive model”
“Inclusiveness becomes much more important because it is for everyone in Europe right?”

“They (Organisations) have that information and in so many countries around the world this it’s still illegal to be gay > “Can I switch (referring to value order) what you just said makes me switch my mind

“Like then you could also say like the colours bias me right you have here red”

(1) Perceived values:
a) Underlying values to fulfil moral goals and meet user believes

Based on the user interviews a view got established that it is about seeing, knowing and having security, privacy and reliability in the process which leads to trust. In which the underlying value is to be respected and cared for. Which was found through mapping out the expressed values into different diagrams and trying to understand the relation and tension between the values a viewpoint on its importance (See Appendix 10, Section 11). In a process of questioning future vs present values the expression of “I want to revoke my data”, “I want to have better information” , “I rather wait a bit and know it is taken care of” showed that it is on one side about a feeling of respect and on the other side a feeling of care to keep the data safe.
Care can also be related to being cared for in having a smooth process. Or being cared for to be able to life without the bias of anyone else. Therefore care and respect are the underlying values.

b) Action & Experience Values

The process should be convenient and suit the purpose. The action itself in which the user expresses mostly is the need for efficiency, ease or convenience. However ease of use is questioned to some extend. For example one user mentions that they rather wait longer for a process to, as that gives the feeling that the process is more secure. Which shows that the tension of ease and security could be lifted in regards to understanding the necessity.

c) Information to understand the interaction & get a feeling of security

This category is called understandable information because we are looking into not only being transparent and rather about creating clarity in what is being said and why it is there. As seen in section a) users express a need for action, however this is also based on the bad ethical online practises or the overload of bad information that we often received at our healthcare practitioner. The little clarity showcases that we are looking for better approaches.

(2) User Uniqueness

The third category user uniqueness was an analysis of the semi-structured interviews and observations at the IDnext conference, the EU podcast analysis and Relying Party interviews, which reflected on user groups which was finally in design iterations brought together in a view on an all inclusive model which shows the different types of users and factors that need to be taken into account, when designing digital identity solutions.

(3) Value uniqueness

Differences are seen in users knowing and expressing their believes for different values, however understanding them from a different perspective they switched their mind and reflected on the actual meaning in relation to their personal believes. Which could be seen as moral imagination (Werhane, 2006)

(4) Value Tension

Currently users often end up in a situation where they balance privacy vs needs. This internal value tension was explored and researched through a method test in which I used consent form as research artefact (see Appendix 15) to find out, if we can overcome the value tension between needs in the moment and privacy as overarching value (See Method Overview). This tension got also discovered in the research especially in situations where a high amount of bureaucracy is needed like the healthcare practitioner. One user describes the moving from one to another country as pain and would give up privacy to smooth out the process. An other example is, that sitting at a healthcare practitioner involves too much bureaucratic things, which is why the users rather wants

(Focus Group) - Question, but what if you couldn’t use the service?
“I would still share it”

“I could have a second layer of instruction. I can voluntarily give up my. (use) I don’t know Face ID or something and then there I have healthcare information. [...] like your blood type, but also like you have your organ donor. [...] It’s not only information for you or the government also for emergencies.
(P7) So like the government would actually entered this? (P5) Yeah, because it your ID for example. They can also access without multiple layers of privacy”

Informed Consent vs Privacy
“With GDPR you have rights but not many options. You can not decide whether or not you want to share specific data. You are only allowed to say yes or no”

Security vs Ease
“I want that others can act on my behalf if I can not act myself anymore. Like forwarding a ‚Vollmacht‘, (so you don’t care about ease) “no .. should be secure”

“I want my health records then I do not have to fill out those stupid forms anymore at the doctor. Always have to remember when I did what and when I took which medicine”

efficiency then thinks about security in that process.

> Privacy vs Autonomy: Not being able to act based on Capabilities
> Privacy vs Need: Not being able to act because something else is more important
> Privacy vs Situation: Not able to act, because there is no room for it in the moment in time

(5) Solution balancing act

This part shows how users themselves would balance their own values out with the values of a solution, which showcases their awareness for the different possibilities that can be seen within the parties that want to provide something they can use themselves.

> Security vs Privacy: Create “multiple layers of privacy” in which the first layers is approachable fro example the donor information and other information should be hidden

> Informed Consent vs Privacy: “Transparency & Traceability to know where the personal information was used”

> Security vs Ease: Knowing why it is not easy strengthens security

> Inclusiveness vs Reliability of Data: Risk tension - let me life without the bias of anyone else

> Transparency vs Informed Consent: There is no consent possible without good transparency as seen within dark patterns.

> Ease vs Reliability: Having to go through multiple steps in order to prove the identity based on unavailability of a service

(6) Value Alignment

Understanding & Feeling Security (> Trust)
„It should be convincing that this information is protected. So maybe right it doesn’t protect.
And also that thumbs up“

Understanding & Feeling Privacy (> Trust)
"you need to know what the transactions are going to be. That’s where the transparency like what is going, how is it going to be used?

Understanding Information & Believing in it (> Trust)
“I want to know why and how they want my data”

Having a reliable service over time (> Trust)
(Fraud Question) “Would be hard to trust them again”

Familiarity (> Trust)
“A bank should issue it”

Understanding to be cared for and respected (> Trust)
(Revealing that the recording started unauthorized) “I feel like you did not respect me”

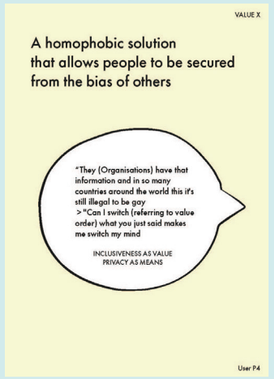
Understanding the aim and necessity (> Trust)
“Like they say don’t share with someone you don’t know right?” (IRMA Prototype testing)

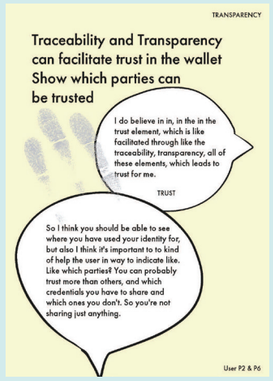
Knowing who is accountable and being able to act on it (> Trust)
“Not being able to know who sees it makes me very uncomfortable because even if I give my ID to whoever is checking it, I at least know it’s that person. It might be sort of seeing more than I wanted to see, but at least know who it is.”

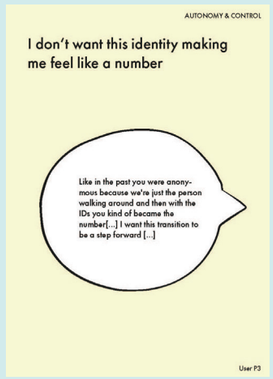
4.9.2.1 Highlights User Values

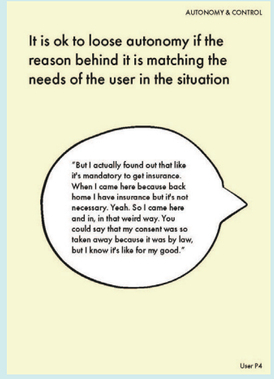
I listed a view expressed values here in order to provide some overview on the expressin of values for the wallet in a more tangibleform then previously seen. As the user will use it I wanted to highlight sme urgencies, that where expressed. In the top you can see the extracted requirement based on the value expression, which can be seen as norm.
(Van de Poel 2013)

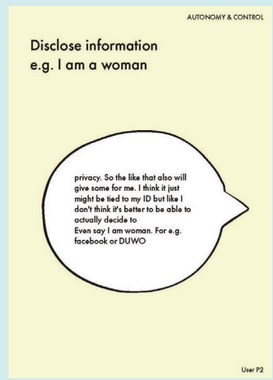
1a Underlying Values

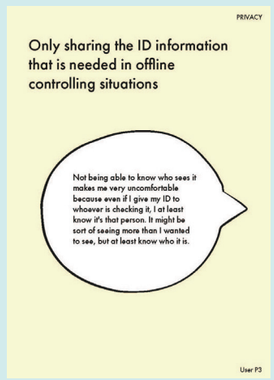


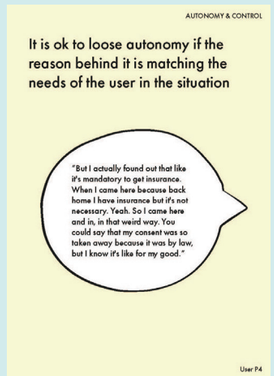




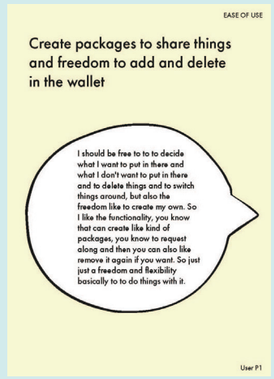


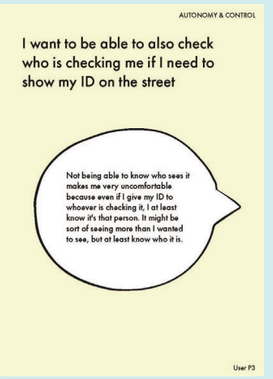




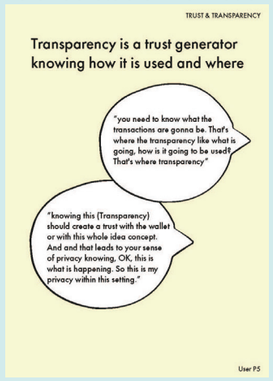


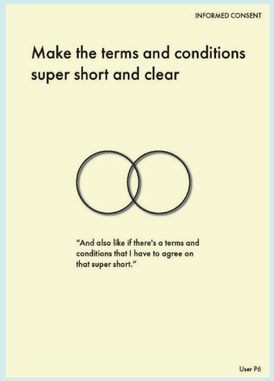
1b Action & Expereince Values

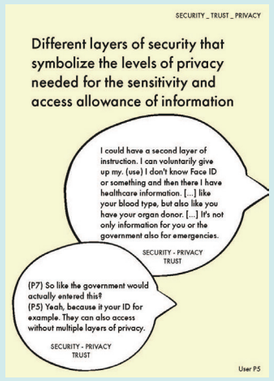




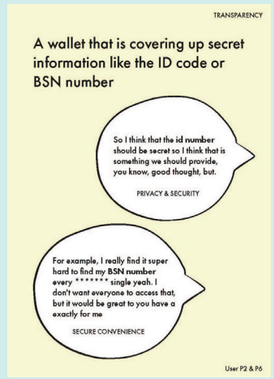
1c Understable Information

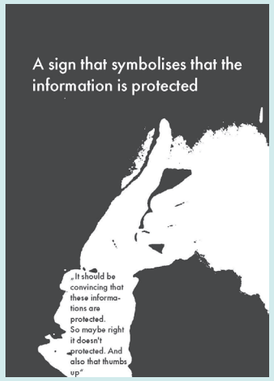






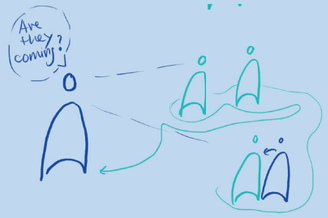
1c Information for Security





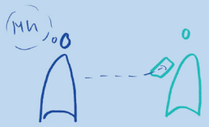
4.9.3 Relying Parties

The view on Relying Parties was established through the integration of five different sectors Telecommunication, Healthcare, (big) online platforms, Education and Construction / Security in which 3 participant groups used method iteration 3 and two used method iteration 5.
What struck me during the analysis was that all of them are different and
only got really to the core of it by looking in detail into what was said; mapping it out within a mental model structure, as mentioned already in the user analysis. The numbers indicate the differences discover and are linked to the next page.
(1) Perceived common values, which are the need for Relying Parties to have actual proof of a person in relation to their identity, (2) Business Uniqueness, as there is a lot or less need for personalization of the service for the users using data practises, (3) Practical Uniqueness were clustered into 3 categories: Context Requirements in which a Relying Party needs different solution based environmental constraints like an MRI room, (3.2) Regulatory boundaries based on the Level of Assurance needed in the process (3.3) or differences in how the attributes can be gathered, as some parties have difficulties to verify a person that is not in their own database yet. (4) Within that framework, the experience with their current identity solutions differ, which resolute in parties that want a change, are likely to change or don't want a change for their identity solution. (5) This can be based on their relationship with them as seen under user relationship uniqueness. (6) Some relying parties mention that they are currently balancing out many values based on regulations, business needs or user perception within the process of identity use (7).

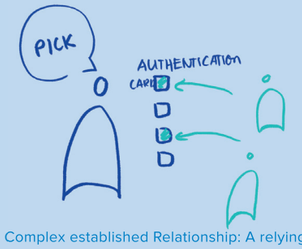


Fluctuating Relationships: A user is coming and going but also has different suppliers e.g. when shopping

Established Relationships: A user is required to use the service for work or education

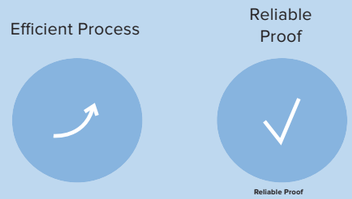


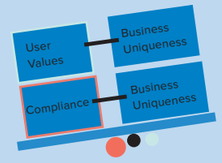
Facilitated Relationship: The user comes with their own 'identity' prove in form of a wallet.



Complex established Relationship: A relying party is serving users for multiple contexts were multiple different authenticators are needed (e.g. card vs phone)

User Integration Relationship
(6.1) Interactive user engagement in solution finding (6.2) No or little engagement





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4.9.3 Relying Parties

What was said:

(2.1) “ if customers are identified in our. In a digital ecosystem, we can we can use a lot of data to yeah, to actually, yeah, interact with them in a personal way so that we can use also the data and that we know because of other parameters, if they are searching for a sort of reassurance or they’re ready to do a change into their product or not.

(2.1) “An Upside could be that we have
more reliable data and can offer a higher amount of Post payment or do fraud protection more easy

(2.2) Yeah, I think the the main concern of the healthcare worker is user friendliness”

(3.1) “You know there is no phone allowed in the MRI”

(3.2) “It needs to be eIDAS high”

(3.3)+(4.1) “But also every country needs to do it separately because we all have our own Chamber of Commerce. That’s all. It’s not also not EU, so every country is responsible to. Do that for themselves. So it’s difficult to connect to display it in the app. Yeah, I think.”

4.0 We acknowledge that RP’s want a solution based on their current experience with the existing one
4.1 “The wallet would help”
(Certifications of Workers from Poland)
4.2 “Embracing a new model at live changing events.
Build collaboration with other parties that need the same attributes”
(Could helpt in the future, however they don’t want to scare them away)
4.3 “If there would be a great benefit”

(1) Perceived common values
What Relying Parties all have in common is that they all Rely on the proof of a person in relation to their attributes.

(2) Business Uniqueness
The Relying Parties vary in their business approach (2.1) Reliable data for personalization (2.2) A working solution.
(2.1) Based on the interviews, the sectors Telecommunication and Large Online Platforms value personalization real-time to data wanted personalized services and attributes that help them provide better services for data reasons.
(2.2) Within Healthcare, the verifying Party mostly looks at the context to see in which context it is used and provides multiple authenticators to know the person will identify themselves.

(3) Practical Uniqueness
(3.1) Context Requirements
The solution needs to be reliable in the context itself
For example, in the healthcare sector, different authentication methods are built to serve different contexts, like an MRI room, which does not allow a phone based on radioactivity or a home situation that requires a phone. Moreover, some parties mention that efficiency in the process is needed, for example, RP’s that need to prove different people from different nationalities need more efficient processes to reduce costs and internal hassle.

(3.2) Regulatory Requirements
Secondly, the level of assurance that needs to be practised differs between sectors, but also within a sector different levels of assurance may apply by regulation (High - Low Level of Assurance)

(3.3) Regulatory Storing Uniqueness
Based on the attributes needed, there is a different ecosystem in which they are operating in as attributes can be currently stored at different systems. For example a person in relation to their business can be proved by getting an allowance to prove the attribute at the chamber of commerce, where the data is stored decentralized. Looking at data like an address a RP has to rely on their ‘word’ that the attribute is correct, as it is mostly manually filled in, whereas public services, like the Gementee to provide the BSN number, see the housing contract as proof.

(4) Experience Uniqueness
The Hype of Relying on Parties for the wallet can be seen based on their recent experiences with the current solution. (4.1 Changing; 4.2 Likely to changet; 4.3 Not likely to change)
(4.1) Changing
Parties mention pain points within their current approach in relation to spending money or not being able to have an efficient process in place to check the attributes based on the origin of the person they need to verify want to have a different solution.
(4.2) Likely to change.
Parties that currently value their solution and have a care team facilitating the approach do not want to change it, as they need to balance out the rise of losing customers with the new features of reliability the wallet could bring, as it is not clear if it might bring more problems than good.
(4.3) Unlikely to Change
Parties who already have a solution in place based on a whole trust network also ask themselves why, and how to change as the process is not only providing extras for the users but also provides enough privacy, even though there is a possibility that the solution has a lack in security based on a single point of failure.

5.1 Education: „We want to try to let them click after 30sec.Well in our user studies we discovered that they
are not acting on their privacy“

(5.2) Health: ” Like I can tell you like the official um standpoint of the ministry is we’re going to make available many different type of authentication mechanisms”

(5.3) Commercial: “It’s a conversion killer”

(5.4) - Observation Banking

(5.5) - Observation the lack of trust explained by INNOPAY for SSI wallets

.
“They do not care so much about privacy in their job”
(Health)

(7)Telecommunication: “As I said before, we have to find a balance with security and privacy”
“But on the other hand, I already explained that the balance that we need to find with privacy and protecting the customer information et cetera”

(7)“Journeys and which are life-time changing moments and for example, when you want to move, if you want to move from, from, from, from address A to BA, that might be a good opportunity and time to to use a digital wallet. And because if you use a digital wallet maybe also other suppliers and we could also be at the supplier side of. So of course it depends on where the customer starts. It’s

(7) “For example, if they’re confronted with the fact that they want they, they need to share privacy related information, for example, or it is indeed about having an impact on their financial situation as as they are going to spend money or something, or they were going to.You have to to have access to really secure information. For example, only at that moment in time it would be a good moment to have a sort of to two step verification, for example, or an additional step to reassure”

(8)“It is enough to see a green light for post payment”
(Online Platform)

(5) User Relationship Uniqueness
(5.1) Established Relationships: A user is required to use the service for work or education
(5.2) Complex established Relationship: A relying party is serving users for multiple contexts were multiple different authenticators are needed (e.g. card vs phone)
(5.3) Fluctuating Relationships: A user is coming and going but also has different suppliers e.g. shopping
(5.4) Real-Time Relationship: The relationship between RP and user is closely connected, as they are providing fraud protection within the service of their identity, as seen in banking.
(5.5) Facilitated Relationship: The user comes with their own ‘identity’ prove in form of a wallet.

(6)User Integration Relationship
(6.1) Interactive user engagement in solution finding (6.2) No or little engagement

(7) Ongoing value balance Practises
Relying Parties express different values, which will fall in the future under the supervision of the wallet, as it would be the identification mean that needs to balance out the values for them.

(2) Reliability vs Privacy vs Security
Balance Hyper Personalisation of data with user privacy and security of data
(3.2) Regulatory Requirements :
Balance out the security level needed with the different perceived values of a user.
(5.2) Balance Solution ease for users with BM & conversion
(5.2) Balance new solution user trust with BM & Conversion

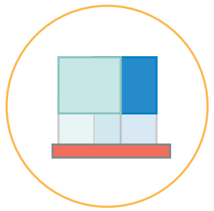
(7) Future Balance
(4/5) Relying Parties talked about the relationship with the user that should be facilitated, as they serve their needs. In that wording, the words, relationship, care and a feeling of home were mentioned to describe how the relationship between the Party and the user should be seen.

(8) Wallet Balancing Ideas:
Within the sessions, different moral value-balancing ideas got generated based on prompting questions.
Reliability of data vs User Privacy: Only show a green light
Facilitate Trusted solutions: Collaborate with a Pirot Party, Trusted Party

“It is a balancing act”

Policy Makers at the IDnext Conference in Utrecht 2022

5 Synthesis



Within the research, I aimed to understand the development process of the EUDI Wallet (Summary in Chapter 11) in relation to the stakeholder values involved and the future implications of it from an ethical technology perspective. As my research question was to find out if we can create a well-balanced digital identity solution, I started with that question in mind, however, while synthesizing, other questions came up:

1 What influences does the development process have on different system participants' future values and roles?
2 What role does the development of technology play in this process?
3 What role does digital identity have in our interactions?
4 What is the real problem?
5 What can I contribute to that?

I searched
I analysed

The big shift in the digital identity ecosystem affects different stakeholders differently and they play entirely different roles. I saw a big difference within the groups I interviewed and that all of them brought new perspectives to the table, which let's imagine that there are plenty more perspectives out there. However, within the discussions around digital identity, I did not hear experts talk about the multi-layered perspectives within the groups. The differences between stakeholders' beliefs influence the viewpoint of how to create the ecosystem and technology for the future. This includes making moral decisions on values within the system layers and balancing out social and economic. Especially the difference between SSI and Federated Identities does not help the harmonizing process. Where most focus lies on creating the technology and App /Wallet, the foundation layers of the system are experienced as forgotten.

The development of the emergent ecosystem is at this stage unpredictable and its implications on different parties in the system as well. Even though experts are trying to give their opinions and help the development by making a blog and social media posts, there is no shared vision". The emergent system on one side with no clear definition on where it is going and the stakeholders' opposing opinions and various believes makes this challenge wicked. These can be described as problems in which there is little or no (1) agreement on the definition of the problem in cooperating with multiple values, perceptions and perspectives (2) clear solutions to the problem due to the vast array of possible solutions and trade-offs associated with each (3) easily identified causes or authority due to the problem having multiple potential causes, jurisdictions, stakeholders and regulator or implications (Rittel & Webber, 1973; summary retrieved from https://aese.psu.edu/)
While creating my concept, I came across a transition design and found a lot of factors that helped me understand my aim. Therefore I will provide some theoretical background and link it afterwards to what I am doing.

5.1 The Emerging Transition Design Approach

Within the paper of Irwin (2020) transition design is described and here presented as input for the synthesis phase and the final design. Therefore we are now looking into understanding the approaches and challenges that are used to ‘solve’ wicked problems described. This helped me to get the required understanding of what I am doing and trying to achieve (Hughes & Steffen, 2013; Jensen, 2017). Even though I found the literature after my analysis, I realized that this is what I was aiming for / doing. Therefore, I will present it here and link my synthesis phase to the different steps taken to the theoretical foundation around the emerging transition design approach.

Traditional design approaches are mentioned as not being capable of addressing complex problems (Sanders & Stappers, 2008, Norman & Stappers, 2016). Therefore design-led approaches are aimed to:

1 Enable stakeholders to arrive at a shared definition of the problem and an understanding of its complexities and interdependencies
2 Identify stakeholder concerns, relations, expectations and beliefs and factor them into both problem frames and design interventions in order to leverage collective stakeholder intelligence (Forrester, Swartling & Lonsdale, 2008; GPPAC, 2015, p 4)
3 Provide a process for stakeholders to transcend their differences in the present by cocreating visions of a shared and desirable long-term future (visioning)
4 Frame wicked problems within radically large spatio-temporal contexts
5 Provide stakeholders and interdisciplinary teams with a palette of tools and methodologies useful in resolving wicked problems and seeding/ catalyzing systems-level change
6 Provide a rationale for “intervening” in complex systems and “solutioning” over long periods of time (dozens of years or even decades) vs. creating short-term, one-off solutions

(As Expained by: Irwin, 2018)

In general, the importance of stakeholder involvement in wicked problems is mentioned. Described in System Transition is the unbalanced power between stakeholders (Bauer et. al, 2010, p 233; Lawhon & Murphy, 2011). Therefore to reframe a problem we are considering the inclusion of cultural norms (Incropera, 2016, p 15) in which Participatory Action Research (PAR) (Cornwall & Jewkes 1995; Chatterton, Fuller and Routledge,2007) aims to include more knowledge to make an action (p. 1667). What it discovers is that: Involving a broader range of expertise and perspectives creates better viewpoints, for example analyses that formulate complex conflict situations. (Which I certainly provided within the stakeholder analysis) .

Within transition design we can look at different steps that help to formulate pathways for transitions. Which includes reframing, Mapping the Problem in the Present, Future Visioning, Backcasting, and Designing Interventions in which I focus on Design for Behaviour Change as an approach to understand and modelling user/ stakeholder behaviour in the context to investigate an understanding of mental models of systems with which they are interacting (Krippendorff, 2007). I will go in the concepts presented briefly.

Reframing: The Present and Future
Reframing describes frames as “mental structures that shape the way we see the world” (Lakoff, 2004). Which are influenced by metaphors, norms, mass media, political movements, personal history, etc., which is why everyone brings in their own frames and aims to create a collective “frame”.

Mapping the Problem in the Present
Toward a collective frame, we want to enable stakeholders to arrive at a shared definition of the problem and provide stakeholders with an understanding of the complexity. This helps to create an appreciation of each stakeholder group’s limited perspective and knowledge base (i.e., no single stakeholder group can solve the problem), to create collaboration and confrontational to see differences.

Therefore stakeholders want to be positioned in workshop participants as representatives (within their wider community group) to arrive at diverse stakeholder perspectives. Here visual artifacts are wanted, like a problem map, which could also be updated through the research.

Mapping Stakeholder Concerns & Relations
Different techniques are used for problem mapping for example the Ojai problem mapping process involves the identification of interconnections and showcases lines of relationship as factors and causes. Mostly interdependencies are discovered between different factors from social, political, economical or others.

Future Visioning
Transition Design aspires to integrate a range of fore sighting techniques
Candy and Dunagan (2017, p 3) note that “experiential futures [are able to] catalyze high-quality engagement, insight, and action to shape change, using whatever means fits the situation”. This seeks to provide individuals and groups with glimpses of a future that resonates more deeply than other modalities, in which a compelling vision is mostly co-created.

Backcasting
‘Transition pathway’ are an outcome of Backcasting (Robinson, 1982; Dreborg, 1996) in which the desired future is used to understand if it is possible to achieve the vision. Where on the other hand forecasting explores current trends into the future. Backcasting allows showcasing of consequences which are necessary to materialize.

Designing Interventions
Within design-led approaches, situate small and manageable problem frames and contexts are used to arrive at a point to create profitable solutions. Irwin (2018) argues that wicked problem resolution requires interventions on multiple levels over a long time, as wicked problems exist on multiple layers. Where wicked problems are described as having their roots in the past. Different design interventions are described find and I will focus on Design for Behavior Change (Irwin, 2018). Modelling human behaviour is became an explicit aspect of designers’ responsibilities (Keinonen, 2010). Mental Models are crucial in Behaviour Change One approach in which the user behaviour is seen in a specific context is to investigate in the users’ own understanding and mental models of their experiences with the system (Krippendorff, 2007). Krippendorff, 2007 says, “designers who intend to design something that has the potential of being meaningful to others need to understand how others conceptualize their world” (p. 1386).
Looking at the transition design approach, we can say that we already looked into ‘Mapping Stakeholder Concerns & Relations’ to some extent in the Research & Analysis Phase. Within the next phase, we are looking at the synthesis process and include different parts of this literature to make connections of my approach with transition design. As mentioned within the introduction of design literature, Digital identity can be seen and a complex problem in which the interconnectedness of parts makes it hard to grasp the whole picture fully.

5.2 Research & Analysis Overview

OVERSIGHT

(1) Perceived values:
b) Action & Experience Values to have a smooth process
c) Information to understand the interaction & get a feeling of security
(2) User Uniqueness
(3) Value uniqueness
(4) Value Tension
(5) Solution balancing act
(6) Value Alignment

USER

(1) Perceived values:
b) Action & Experience Values to have a smooth process
c) Information to understand the interaction & get a feeling of security
(2) User Uniqueness
(3) Value uniqueness
(4) Value Tension
(5) Solution balancing act
(6) Value Alignment

(0) Birdview
(0) Account for failure before it happens
(1) Communication Balance
(2) Establish a security solution within the Privacy value of a user
(3) Provide Trust

RP's

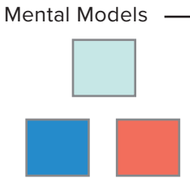
(1) Perceived common values
(2) Business Uniqueness
(3) Practical Uniqueness
(3.1) Context Requirements
(3.2) Regulatory Requirements
(3.3) Regulatory Storing Uniqueness
(4) Experience Uniqueness
(4.1) Changing
(4.2) Likely to change
(4.3) Change
(5) User Relationship Uniqueness
(6)User integration Relationship
(7) Future Balance
(8) Wallet Balancing Ideas:

Overview Experts Tensions

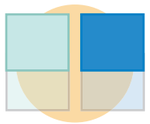
EUDI Wallet as Facilitator of the emergent ecosystem
Solve the Chicken & Egg Problem

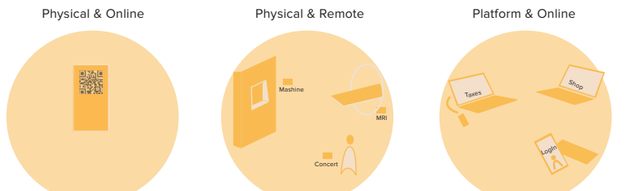
Expert Tensions
Communication Tension
Development Tension
Technical Tension
Ecosystem Tension

A Mental Models

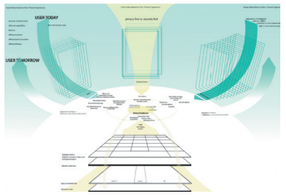


B Context Differences

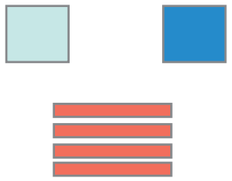


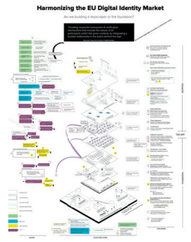


C Future Experience

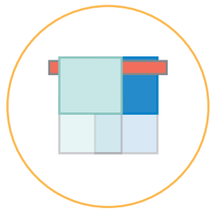


D The Layers Behind the App





E Reframing Identity



"Creating respectful and transactions and verification mechanisms that include the values of all parties involved in the given contexts by integrating a trusted relationship within the layers behind the app".

Figure 22: Synthesis Overview

5.2.1 Synthesis Overview

The research analysis and synthesis overlapped multiple times as I always looked two steps ahead in time. We can see the fields discovered within the research and analysis phase (lef). After collecting all the information of the multiple stakeholders, I started looking into connections and its's interrelationships and tried to understand what can I provide within the development process. I saw that there are currently a lot of tensions in developing the ecosystem, but I tried to get a grasp on what is actually the underlying problem. The synthesis process helped me to understand 5 main themes:

A Mental models
B Context Differences
C Future Experience,
D The Layer Behind the App
E Reframing Identity

I am using the theory around emerging transition design approaches at different practises in which I tried to understand the complexity.
1) Reframing the present and future throughout the synthesis phase to arrive at a final future interaction vision for verification experiences
2) Mapping the Problem in the present was not realized in a collaborative process, however, I used Research Phase 1 and 2 to gather information to work with.
3) Mapping stakeholder concerns and relations were established through an analysis inspired by the theory around value as worth from Martuso 2020 in which I clustered the different insights on the basis of economic, social, and political factors within the system layers.
4) Future visioning was included within the analysis around risks and concerns
5) Backcasting was not purposeful used, however the scenarios created from the future within the research and analysis phase could be seen as objections to make backcasting possible.
6) Designing Interventions is probably the most crucial factor as it is about creating action with the research and enabling INNOPAY to follow the vision created to realize the design I am proposing later.

5.2.2 Mental Models & Contexts & Future Experience

Firstly I included mental models in my analysis part based on the differences that I saw in the participant groups. I wanted to understand where it comes from and if I can map it out to be useful for future analysis of this topic. I built my model up in iteration from literature and realized in the process that it is all about the context and that mental models are dynamic based on the context and experiences we had in the past. As well as cultural norms. Mental models are used by “designers who intend to design something that has the potential of being meaningful to others and need to understand how others conceptualize their world” (Krippendorff , 2007 p. 1386). The model visualized (see figure) includes different literature: The parts that a mental model is conceptual (Norman 2013), dynamic (Snowden and Boone 2007), and developed individually through diverse influences like culture and experiences (Werhane, 2006). As values are dynamic (Halloran et al. 2009) and change
over time with new developments in technology or a change in a social context (Hekkert and van Dijk,
2016) I included those parts in the map. Finally, I created on the basis of digital identity literature (Gonzalez, 2014), which gives examples of internal and external characteristics of a person’s identity to create a model that helped me understand the connection between internal identity data and privacy issues.

5.2.2.1 Mapping Process

I followed an iterative process to define mental models in digital identity, which was half based on literature and on the other side intuitions. In this process, I mapped the minds of users, Relying Parties and experts to understand their beliefs better and where they are coming from. In the final stage, I defined the mental model of the user and Relying Party in the final stage and linked literature from the digital identity field to it to create a link between Relying Party and the user (See Appendix 14 _ All Mental Model Maps)

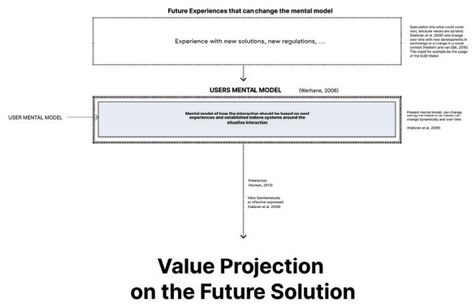


Figure 24: Dynamics of mental models

We are projecting different Mental Models of different verification interactions
into a future solution. Our privacy need changes per situation based on it’s context and personal experiences (e.g. “they should know my name vs why should they know my name”)

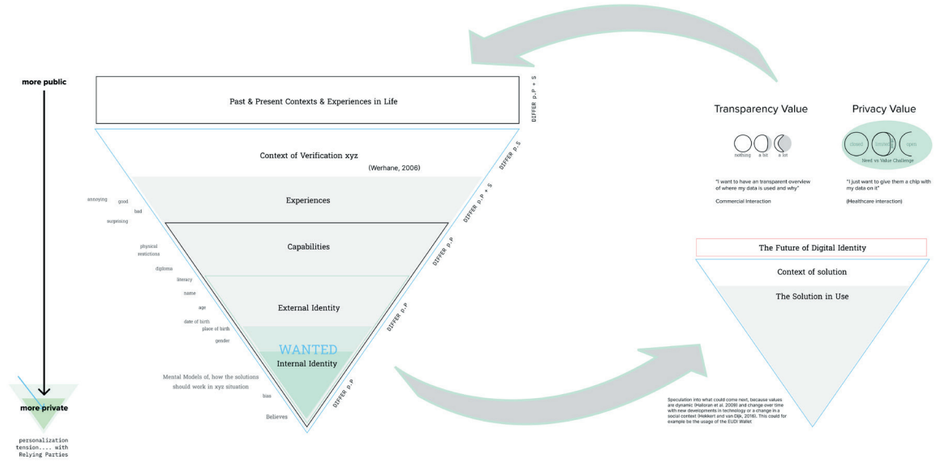


Figure 23: User Mental Model in the Digital Identity Field

User Values have to be seen in relation to the person
and context the digital identity solution is operating in

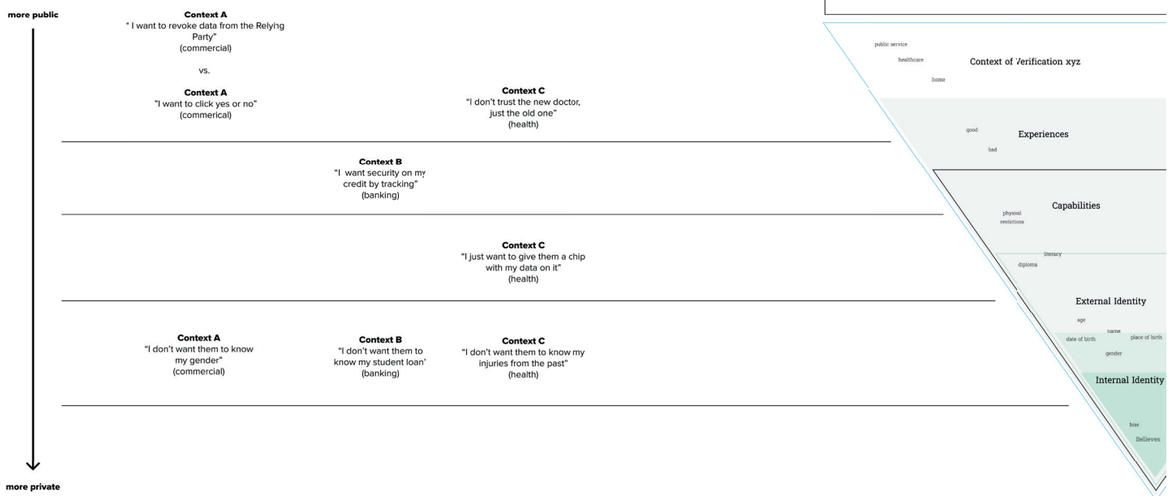
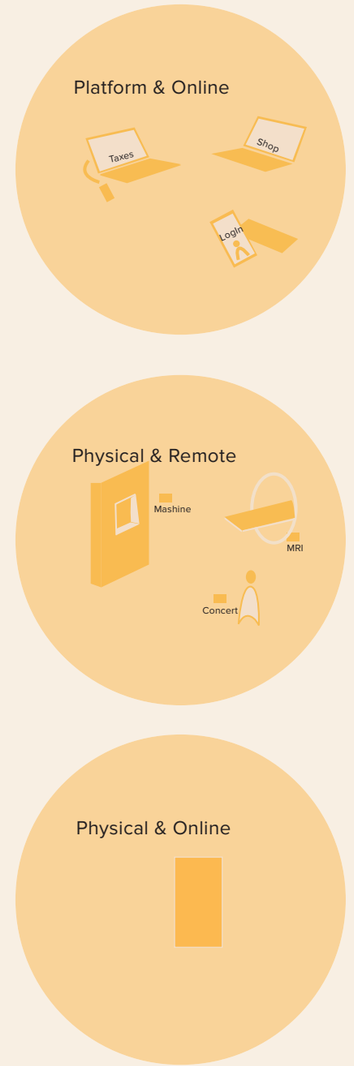


Figure 25: User Mental Model in the Digital Identity Field in different verification situations

5.2.2.2 Context

During the definition of the mental models, I defined a context map which shows different locations where verification is used. I realized that all different future verification processes would take place in different contexts and therefore have different needs and values. I define three categories in which the wallet will be used. This is aimed to help to understand link between the solution in use and where it is used to help imagine different verification scenarios better, because as previously established Relying Parties are interacting in different contexts and their needs vary. For example some prove their users online, where others need to verify them in a working environment. Physical and online, mostly by using a QR code, Platform and Online, which is about using a service where a log in takes place. Or physical and remote for using a card to access a bank, verify at a concert or in an MRI room as a healthcare practitioner.



5.2.3 System Layers

After a long synthesis procress (Section 11, part 9) I started to understand the conntеion of value to system layer and mapped them within the development process. I established a view on the most crucial aspects based on an overarching mapping process (Section 11, part 4-8) in which I created an overview for myself about the most crucial points within the development process which influence how we will experience the EUDI Wallet in the future.

The analysis took place in a table (Section 11 part 7) based on the sensitizer toolkit in which the aspects technology, semantics, legal and government were mentioned as important aspects of the oversight participants. I established that there is a need to look into the foundation layers and therefore created moral values as a foundation in the system development map as seen on the right. I asked myself which aspects are most important in the development process, If we consider that the technology we create today shapes values in the future. The answers that most struck me are presented on the map in yellow and are explained here. The top layers of the map are already explained within Chapter 1 to 5. Integrating the expressed values and mental models and the context maps.

1

The overall value to create the wallet is to provide privacy, but it looks like we are creating ‘autonomy washing’, by saying the user can do everything alone and throw everything in there

“Is it a wallet or a certificate holder?”
“We have to consider the not literate”
“Everyone can be hacked I always start my talks with also smart people you know make mistakes”
“Hackers are smart not dumb”

2

(Links also to 1)
If we have more data available it is less secure

“I am scared how we give up ease for security”

3

(Links to 1)
Banning over asking to some extends is crucial as we fall into the risk that consent practises will get on one side easier, but worse as more information can be shared

“So every Relying Party can get a source code?”; “Yes” “So over asking is still possible”

6

We wish to life without the bias of anyone else, whicih related to the attributes that will be included

“It could fail some countries like Hungary have a different understanding of privacy. Like.. LGBTQ”

7

There should not be a unique identifier

“You will be able to track you everywhere”

10

The Trust level towards the government could hinder the whole approach, because there is government involvement already in which they have to issue the ID card. However how will that turn out?

“We need to talk to the people”

The overall Idea is to look at the foundation layer which was discussed in the Research and Analysis Part and build into this map as metaphor in which we see on the right side the foundation market in which the most yellow parts are integated.
The map shows that we are integrating the ethical rights as foundational layers (Europes Digital Decade, : Digital targets for 2030, 2021), which are at risk here.

Summing all the information together looking at mental models and contexts I realized in the process we need to:

“Create respectful transaction & verification mechanisms that include the values of all participants within the given contexts by integrating a trusted relationship in the layers behind the app”

The following map shows how experts would balance out different values. It got created on bases of the sensitzer toolkit which the Experts filled in. It goes into the direction of starting to balance out social and economic values by distinguishing them from each other. An iterative process of the Value Management process of Martinsuo (2020) and system layer thinking.

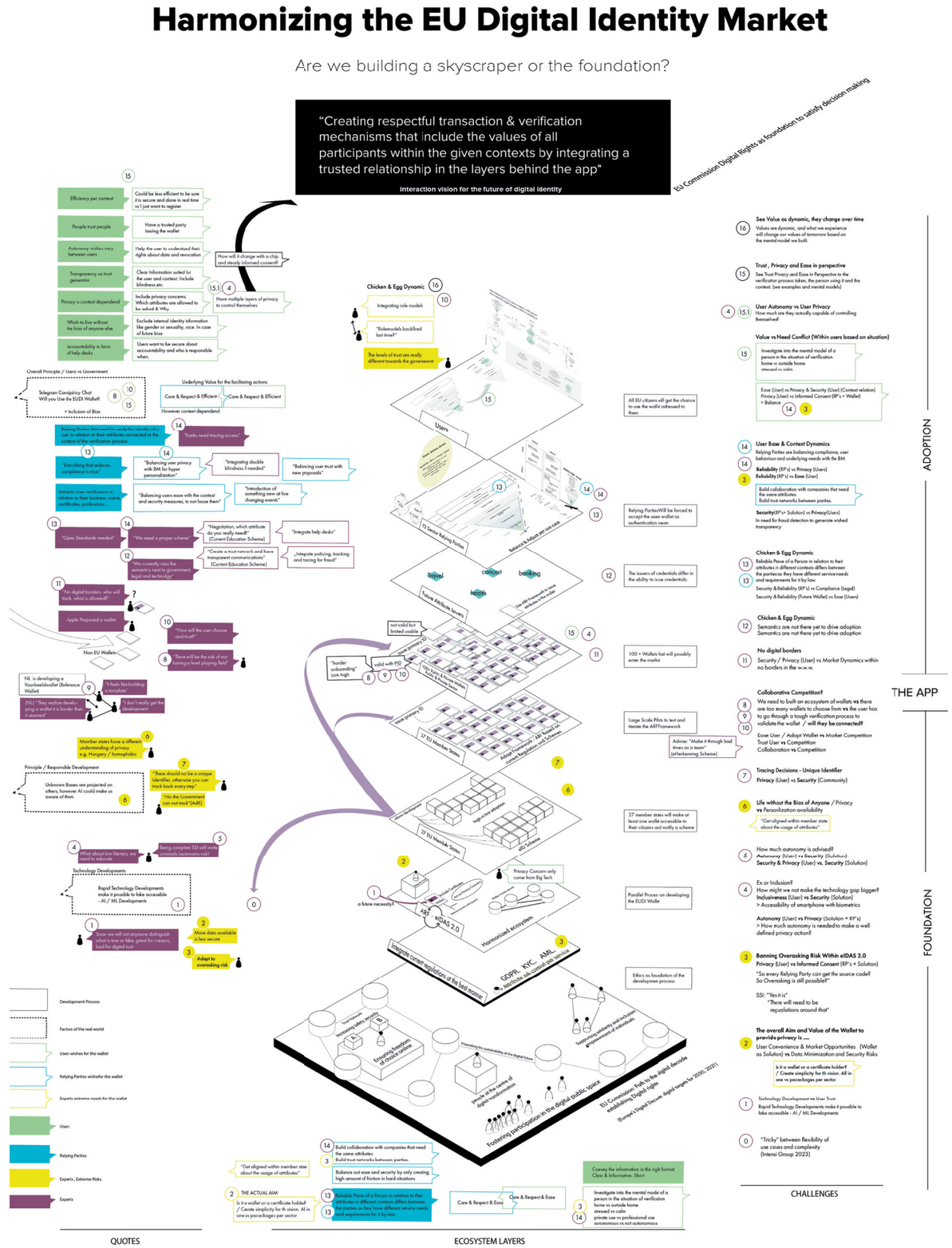


Figure 26: Digital Identity Synthesis Map

5.2.4 Balance Overview

Social Balance

This visual provides a better overview on how the experts would like to balance out the extreme tensions, as we currently experienced there are many. We are looking from top to button. You can find the quotes related to it in the expert tension overview. Firstly member states should align on their privacy understanding to answer the question how might we ensure to live without bias of anyone. Secondly, there should be standards created to hinder Relying Parties to ask everything, as the wallet could provide a market place, that could be misused. Thirdly trust list could establish an understanding of who is allowed to join the system to balance the speed of the innovation. Within Inclusiveness vs security, experts already discuss that the wallet should not be device dependent on assuring little resources of citizens that do not own a smart phone (Intensi Group, 2023). Lastly we can look at still being collaborative without sharing everything to ensure that no fraud attacks are possible.

Economical

On the right sight, we have the economic perspective in which the balancing ideas include an in-depth analysis of Relying Parties, as stated by INNOPAY and seen in this thesis. Moreover, build up open research Models to establish the correct values in iteration. Next, they create schemes and look into the foundation layers to ensure that Relying Parties are not left behind and start applying for oil funds, as they do not have the resources to keep up with the development, which would end up in the complexity of sustainability as an ecological problem.

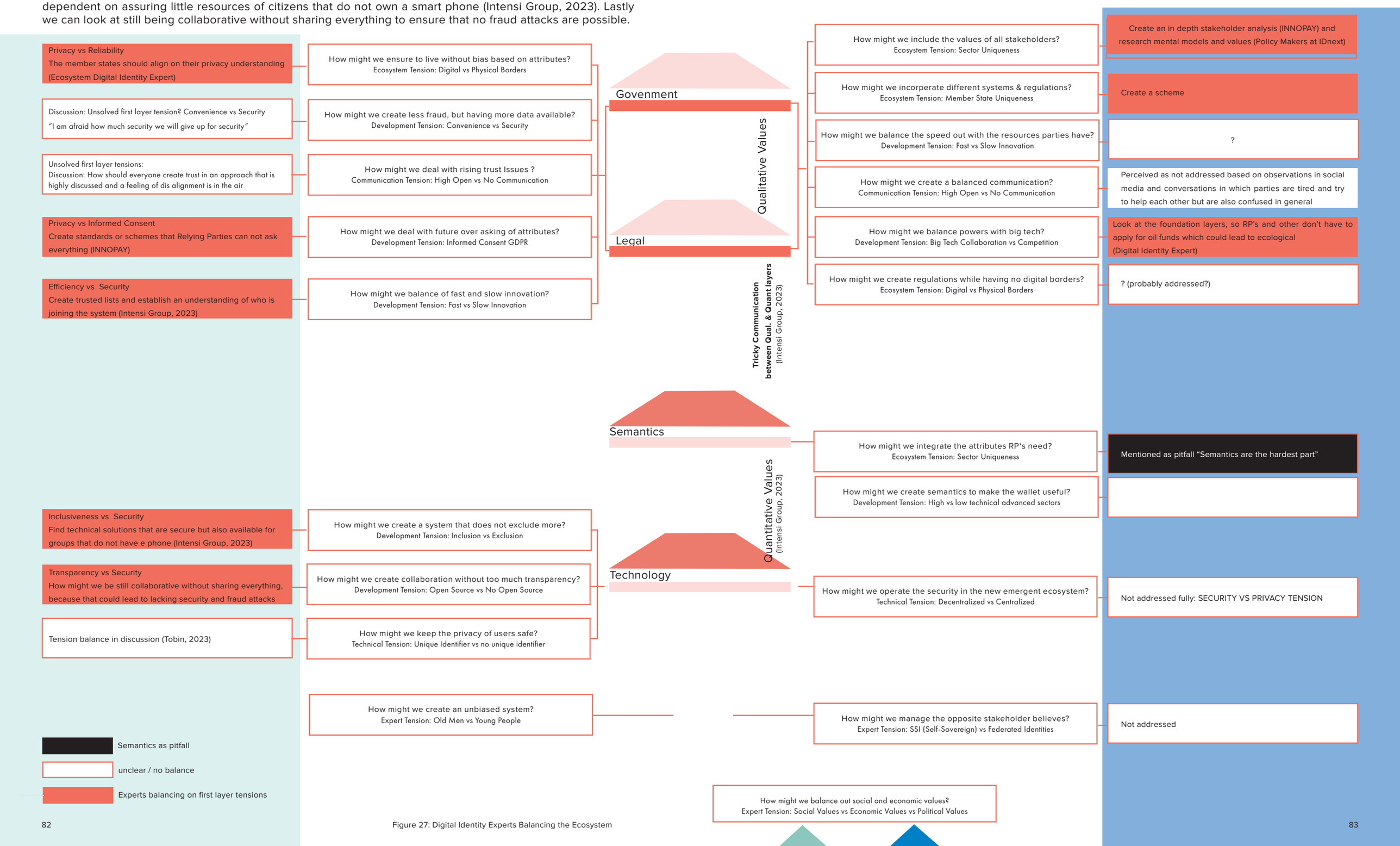


Figure 27: Digital Identity Experts Balancing the Ecosystem

6 Design Process

How can **I help....**

in the process of designing future verification experiences, which are created in the matter of my storyline by the oversight / experts in the field of digital identity.
I wanted to create something that could be carried on by INNOPAY to help in the process and possibly add on transition design.

6.0 Design Process

Firstly I wanted to create a design tool for INNOPAY that can help them to act on their goal to balance values in the future together with clients. In conversations and the interaction with INNOPAY I realized, that the design should enable them to make first steps in the direction. Therefore I wanted to contribute to that by designing to fill this gap. They are the right people, that can make the vision actionable.

“Create Awareness for the future of balancing values within the emergent ecosystem of digital identity by integrating multiple perspectives to act truthfully and with little bias in creating new ethical technology solutions.”

6.2.1 Design Concept

On this page you can see the design process from left to right. I will explain the steps and go in detail in the final concept on the next page.
I established the final concept in three phases The first phase considered plain to make the research material actionable where I thouhgt about creating a toolkit with the material. The second phase looked into how to make it interactive, as I realized it is about giving a tool that should create an interactive and reflective process for the development.
The final idea was to create a process in which some parts of the research can be integrated to create empathy for the different people in the system. Therefore I am introducing strategic dialogues and make connections to literature and a book which is called Talking Across The Divide. (n.d.) at Final Concept (6.3)
This idea got tested one time within a physical set up and 6 INNOPAY’ers as participants. After that feedback got gathered (see Appendix 2) and an iteration was created based on the feedback to make it more structured. Moreover I relized I should be able to explain less in order to make it stay. The second version was created in Figma Jam where 2 participants where guided though the imagined four steps without any facilitation needed.
Withiin the concept explanation I showcase how and why I introduce In the design process. Within Concept 6.3.2 and 6.3.3 I shortly introduce the concepts which can further be explored in the Appendix if wanted.

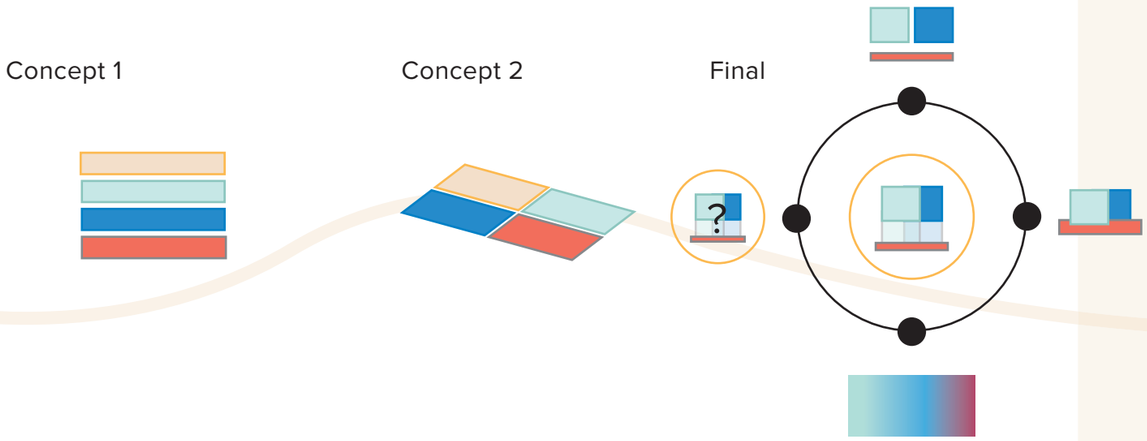


Figure 28: Design Process Overview

TEST 1 ADAPT

6.2.2 Concept 1

(see Appendix)
What:
A Toolbox that integrates all the material produced in the research in form of a toolkit
Why
To make the outcome usable and tangible
How
By integrating it within the offices

Self Reflection:
How will anyone use it it must be interactive

INNOPAY Feedback:
Pro:
People get the context of values and mental models in general... Why people think like they think Knowing why they value security etc.
Cons
But where , but when but how

6.2.3 Concept 2

(see Appendix)
What:
Keeping the Idea of a toolkit but making it more interactive
Why
To create an action point for implementation
How
By providing a framework in which they can work together

Self Reflection:
There is still too little structure in this and how do I explain everything

INNOPAY Feedback:
Pro:
I like that it steers discussion you force people in a role. Clear and recognizable context. I would use the matrix. Brings together value tensions quite clearly
You can make a debate.
Cons
Which of these values are in tension for convenience it would be difficult they don’t know the values...

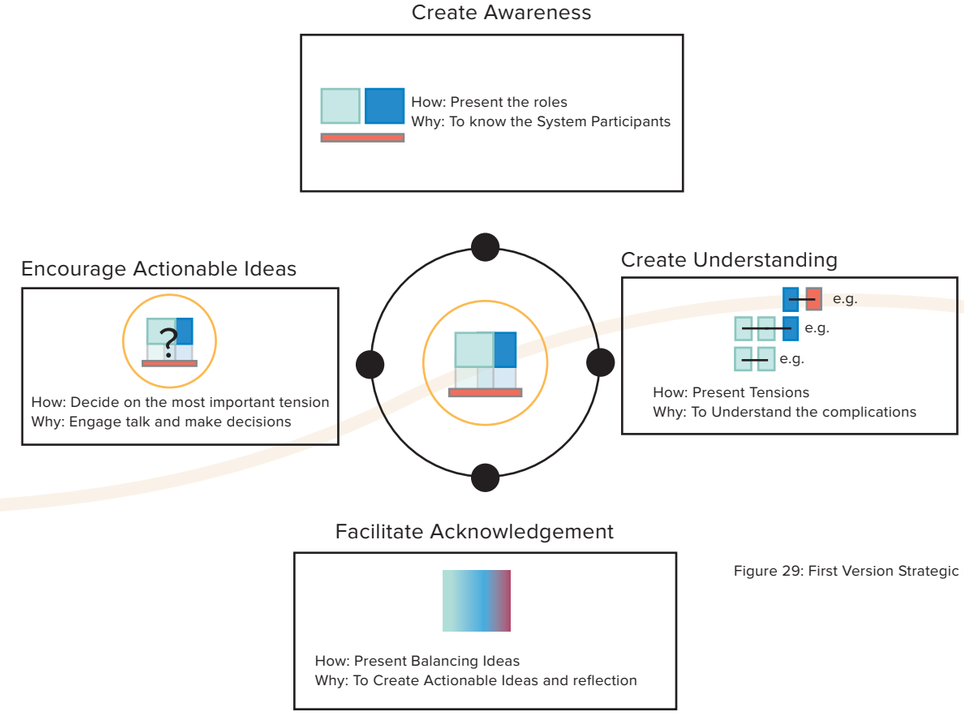


Figure 29: First Version Strategic Dialogue

TEST 2 DESIGN

6.3 Design Iterations & Concept Idea

Personal motivation for Strategic Dialogues:
I learned that people are the heart of the system and to design for them, we have to design with them. However we as people are all biased have our own experiences and values for different experiences. However designing for such a big and complex topic we have to break it down and that is why I want to introduce experiences within different contexts. As we look at digital identity we should look at values in connection, with the experience and the people within by considering different believes and aims for the situation. Which could possibly be linked to two sided markets.
Therefore I re framed identity into verification experiences. It is easier to understand values in a single context, then talking about them from above. I want to engage with an approach that aims to engage stakeholders to understand the multi layered-ness of identity and that decisions we create today should be well thought through as we see many risks and value tensions.
My proposition is therefore a strategic dialogue that brings together the perspectives seen within this research in a common ground. I want to acknowledge that we are all biased, which is fine, but by talking about the options and acknowledging perspectives we could possibly act on them and create reflections.

Within some iterations with fellow students and alone I ended up at the final concept: Creating strategic dialogues.
The format of strategic dialogue found validation in a book, which I listened to via the App Blinkist.
It is called Annotated to 'Anyone hoping to restoring relationships broken over differing opinions and people who would like to argue less. Summarizing that it is hard to generated change but by making everyone the protagonist of their own stories and showcase differences we can release the strain around relationships. I argue that it falls under the category Design for Behaviour Change (Irwin, 2018) within transition design (6.1).
.
The Blinkist episode on Talking Cross Devide (n.d.) explains that strategic dialogue has been purposefully used within the governments to help them accept and acknowledge different beliefs and opinions. The book is based on the fact that we live in polarized times which get stronger over time and that there is little understanding in which, also Google and Facebook are mentioned to create single-sided believes based on AI (Artificial Intelligence) and ML (Machine Learning). This happens by tracking the IP addresses and in which search engines provide different content.

Therefore the format seems to align with transition design and would bring a good format as it can be practiced over multiple times and different stakeholders can be included (see 6.1).

The final design aims to create a space in which multiple stakeholders can come together and discuss values and ethics in an interactive space to create a well formed decision about the actual context we are looking at and go from talking about high up values towards the integration of values seen in context and within the space of "(all) future verification experiences".

From the theory of strategic dialogues I included the already discovered system participants: User, Relying Party and Oversight as protagonist of their own stories and added their most important values in the dialogue. Werhane (2006) describes to create moral imagination we could follow four steps which are:

1 System Dynamic: Present the system networks and the interrelationships to grasp the interconnectedness of the system

2 Core Values of Stakeholders: Explain what is not included in the system, by presenting the core values of each set of stakeholders

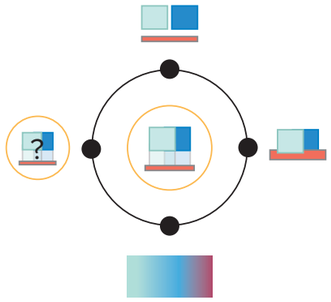
3 What is the Goal: Outline the core values of the system to speculate what it should be to reach a reflective process to reach the value and consideration of the system participants.

I argue strategic dialogues have the ability to create less biased opinions, because we end up with a will reflected opinion based on the integration of different believes, values and needs per context.

DESIGN AWARENESS GOAL

Digital Identity **does not exist only in an app**, we are creating the path for trusted relationships for all future verification experiences

6.3.1 Design Test 1



Set Up

6 participants within INNOPAY participated in the physical session (see Appendix 2.0). The goal was to go through the 4 steps. Create Awareness, Create Understanding, Facilitate Acknowledgement and Encourage Considered Action. I will explain those stages within the final version of the concept.

Within a presentation I explained the vision I have as seen on the right and the importance to see digital identity in the context of verification experiences and introduced the stakeholder as system participants into the story.

My goal was to create an understanding to adreess that

(1) We are including the users experience per context in the creation process,

(2) We are including the Verifying Parties current believes & Aims in the creation process.

The group was split in three and became a role. User, Relying Party and Oversight Role. Sheets of paper introduced their most imprtant values to them. On the sheets context where mentioned in which the different parties had to act out what they want and why and start balancing the wishes out in consideration of each other.

Link to moragl imagination (Werhane, 2006)

1) System Dynamic:

I presented my research in a shor presentation in which I showed the interconnectedness of the system with the participant values.

2) Core Values of Stakeholders:

I presented the core values and prepared cards that outline their values and outline in the system.

I prepared the session with boards that showcase values

3) What is the goal:

I presented the interaction vision as outline and showcased value tensions as examples in form of boards that integrate all 3 perspectives and the value cards as they already created valuable reflection in the research phase.

The session was interactive and reflective in which a considered balancing ideas where created and conflicts mentioned ending with: “This is really difficult to solve” “How can it be solved with the wallet what is the problem behind the problem”, by reflecting back at the actual EUDI Wallet development.

Positive Feedback for the Strategic Dialogue:

“I was surprised about the values you were able to come up with. Those values were a combination of outcomes by all stakeholders and this really enabled us to uncover what matters and try to balance that.

Potential: “It can help clients better look at the wallet from the perspective of the client. what doe people want, and focus on those things”

Reflection: “I find it striking is that most of the time there is very little dialogue in society about what these identity products should look like to account for the conflicts of values and interests. I have never seen any attempts to mediate them before releasing/enforcing them on the masses.

However I noticed that I was too involved in explaining and that it is possible to make it more smooth.

We are drawing out (all) **future verification experiences**

Creating verification processes involves people with different beliefs and mental models from the verifier over Relying Party to the creators. Therefore we are considering the people layers to arrive at solutions that can thrive for creating well-thought-out value balances. Therefore we want to be at least bias as possible and integrate the different perspectives into the creating process.

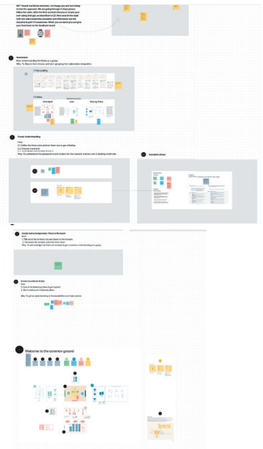
We are including the **users experience per context** in the creation process

Users have different mental models for experiences for example we like informed consent within healthcare practises and believe a chip would solve the paper struggles but we don’t like it so much when shopping online or browsing through the web

We are including the **Verifying Parties current believes & Aims** in the creation process

All Verifying Parties are different with different user relationships and practises. The integration of that knowledge in the creation approach aims to be fruitful.

6.3.2 Concept Test 2



Set Up / Check flow

Now it was time to test the board in action and create a beter intersection with the actual flow in which four steps are followed.

2 participants of INNOPAY participated in the online environment (see Appendix 2.1).

What: I prepared a Figma jam board with all the needed elements and flows. The session was recorded an sent to me afterwards.

How: The Participants followed the strategic dialogue and explored the board on their own terms.

Why: I wanted to see how little I actually could facilitate and therefore session with boards that showcase values and the value card deck from iteration 5 , because I wanted to create reflection first. and a presentation. Moreover the goal was to check the flow first before I make a design proposal and validate my assumptions.

What happened: They read out loud and started to develop balancing ideas and reflected.

Key takeaways: Based on my assumption I should have made a video, however it actually led to great reflection within the process of reading the storyline out loud between the participants (see Appendix 2.1).

Positive Feedback: “Hey we finished going through the framework :) it looks rly good! I love the improvements to the method and how you incorporate all these different types of tensions”

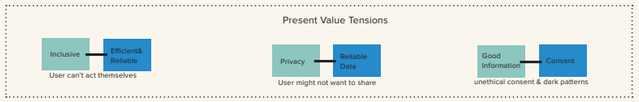
6.4 Final Design
Welcome to the Common Ground

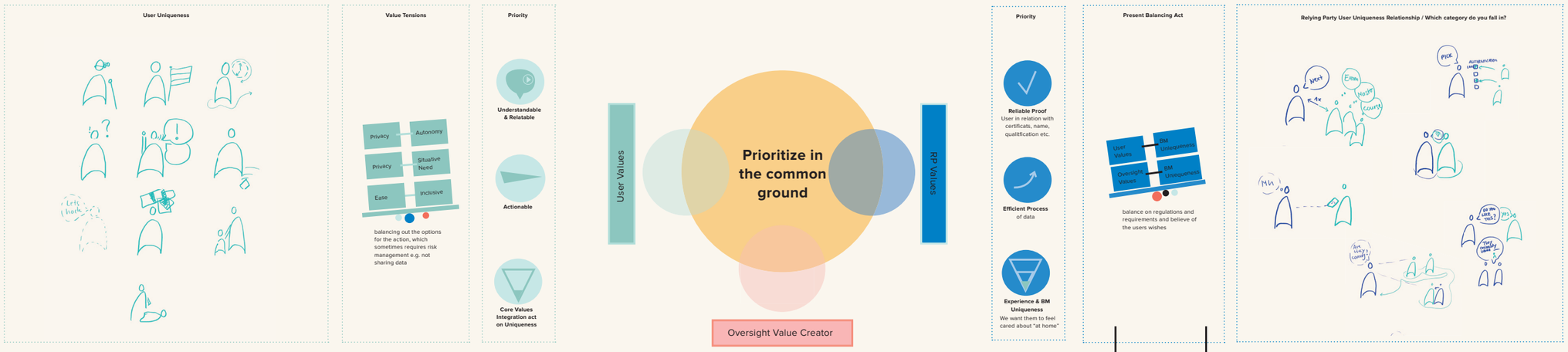
6.4.1 The Common Ground

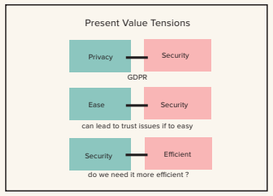
After the first test I wanted to create a metaphor that helps to understand the actual meaning behind the strategic dialogue. Within an collaborative process with a fellow designer we came up with the common ground. The common ground is a space in which everyone meets. From the name itself it is already clear, that it is about the creation of a common ground, which also already includes that more then one person is involved. Value tensions are showcased and the different parties represented in a much clearer format. The format interchangeable which means new parties could be added, however it always follows the same pattern:

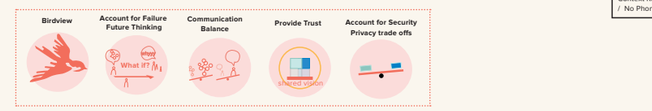
1 Integrate the people
2 Integrate their ‘core’ values and tensions
3 Symbolise Uniqueness for empathy / also Relying Parties are different.
4 Create scenarios to bring the ‘core’ values to a tangible level

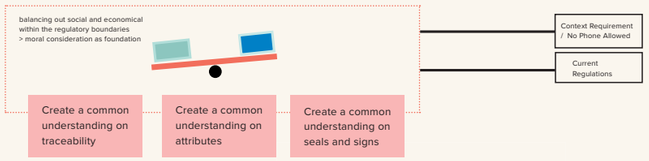
For Example: Context Healthcare Worker











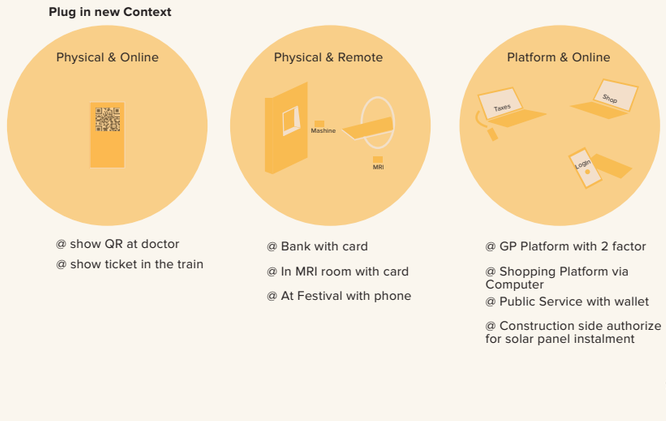


Figure 30: Final set up of the Strategic Dialogues (Suggested is to include the research on the participant groups: Users, Relying Parties, Oversight)

Example to Create Thinking Patterns for the roles:

User: Imagine a person that has to verify themselves at work every day. They want to have it as easy as possible every day, because they are doing the verification process so often.

Relying Party: Now imagine the Relying Party which is focused on providing their users the best possible solution for their convenience and because they already have a good user relationship they can focus on the process itself.

Oversight: Imagine the Oversight which will have the bird view of the situation and looking at how to account for failure and address the privacy security trade off, by providing trust. In this case they want to know how the verification process looks like and which authentication process is used, because they know that mentioned ease stands often in tension with security & privacy. So we are aiming to understand the context of user and the verification experience itself. So we are looking at context (yellow)

6.4.2 Strategic Dialogue Flow at The Common Ground

1 Awareness involves examples of tensions that has been created from literature, a storyboard that can be used to create awareness for the theme and the explanation of all roles including their aims and what they do.

2 Create Understanding:
Here everyone first acts out the experienced roles and talks loosely about them. Then a verification scenario is chosen which is based on the roles as represented in 6.3.2. Considering the thinking process of: The person .... wants ...., because currently they experience .... in scenario ..., which was tested to make it easier to understand where a person's value for a specific context might come from and imagine the person better. This process can be user for all three parties in order to get better into the role.
To create new scenarios the recommendation is to use Chat GPT to create new scenarios and get inspired, by pasting the example in the AI chat bot. If a scenario is chosen the context maps can be used to integrate actively thinking about the process itself.

Additionally if there is a new client also value finding methods could be used at this stake as presented in the methods.
Moreover also future experiences can be integrated to imagine back casting as explained in transition design. For example imagine the scenario of a user wanting to go back to paper because there was too much over asking.

3 Create Acknowledgements:
What tensions are was already discovered in the sensitizing process.
Within acknowledgement we look at the tensions represented in the board and imagine from the different roles which other tensions there are and write them down.

4 Create Considered Actions:
Value balancing ideas are shown and from there the participants of the strategic dialogues have to start judging themselves. A plus here is that they know the different angles and are able to judge less biased.

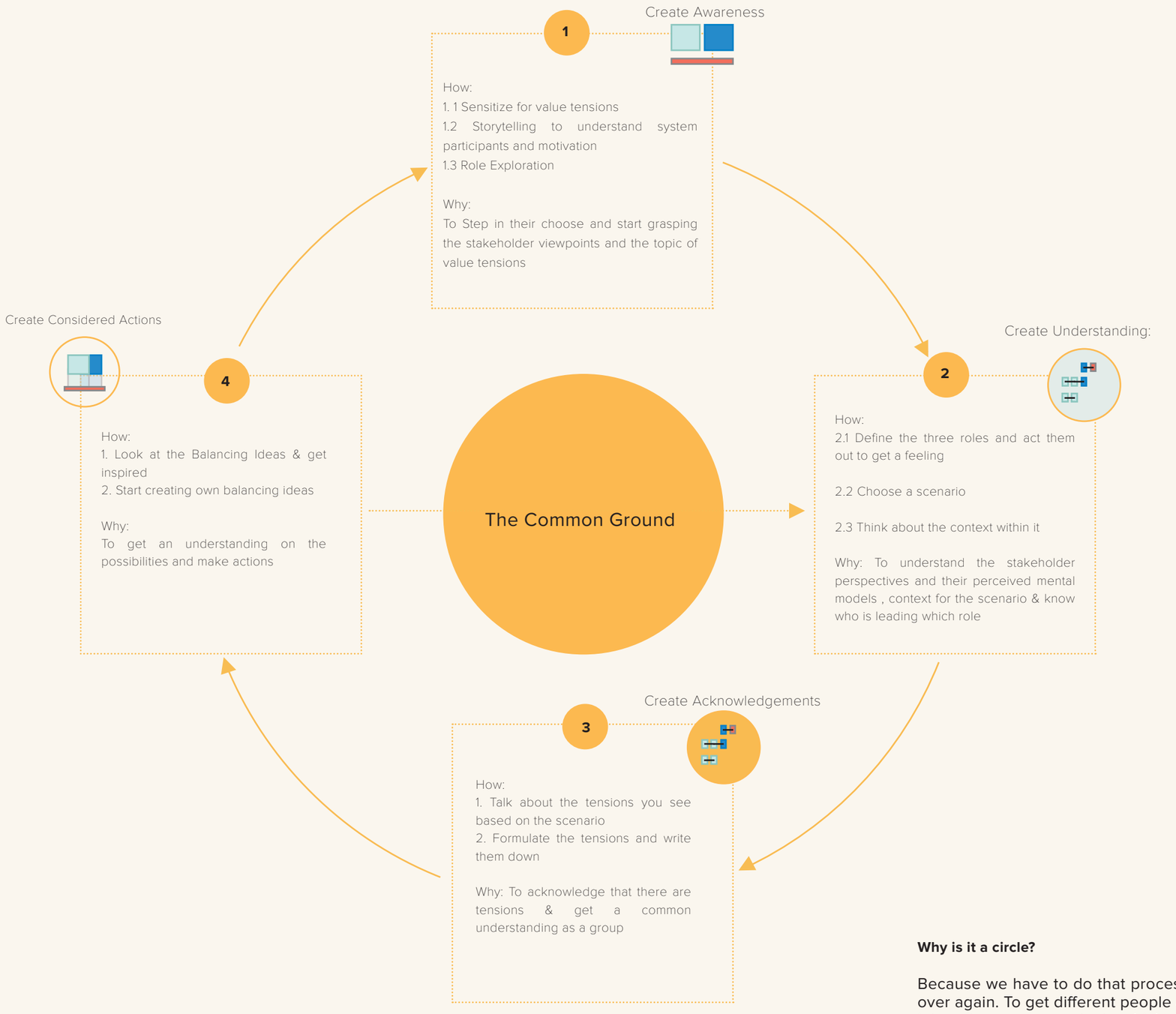


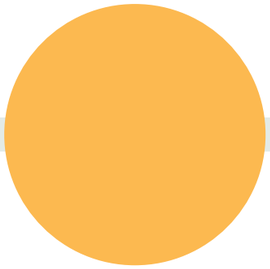
Figure 31: Final Strategic Dialogue Process Structure (tested once)

Why is it a circle?

Because we have to do that process over and over again. To get different people aware or to integrate a new context, which is the only time, when step one can be skipped, because we already went through it. The testing phase shows that it can and will work.
So I recommend to use it :)

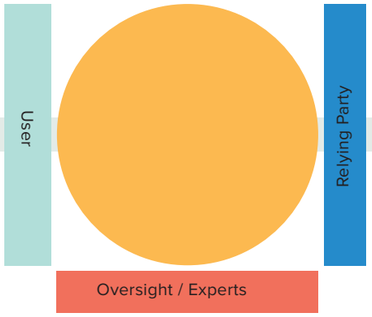
6.4.3 Storytelling: Welcome to the Common Ground

1



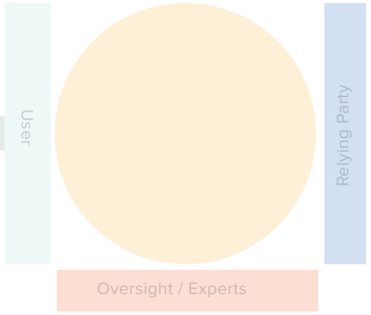
‘Welcome to the Common Ground’

2



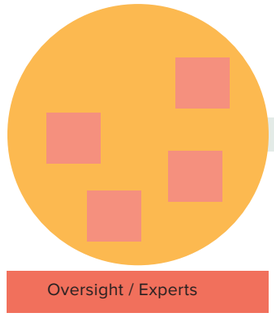
The ‘common ground is a place where stakeholders can meet and create value balance actions together and in consideration to create better ethical driven technologies & everyone can express themselves

3



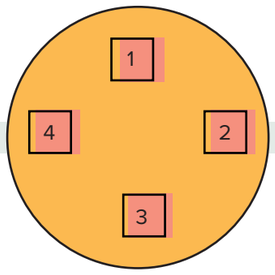
It works like this

4



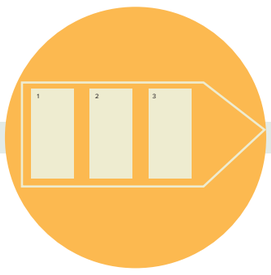
A group of creators which we call the Oversight comes together and meets in the common ground.

5



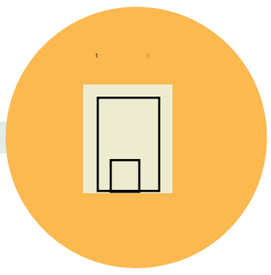
The creators see that the common ground is a strategic dialogue set up in which they are walked through 4 steps

6



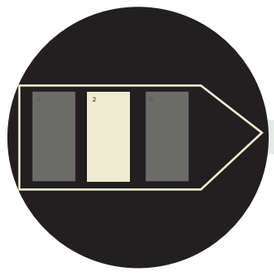
The first step is awareness creation. Here the creators get sensitized for the creation process. Awareness is a 3 stage approach

7



Stage 1: Did you know that back in the days they designed a church door too small in order to establish security? Because attackers came on horses? The inconvenience ended up in the name ‘the door of humility’

8



Stage 2: Let me tell you a story:

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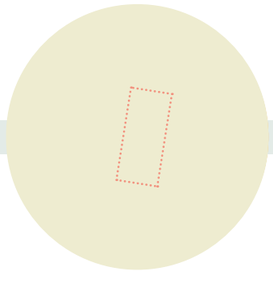
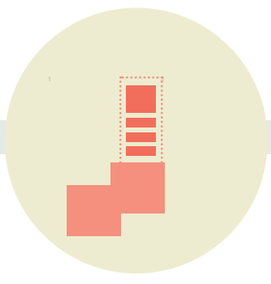


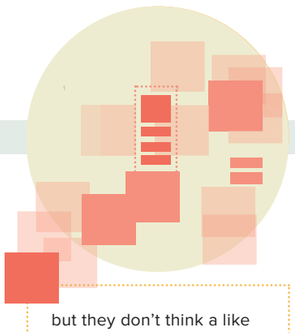
Currently every experts is looking at this App. The EUDI Wallet

10



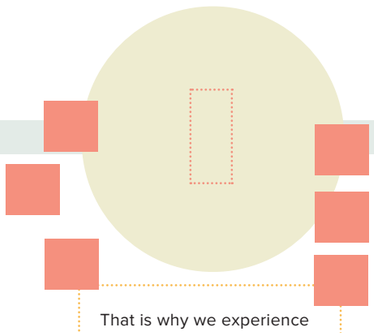
and all of them are interested in helping the creation process somehow

11



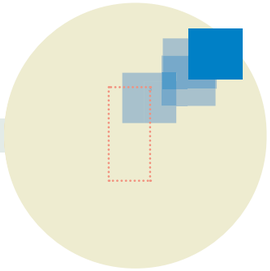
but they don’t think a like

12



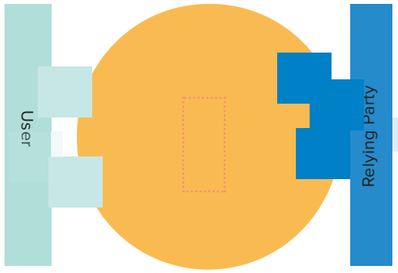
That is why we experience a lot of value tensions between the other creators. They have separate opinions

13



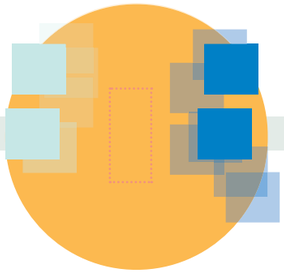
Maybe because there is a lot of change coming for the system and Relying parties ask: “What should we do?”
“Will not be the creator of our own identity solutions anymore?”

14



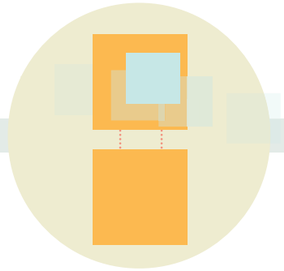
There are a view things to realize in that process.
For example we are creating for all people with their different mental models and believes for a specific situation of verification

15



But users and Relying parties are quite unique

16



A user might want to revoke data from an online platform, because they experience unethical practises in that verification process

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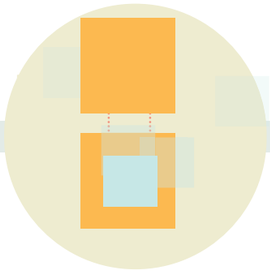

Or to have a a much more efficient process in bureaucratic procedures, because they have to fill in all those papers

18

Oversight Understands

Ok, so that means the person thinks:
I want to revoke data because previously we experience bad practises, or I want it easier at healthcare, because currently I need to fill Yes

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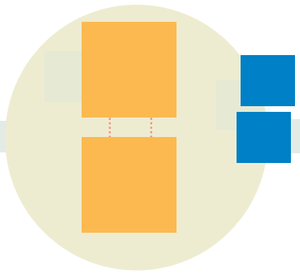

And for the Relying Party / Parties?

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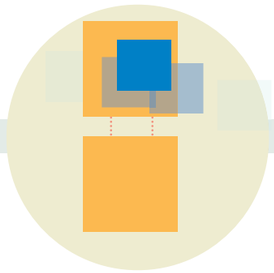

That is the same for them too... Some might have data personalisation as key for personalised services, because of conversion.

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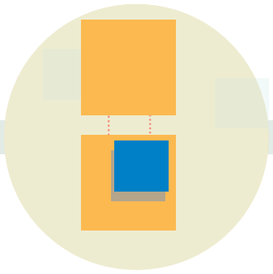

And others just need the solution to work because they previously do not experience and different need. A less strong mental model, because their user base is steady

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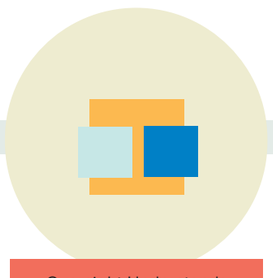

Oversight Understands

So we are designing for the mental models of different people but we focus on single verification processes to understand the values in the context

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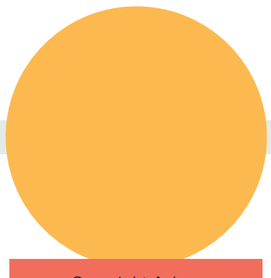
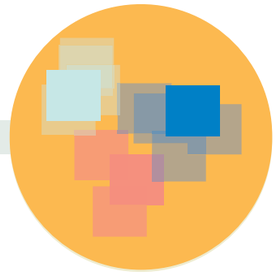


Oversight Asks

Wow. And which role do we play?

24



You are aligning it and take care of the values and value balance, somehow like this. But take care of your own mental model. You don’t ant t be biased. We are in the common ground.

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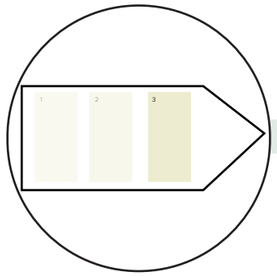

Stage 3: Role Exploration

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Here you get to know the different parties for real

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Users

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Relying Parties

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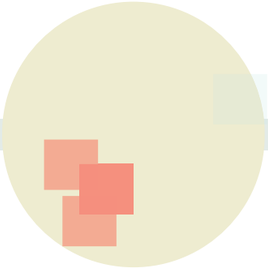

And your role as oversight and creator

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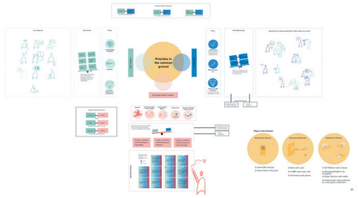

You will explore it in the environment

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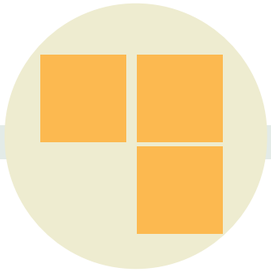

And also learn how thinking about the environment the verification is taking place can help to identify the process

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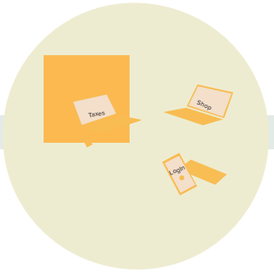

Online / platform: The representative for all third party platforms we can log into.

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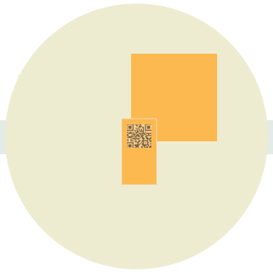


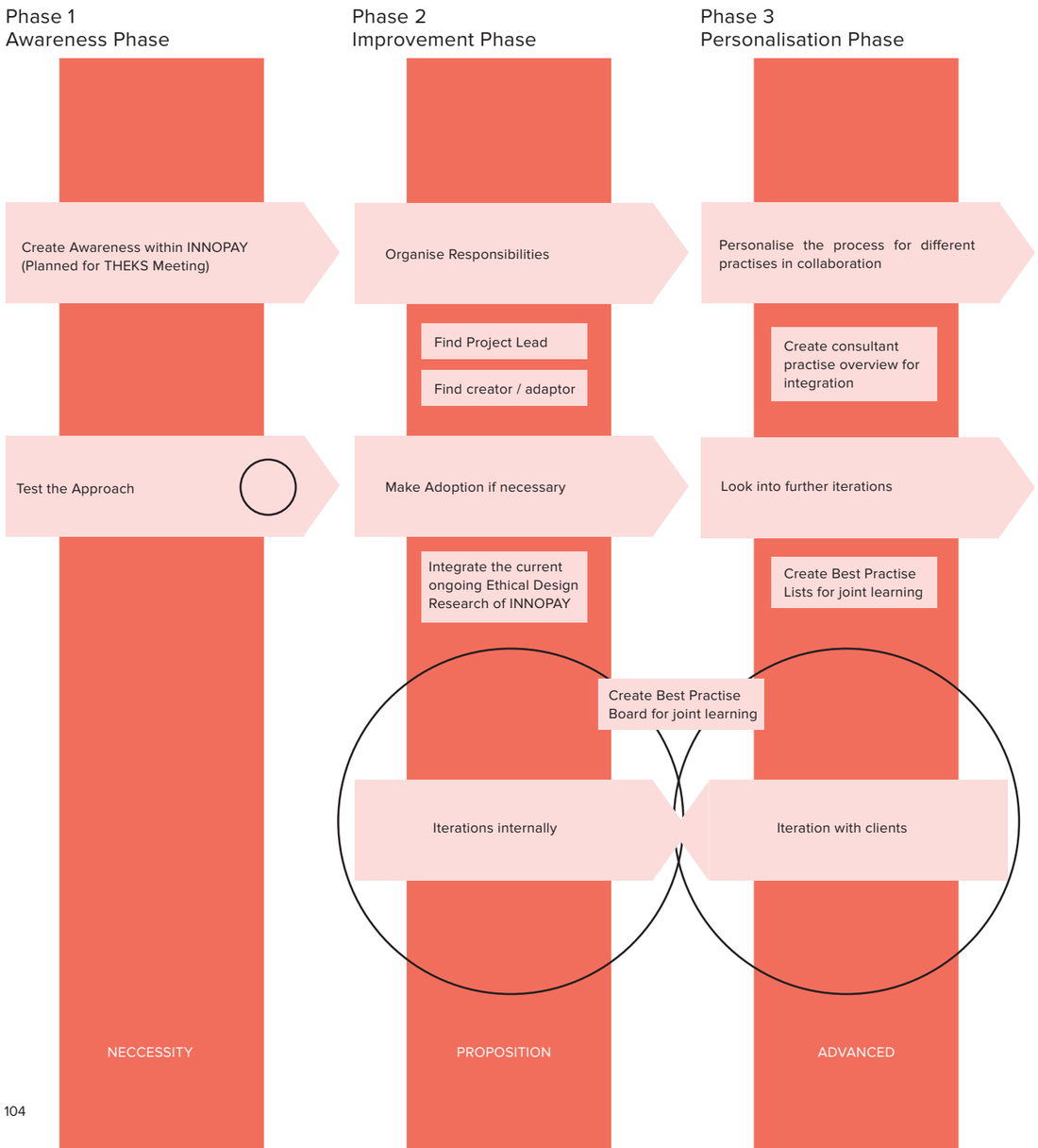
Online and physical: This can be a QR code or travel documents. So what next we know different contexts now so who is involved in this?

34

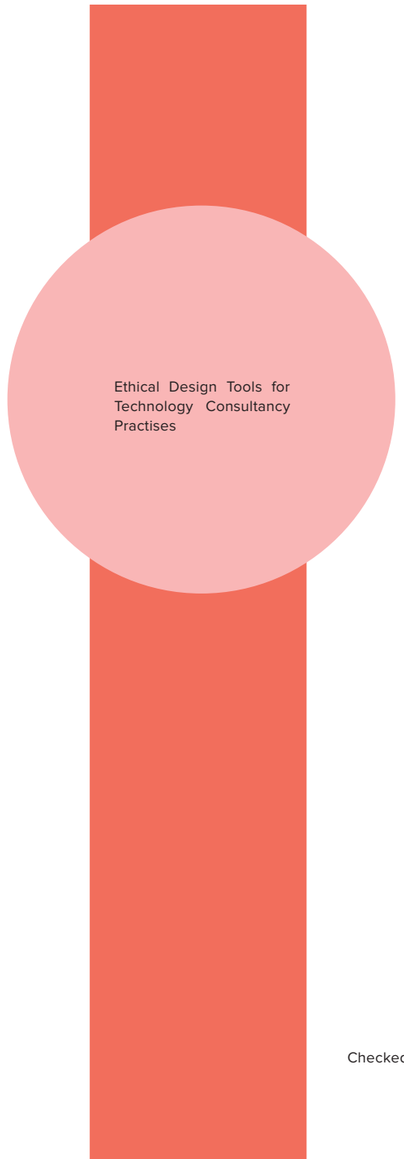
Physical / Remote: Here we can enter only with a card or we also consider scenarios when the phone is empty

7 Ethical Value Integration Roadmap

Now that we discovered the tool and the idea around strategic dialogues. How can it be integrated. The tool can work in offline and online environments. For an online environment the suggestion is to move it to Figma Jam, as it already works there. Important is to follow the steps as described in the examples. However the integration of the strategic dialogue as tool does not go by itself and has to be further explored and tested within the organisation to catalyse best practises , as I could not fully iterate how the process could work best. Luckily I know that this is wanted. Therefore I created an outline and vision to integrate the tool and moreover integrate what is already there. Within conversations I realized that there is a drive towards technology ethics. Even though practised already at some stages it is not completely integrated yet.
I believe that especially the first part ‘Value Finding’ is thought through the most , however the other tools need to be seen in different contexts of the consultants practise. The strategic dialogue set up provides and outline as structure and leaves room for flexibility in picking examples of different stakeholder to create awareness for different value tensions. This involves tension of today and imagined tension of the future to help understanding that what we create today has an influence on future practises. To test the final tool I would recommend to first create awareness in the organisation about my research which starts at my presentation and is further explored at an internal THEKS meeting. Within that process more ideas from the whole organisation can be gathered, where how when and why this approach could be most beneficial. After the awareness phase we are looking into Integration



Vision
INNOPAY leading the ethical design integration phases for (all) future verification experiences by creating respectful transactions and verification mechanisms that include the values of all parties involved in the given contexts by integrating a trusted relationship within the layers behind the app



8 Discussion

I will discuss two parts (1) the future of digital identity and what I see as important and (2) The Format of Strategic Dialogues

(1) Discussing the Future of digital Identity
In a society in which we are designing systems and technology that will influence individual experiences, but also the current existing systems I believe it is hard to distinguish between right or wrong. Moreover it is hard to say which values are more important then others when it comes to technology. Let me explain.
I learned that when we start strengthening values on one part we are creating different experiences on the other side. For example adding more security in a verification solution and make it more bound to a person will certainly hinder the ease to pass it on to someone else, for example forwarding our coffee card to our friend easily. So how much security do we need in this process and how bad is it actually that we forward our coffee pass? Isn't it a great gesture? I mean how much coffee could you possibly gift anyway, that it creates a bad influence on the economic factors of TU Delft?
Every single verification process needs consideration and I believe that we can not just claim that a wallet will solve every issue without understanding the stakeholders involved and why they are doing the practises they have in place now, because they have so much knowledge to provide on how values are balanced currently. Also we need to think about verification processes and experiences within different user contexts and integrate the people within. Asking where are they are coming from and why they believe the verification process should be like (fill in the gaps.....).
Within my research I could not go in detail in every aspect, but I genuinely tried to cover up as most as possible in a generic way and also some depth in between. To design a well- balanced digital identity wallet we need to think about the bigger picture and influences the technology can have on society as a whole in the future. I present tools that can be used within new research around verification experiences to understand the system participants better and showcase value finding approaches to help creating an integrative approach within the area of values and mental models of stakeholders in the system. Now we also need to look at the flip side of the balancing act.
Even though I describe that it is hard to balance certain values I strongly believe that we have to be careful in which technology we create and also which legal structures and standards we create. For example I strongly argue that we all want to live in a place in which we can live without the bias of anyone else.
I would like to see that everyone gets aligned which implications the reliability of data points of a person can have for the future of society which is already polarized. For example do we really need reliable proof about the gender of a person or sexuality or can we find other ways to do marketing by genuinely connection better with the user groups and built a relationship with them. Often a simple call as seen in start- up approaches can help to unravel what users really need and want. Moreover I would not like a place in the future were users are excluded from a party based on their internal identity believes that are available for everyone. I believe that would not do any good to the technology developments and that is certainly not a space in which we respect and care for each other. I hope that the format of strategic dialogues the inclusion of mental models and the considerations of different parties in the system can help to actually create a better place for the future, by integrating the different perspective and therefore reflect on our biases, as we all have them. I claim that it is normal to be biased, because it is based on our experiences, but we need to work on that in collaboration.

The creation of (all) future verification experiences with moral values as foundation.

(2) Discussing mental models within a transition design intervention
I find it interesting, that we are often reading in papers which elements are important to create tools, however in this case I followed the steps mentioned in my first strategic dialogue session, but the actual point missing was a visualization of the tensions more clearly instead of the common value. Therefore the second iteration presented clear examples to ease the participants in and understand value tensions within a context, which worked much better. However I would love to claim that it works to integrate the believes and mental models of different people to grasp the complexity and solve big challenges, however I only had the chance to test it one time based on the time frame and therefore we would need to see how this could develop in the future an serve the actual purposes within the system. I believe that it is a good first step towards looking into the complexity from a an ethical perspective and got good feedback from the participants.
I would have liked to develop and test the method of strategic dialogues further, however the time frame in the end did not provide the sufficient time and therefore would need to be tested further on. Never the less the outcome of the first testing session showcased that the approach was really helpful and I could create excitement within the session to further develop the tool at INNOPAY and make it even more useful. Therefore I am happy that I could create first steps towards the direction of including practises of ethical technology. Within the second testing phase ethical considerations and balancing ideas were created and moral imagination happened.

- A lot of info, that has to be accurate, up to date and readily available. So ease and reliability because healthcare can often be time sensitive, but also security and privacy because its such sensitive info.
- Reliability is important and needs accurate data, but also balance with informed consent. Like I dont wanna share how many cigs i smoke or how often i drink. Its a balance overasking the more you overask they might hide or lose trust. Needs clear context on relevance of info, so transparency. But need to be fast. Jeez.

9 Personal Reflection

I learned, I struggled, I grew. I think personal growth describes best how I experienced this journey and I am incredible glad I managed my way through the complexity in the end, because in between I was not sure, where I will end up, what my final design should be and was moving a lot on that balance board, because there is a lot going on currently within the development process. It was quite a journey, but I don't think I have learned so much about myself as a designer and my strength ever before. I actually believe that I found my path and know now better then before what I am best at.
Including people, ask questions, provoke thoughts, let them reflect, imagine and genuinely help people to be and express themselves, by still reflecting on the bigger picture. I always have been a peoples person and within my masters and especially the project I found my way into the role I described from my first months at TU Delft 'A Cohesion Creator' with the aim for social justice and change.
Reflecting on the methods used and the process in general I don't think that I always used the right approaches at the right time in this project, as I just wasn't fully aware of where I will end up and struggled with the complexity and understanding the essence.
However I followed my heart and my intuition most of the time in which my exploitative nature drove me into wanting to now it all. I am glad that people were around me to exchange thoughts and processes in order to get back on track and find my way but don't run too far away from it. This is definitely a big lesson learned.
However being the only one with the actual 'ownership' about the project was quite a challenge. I believe a joint Master thesis with a fellow student would have been the best approach for me and my personality, see 11.0 why I feel that way.
I don't believe that dealing with wicket problems is made for one person :)

Reflecting on the report, skimming my whole report down to the essence felt incredible amazing, as I realized a lot of achievements, which I was not conscious about (see Time to Celebrate on the next page).

Also it helped me to appreciate what I achieved myself with help of all the lovely INNOPAY'ers, the help of Peter and Ruud and my fellow design friends.

I am proud. I am proud to say I did this and it has so much personality of myself even in the last design.

And now it is time to celebrate some achievements.

Figure 33: Me at the ID next Conference 2022, Utrecht

10 Time to celebrate

What we did not touch up on yet: some values are not measurable so this list includes all achievements measurable and unmeasurable

I sparked conversations about futures and moral values

I sparked interest in value creation within technology ethics and found someone at INNOPAY that got sparked the most and wants to carry the project further to integrate ethics as core in the consultancy practice and generate the tool further

I connected people in conversations with each other which was mentioned as alignment in different organizations (Final Method)

I helped to understand the complexity from an emotional and less technical perspective using storytelling and integrating stakeholder values at the heart of the system

I developed a new toolkit for myself and INNOPAY to integrate value finding methods within consultancy practice outlining best practices

I created multi layered perspectives to design for the future as a creator by introducing the values and needs of different people to spark conversations and ideas which probably connect underlying

For myself

I learned about technology and digital identity

I learned about consulting and strategy at INNOPAY

I learned how to think like a user, verifying party and digital identity expert/ oversight

I learned how to look at a complex system from a people centred perspective

I learned how to use my intuitive character in the best way

I got an even better creator of participatory design practises

I found my own voice within the design practise and learned to pace myself better

I learned how to report and structure myself better

I finally learned what design can bring into a world full of strategies
(was struggling here)

Finally I learned that I like complexity, but I rather focus on people in general and their role in the system and have someone else helping me around, as I enjoy joined projects with simultaneous

(there is probably much more)

Thanks for reading, enjoy your day!

(or see my synthesis approach)

11 Behind the Scene: The Big Analysis & Synthesis Process

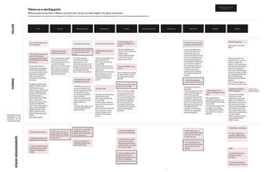
Question: My core question was: How can we create a value balanced system. Therefore I looked into value literature (Van Den Hoven et.al., 2015). I reflected back to see how I actually ended up with my synthesis phase.
It was quite a challenge see here the reality on how that happened.

.1 Value Conflict Resolution Methods

I looked into value literature. Five methods for value conflict resolution are described (Van Den Hoven et.al., 2015). Here different processes are described in order to solve value conflicts, where I picked two of them as they already suited into my approach.

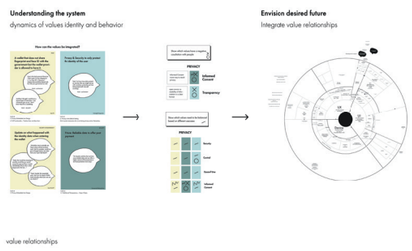
Satisfysing to reach an 'aspiration level'(Simon 1955, 1956) is presented to guide the decision making process. As I already used moral values and found factors like the importance of making information understandable for the user an satisfaction level was set.

Innovation: On the other side I looked into how I can go from the values I found towards actionable steps of creating requirements for the wallet. Here I integrated the innovation approach of translating values to norms to design requirements (Van de Poel 2013). I did that for most of the interviews within a framework I created in which we can see the values expressed within the value cards and the integration until the bottom layer integration naming design requirements for the wallet. (11.1 Users)
All values where categorizes in the 10 pre established values for the study.



.2 In between from single values to system thinking:

To understand the connection between the parties and system layers I generated multiple overviews for myself to get an understanding of how to create the satisfied values. For example having a transparent wallet, that aims for having the user understand everything and does not over ask attributes. I created a drawing which I used to understand if I myself would create it, what would I do. However I was always ending up in the system layers and looking at the development, that was still ongoing I realized the tension is coming from somewhere else.

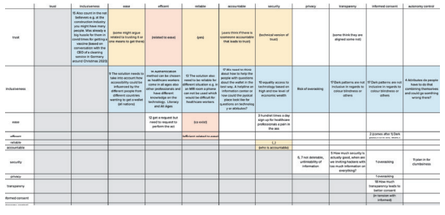


.3 Participatory value conflict mapping:

But firstly in an participatory session I tried to make sense of the value tension between the different parties using the data generated in 1. I pre-labeled some to generate an understanding of 'I think the value tension comes from a system layer'. Even through we (INNOPAY +me) came up with a value table I did not see any connection to the system layers or my experienced struggle where is the value tension coming from and where can it actually be created. For example who will decide which attributes are allowed in the wallet, as that was experienced from users at a high degree "I want to revoke my data", I want to be able to know what happens with my data and where it is used"

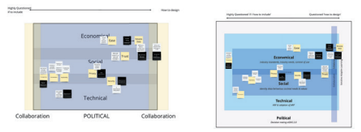
.4

First I used the value tension table to map out value tensions, however it did not show where the value tension is coming from. Then I started to put layers also in the map. To make speculations for the tension points. Here I did not describe the core tension as it was already represented in the other map. But also it did not serve the goal, because I wanted to satisfy just a view of them and realised others have to be seen in context.



.5 Value Management Analysis / What is the problem in collaborating?

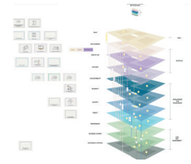
I asked myself where the tension in the system are actually coming from and why there are so many arguments around social values like privacy or security. The framework of Martinsuo (2020) (see Appendix 8) was iterated and fitted to the current development process. The process showed me the difference between social and economic values and also I came to the point in which I saw politics surrounding the process as value creator. I also saw the lack of communication and therefore mapped it first into the 'to be improved' layer.



(see Appendix 8)

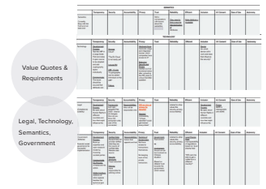
.6 System Layer Thinking / How can I create collaborative action?

This part was connected to part three, in which I generated more ideas on how to make the system layers actionable, because if values are created from politics. Should there not be a method to create awareness for this?



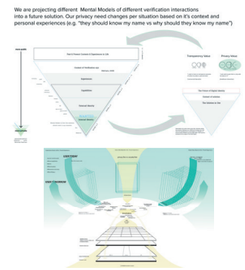
.7 Digital Identity & System Layer Connection + Value Connection / Connecting values and digital identity creation

After I generated an understanding of the value creation in the system layers I started to match the sensitizer tool kit information of the oversight in which the participants described semantics, technology, legal, government and collaboration terms ,with the value interpretation of the different provided moral values.
The outcome was a big table which in cooperates the information gathered by different stakeholders with integrated analysis of differences and questions.



Report Display Tension Points

But, the values are a bit generic right?
What is really said?

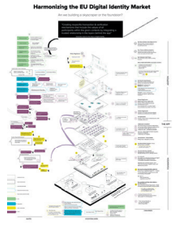


.8 Mental Model & Context Integration (5.2.2) / What is really behind the values / The underlying

I realized that the interviewees where switching around their values and by looking into literature around systemic design and value creation I could create a generic mental model of a user, Relying Party and Oversight that helped me to understand we are not talking about digital identity , instead about all verification processes out there.

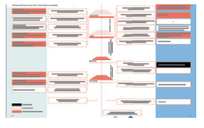
.9 System Map Development (5.2.3)

Now that I understood the connections of the system towards values I started integrating the values into the system map to see where the values should be generated within the development process. I marked urgent ones in yellow to draw attention. Within that process I also added the overall values gathered from the different system participants, even though they are generic. And formulated foundational rules to create the vision of respectful verification processes for trustworthy transactions.



.10 Towards a structured approach (5.2.4)

Now that I knew the system layers I want to make it actionable so I linked back the balancing ideas of the stakeholders into a map to showcase how big tension points could be balanced



.11 The reality / What can I really do? (Concept + Report Writing)

I started to structure my data better and created three roles and overall themes that express what those stakeholders want from the system. Here I integrated the information of the mental model analysis + context in the best way (4.1, 4.2, 4.3). The next step was to create an intervention as seen in transition design (5.1) to fulfil the purpose of integrating the values of people in the context we are talking about and started to create the first outlines on how a strategic dialogue should take place in order to come together and talk about values for each verification process instead of on a high level.

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Figures & Tables