D2_1

Multidisciplinary Use Case Analysis

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This document describes the results of the use case analysis done during the first six months of the USEMP project. Sufficient time was reserved for this task during the two Consortium Meetings in Paris and Brussels. As such, this deliverable presents the elaborated versions of the two use cases described in the USEMP proposal and an overview of the methodology and tools used to refine and clarify the scope of the ongoing tasks in the USEMP-project. This document will be used as a framework for the upcoming user research and prototype definition.

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1. Executive Summary

USEMP is a multidisciplinary research project, which makes it important to keep a clear view throughout the project on the needs, limits and challenges of the different involved disciplines (lawyers, engineers, computer scientists, marketing experts and social scientists). The multidisciplinary research team needs to stay aligned for the whole duration of the project and during the different phases of the prototype definition and development. To achieve this, different methods were used to bring disciplines together and to create bridges between different languages, goals and epistemological positions.

This deliverable elaborates on the different steps that are taken and the decisions made to evolve from the defined use cases in the USEMP Description of Work (USEMP Consortium, 2013) to the defined user stories that form the basis of the first prototype definition development. Via a process of divergence and convergence both initial use cases were discussed, broadened, scrutinized and made concrete. The work title of the first use case is “OSN presence awareness and control tool” and the second “information monetisation tool”. The use cases were enriched after interdisciplinary discussions and creative workshops in Paris and Brussels that were attended by all project partners. Subsequently, they became manageable working documents.

The goal of task 2.1 is to bring consensus across the consortium on the details of the challenges to be addressed and to refine and clarify the scope of the ongoing tasks in this project. The outcome of T2.1 is expanded upon by T2.2 for the requirement analysis and, taken together, will contribute to maintaining the research and development scope throughout the course of the project.

This deliverable starts with the description of the methodology used to enrich both initially defined use cases. Then we describe how we implemented the described methodology in the USEMP project. We started from the known two use cases as they were stated in the project proposal. We discussed them during the interdisciplinary workshop in Paris. Later a first version of the future scenarios was created, together with the tech cards. The scenarios were discussed during the interdisciplinary workshop in Brussels. Afterwards all information was converted into the final user stories.

2. Interdisciplinary Methodology

2.1. The innovation binder approach

Our (Stewart & Claeys, 2009), and others' (Van Helvert & Fowler, 2003) past experiences show that challenges arise when working together in a multidisciplinary team made of social and technical researchers. Some of the problems that one might encounter are epistemological differences, terminological misalignment, resistance to input from other disciplines, power issues and management failures.

One of the attempts to define a structured way to overcome these interdisciplinary problems was the creation of the 'innovation binder approach', an approach developed within the iMINDS-SMIT research group and recently published by An Jacobs (Jacobs et al (2014)). The innovation binder approach was developed in response to a need for a tool supporting interdisciplinary collaboration in the health domain, but can be translated to other domains. Jacobs (2014) states that they wanted to create a procedure to confront multiple viewpoints from user/social, technological and business perspective to make the choices (e.g. about target groups, practices, actors, messages, means, steps, procedures, technologies) more explicit and coordinate the team to work together to a common abstract goal with a lot of unknown viable options.

A commonly known method, **scenario** creation (Van Helvert & Fowler, 2003), has the ability to smooth these differences by promoting dialogue between the different groups. Social scientists might be perceived as useful for the process but the perception may exist that they are slowing things down. The innovation binder approach therefore separates a social and a technical stream and notes that the continuous integration of both streams should start at the very beginning of the development process. This helps to overcome the waiting game between technical and social output.

As such the innovation binder approach conceives scenarios as boundary objects. These can be defined as documents that facilitate coordination of work between different groups. They are malleable enough to be adapted to the specific needs and constraints that the different stakeholders may have (Johansson & Arvola, 2007). In this way they structure the discussion and decide where the focus should lay. Central to the approach is the iterative use of scenarios and **personas** with different finalities and how they are iteratively discussed and questioned.

As seen in Figure 1, the innovation binder approach can be divided into two main phases. First, it runs through a concept development phase, which can be defined as the materialization process towards a new technology idea of the product or service. This phase is successively followed by a proof of concept stage where a demonstrator of the concept is developed. In this deliverable we describe **the concept development phase**. This is an exploratory, divergence stage of the project, which in the second phase converges towards technical requirements definition. One of its main purposes is to build a space for creativity for the different research activities and to bind their contributions together in one jointly created story.

In the next chapters, we will take a closer look at the different steps we took for our use case analysis and how they connect to this innovation binder approach, but first we elaborate a little bit further on the importance of scenarios in interdisciplinary work.

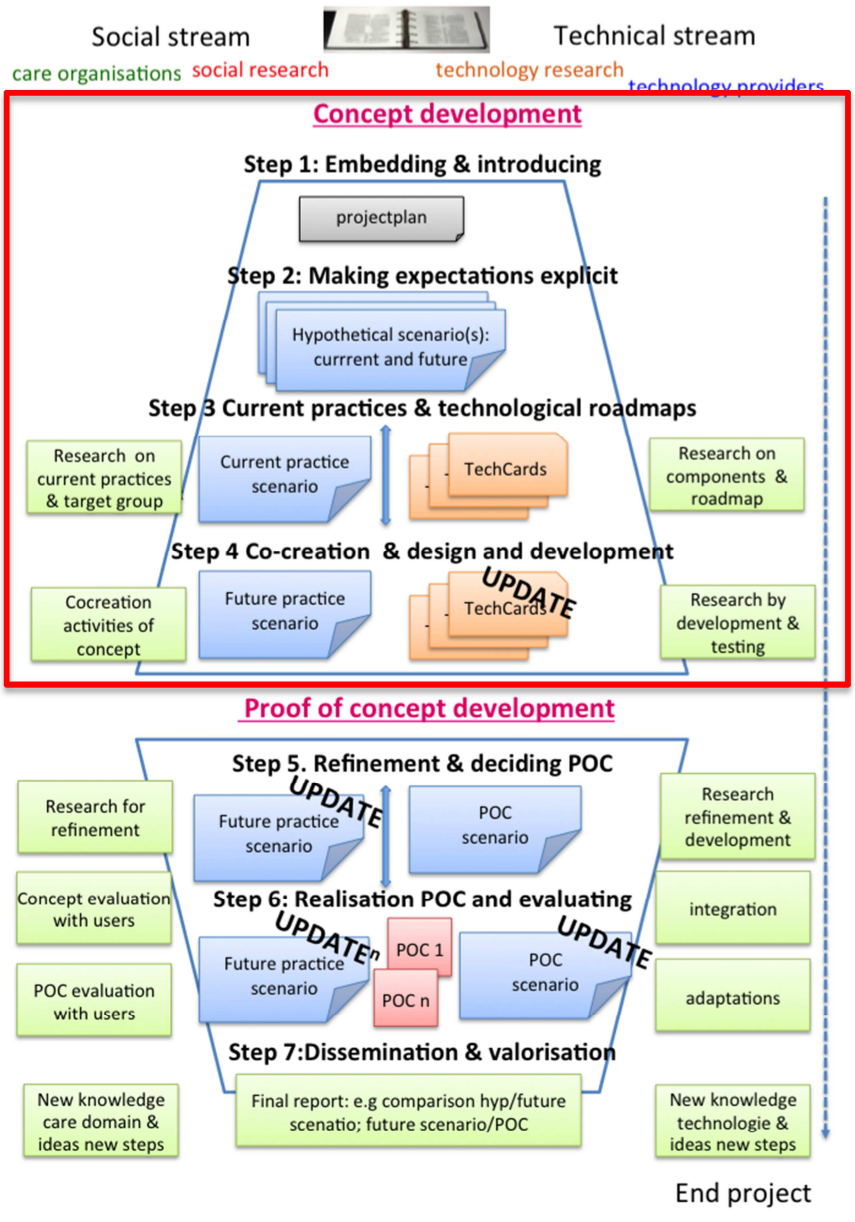


Figure 1: The Innovation Binder Approach (Jacobs, 2014)

2.2. Scenario Definition

A seasoned method for clarifying and refining ideas is the usage of scenarios. These could be defined as stories that include actors, their background information and assumptions about the environment, their goals, objectives or expectations and the sequences of actions and events (Go, 2009). Bødker (2000) proposes three main reasons for making and using scenarios (in design): to identify potential problems, to present and situate solutions and to illustrate alternatives.

A main advantage of the application of scenarios is that it is a useful tool for guiding the collaboration in an interdisciplinary research project (Van Helvert & Fowler, 2003). Interdisciplinary research, such as the USEMP project, implies unknown grounds to be visited and gaps to be bridged (Stewart & Claeys, 2009). The method lends itself perfectly to these situations where all partners have different backgrounds and competences since it makes use of the same narrative styles that people already use in their day-to-day lives and it does not require the learning of new conventions. As a result, scenarios present a clear basis that is easily understood by all stakeholders, non-hierarchical and thus holds the promise to build trust among the consortium.

A second benefit of scenarios is that because they are formulated as stories, they easily trigger conversation and discussion about the situations that the different personas encounter. Through this dialogue the team can create a shared understanding of the use cases and will develop a common vocabulary. This results in the formation of a shared base where multiple perspectives can be reconciled and possible alternative realities can be explored. An important feature of scenarios is that they are flexible enough to promote this discussion while providing a structure that helps keep the design activities focused on the user needs. As such they prevent the discussion to get carried away off topic.

Through the use of scenarios a common understanding of all the stakeholders' needs and service requirements will be developed.

In what follows, we take a closer look at the innovation binder approach and the specific manner in which we made use of scenarios in USEMP. This method is based on (Jacobs, 2014), where it was used to support an interdisciplinary collaboration when developing new pervasive health systems.

3. The Interdisciplinary Methodology followed in USEMP

For the methodology used in USEMP we started from the innovation binder approach, but made some changes into the way of working because of different aspects. First, as an international consortium we had to work mostly physically separate from each other. This made the work more complex. Secondly, because of time constraints we had to proceed faster into the user requirement phase.

Therefore we adapted the Innovation binder approach in the following way.

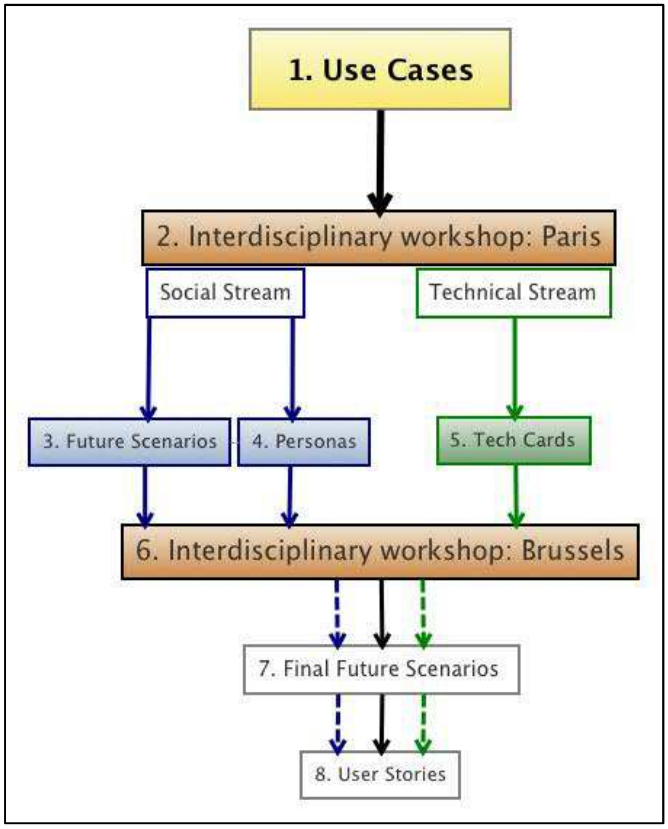


Figure 2: The Innovation Binder Approach in the USEMP Project

Starting from the two use cases as articulated in the initial proposal and DoW, the next step was to further refine and clarify the scope of the USEMP project. This allows us to discuss in detail the underlying challenges that the consortium will have to address. One way of bringing all latent issues to the surface is by bringing the use cases to more tangible use situations. These will present what users will encounter when employing the USEMP platform in their daily lives, which allows contemplation about the requirements for the development of needed artifacts (Bødker, 2000). Within USEMP we achieved this by discussing the use cases, enriching them and then creating future scenarios. The first version of the future scenario was mostly written by the social scientists, based on the outcomes of the workshop held in Paris on November 21 and 22, 2013.

3.1. Starting point: USEMP Use Cases

In the Description of Work (USEMP Consortium, 2013) two use cases are defined upon which the consortium would work. These initial use case descriptions were already the outcome of an interdisciplinary exercise, but the way they were formulated was still very technology focused.

The formulation of the initial use cases was as follows.

3.1.1. Use Case 1: OSN presence awareness and control

This use case encompasses the creation of tools that will give OSN users improved control over the content and information they explicitly share online, that can be observed and/or can be inferred. This control implies handing the users a series of tools for assessing and changing the visibility of sensitive content towards other users and the availability to the online social network. The USEMP platform must deliver two major functionalities: real-time OSN presence management and long term OSN presence management.

In order for real-time OSN presence management to work, USEMP must be able to study the volunteered, behavioural and inferred data of a user and provide feedback on what was shared. At the same time, the user has to be capable to define what type of information he wants to keep private and what happens when USEMP localizes a potential breach in his privacy. This will allow the USEMP platform to raise users' awareness of unintended private information sharing and the user to understand and influence the invisible processes that are monitoring his/her online behaviour.

The goal of long term OSN presence management is to give the user feedback about her global privacy and to grant her the possibility to remove or change the visibility of data that contribute to breaching her privacy rules. In order to make it easier for the user, a content analysis tool must be created that helps detect potentially sensitive information. In this way we allow the user to regain more control over her volunteered, observed and inferred data.

3.1.2. Use Case 2: Information monetization

The goal of this second use case is to raise users' awareness concerning the economic value of their personal data. At the moment, the economic relationship between the online social networking sites and their users is uneven and benefits mostly the OSN operators. This use case is again divided into two functionalities of the USEMP platform: awareness of economic value of personal information and personal content licensing.

There is a growing need for more transparency on the business model of the OSNs. These business models are currently based on the monetisation of their users' personal information in return for offering their services and applications. USEMP will provide an interface for raising users' awareness on the economic value of their personal data and in what way it is being exploited by the OSN operators. Through simulation of an advertisement network, it will help increase the understanding of how posted content and behavioural data gets linked to certain advertisement and brands.

In order to let the users gain more control of the monetisation processes behind shared information, USEMP will provide a framework for licensing personal data and a control

mechanism. Besides being rewarded for their content, this will also allow the users to become aware of when and how their personal information is being used for profit.

To avoid commodification and to prevent the online environment from turning into a market place for personal information, USEMP will install control mechanisms that discourage the user to share data with very high frequency for profit.

3.2. Interdisciplinary workshop in Paris

In light of USEMP, it was decided to schedule project meetings every three months. This creates several benefits like guaranteeing a continuous involvement from all partners from day one. These meetings also helped to align the different goals and expectations, build bridges among the stakeholders and they facilitated a basis for future communication.

In line with the innovation binder approach this setup supports the establishment of an iterative approach where scenarios and personas can be used as a common vocabulary to guide the research process.

So far two meetings were held. The first one was set in Paris in November 2013.

3.2.1. First Interdisciplinary Meeting: Paris

Figure 3: USEMP partners providing structural feedback on the initial use cases in Paris, November 2013

This interdisciplinary meeting marked the launch of USEMP and was construed as an environment where rules concerning the management and execution of the project could be set. Besides discussing the financial and strategic aspects of the project, a timeslot was reserved for each partner for setting out their specific interests and expectations in USEMP. This was important for understanding everyone's background, ambitions and goals. One of the methods used for the use case analysis was the mapping of different subparts of the scenarios on two axes: difficult-easy and clear-unclear. As such we arrived at a first overview of the feasability of the project. Also sector specific challenges that one might have unknowingly overlooked were stipulated in this process. E.g.: the social scientists of Luleå Universitet and iMinds got a view on the legal or technical aspects of the project that they might otherwise not have been aware of. In addition, this iterative way of working ensured that their work will be correctly translated into technical choices (Jacobs, 2014). Partners with a more technical background, such as Velti, get a guarantee that the user needs and desires

will also be put into account. Afterwards, the two use cases for the monetization and presence and control tool were presented and elaborated upon while bringing these differences into account.

This first meeting can be linked to our approach of the innovation binder approach (See Figure 2, step 2). First of all it provided a forum where the social scientists could present the method and the steps that needed to be made in the future. Secondly, each stakeholder could reveal his expectations towards the project output and these differences could be charted and discussed. Based on the outcomes of this kick-off meeting, the social scientists of iMinds could start building future scenarios and personas in an iterative process where each partner could stipulate what is important from his point of view (Figure 2, step 3 and 4). The technical partners could start creating tech cards that provided an overview of which technical components were available and how they worked together (Figure 2, step 5).

3.3. The road towards future scenarios

Based on the first input that was gained from the interdisciplinary meeting in Paris, the social scientists could start with the development of future scenarios for both use cases, including persona creation. In this way the more abstract use cases get placed in more concrete situations which helps the identification of the sector specific challenges that arise. In a first step these hypothetical scenarios have the goal to facilitate and guide the discussion among the consortium. It is important to note that this is a process that is guided by one of the project partners, iMinds, but where input from all partners is necessary to come to a document that everyone agrees upon. These future scenarios are a part of the divergence phase of the innovation binder approach that tries to stimulate idea generation.

3.3.1. Use Case 1: Future Scenario "OSN Presence Control (Empowerment) Tool"

The discussion in Paris provided some insights and questions about the first use case on OSN presence awareness and control. These remarks helped to draw the use cases out of its abstract level. Some of these questions and assumptions for the future scenario are shown in Table 1.

Questions for the future OSN presence control tool scenario
1. When do people consider data private? Understanding privacy in context.
2. What types of data could be perceived as sensitive?
3. How do we analyse photos showing the user in certain circumstances?
4. Is there a possibility to change the visibility of data?
5. Privacy levels: are they homogenous and static?
6. How do OSN operators profile users?
7. What are the choices for users for retaining their personal data?
8. How to define real-time privacy management?
9. How to avoid annoyance of users when empowering them?
10. How will we make the user aware that online presence management is a long-term process?
11. How to make users aware whenever content or information that was volunteered, observed or inferred breaches their privacy settings?
12. Where is the value for the user of the USEMP platform?
Assumptions for the future OSN presence control tool scenario
1. We will develop a privacy enhancing tool for OSN users
2. We will use Facebook as testing ground
3. Privacy expectations are different depending on social network
4. Privacy levels can be defined in a static way
5. People share sensitive data
6. People want the 'black box' of the technology to be opened
7. (Part of) the algorithm will be visualized for the user
8. The user will be able to change the working of the algorithm
9. The EU directive will be accepted
10. We will do intermediate tests in lab context
11. Users will provide us with their personal OSN data (volunteered, observed, inferred)
12. We will test (2 iterations) with real users in a living lab

Table 1: Questions and Assumptions for the future OSN presence control tool scenario

These questions and assumptions provided a framework for structuring the future scenarios. They also guided the reflection about potential situations where people feel the need to use privacy enhancing technologies.

Afterwards a basic story was created in which a married director of a christian school has a lesbian relationship with a colleague of the school. Several potential privacy threats could be extracted: the risk to get fired from the job, the end of the marriage, etc. We show how the personas struggle with this new reality and how they adopt several strategies to keep their personal information as private as possible: they start making use of privacy ensuring technologies (such as snapchat, confide), they withold themselves from posting certain (sensitive) information, they consciously start managing their online audiences and eventually they come into contact with the USEMP platform (in the scenarios referred to as ‘Lio’).

An overview of the main personas and their background is provided on the next page.

Sofia Moore

Background Information

- 36 year old woman
- Married with Stephan and mother of two: Anna (3) and Trixie (5)
- Director of a Christian school for deaf Children in Oxford
- Engaged in crowdsourcing initiatives for Medical Research
- Intense social media user
- Recently started a lesbian relationship with Caro, a teacher at the school

Goals and Motivation

Sofia would use Lio to…

- Gain control over her children's privacy (names, age, pictures)
- Conceal her medical situation (insurance company, …)
- Keep her lesbian relationship hidden (from husband, her work, insurance company, …)

Sofia expects Lio to…

- Clearly visualize where her personal data reaches
- Warn her when she's about to release sensitive information
- Hand her tools for changing or deleting sensitive information
- Empower her in relationship to her personal data

Caro Edgerton

Background Information

- 33 year old woman
- Single
- Teacher of a Christian school for deaf Children in Oxford
- Intense Facebook user
- She has a big interest in Japanese culture
- Recently started a lesbian relationship with Sofia, the director of the school

Stephan Zimmer

Background Information

- 35 year old man
- Married with Sofia and father of two: Anna (3) and Trixie (5)
- Professor at Oxford University
- Passive user of OSNs
- A passionate runner, keeps track of his performances with various apps (Runkeeper, …)

Figure 4: Persona creation for the first use case

3.3.2. Use Case 2: Future Scenario "Monetization Tool"

For the transformation of the second use case into a tangible future scenario, a conference call was held on the 4th of December with all partners. This ensured that each partner could contribute to this important task. In preparation of this conference call, an empty template was send around in which they could enter their remarks concerning the second use case. Table 2 presents some of the in-depth questions that needed to be answered.

Questions for the future monetization tool scenario
1. How is the value of personal data defined? (By advertisers, by Facebook, by users, etc.)
2. How to bring mobile and cross channel activities into the scenario?
3. What does it mean to license personal data from a legal point of view?
4. Which roles need to be included in the scenario?
5. How can we avoid commodification of personal data?
6. What type of content can trigger personalized advertising?
7. What could be possible rewards for the end user?

Table 2: Questions for the future monetization tool scenario

Similar to the creation process of the first use case scenario, a list of assumptions was composed as a framework in which the narrative could develop (See table 3).

Assumptions for the future monetization tool scenario
1. We will have access to volunteered, behavioural and the OSN profiles of the users of the USEMP tool
2. There is an operational 'user value model' that businesses use to derive a value for users based on their profiles
3. We will create a browser add-on to collect detailed information about the online behaviour of the user
4. We have the resources to reward users for their simulated licensing of content
5. The tools for information gathering are: online behaviour analysis, multimedia content similarity, product detection and opinion mining
6. OSNs will agree to offer their services giving the licensing of personal information. An authority will monitor and supervise this process.
7. We will test different techniques as part of the design for avoiding commodification

Table 3: Assumptions for the future monetization tool scenario

Within these boundaries a second scenario was created about a 25-year old student with a passion for whiskey, photography, sailing and the designer clothes of Henry Lloyd. He is interested in getting more control on his online data and decides to use the USEMP platform to become a brand ambassador for the products of his choosing. Potential problems are identified such as poor audience management, which results in his father, who recently quit the habit of drinking, receiving tailored advertisement for whiskey. A third character was introduced as the technology savvy friend, but he needed further elaboration.

An overview of the main personas and their background is provided on the next page.

Karl Vrijders

Background Information

- 25 year old man
- Studies economy in Brussels
- 'Early adaptor' of OSNs and technical gadgets
- Passionate sailor and freelance photographer in his free time
- Whiskey enthusiast
- Loves the designer clothes of 'Henry Lloyd'

Goals and Motivation

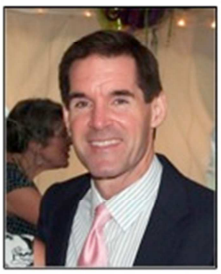
Karl would use Lio to…

- Earn some money when he is sharing his passions/purchases (E.g. new Sony Camera)
- Become a 'brand ambassador' for products of his choice
- Keep track of his digital traits

Karl expects Lio to…

- Clearly visualize where his personal data reaches
- Help him manage the monetization of his personal data
- Give him the possibility to tailor his subscription (no recruitment of other profiles via his, …)

Etienne Vrijders



Background Information

- 51 year old man
- Married to Ellen and father of three: Karl (25), Anna (22) and Pascal (16)
- Production manager at Volvo cars
- Passive Facebook user, no other OSNs. Doesn't have a smartphone.
- Recently had some heart problems, and since then tries to quit some bad habits (e.g. drinking too much)

Victor Segers

Background Information

- 25 year old man
- Lives together with Maaike
- Works at Quest Visual, developing an App for Google glass
- Highly involved with new media technologies
- Creates his own apps for android phones in his spare time

Figure 5: Persona creation for the second use case

3.4. The second interdisciplinary project meeting: Brussels

On February 13 and 14, 2014, the consortium came together in Brussels for the 2nd of the trimonthly project meetings. Some time was reserved for going over all work packages of USEMP with a focus on their current state and future planning and development. This project meeting was for the second time a great way of establishing better understanding among the consortium.

The time together was also used to further elaborate on the future scenarios. Some problems and opportunities were explored, with a greater focus on the state of current practices and on what was technologically possible. Therefore it was very important that each project partner was given the time to individually challenge the future scenarios with concepts of their field of expertise. To sum up: in this phase of the innovation binder approach there is an evolution from future (ideal) scenarios, to narratives in which impossibilities were being replaced by more grounded concepts. The difficult part in this phase of the use case analysis is that it is not easy to understand for everyone the state of the art technical solutions that are presented. To counter potential misunderstanding the solutions were presented by using Tech Cards (Ocnarescu, Pain, Bouchard, Aoussat, & Sciamma, 2011). Tech Cards have the possibility to sum up the basics behind all technical components in a more comprehensible way. They provide a simple and clear manner to describe individual technical solutions, their role in USEMP, the importance for the different partners and the way they can be mutually combined to create an overall technical architecture. In the next paragraph a summarized overview is offered of the different technical components that were presented in Brussels.

3.4.1. Overview USEMP technological components

1. Face detection: this module allows detecting the presence of a human face within an image. It may be used as an input for other modules such as face recognition.
2. Face recognition: this allows identifying a person in a digital image. It usually works from a previously identified closed area around the face (see face detection). It finds the closer identity among a closed list of persons. Ideally, it would also work when the person is not in the list.
3. Logo detection and recognition: this is an algorithm that allows identifying a logo within a digital image. It identifies the logo out of a closed list of registered logos.
4. Multimedia similarity: this allows to estimate how much two documents or content are similar, even when they are composed of both textual and visual content.
5. Multimedia content location: this tool associates geographical coordinates and a place name to multimedia content (a text/image). It can be used in order to automatically estimate the location of an OSN user.
6. Opinion mining: This tool extracts sentiment(s) from a text. It surfaces the opinion of a given user about an entity. E.g. it can be exploited to characterize one's political views.

7. Text similarity: this technique automatically represents text documents via Wikipedia concepts and then exploits these representations to compute their similarity. This is useful for determining which are the general domains of interest of an OSN user.
8. HTML5 and interactive web development: This offers the possibility to design one application for use on multiple platforms (desktop, mobile, tablet) that are interpreted by a web browser on each platform.
9. Personal attribute behavioural predictor: This module allows the prediction of personal user attributes based on a history of user online behavioural data (e.g. clicks, likes, …)
10. Personal attribute multimedia predictor: This module allows the prediction of personal user attributes based on uploaded photos.
11. Tracking and analytics platform: The tool allows to track behavioural information on how end-users use web apps, Facebook apps and mobile apps. It can be used to track the behaviour of users in the developed user experience prototypes.
12. 5ml: web/mobile/Facebook application creation environment: It can be used to fast prototype applications and designs for the pilot experiments.

Below a Tech Card is presented for the face detection component.

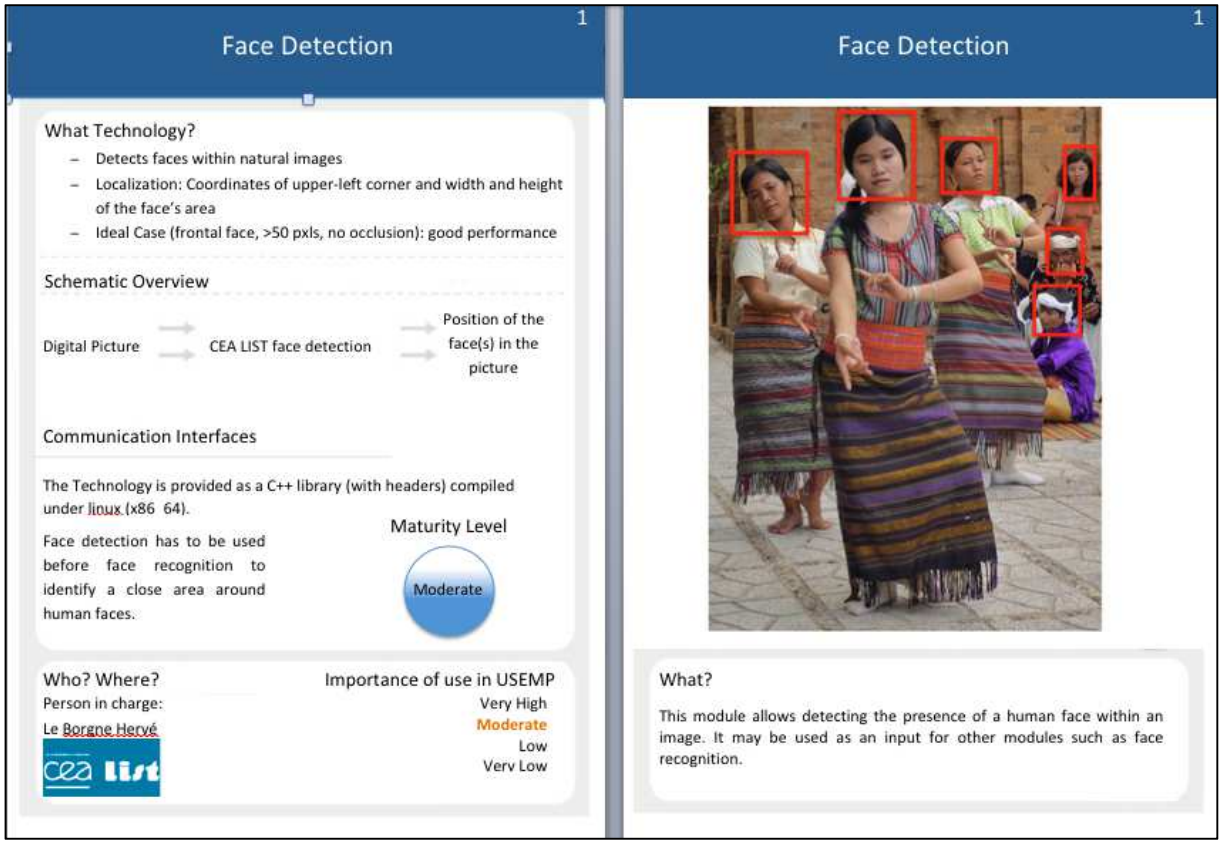


Figure 6: Tech Card Face Detection component

3.5. Finalization of the future scenarios

The input of all partners and the overview of Tech Cards brought on some useful feedback for the future scenarios. This is a clear example of how the innovation binder approach promotes a co-creation of future scenarios. The next paragraph will provide a resume of what needed to be included to arrive at an agreement for use cases and thus show how this process of co-creation takes place in practice. The full version of the final future scenarios can be found in the Annex (see section 5.1.) of this deliverable.

3.5.1. Use Case 1: Final Future Scenario "OSN Presence Control (Empowerment) Tool"

The general question that was asked was how the scenarios could be enriched, for making them a useful tool for the upcoming research.

One of the propositions was to make the secret lesbian partner Swedish. This decision was made because part of the user research will be done in Sweden. In this way this character helps to remind the technical partners that the technical components they will create for data mining must be able to work with the Swedish language. As such, the lesbian partner Caro became Carola. We also gave her the habit of smoking. This creates the possibility to put the personal attribute multimedia predictor to use. This is a technical component that is being developed by one of the partners, and that for example can detect that Carola is holding a cigarette in a picture. Another example of how the future scenario was altered to keep track of interesting research possibilities is the introduction of a pregnant teenager. This girl was very open with her pregnancy on Facebook, which influenced her search for a new high school.

There were also more general discussions on what kind of strategies our personas might use to control their privacy online, such as:

- Post differently and like less pages
- Think more about the consequences of cookies
- Turn to experts for help
- Change browsers

3.5.2. Use Case 2: Final Future Scenario "Monetization Tool"

Also the scenario for the second use case was enriched during the interdisciplinary meeting in Brussels. One of the partners noted that we forgot to include that USEMP wants to discourage the commodification of personal data. In the first version of the scenario, too much focus was being set on how one of the characters received rewards from sharing his personal data. To solve this issue we made clear that the more one posts, the less valuable his data became for the brands.

Another relevant question was what would happen when users posts pictures where a brand is illustrated in a negative way. This is a good example of how in the discussion of scenarios technical issues can be raised. Is it possible for a technical component to detect when a brand is made fun of instead of promoted?

After the project meeting all feedback was put as a narrative in the final future scenarios. Then an iterative process started, where all partners could provide extra input by mail until a general agreement was reached. The final future scenarios for both use cases can be found in the Annex (see section 5.1.).

3.6. From Scenarios to User Stories

The project meetings and the presentation of the Tech Cards helped to identify technical constraints, legal problems and some inadequacies in the transformation from the original use cases that needed to be addressed. This was an important step in light of bringing the future scenarios into the current reality.

To help this transformation we made use of user stories. These can be described as a display of the different functionalities of the two use cases in the form of short narratives (Boschetti, Golfarelli, Rizzi, & Turricchia, 2014). The structured narratives contain an actor in a certain role (the user), who wants to achieve a goal by making use of the software (Fancott, Kamthan, & Shahmir, 2012). This makes them user valuecentric in that they reflect what the user would like the system to do as opposed to how this should be (technically) done (O'hEocha & Conboy, 2010). User stories are a great step towards extracting the system requirements, as they express a problem that the system needs to develop a solution for. In this way they provide light specifications that can later be more detailed by continuous interaction with the users, but at the same time they need to be sufficiently described to be able to estimate the development complexity. Besides this, they also contribute to greater awareness among a project team about the utility, non-delivery risks and dependencies (Boschetti et al., 2014).

After the finalization of the future scenarios, the iMinds researchers created a first version of the user stories. They were sent around to all project partners who could provide their input. This already helped to generate a greater understanding about the technical aspects of the application. The scenarios were as such presented in a more concrete form, which helped to analyse the feasibility of the different aspects at a micro level.

The first version of the user stories holds an example of a feature that might not be possible to develop. In it, the user gets presented with an overview of the organizations that can make use of his personal information. This assumes that Facebook reveals the third parties with which they share their users' personal data, but they are not obliged to do this. This holds the consequence that if we would like to provide such a list to the user it should be stated clearly that this is a mock-up.

A second example of how the user stories helped create a clear view on the USEMP platform is how one of the partners made the division between the different components underlying it. The USEMP platform became divided in three different software components: on the one hand a browser plug-in and an OSN-enabled application for data collection, on the other hand a web application for enabling the users to access the USEMP features and services.

The different technical requirements that will be gathered from these user stories will be included in deliverable D2.2. In the Annex, the latest version of the user stories can be found with a separate column to indicate what is technically possible (see section 5.2).

4. Conclusion & next steps

This deliverable presented the steps that we took for analysing the use cases as they were stated in the project proposal. For dealing with the specific characteristics of a multidisciplinary research project, we did our analysis making use of the innovation binder approach, as suggested by Jacobs et al (2014). In essence this meant that we applied various research methods such as the creation of scenarios, personas, tech cards and high-level user stories. In this way we generated deeper insights into the needs, expectations and wishes for each of the project partners. The method also helped strengthen the trust and cooperation across the consortium. In our last step we already got a view on the technical feasibility of the proposed use cases, from which the technical requirements will be extracted in deliverable D2.2.

5. Annex

5.1. Final Future Scenarios

5.1.1. Future scenario: "OSN Presence control (empowerment) tool"

'What If'- Aspects of the scenario

- Organizations make known or are obliged to make known with whom they share personal data of end-users (and their profiling behaviour: volunteered, observed and inferred)
- People have the option to anonymize OR pseudonymize their personal data (e.g. hashing with key in hand of end users OR in hand of provider), possibly differentiating on type of third party service (e.g. profit vs. non-profit; social vs. institutional privacy)

The setting

Sofia is a hard-working director of a Christian school for deaf children in Oxford. Her husband Stephan is a professor at Oxford University. Together they have two children, Anna and Trixie, who are three and fifteen years old. Sofia and Stephan have been married for a long time. With their busy lives their smartphone has become more than merely a phone, they use it intensively, e.g. for planning their professional and private lives. They also use Google Now as a personal assistant.

Stephan intensively uses RunKeeper[1] on his smartphone for keeping track of his sport activities. He also uses waze[2]: a social GPS, Maps & Traffic application to avoid traffic jams. Anna is the most avid user of the iPad mini at home and Trixie has her own smartphone.

Sofia is an intense social media user and also contributes to crowdsourcing initiatives for medical research on the CureTogether[3] platform, especially related to the topic of deafness. She loves posting messages on walls and sharing pictures with friends. She uses Pinterest, Facebook, Twitter, Foursquare, and Google Now. Since she got involved with Carola she started using Snapchat and Confide.

Carola is a teacher at the school where Sofia is director. During the last party at the school she tried to seduce Sofia. From this came that and now they have a kind of relationship, despite the fact that Sofia thought it would be impossible for her to have a relationship with a woman, and especially one that smokes. Carola is originally from Sweden, but as she once was in love with a woman from Oxford, she came over to live there. Of course Sofia and Carola's relationship should not become public: a lesbian relation on a Christian school is absolutely impossible, and Stephan would for sure ask for a divorce if he would find out.

[1] http://runkeeper.com/

[2] https://www.waze.com/

[3] http://curetogether.com/

In the beginning of the relationship Sofia did not take into account that her social media behaviour revealed much of her private live. Until Stephen asked her who this Carola was who so often liked her posts on Facebook and who she recently started to follow on Twitter and Pinterest. Wasn't this someone she was managing? And was this kind of behaviour acceptable for someone in a leading position?

Sofia managed not to look too surprised when Stephen asked, but she started thinking about the digital trail she and Carola were leaving behind...there were loads. Recently Foursquare even alerted her that there is a nice gay bar in the neighbourhood of their school. They started using Snapchat and Confide, when communicating on intimate topics, since these services delete the messages after some time. And as Carola wanted to talk to her Swedish friends about her love life, she decided to only post messages related to her love life in Swedish.

The real shock arrived when the insurance company of Sofia's family informed her that her health insurance premium would rise 20%. Fortunately Sofia manages all the administration in the household, so she called the insurance company to learn more about the mail. They didn't tell her much, but they said she (and not someone else from her family) changed certain behaviour and so she belonged to another health segment than before, which changed the risk calculated by the insurance company.

She dug into her memory to find out what could have changed her medical profile, and then she realized that she had recently suffered several urinary infections and that she not only searched online on the symptoms, but also shared this information in the crowdsourcing medical research site CureTogether, talked about in on the Facebook chat with some friends and told her doctor. Only when Carola told her that it was quite common to have urinary infections when engaging in sexual activity with another woman that she began to wonder what the insurance company had inferred from her online behaviour. Would the rise of her insurance premium be related to the behavioural data captured by her online presence? No idea.

Sofia getting control on her digital trails

Sofia understood that she had to be more careful with her (digital) private life because data somewhere met with other data. She had never expected this to become problematic in her own life, but okay, now it was. Stopping to use online social network sites or Google, or ending her engagement in the crowdsourcing medical research was not a possibility for her. Besides the more common solutions of unliking and posting less sensitive information, she also searched on the WWW for tools that could make the way she communicated, and the possible impacts better understandable for her. She found a browser plug-in on the website of the Consumer Association for Digital Empowerment that promised to inform her about sending or searching on information that might reveal her sexual orientation. This tool was still in beta, hoping to prepare for the upcoming EU legislation on data protection. She decided to install the plug-in in her browser. After the plug-in was installed she got the option to visualize where her personal data was probably floating around in cyberspace. To achieve such transparency, however, she had to give in all of her accounts and password. This made her worry so she decided to stop using the plug-in.

But Sofia still wanted to get more grip on her digital footprint, so she called the Consumer Association for Digital Empowerment helpdesk with her question. They told her about a new

organization called ‘Lio’ that helps people gain control and transparency on their personal data. She contacted the organization; they had a chat and agreed on a one-year Lio service contract. Then, she installed the Lio plug-in in her browser(s) and she noticed that this time she didn’t have to enter the account name and passwords to all her online social network sites.

The tool visualized her digital trail in a nice network and infographic. She also received a probabilistic estimation of profiles used by different actors to target or accommodate her (Facebook, marketing agencies, public services, medical firms, etc.). On the basis of this information she was able to snip through certain data sharing links by using the dynamic permission revocation. This allows her to control who is granted different types of her personal information. She decided that specific bits of information should be removed and/or that the permissions associated with certain data had to be changed (e.g. the sharing or dissemination of her personal data by a website with third parties, the purpose for which personal data may be processed by a service provider). She also stipulated that certain enterprises should never ever be able to identify her personally and thus, stop monitoring/tracking her digital behaviour and data.

Every time she changed the permissions it was visualized where her personal data would reach, and where not. When she was finally satisfied about her digital traits and traces, she also configured the tool for future permissions. There she defined that the tool should always (before she e.g. posts a picture or message on an OSN site) inform her when her ‘sexual orientation’ would lean more towards homosexual (based not on the knowledge of the individual post but also on her captured behavioural data (e.g. past likes or web searchers) and inferences drawn from aggregated data of millions of users). She also never wanted to reveal the names, pictures and ages of her children or anything about her medical situation (except for academic research goals with clear guarantees for anonymisation). She defined this type of constraints for the different tools and domains where she shared personal data (social networks, health context public administration, app developers, legal environment).

After defining the constraints she also got an overview of the possible strategies she could use when she was informed that she was going to disclose sensitive information. She got the options of: not submitting post, obscuring post (e.g. making pictures or text obscure, so that it can only be read by certain audiences), change location of post, change application that sends post and a random generator of messages. When looking through the possibilities she found out that she could be informed, when submitting a post on her social networking sites, in which profiling category she was put (sexual preference, customer behaviour, health related, age, ...) for different stakeholders of FB (cosmetics companies, food companies, holiday & travel). As Sofia was a curious person she also subscribed for getting this information.

and Carola...

As Carola was looking for a new job because she found the love-work mix up too much of a hassle, she had to go quite sometimes to job interviews. The last time she had the feeling the director of the school was very pushy to talk about her relationship status and family and addictions. She wondered if it was so obvious that she was a lesbian and a smoker, or if he had access to certain forms of data she didn’t know about. She knew that certain schools in the UK did not appreciate lesbian teachers, so she normally was very careful about her

verbal and non-verbal behaviour during job interviews. Of course she also didn't define herself explicitly as a lesbian on her FB profile, and she untagged herself in pictures where she was caught holding a cigarette, but was that enough? And how could a director of a school have access to that information? As Sofia had told Carola about Lio, she installed the application in the hope to gain some more control over her digital footprint.

and Trixie...

Sofia and Stephan were thinking about moving neighborhoods because of the bad air quality (as Sofia was very much involved in participatory sensing of environmental data she was also sensitive about this topic). But when looking for a new school for Trixie, they find it to be very difficult. The schools were very reluctant to give reasons for her non-acceptance. Other families didn't have this problem when subscribing a girl from the same age.

The family thought it could have something to do with the surprising news they received a couple of months ago: Trixie was pregnant but had later lost the baby. She had gullibly been posting questions on online forums and Facebook groups about her problem for the entire world to see, so most of the people in her network knew what had happened. The schools must have contacted her current high school to see what kind of student she was and might have heard of her teenage pregnancy. Trixie acknowledges that if she had known about Lio before, it would have been easier to move to another neighborhood without anybody knowing.

The New Neighborhood

Once the family managed to find a new school for Trixie, they moved to a new neighborhood in Oxford, where the quality of the air was a lot better. Not soon after they settled in their new home, they received a letter from their insurance company stating that their insurance costs would rise again. After another worried phone call they explained Sofia that this was due to her recent move to a new neighborhood. From city data on criminality in Oxford that was freely available for everyone, the insurance company could extract that the family now lived in an area with a higher risk on burglary and because their house didn't have a proper alarm installation they were defined as high risk housing.

5.1.2. Future scenario: "Economic Value Awareness"

'What if'- Aspects of the scenario

- Organizations make known or are obliged to make known with whom they share personal data of end-users (and their profiling behaviour: use of volunteered, observed and/or inferred)
- People have the option to anonymize OR pseudonymize their personal data (e.g. hashing with key in hand of end users OR in hand of provider), possibly differentiating on type of third party service (e.g. profit vs. non-profit; social vs. institutional privacy)
- End-users could monetize their digital data and the inferred profiles.

The setting

Karl is a 25-year old Belgian student who uses the Internet, and for sure OSNs very intensively. He can be defined as an 'early adopter' of Facebook, Twitter, Foursquare and Snapchat and is a fan of technical gadgets. He recently bought a smart watch and uses the Health Book app from Apple. He also uses Siri, Foursquare and uses smart phone apps in shops that are equipped with iBeacons[4]. As a friend of his, Victor, works at a company that makes applications for Google Glasses he was able to obtain a Google Glass of the first batch that was dispatched in Belgium. Karl is in the final year of his studies in Economy in Brussels and he is a freelance photographer in his spare time. You can find Karl often at the seaside during windy days, as he is really passionate about sailing. He also really loves the design line of clothes of Henry Lloyd and loves drinking a good glass of whisky, especially Johnny Walker.

Getting control on digital trails

Some months ago Karl installed the Lio plug-in in his browsers, a tool that helps people gain control and transparency on their personal data. He liked the visualization of his digital trails that Lio enabled and looking at the estimations of profiles (and/or profile segments/categories) he was placed into by different actors in the network. He also liked the enclosed games to change the estimations of his profiles. By playing this small ESP game he was able to construct his own identity and gain knowledge on the third parties and what kind of information they could see. In one of the games he was provided with some of the pictures he was tagged in and quizzed about what third parties could infer from these images. Sometimes he also changed the permission settings of third-party actors because he thought it was scary that some companies profiled him so precisely. In that way he gained a feeling of control over his digital footprint.

[4] iBeacon is an indoor positioning system by Apple. The technology enables an iOS device or other hardware to send push notifications to iOS devices in close proximity. The iBeacon works on Bluetooth Smart. (Wikipedia)

Data monetization on volunteered data

Karl initially started to use Lio because he struggled with the way Facebook makes money with his personal data by sending sponsored stories to his friends. He found it fairer if he would earn some money from sharing his purchases (e.g., from his sharing on Facebook, even if the latter is not allowing it). When he found out about Lio he decided to use it to manage his personal data sharing behaviour hoping to learn how to earn some money this way. From that moment on, Lio enabled Karl to efficiently manage the monetization of his personal data.

Specifically, Karl chose to be brand ambassador for the whisky Johnny Walker and Henry Lloyd clothing and for Sony cameras. To accomplish that, he defined these preferences in Lio and from that moment on:

He could gain useful insights on the value of his digital data and social footprint that he either directly shared in social networks (e.g., Likes of FB) or were indirectly collected by various network actors that track his activities on his web browser.

He knew he would be rewarded (explicitly or implicitly) when he clicked Likes on pages of these brands, posted pictures of himself using these brands on the web, uploaded movies mentioning the brand or when he liked posts on the web related to the brand. Karl also responded positively when asked to participate in research related to the new Sony camera 900. Therefore he had to fill in three questionnaires. In exchange he received a 15% voucher for buying Sony materials in any shop in his neighborhood. He also agreed on having his online portfolio of photos analyzed to enrich the research data of the research center. Lio however mentioned in a pop up that it also tried to avoid commodification of Karl's data by reducing the amount of money earned if a rise of monetizable content sharing was observed.

Launching a marketing campaign: monetization on observed and inferred data

The marketing company VLT recently launched a whisky tasting campaign on request of the brand Jack Daniels.

VLT was asked to roll out a dedicated campaign to raise the sales of Jack Daniels whisky in Europe. Jack Daniels told them their most important customer group was males between 25-55 years old. VLT proposed to launch a campaign for two different, more dedicated groups. Their first campaign is aimed at heterosexual males between 45-55 years who were not Muslim, and had an introvert personality. Their second campaign is aimed at heterosexual males between 25-45 that were single, had a neurotic personality, were not Muslim and were known to drink alcohol. They developed two different campaigns to target the groups with.

The data that VLT used to profile the groups were: vocabulary analysis of their FB posts (age, gender, neuroticism, introversion), analysis of images shared online, Facebook likes (sexual orientation, religious view, use of addictive substances) and consumers behavioural data and preferences from similar past campaigns. Furthermore, VLT contacted the organization behind Lio to request a list of people who were willing to be brand ambassador for whisky. VLT paid brand ambassadors via the Lio Platform for obtaining their data (social graphs, FB likes, FB profile information, contact information, FB text and media posts). They analyzed the gathered data to distil the chosen profiles (of ambassadors but also from friends of ambassadors based on the social graph/friends list of the ambassador).

By providing his data for this campaign, not only Karl received an advertisement and an invitation for whisky tasting, but also his father, John, and some of his friends. Karl received also a free bottle of whiskey when he would go to the whisky tasting.

John, Karl's Father, was not at all happy with the personalized advertisement as he was currently kicking the habit of drinking. This wasn't his first encounter with unwelcome advertising. Just a while ago, when John was shopping in the local Carrefour, he got notifications from the shop's iBeacon-enabled mobile application giving him reduction for some spirits. He therefore, contacted Lio and asked the organization to manage his personal data. First, he asked to get insight into the profiling that happened which led to the invitation for whisky tasting. After installing the Lio plug-in and thus allowing the Lio system to access historical data from his digital social footprint, he got useful insights (via enhanced visualizations) of the profiling activities and the different data sources that were combined to profile him. He also told his son Karl that he was behaving irresponsibly by being a brand ambassador for whisky and getting him into trouble this way and said he should quit this ambassadorship. In addition John totally opposed the idea of personal data being treated as a commodity, so he asked Lio if he could delete all his digital trails or at least stop the monitoring, tracking and thus, selling of these data. In any case he would be much more careful in his digital life, in order to avoid the commercial use of his digital footprint.

Karl was surprised to learn that his brand ambassadorship could have such a far-reaching impact. He was tempted to cancel his ambassadorship for whisky. Not only because of his father's problems but also because he was contacted by Lio recently. They alerted him that he had uploaded some pictures where Jack Daniels was positioned in a bad way.

Licensing personal data: monetization on observed and inferred data

Karl learned fast that the data gathered by the SmartWatch and Health book was perceived as relevant for lots of different companies. Lio provided him with the option to license his personal data. In this way Karl receives a greater control over who and which way his data is being used. He therefore decided to attach a license to the different types of data. In that way he didn't have to answer the questions of all the different companies to (re)use his data. He decided that, once anonymized, all non-profit and academic research institutes could use his data for free, but that all commercial organizations (pharmaceutical sector, insurances) had to pay for use. This way of using his information and the amount of money he would receive would depend on the type of data they wanted to use and they were always prohibited to use it for x.

Personal audience management platform

The friend of Karl, Victor, went even further: He decided to manage his audience, the people he thought essential to reach with his posts, by his own. As he had a high Klout ranking, he thought it to be totally realistic to earn quite some money with this. He therefore subscribed to Lio and enabled the supported personal audience management feature.

The above feature allowed Victor to get fruitful insights on how relevant his profile was for different stakeholders. Specifically, the Lio App based on his current social profile and digital footprint indicated that he could become a brand ambassador for not more than three different brands, highlighting the areas of gaming, music and extreme sports. Consequently,

Victor chose to become a brand ambassador for PlayStation, Coldplay and Red Bull. Victor further updated his Lio profile accordingly.

Upon that moment, Lio's audience management feature enabled Victor to identify, monitor, visualize and ultimately manage his audiences. Specifically, Lio provided Victor indicative metrics on his audience, in terms of amount of people (followers) influenced/affected by his social actions (e.g., posts, likes, etc.), the evolution of the latter audience segments over time and across various dimensions (e.g., age, gender, etc.). Such information was offered to Victor via Lio's sophisticated visualizations that allowed him to get tangible insights on his audiences. Furthermore, Lio visualized the relevance of different parts of Victor's existing audience.

This way, Victor was able to manage his audience in such a way that he didn't bother anyone (or he thought he didn't bother anyway) either explicitly, via allowing the monitor and collection of his actions/profile by specific stakeholders (e.g., the ones related to the brands he served as an ambassador), or implicitly, via his postings (and social actions in general). Furthermore, he had the feeling he had total control about the way his data was used by commercial companies and it felt like a right balance.

Towards increasing the volume of his audience related to the brands he was ambassador for, Victor started posting more on topics related to the them. For instance, he started posting regularly on the expected features of the upcoming PlayStation 8 and the delays in its release date.

After some time, Victor started getting some reduction vouchers for PlayStation games. He found out that he didn't get a clear view on which particular information and which amount of sharing made him eligible for receiving 'gifts'. What is more, he had never given his explicit consensus in any way towards receiving such "gifts". He just noticed that he got them from time to time!

Because of the latter "intrusive" outcome and hence, because Lio's audience management visualization indicated him that via increasing the frequency of posting information on specific issues didn't actually had an effect on his audience (i.e., to increase his audience as Victor believed would happen), he decided to just maintain the same frequency as before he became a brand ambassador. Eventually, Victor stopped receiving game "gifts".

5.2. User Stories

5.2.1. User Stories: "OSN Presence control (empowerment) tool"

To decide for every story: will we be able to create it, and if not, will we be able to simulate /mock it in a way it makes sense to the end-user?

In total three different software components will be created within the USEMP project:

- For user data collection:
  - a browser (e.g. Firefox) plug-in (e.g. Lio Plug-in)
  - an OSN-enabled application (e.g. a Lio Fb App)
- For enabling users to access USEMP features and services:
  - a web application (e.g. Lio Web App)
  - a mobile web application (e.g. Lio Mobile Web App)

The user searches online for a presence control tool	Feasible
The user finds the Lio tool online	Feasible
The user reads about the Lio tool online	Feasible

The user downloads the Lio data collector plug-in on her computer (Lio plug-in for free)	Feasible
The user installs the plug-in in all her web browsers (Chrome, Firefox) on (all) her computer(s) (Windows OS, MAC)	Feasible, but initially target one browser, one OSN (resource constraint)
The user accesses the Lio web App and logs-in to her Lio account (if a new user then she/he creates a new Lio account).	Feasible
The user logs-in via Lio web App (which also is an OSN-enabled app) with her OSN(s) account (e.g., FB).	Feasible
The user gives permission to Lio to access her OSN (e.g., FB) profile and Graph API information.	Feasible

The user accesses the Lio Mobile Web App on her smart phone (Android, iOS)	Feasible

The user logs in on Lio Mobile Web App from her smart phone	Feasible for visualization and interaction but not for the browsing data collection

The user arrives at the homepage of Lio. She sees a high-level visualization of her personal data trails	Feasible
The user zooms in on the visualization of her personal data trails, being able to filter the latter in various dimensions (e.g., time, sensitivity, etc.)	Feasible
The user sees the different companies and organizations (that FB has a contract with) that use/have access to her observed, behavioral and inferred data in a visual attractive way	only possible with synthetic data or unless Facebook is forced to give us access to the list of third parties they work with
The user swipes the screen in order to navigate through Lio features such as: 'Profile', 'PD control', 'Future Control', 'Settings', …	Feasible

The user selects 'PD control'	Feasible
The user is able to visualize her digital trail in intuitive infographics	Feasible
The user gets a list of different types of Privacy-sensitive Dimensions: Sexual orientation, Political preferences, Religion, etc.	Feasible
The user selects 'sexual orientation' and gets an overview of a) a probabilistic estimation of profiles used by different actors to target or accommodate her and potentially b) different categories of institutions/organisations that may be interested in such privacy-sensitive dimensions.	Feasible for point a), not feasible for point b) unless Facebook is forced to give us access to the list of third parties they work with
The user sees which parties that have access/use her personal data are also tracking (profiling) on this privacy-sensitive dimension	Not feasible at the moment. Would become

	feasible if Facebook is forced to give us access to the list of third parties they work with
The user can -for every party that have access/use her personal data- dis/enable to get tracked with respect to that privacy-sensitive dimension	Under current regulation, feasible as a simulated functionality. The other option is for the user to remove/change visibility of content for each item
At the bottom she also defines to apply these settings as generic policies that will affect (be applied) all future institutions/organisations belonging to one of the categories.	Under current regulation, feasible as a simulated functionality.
The user clicks on the home button and returns to the a high-level visualization of her personal data trails	Feasible

The user clicks on the ‘profile’ button	Feasible
The user gets insights of the different companies and organizations that are profiling her	only possible as mock-up
The user clicks on the icon of the shop named ‘Colruyt’ (where she does her weekly shopping)	only possible as mock-up
The user sees the probabilistic estimation of the way she is profiled by ‘Colruyt’	only possible as mock-up
The user wants to change what personal data is available for Colruyt and clicks on the ‘Data control’ button	only possible as mock-up
The users sees an overview of the different options she has to control her digital trails: permission revocation, PD data removal, Copy settings	only possible as mock-up

The user clicks on ‘Permission Revocation’ and sees a graph of	only possible

what personal data she is sharing with Colruyt	as mock-up
The user creates in a visual programming way rules (privacy policies) to define what type of information may be used by Colruyt and under what conditions.	only possible as mock-up
The user can choose in the next window which data may be available for Colruyt	only possible as mock-up
The user returns to the estimates profile by Colruyt	only possible as mock-up
The user now sees how her estimated profile has changed	only possible as mock-up
The user clicks on the home button and returns to the visualization	Feasible

The user clicks on 'Show permissions' and sees the rules that she created related to the use of her personal data	Feasible
The user selects one rule and changes it to another setting (e.g. from 'free use' towards 'free use for non-commercial'	Feasible
The user saves the rule	Feasible
The user looks at the overview of the rules	Feasible

The user clicks on 'future control'. Here she can allow Lio to notify her when she's about to release sensitive information of her choosing (Auditing)	Feasible
The user creates in a visual programming way rules to define when she wants to get notifications (real-time) when her online behavior influences the way she is profiled on different privacy-sensitive dimensions	Feasible
The user creates rules (where, when, how long the rules have to be active)	Feasible
The user saves the rules	Feasible
The user checks if the rules are saved in the defined way	Feasible

The user submits a picture on FB	Feasible
The user sees a pop-up, in a non-intrusive manner in terms of frequency, from Lio that tells her she is going to submit information that will influence one of her privacy dimensions (e.g., sexual orientation), based on privacy priority, sensitivity and importance	Feasible

rules	
The user is proposed to select between ‘not submitting the post’, ‘obscuring the post’, ‘post picture from other application’	Feasible
The user selects ‘obscure the post’ and submits the picture	Feasible
The user looks at how the picture was submitted and is happy	Feasible

5.2.2. User Stories: "Economic Value Awareness"

To decide for every story: will we be able to create it, and if not, will we be able to simulate /mock it in a way it makes sense to the end-user?

In total three different software tools will be created within the USEMP project:

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  - an OSN-enabled application (e.g. a Lio Fb App)
- For enabling users to access USEMP features and services:
  - a web application (e.g. Lio Web App)
  - a mobile web application (e.g. Lio Mobile Web App)

Some months ago Karl installed the Lio plug-in, Lio FB App and Lio Web & Mobile App in his systems. He liked the visualization of his digital trails and looking at the estimations of profiles he was placed into by different actors in the network (=empowerment scenario).

The user arrives at the homepage of Lio web application and logs-in with his Lio credentials. He sees a high-level visualization of his personal data trails.	Feasible
The user zooms in on the visualization of his personal data trails, being able to filter the latter in various dimensions (e.g., time, sensitivity dimensions, etc.)	Feasible
The user is able to see the estimations of profiles (and/or profile segments/categories) he is placed into by different actors in the network.	Feasible with simulated actors
Another feature he likes is the games that he can play. By playing the game he helps people who want to obscure their post, or cuts out part of the picture. He earns points with it.	Feasible in a simple manner
Another game is a quiz where he can guess what 3rd parties could infer from his online data. By playing the game he learned about his digital traits and could potentially implicitly intervene in the way he was profiled by others.	Feasible
His friend has sent him a request for re-use of his privacy configuration settings. As he is known as somehow ICT skilled and privacy aware, friends wanted to take over his configurations. He accepts the request.	Feasible

On the Homepage of the Lio Web App the user clicks on 'Your personal data value'	Feasible
The user sees enhanced Lio visualisation via which a) he could gain useful insights on the value of his digital data and social footprint that he either directly shared in social networks (e.g., Likes of FB) or were indirectly collected by various network actors that track his	Feasible with simulated actors

activities on his web browser.	
He looks at it and requests more insights	Feasible
The user is shown some profile categories that Lio thinks he is interested in (e.g., brands or activities). The user can click on these categories and delete specific profile attribute topics or acknowledge/refine his interest in a topic.	Feasible with simulated actors

The user can also search on the brands and topics he is interested in to find his personal interests.	Feasible with simulated actors
The user selects the brands and topics he is more interested in.	Feasible with simulated actors
The user gets presented a list of possibilities to validate his data: brand ambassadorship, scientific research, citizen engagement.	Feasible with simulated actors
The user clicks on Brand ambassadorship and gets presented again with his interest lists: technology, music, sailing, whiskey, photography, clothing, etc.	Feasible with simulated actors
The user clicks on whiskey and sees the brands that have contacted Lio to get access to its database	Feasible with simulated actors
The user sees whiskey brands and can choose one for which he can become a brand ambassador	Feasible with simulated actors
The user highlights Johnny walker	Feasible with simulated actors
The user returns to the Brand Ambassadorship page and sees that he can still become BA for two more brands of his choice	Feasible with simulated actors
The user clicks on cameras and is delighted to see that he can become a BA for his favourite brand: Sony.	Feasible with simulated actors

The user clicks on ‘Profiles’	Feasible

The user gets an overview of different topics on which he might be tracked (Socio-demographics, Personality traits, Interests, …)	Feasible
The user is very interested to see how his socio demographics are estimated and how close they are to the reality and clicks on this topic.	Feasible
He gets estimated insights for his age, gender, ethnicity, nationality, sexual preference, professional background, political preference, …	Feasible with the features defined in WP6
He returns to the previous screen and clicks on Personality traits	Feasible
He gets estimated percentages for openess, neuroticity, …	Feasible with the features defined in WP6

The user returns to the Brand Ambassadorship page and sees that he is now presented with two new buttons: one for each brand.	Feasible
The user clicks on the Sony Camera-button	Feasible
He is presented with the value of his BA for Sony Camera's, a settings button, …	Feasible
He can enter his email address in order to receive surveys where he can participate in, advertisements for workshops on Sony camera's, vouchers for a free SD card, …	Feasible in principle but the simulation will no go as far as that. Beyond the immediate scope of USEMP.

The user returns to the homepage of the Lio-web application	Feasible
The user clicks on PI control	Feasible
The user clicks on Personal Data Licensing	Feasible with simulated actors
He gets a list of actors that might be interested in his data: non-profit organizations, research institutions, commercial organizations	Feasible with simulated

	actors
He clicked on the Open Knowledge Foundation NGO	Feasible with simulated actors
He decided that they could use the sensor data from his smart phone whenever he was connected to a Wi-Fi network with it for free and returned to the previous screen	Not feasible
He clicked on the research institution on Alzheimer disease and there he configured that they always ask him to share certain types of information if they needed some	Not feasible
He clicked on Commercial organizations	Feasible with simulated actors
The user gets an overview of different topics on which these organizations might find useful (Socio-demographics, Personality traits, Interests, …)	Feasible with simulated actors
The user clicks on socio-demographics	Feasible with simulated actors
He gets estimated insights for his age, gender, ethnicity, nationality, sexual preference, professional background, political preference, …	Feasible with simulated actors
He decides for each of these traits for which actors (that have a contract with Lio) they could become available and looks at how much value this data received.	Feasible with simulated actors

When the user encounters his dad, his dad tells him he was spammed with ads for spirits and that he didn't want this	Feasible with simulated actors
The user browses to the Personal Audience Management Panel of the Lio Web App.	Feasible with simulated actors
He gets graphics on who is influenced by his posts, how his audience evolves, the segmentation of his audience. He sees his father was divided in the group of 'having interest in drinks'	Feasible with simulated actors
The user takes his father out of this group.	Feasible with simulated actors

The user uploads a picture with a bottle of Johnny Walker	Feasible
Lio user gets a pop-up from Lio that this was his x-th post about whiskey in one week and that this commodification of his PI was not being encouraged through more value, …	Feasible

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