D2.1 DID user interface technical description and mock-up (version 2)

WP2 Digital Interaction Data Platform – T2.1 Development of the DID user interface

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ABBREVIATIONS

Acronym	Acronym Meaning
AWS	Amazon Web Services
DID	Digital Interaction Data
GUI	Graphical User Interface
HCI	Human Computer Interaction
UCD	User Centred Design
UI	User Interface
UX	User Experience
UXD	User Experience Design
WP	Work package

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1. INTRODUCTION

The overall objective of Task 2.1 is to provide the technical description and the development of the DID (Digital Interaction Data) user interface, taking into account the user's needs. The user interface must be simple, intuitive and adaptable to changing end-users' abilities and requirements. In order to accomplish the scope of the deliverable during this task we designed the mock-ups for each component of the SoMeDi platform.

The current deliverable D2.1 aims at examining aspects related to visual design and developing a usable, accessible and easy to use visual interface. This involves comprehensive research on user experience design, therefore introducing applicable modern usability concepts into the project domain.

Deliverable D2.1 had two iterations with the objective to have a SoMeDi interface totally adapted to the needs of the project: the first one had deadline in M11 of the project (in order to have a first front-end to start working with) while the second one has deadline in M18 of the project (where the final front-end design for SoMeDi platform will be delivered).

This current deliverable represents the second iteration of D2.1 and covers theoretical aspects of designing a user friendly interface, presents the general layout and a new version for mock-ups, taking into account the users' feedback.

This second iteration of D2.1 document is organised as follows:

- Section 2 describes methodological approach for defining an user-friendly interface
- Section 3 presents an introduction in User Experience: concepts, general principles, user-centred design
- Section 4 describes the Visualization techniques that will be used when defining the dashboard of DID
- Section 5 presents which tools we use for creating the mock-ups and for design
- Section 6 is focused on the evaluation of usability by presenting methodological approach for testing user interface
- Section 7 presents the layout design and the secondversion of wireframes
- Section 8 concludes the document
- Annex 1 Questionnaire for evaluation

2. METHODOLOGICAL APPROACH FOR DEFINING AN USER-FRIENDLY INTERFACE

The goal of User Interface (UI) design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals. The design process must balance technical functionality and visual elements to create a system that is not only operational but also usable and adaptable to changing user needs.

In order to identify and evaluate statements about user interface design we conducted a targeted literature review that helped us to define a set of techniques for description of usability requirements and goals relevant to the SoMeDi platform. Research was mainly realised by literature review based on keywords such as: usability, accessibility, GUI (Graphic User Interface), UCD (User Centred Design), user interface design performances, HCI (Human Computer Interaction), Visual Design. Case reports, guidelines, analyses and usability testing models were also retrieved. The collection and analysis of data was a continuous process, in which the collected data itself influenced further research.

The literature research revealed that is recommended to follow a User Centred Design approach when defining the user interface.

User Centred Design (UCD) is a process or set of techniques that can be used to create a usable system. It is a user interface design process that focuses on usability goals, user characteristics, environment, tasks and workflow in the design of an interface. The process is an iterative one, where design and evaluation steps are built-in from the first stage of the projects, through to implementation.[1] In UCD, all "development proceeds with the user as the centre of focus." [2]

The User Centred Design Process is an approach to an interactive system development that focuses specifically on the usability of the systems. “It is a multi-disciplinary activity.”[3] The international standard 13407 is the basis for many User Centred Design methodologies[4]. According with this standard, before the actual design of the User Interface there are several steps that must be taken. This workflow is already familiar and applied in industry for UI design.

User centred activities take part during the whole design and development process, from concept development to final testing and beyond, during support and maintenance.

FIGURE 1 UCD SCHEMA

The analysis part is the base of the User Centred Design Process. In this step, the objectives, goals and vision of the project are established. Once these options are set, the challenges and constrains must be understood, in order to have a clear image of the whole

[1] Shawn Lawton Henry and Mary Martinson, Accessibility in User-Centred Design
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design process. For having a successful User Centred Design, the main characters that have to be taken into consideration are the users themselves. Thus, the users must be split into categories that will be written into a category list. Each user must have a profile so that, based on the profile characteristics, the User Interface can be adapted to these specific characteristics. In a User Centred Design Process user personas also help with the type of User Interface that must be designed. These personas are fictional characters that have a specific name, age, gender, occupation and specific personal traits and personality.

After the user details are done, a list of tasks that the users must complete is set just to check how the UI will function. Based on the time and difficulty of the task, the final design will be successfully implemented and it will be user-friendly. Besides the tasks, a set of scenarios can be written to help the users complete their tasks during the user tests.

The designing of the User Interface can start once the Analysis is complete. The first designs are concepts based on the analysis. In the conceptual mock-ups, the navigation of the application's sections, detailed design, like buttons, colour palette, pictures and icons that are easily recognisable by the users, are developed. After the conceptual design is developed, the mock-ups are transformed into functional prototypes that must be evaluated.

In the evaluation phase, there are Heuristic Evaluations – that focus on identifying the problems associated with the UI. In Heuristic Evaluations the experts test the UI against a set of rules and the usability principles that are set down by the industry. The experts are guided by the designer on how to use the UI with the help of the design walkthroughs (or cognitive walkthroughs). After the experts' input on the UI, there is a first iteration back to the design phase, in which the user corrects the eventual errors that the experts discovered in the Heuristic Evaluations. After this, the user testing starts, where test subjects are recruited and start testing the UI based on the scenarios and the task lists. Once users' input is completed, the designer corrects and adapts the UI.

Once the evaluation phase is completed, the implementation of the application can start. The UI will be programmed and the application is deployed and ready to be used.

We had performed a functional analysis, starting from the use cases, functional and non-functional requirements presented in deliverable "D4.1 Use cases and demonstrators definition". A detailed description of it is covered in section 7 of the current deliverable. Based on the functional analysis and on the user feedback to the first version of wireframes, we designed the second version of user interfaces.

3. USER EXPERIENCE

This section depicts a study about the features of the user experience (UX). Firstly, the section shows the definition of the user experience indicating its characteristics. Two parts essential in the user experience are the usability and the accessibility which will be explained. It also includes an evaluation about the User Experience metrics.

Once these concepts have been understood, the User Experience Design (UXD) will be explained. This concept is needed since it offers a methodology for creating a User Experience, trying that the implementation of the services and the delivery of the concepts can be accepted for the user from the first moment. In addition, the elements of the user experience have been indicated.

On the other hand, the contextualization plays an important role in the User Experience, thus this section will show its characteristics and the tools which can be used.

3.1. INTRODUCTION

The user experience (UX) is the totality of the end user's perceptions as they interact with a product or service. These perceptions include effectiveness (how good is the result), efficiency (how fast or cheap is it), emotional satisfaction (how good does it feel), and the quality of the relationship with the entity that created the product or service (what expectations does it create for subsequent interactions)

This definition attempted to transcend ergonomic, attitudinal, and visual metrics to include all facets that an audience considers relevant to an experience. The goal is to align developers' understanding of the role a product plays in a person's life with how that person perceives the design of that product.

Some people distinguish between the terms usability and user experience. Usability is usually considered the ability of the user to use the thing to carry out a task successfully, whereas user experience takes a broader view, looking at the individual's entire interaction with the thing, as well as the thoughts, feelings, and perceptions that result from the interaction [1]. For that reason usability is related with UX.

Usability is defined by 5 quality components [2]

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
- **Efficiency:** Once users have learned the design, how quickly can the perform tasks?
- **Memorability**: When users return to the design after a period of not using it, how easily can they re-establish proficiency?
- **Errors**: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- **Satisfaction**: How pleasant is it to use the design?

3.2. ACCESSIBILITY

The accessibility [3] is part of the UX. Accessibility enable people with disabilities to perceive, understand, navigate, interact with, and contribute to the web.

The accessibility not only benefits the people who have a disability (visual, auditory, physical or motor, cognitive or neurological) but also benefits all kinds of people, such as people who have problems related with the aging, or people who have an unfavourable situation:

- Elderly users who present different problems related to the aging, such as visual, memorial or coordination problems.
- Users with transitory inability.
- Users who are affected by the environment such as low illumination, noisy places, and confined spaces.
- Users with limited equipment or connections.
- Old navigators with lacking support for new technologies.
- Users who don't master the language, for foreign language or for low cultural level.
- Inexpert users or users who present insecurity with the use of electronic devices.

The World Wide Web Consortium (W3C) is an international community that developers standards for the web.

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect"

(Tim Berners-Lee, W3C Director and inventor of the W3C)

The W3C recognizes the access to Information and Communications Technology (ICT) as a basic human right. As an effort to improve accessibility, the W3C launched the Web Accessibility Initiatives (WAI) in 1997. The WAI provides guidelines, standards and techniques for accessibility.

The WAI has created three core guidelines for the web:

1. Web Content Accessibility Guidelines (WCAG)
   Addresses the information in a web site, including text, images, forms and sounds.

2. Authoring Tool Accessibility Guidelines (ATAG)
   Addresses software that creates web sites.

3. User Agent Accessibility Guidelines (UAAG)
   Addresses Web browsers and media players, and relates to assistive technologies.

Web Content Accessibility Guidelines 2.0 has a set of design principles, guidelines and techniques. It is created for UX and web designers, content creators, and developers.

1. Principles
   The top layer of guidance is four principles that provide the foundation for Web accessibility: Perceivable, Operable, Understandable, and Robust (POUR)

2. Guidelines.
   Under the principles are guidelines. The 12 guidelines provide the basic goals that designers should work toward in order to make their designs more accessible to users with different disabilities.

3. Success criteria
   Each guideline has a set of testable success criteria to verify accessibility for a web application or website.

4. Sufficient and Advisory Techniques
   For each of the guidelines and success criteria, there are a wide variety of techniques which fall into two categories.
   1. Those that are sufficient for meeting the success criteria

2. Those that are advisory

3.3. Principles And 12 Guidelines About Accessibility

The following four principles: Perceivable, Operable, Understandable and Robust (POUR), are easy to implement, and they will help you remember to design for accessibility whenever possible.

Principle 1: Perceivable – "Information and user interface components must be presentable to users in ways they can perceive."

- Guideline 1.1 Text Alternatives: Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.
- Guideline 1.2 Time-based Media: Provide alternatives for time-based media.
- Guideline 1.3 Adaptable: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.
- Guideline 1.4 Distinguishable: Make it easier for users to see and hear content including separating foreground from background.

Principle 2: Operable – "User interface components and navigation must be operable."

- Guideline 2.1 Keyboard Accessible: Make all functionality available from a keyboard.
- Guideline 2.2 Enough Time: Provide users enough time to read and use content.
- Guideline 2.3 Seizures: Do not design content in a way that is known to cause seizures.
- Guideline 2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.

Principle 3: Understandable – "Information and the operation of user interface must be understandable."

- Guideline 3.1 – Make text content readable and understandable.
- Guideline 3.2 – Make web pages appear and operate in predictable ways.
- Guideline 3.3 – Help users avoid and correct mistakes.

Principle 4: Robust – "Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies."

- Guideline 4.1 – Maximize compatibility with current and future user agents, including assistive technologies.

Our goal is to develop the SoMeDi's user interface in a way that allows all types of users to access platform's functionalities - even those with disabilities - so we shall design the UI following the above listed guidelines.

3.4. User Experience Metrics

A metric is a way of measuring or evaluating a particular phenomenon or thing. The user experience has the following metrics: Task success, user satisfaction, and errors, among others. Using the same set of measurements each time something is measured should result in comparable outcomes. All UX metrics must be [1]:

a) *Observable* in some way, either directly or indirectly. This observation might be simply realising that a task was completed successfully or noting the time required to complete the task

b) *Quantifiable*, they have to be turned into a number or counted in some way. All UX metrics also require that the thing being measured represent some aspect of the user experience, presented in a numeric format. For example, a UX metric might reveal that 90 % of the users are able to complete a set of task in less than 1 minute or 50 % of users failed to notice a key element on the interface.

c) *Effective:* being able to compare a task.

d) *Efficient:* the amount of effort required to complete the task.

e) *Satisfactory:* the degree to which the user was happy with his or her experience while performing the task.

Types of Data

There have been identified four types of data in UX metrics: nominal, ordinal, interval and ratio. Each type of data has its own unique characteristics and, most importantly, supports specific types of analyses and statistics. It is important knowing what type of data will be used when is collected and analysed user experience data [1].

NOMINAL DATA

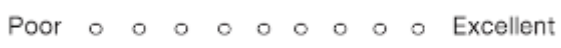
In user experience, nominal data might be characteristics of different types of users, such as Windows versus Mac users, users in different geographic localization, or female vs male. These are typically independent variables which allow to segment data by these different groups. Nominal data also include some commonly used dependent variables, such as task success, the number of users who clicked on link A of link B, or users who chose to use a remote control instead of the controls on a DVD player itself.

ORDINAL DATA

In user experience, the most common examples of ordinal data come from self-reported data. For instance, a user might rate a website as excellent, good, fair or poor. The most common way to analyse ordinal data is by looking at frequencies. For example, reporting that the 40% of the users rated the site as excellent, the 30% as good, 20% as fair, and 10% as poor.

INTERVAL DATA

Interval data allows calculating a wide range of descriptive statistics. There are also any inferential statistics that can be used to generalize about a larger population. It provides many more possibilities for analysis than either nominal or ordinal data. The following figure is an example of the interval data.



RATIO DATA

Ratio data are the same as interval data but with the addition of an absolute zero. This means that the zero value is not arbitrary, as with interval data, but has some inherent meaning. With ratio data differences between the measurements are interpreted as a ratio. Examples of ratio data are age, height and weight. In each example, zero indicates the absence of age, height, or weight.

In user experience, the most obvious example is time. Zero seconds left to complete a task would mean no time or duration remaining. Ratio data allow to say something is twice as fast or half as slow as something else. For example, permit to establish that one user is twice as fast as another user in completing a task.

There are not many additional analyses for do with ratio data compared to interval data in usability. One exception is calculating a geometric mean, which might be useful in measuring differences in time.

During evaluation of DID user interface process we shall use user experience metrics, by analysing statistics provided by ordinal data and interval data.

Descriptive Statistics

Descriptive statistics are essential for any interval of ratio-level data. The most common types of descriptive statistics are measures of central tendency (such as the mean), measures of variability (such as the standard deviation), and confidence intervals [1].

MEASURES OF CENTRAL TENDENCY

Measures of central tendency are simply a way of choosing a single number that is in some way representative of a set of numbers. The three most common measures of central tendency are the mean, median and mode.

MEASURES OF VARIABILITY

Measures of variability reflect how much the data are spread or dispersed across the range of values. In most usability studies, variability is caused by individual differences among the participants. There are three common measures of variability: range, variance, and standard derivation.

CONFIDENCE INTERVALS

A confidence interval is an estimate of range values that includes the true population value for a statistic, such as mean.

3.5. USER EXPERIENCE DESIGN (UXD)

User experience design [5] is the process of enhancing user satisfaction with a product by improving the usability, accessibility and pleasure provided in the interaction with the product. User experience design encompasses traditional human-computer interaction (HCI) design, and extends it by addressing all aspects of a product or service as perceived by users. UX designers focus on the structure and layout of content, navigation and how users interact with them. The types of deliverables they produce include site-maps, user flows, prototypes and wireframes, which are more focussed on the underlying structure and purpose of the software.

User Experience design most frequently defines a sequence of interactions between a user (individual person) and a system, virtual or physical, designed to meet or support user needs and goals, primarily, while also systems requirements and organizational objectives .

Typical outputs include:

- Person (an archetypal user for whom the product or service is being designed).
- Wireframes (screen blueprints or storyboards).
- Prototypes (for interactive or in-the-mind simulation).
- Written specifications (describing the behaviour or design), e.g. use cases.
- Site audit (usability study of existing assets).
- Flows and navigation maps.
- User stories or scenarios.
- Sitemaps and content inventory.
- High-fidelity visual mockups (precise visual layout and design of the expected product or interface.

The role which is executed by the Designer of user experience can be considered like communicative process, where the designer is an intermediary between:

- The communicative needs which are established by the person or institution that request the product (clients)
- The informative and functional needs of the persons that will use the product (users)

Therefore, the function of the UX designer is to achieve a balance between clients and users. The following figure represents the characteristics of the successful designer.

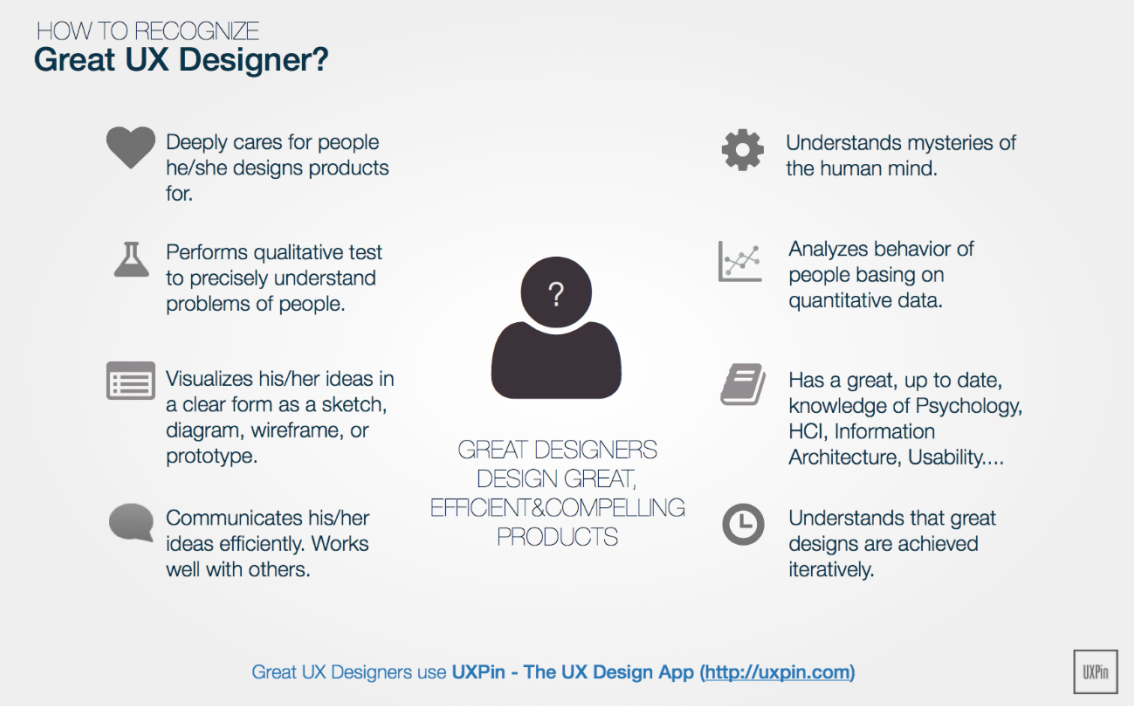


FIGURE 2 FEATURES OF THE SUCCESSFUL UX DESIGNER

The Elements of User Experience

There are five planes [8] which form the elements of User Experience. These five elements a:

1. strategy
2. scope
3. structure
4. skeleton
5. surface

On each plane, the issues we must deal with become a little less abstract and a little more concrete. The lowest plane does not contain information about the final shape of the site, it provide how the site will fit into the strategy, meeting the needs of the users. The highest plane focuses the concrete details of the appearance of the site. Plane by plane, the decisions have to be more specific and involve finer levels of detail, thus each plane is dependent on the plan below.

The web was originally concerned as a hypertextual information space, but the development of increasingly sophisticated front- and back- end technologies has fostered its use as a remote software interface. The software side is focused in the tasks, the stages involved in a process and how people think about completing them. It considers the site as a tool or set of tools that the user employs to accomplish one or more tasks. The hypertext side is focused in the information, what information the site offers and what it means to the users. Hypertext is about creating an information space that the users can move through.

In the Figure 3, on the left, appear the elements which specify the Web as a software interface, while on the right, appear the elements specific to hypertext information spaces.

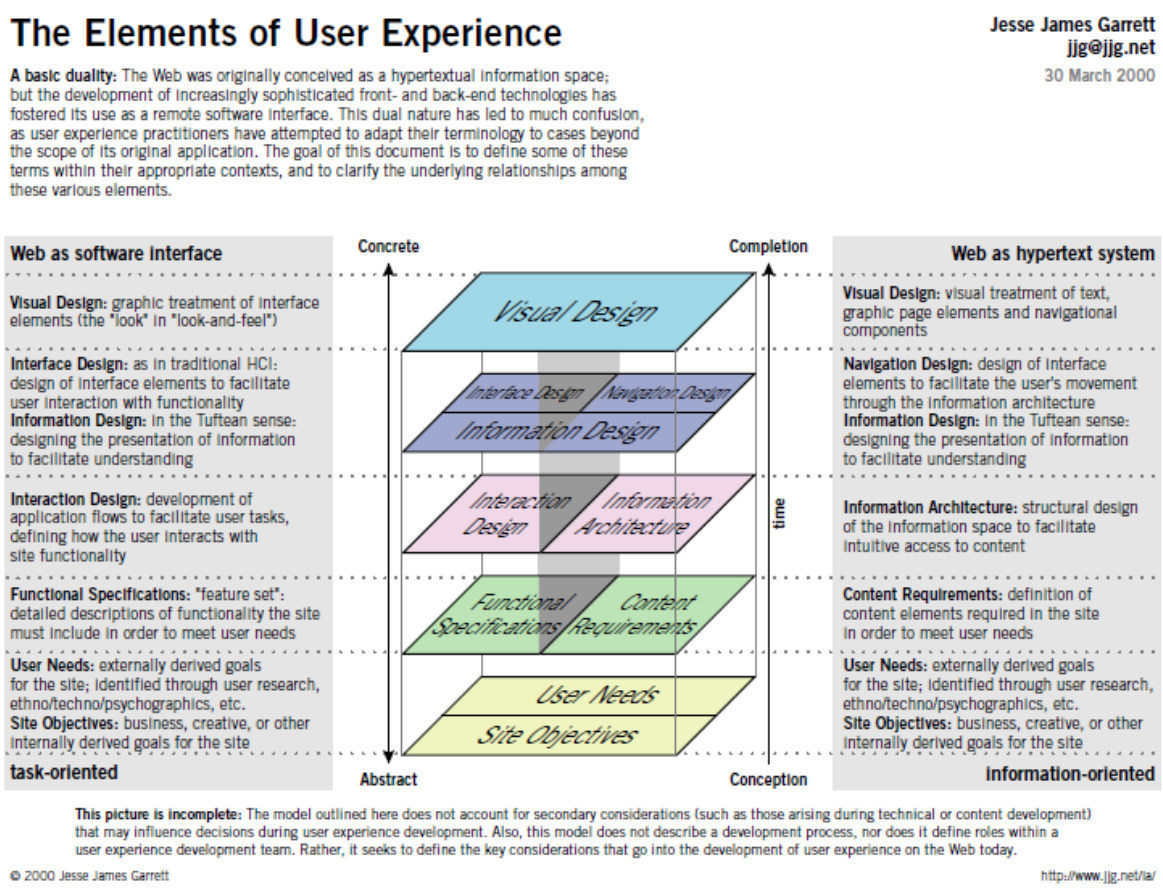


FIGURE 3 ELEMENTS OF USER EXPERIENCE

The strategy plan

User needs are the goals for both software products and information spaces. User needs are the goals for the site that come from outside the organization, specifically from the people who will use the site. It is important to understand what the audience wants.

The scope plans

On the software side, the strategy is translated into scope though the creation of functional specifications: a detailed description of the “feature set” of the product. On the information space side, scope takes the form of content requirements: a description of the various content elements that will be required.

The plan’s structure

The scope is given structure on the software side through interaction design, in which it is defined how the system behaves in response to the user. For information spaces, the structure is the information architecture: the arrangement of content elements within the information space.

The information architecture (IA) and the Interaction Design (IxD) are an important part of the User Experience Design.

- The information architecture is the art and science of structuring and organizing information environments to help people effectively fulfil their information needs [6].
- Interaction Design is the practice of designing interaction between the user and products and exploring how the user interacts with it. Rather than analysing how things are, interaction design synthesises and imagines things as they could be. While interaction design is geared toward satisfying the majority of users, in software engineering field is focused on designing for technical stakeholders [7].

The skeleton plane

The skeleton plane breaks down into three components:

a) the information design, the presentation of information in a way that facilitates understanding
b) the interface design, on arranging interface elements to enable users to interact with the functionality of the system
c) the navigation design, the interface for an information space, the set of screen elements that allow the user to move through the information architecture.

The surface plan

It is the visual design, or the look of the finished product.

CONTEXTUALIZATION

To succeed in today's digital environment, companies must deliver smarter, more customer-centric interactions that feel like they were tailored for each user and his or her specify set of circumstances. That is why firms need to evolve their thinking to focus on contextualization, which Forrester [9] defines as:

A tailored, adaptive, and sometimes predictive digital customer experience

Contextualization combines and extends existing segmentation and personalization techniques with in-the-moment details. This enables more-dynamic, more-predictive experiences by processing explicit and implicit user information. For these reasons contextualization plays an important role in the User Experience.

Three key types of data inputs, which occur at both the aggregate and individual level, power contextualization.

- **Profile: Who the customer is.**
  It is important for the companies to understand their target audience members and their behaviours, for example, how they interact with the digital channels, where they live, their key concerns, and their knowledge of subject matter.

- **Historical data**
  Customers leave many markers when they interact with a company, including a record of web pages that they visited and the purchases that they made. Through understanding where the customer has been, you can anticipate their questions and predict future actions.

- **Situational data**

What is happening with the customer now. Factors such as time of day, geographic location, device, browser, and even weather indicate a user's current situation. Organizations can use this data to help predict what an individual may be trying to achieve at a given point in time.

INPUTS	DESCRIPTION	AGGREGATE	INDIVIDUAL
Profile	Who the customer is	Personas	Country, language, age
History	What the customer did in the past	Journey maps	Product history, service history
Situation	What is happening with the customer now	Point in customer journey	Location, device, time of day, entry point, clickstream, point un customer journey

Contextual interactions manifest themselves in a number of ways, including:

- **Right-sized content and functionally.**

Users do not want (or need) every piece of content everywhere. For example, it is not necessary that the mobile site provide the same level of details as its website. Usually, the mobile sites focus on details that they are essential. For example, in Amazon's mobile site does not appear an editorial review or author information for books, only appear the price and details needed to make a decision.

- **Adjacent content**

The path that a user takes through a site or application reveals what they are interested in. Companies can combine this information with relevant data to deliver related content specific to the browsing patterns of users.

- **Adaptive design**

When a company needs to support users across devices with highly varied display characteristics is important to adapt to each need.

Contextualization Parameters

These parameters define changeable features that affect in the way to perceive the information by the user, therefore, for achieve a successful UX design is necessary keeping in mind these parameters.

- **Localization:**

Localization technologies have developed since there are several networks in which the users connect it and for the use of multiple devices. The localization with the best accuracy is the GPS (actually the majority of the smart devices have this technology), which is combined with Wi-Fi and cells in order to achieve more precision. In PC environment the user IP can offer the localization.

- **Date and Time:**

The web communication requires to the request from client until server, these requests are realised in a specific time which can be stored by the server.

- **Session time:**

The session time information is a configurable parameter on the server side, its utility is to secure that the session is closed in a specific time, preventing that the session is opened indefinitely. For the system, the session can offer the amount of time in which the user is connected to the service.

- **Browser:**

There are several browsers in the market thus is necessary having in mind this variety in order to adapt the contents, using the advantages and avoiding the disadvantages for each browser.

The information of the browser can be obtained through the HTTP request realized to the server. Figure 4 shows the head of the HTTP request and the data of the browser.

GET /google.es HTTP/1.1
Host: google.es
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:27.0) Gecko/20100101 Firefox/27.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,/*;q=0.8*
Accept-Language: es-ES,es;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive

FIGURE 4 HTTP REQUEST IN A FIREFOX BROWSER

With the User-Agent parameter is possible to obtain information about the browser and the operating system which is useful in order to offer adaptable contents for the user.

- **Device:**

The information obtained through the device used by the user for connecting is very important.

At the beginning of the use of mobile phones with connectivity to internet was habitual to see the UA-Profile parameter in the header of the HTTP request. This parameter contains the URL of the XML of the terminal's profile that make the request. This XML contains the features about the device, in order to offer different content depending on these characteristics. In addition, the UA-Profile was used to generate adaptable applications respect to the terminals. More than that, if the terminals have different operating system - for example, Apple and Android terminals – the request is redirected to different shops from where each terminal downloads their owners applications for their OS.

Therefore, in an IOS or Android request appear changes in the User Agent which will indicate the OS of the terminal.

Figure 5 and figure 6 below depict the request in one Android device and in one IOS device.

```
GET / HTTP/1.1
Host: 192.168.3.10:8080
Connection: keep-alive
Cache-Control: max-age=0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Linux; Android 4.4.2; XT1032 Build/KLB20.9-1.10-1.9)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/32.0.1700.99 Mobile Safari/537.36
Accept-Encoding: gzip,deflate,sdch
Accept-Language: es-ES,es;q=0.8,en;q=0.6
If-None-Match: W/"7777-1322475648000"
If-Modified-Since: Mon, 28 Nov 2011 10:20:48 GMT
```

FIGURE 5 HTTP REQUEST IN ANDROID DEVICE

```
GET /tomcat.gif HTTP/1.1
Host: 192.168.3.10:8080
Referer: http://192.168.3.10:8080/
Accept-Encoding: gzip, deflate
Accept: */*
Accept-Language: es-es
Connection: keep-alive
User-Agent: Mozilla/5.0 (iPhone; CPU iPhone OS 7_0_4 like Mac OS X)
AppleWebKit/537.51.1 (KHTML, like Gecko) Version/7.0 Mobile/11B554a Safari/9537.53
```

FIGURE 6 HTTP REQUEST IN IPHONE DEVICE

- **Language:**

It is habitual that the user configures the browser with the same language, this value is stored and it will be sent to the server, for example, with a HTTP request.

Accept-Language: es-ES,es;q=0.8,en-US;q=0.5,en;q=0.3

Accept Language field indicates the user prefers for receiving the information. The parameter q defines the acceptation grade from the other alternative language, being q=1 the value for defect. Furthermore, the field is defined like language-range which indicates the language and the localization, since the localization can change the language.

Analysing this example, the user prefers Spanish Language from Spain and general Spanish, then prefers English from United States in 80%, general English in 50% and the rest of languages in 30 %.

- **Use of digital content**

The information about the use of content offers different parameters such as what contents are the most visited or are the most consumed. In the web applications exist several tools in order to know the user's behaviours, while in the web contents is possible to adapt these, for achieve the biggest impact in the public.

The DID user interface will be design so that the content will be tailored on user profile: it will take into account user's location, the device used to access SoMeDi functionalities, the language settings, user's time zone.

User Feedback

The successful of the social network demonstrates that the users want to be part of the network and want to be heard, therefore is necessary to use tools which can obtain the user feedback in order to improve the user experience. There are a variety of ways for collecting feedback from users and customers:

CONTACT FORM

The contact form is a basic feedback, in which the user has to send his comment, complaint, etc. Usually, the contact form is used for settling incidents and support, since this kind of communication is one to one.

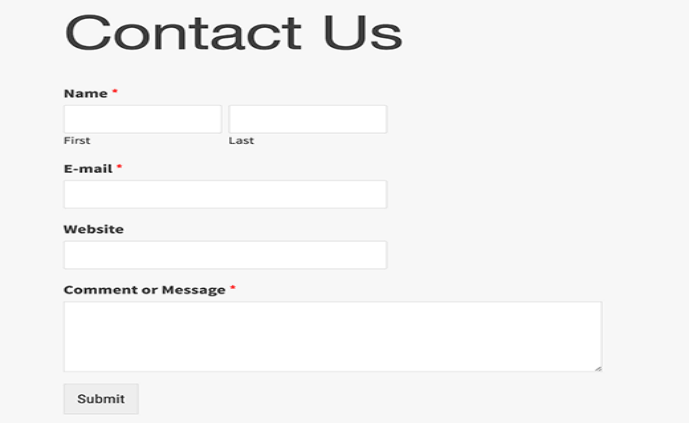


FIGURE 7 EXAMPLE OF CONTACT FORM

This simple and basic feedback form will be implemented in SoMeDi project

EVALUATION TOOLS

It is another popular method for collecting online feedback, frequently used among web shops. With this type of tool, it is possible send the customer an invitation in order to evaluate a specific product. The assessment often takes the form of a star rating from 1 to 5, and an open comment field. Here people can indicate how satisfied they are with the product or service. This evaluating tool is very important, since it is the main element which the users consult when they are going to purchase a product or service.

FIGURE 8 EXAMPLE OF EVALUATION TOOL

This type of evaluating tools (star rating from 1 to 5) is being replaced for other types less complex.

SIMPLE FEEDBACK TOOLS (LIKES)

Actually, the evaluating tools have been reduced a simple like, this option offers an option easier than other kinds of valuation, but thanks to its simplicity provide more valuations, since the user only has to indicate if he likes it or he does not like it. Here have been demonstrated that the simplest mechanisms are the most efficient. Two examples very representative which have this evaluating tool are Facebook and YouTube.

FIGURE 9 LIKE IN FACEBOOK

FAVOURITES

The use of favourites allows classifying the information for the user and providing information about the user's preferences. In this case the user has the option "Add to favourites" in order to connect this content to his user, using this list for provide similar contents for him.

FIGURE 10 OPTIONS IN TARINGA FORUM FOR THE CONTENTS

TOOLS FOR SHARE

Actually, all pages have the option to share its contents in the main social networks. This tool allows to connect the social network and publishing in the name of the user, therefore the people associate with this user can access to this contain, normally through the URL.

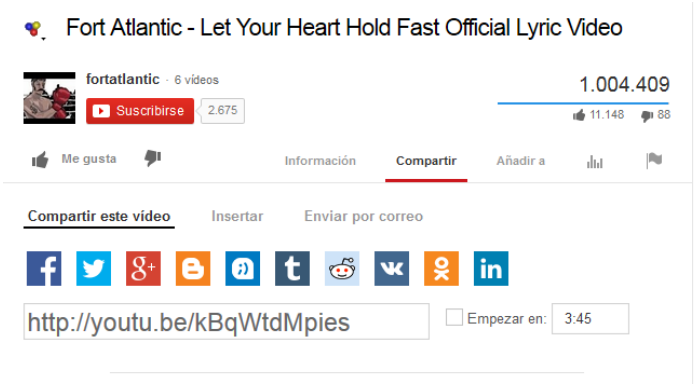


FIGURE 11 OPTIONS FOR SHARING VIDEOS IN YOUTUBE

Contextualization Tools

The tools of contextualization are several and variety, these tools can help in the user experience design stage, in the user outline, the active catching of the information and user feedback.

TOOLS FOR THE USER EXPERIENCE DESIGN

These tools are variable, depending on the economics and technological possibilities of the project. In the market there are different solutions, such as tools with a high cost and free tools.

The online survey is used for obtaining information about the users; there are tools that allow to design surveys in line and that the users answers in a remote way.

Two examples are the following:

- Survey Manager de Netquest (www.solucionesnetquest.com/survey_manager)
- E-encuestas (www.e-encuesta.com)

There are different applications which can be used for the content mapping such as:

- MindManager de MindJet (www.mindjet.com)
- CMapTools. (http://cmap.ihmc.us)
- Freemind (http://freemind.sourceforge.net)
- PowerMapper (www.powermapper.com)
- Xtreeme SiteXpert (www.xtreeme.com/sitexpert)

For the represent of contents the next tools are very accepted:

- Axure RP Pro (www.axure.com)
- SmartDraw (www.smartdraw.com)
- Microsoft Visio (www.microsoft.com)
- OmniGraffle (OSX) (www.omnigroup.com)
- iGrafx Flowcharter (www.igrafx.com)

It is frequently to use prototypes in HTML using editors like Adobe Dreamweaver, or using Microsoft Power Point in order to obtain a semi functional prototype in the form of presentation. Actually the Content Management System (CMS) is used for create similar prototypes to the end product

USER OUTLINE TOOLS

The user outline cannot be understated without a context or purpose in order to store information. There are several ontologies which store user information:

The OEG have developed the mIO! Ontology network [11] which want to improve the user experience in the mobile phone in order to make this device like the source most reliable in the contextual information about their preferences, social information, services and environment.

The aim of the ontology network mIO! is to represent knowledge related to the context of the user. The context of the user must include the user's local information (position, date), information from the environment (temperature, luminosity), personal preferences of entertainment (theatre, sport), and social information (buddy list, agenda). Furthermore, this context should include information about the services that a user can produce and/or consume (available, price), as well as information on the devices that a user can use (battery, cover).

The ontology network mIO! consists of a central ontology (mIO.owl) that links together a set of ontologies that describe different sub domains required for modelling the context. These sub domains are: Device, Environment, Power, Interface, Location, Provider, Internet, Role, Service, Time and User.

It is interesting to note that during the ontology development project of mIO! ontologies were reused from both existing ontologies as well as ontological design patterns and not ontological resources.

The development of ontology network mIO! consists of three phases, two of which have been completed and it is working on the third and last.

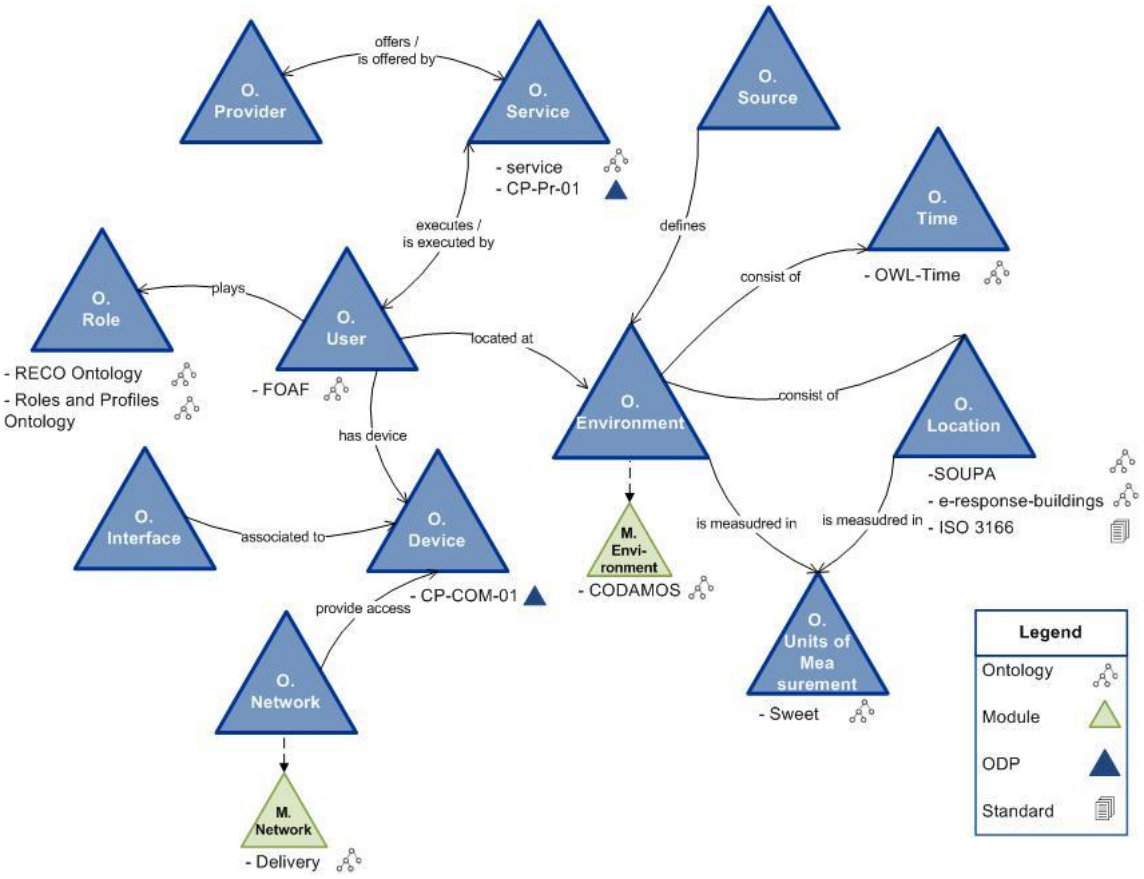


FIGURE 12 CONCEPTUAL MAP AT A HIGH LEVEL OF THE ONTOLOGY NETWORK MIO!

Analytic Tool Of Context

There are several technological solutions which obtain the context parameters from applications and WEB portals. These applications obtain information about the time, place, features which offer the user context and usage data. In this section have been analysed the tools with extern HOSTING.

- **Google Analytics**

Google Analytics is a freemium web analytics service offered by Google that tracks and reports website traffic. It is now the most widely used web analytics service on the internet. Google analytics is offered also in two additional 360, previously Google Analytics Premium, targeted at enterprise users, and Google Analytics for Mobile Apps, an SDK that allows gathering usage data from iOS and Android Apps.

Google Analytics e-commerce reporting can track sales activity and performance. The e-commerce reports show a site's transactions, revenues and many other commerce-related metrics.

Price: Free
Application for phones: Third-party iPhone
Results in real time: No
Requirements: No
Developer: Google

- **Reinvigorate**

Reinvigorate offers results in real time, “NameTags” for visitants is excellent in order to know who is in your web site. The design of the application is easy to use.

Price: $10 per month
Application for phones: No
Results in real time: Yes
Requirements: No
Developer: Sean McNamara

- **Mint**

Mint is an extensible, self-hosted web site analytics program. Its interface is an exercise in simplicity. Visits, referrers, popular pages and searches can all be taken in at a glance on Mint’s flexible dashboard.

Price: $30 in each Web site
Application for mobile phone: Third-party iPhone
Results in real time: Yes
Requirements: It requires server (PHP, MySQL)
Developer: Shaun Inman

- **Open Web Analytics (OWA)**

Open Web Analytics (OWA) is open source web analytics software that you can use to track and analyse how people use the websites and applications. OWA is licensed under GPL and provides websites owners and developers with easy ways to add web analytics to their sites using simple JavaScript, PHP, or REST based APIs

Price: Free (Open source)
Application for phones: Yes
Results in real time: Yes
Requirements: Owner Hosting (PHP, MySQL)
Developer: Open Web Analytics

- **PIWIK**

Piwik is a free and open source web analytics application written by a team of international developers that runs on a PHP/MySQL webserver. It tracks online visits to one or more websites and displays reports on these visits for analysis. It is available in 30 languages.

Price: Free (open source)
Application for phones: iPhone or Android
Data in real time: Yes
Requirements: owner hosting (PHP, MySQL)
Developer: Piwik

The user feedback tools are very useful in order to leverage the Comments for grow, improve and advertise a company. This section depicts different software with open source in order to cover the needs of the social media.

- **Dolphin:**

This platform is written in PHP, Dolphin is a social network application which can be personalized. Dolphin is one of the most popular open source applications in order to create a social network. It offers different functionalities very similar to functionalities from Facebook, LinkedIn, Twitter and Match.

- **XOOPS:**

eXtensible Object Oriented Portal System (XOOPS) is a free open source management systems written in PHP. It uses a modular architecture allowing users to customize, update and theme their websites. XOOPS is released under the terms of the General Public (GPL) and is free to use, modify and redistribute.

- **Elgg:**

Elgg is open source social networking software that provides individual and organizations with the components needed to create an online social environment. It offers blogging, microblogging, file sharing, networking, groups and a number of other features. It was also the first platform to brig ideas from commercial social networking platforms to educational software.

- **EXO:**

EXO is a digital platform for business portal and social intranets, provides collaborative solutions to enhance productively and teamwork. Firstly, it offers a free service, but if the user wants to use all the functionalities the service has an additional cost.

- **Drupal & Joomla:**

Drupal & Joomla are tools which main purpose is the content management; in addition these systems have different extensions which offer different social network functionalities.

APIS FROM OTHER SOCIAL NETWORKS

For the users is very interesting and useful having different options for share information, also offering a service or content can be a successful method for publishing them. The majority of the social networks have an API. This section will show the most important social network APIs.

Facebook is an American for-profit corporation and an online social media and online social networking service. Facebook offers webmasters and bloggers a lot of options for integrating their platform onto websites. The best part is that Facebook offers several social plugins which the user can implement onto virtually any website.

Like button: It is probably the most well-known and recognized of the Facebook social plugins. Like buttons can be placed in any page of the website and can be targeted to like the page that the button is on, or a URL that you specify.

Share button: This button allows to the users share content with Facebook, this content can be shared with a particular friend or with a group. In addition, it can be shared in a private message.

Embedded Posts: It allows to the users add any information from Facebook in the web or blog.

Comments: This API allows writing comments where is installed

Send Button: It offers the option for send content where is installed for other users

Follow Button: The user can subscribe to the contents in a specific page from Facebook

Activity Feed: It shows the activities and publications more interesting from the user's web

Recommendation Feed: It shows the content more recommended from the user's web

Recommendation Bar: It present several options which allow evaluating, recommend and share

Facepile: It shows the photos from people who are connected to the user profile.

Twitter is an online news and social networking where users post and interact with messages, "tweets" restricted to 140 characters. Users access Twitter through its website interface, SMS or a mobile device app.

Tweets are publicly visible by default, but senders can restrict message delivery to just their followers. Users can tweet via the Twitter website, compatible external applications (such as for smartphones), or by Short Message Service (SMS) available in certain countries

Users may subscribe to other user's tweets. Individual tweets can be forwarded by other users to their own feed, a process known as a "retweet". Users can also "Favourite" individual tweets. Furthermore, Twitter allows users to update their profile via their mobile phone either by text messaging or by apps released for certain smartphones and tablets.

LinkedIn is a tool which is oriented to the business and to share in the professional field. This network also has different APIs in order to share the information.

Google Plus us an interest based social network that is owned and operated by Google. The idea is very similar to other social networking services, but Google attempts to differentiate

Google+ by allowing more transparency in who the user share with and how the user interact. Furthermore, it integrates all Google services. It has several API's for sharing and using this social network.

TripAdvisor is a travel oriented social network in which the users share their travel experiences: hotels, flights, car shares and, critically for SoMeDi, restaurants. The service is often used by users through the website or their mobile applications, but it has a separate developer side. Approved users of the TripAdvisor Content API can access the following business details for accommodations, restaurants, and attractions:

- Location ID, name, address, latitude & longitude
- Read reviews link, write-a-review link
- Overall rating, ranking, subratings, awards, the number of reviews the rating is based on, rating bubbles image
- Price level symbol, accommodation category/subcategory, attraction type, restaurant cuisine(s)

As of the writing of this report we are implementing the access to TripAdvisor data for our DII modules. This will be part of the Marketing use case.

3.6. Brand And User Experience

Brand is a subjective perception of value based on the sum of a person's experiences with a product or company that ultimately influences that person's sentiment and decisions in the marketplace.

Advertisers [9] are part of nearly all of our experiences. Now even non-Web products have marketing messages in their interfaces. There are now sponsored links, co-branded advertorial content, pop-unders, traffic-sharing deals, affiliate programs, affinity incentives, and a host of other kinds of revenue-earning devices.

All these things are parts of the user experience, but they are really there for the advertiser. The user is supposed to see them, act on them, and remember them. And, in the end, advertisers are primarily interested in the effectiveness of their advertising for their chosen market. They may be willing to wait and let and advertisement's popularity grow, or they may be interested in a good end-user experience insofar as it can positively affect their ad sales, but ultimately they want to know how much revenue a given ad deal is driving. On the web, the results are measured by traffic or by awareness.

TRAFFIC

On the web there are three primary measures of advertising performance: impressions, click-through, and sell-through.

Impressions measure how many times the advertisement is inserted into a Web page that is subsequently downloaded. Thus, it is a measurement of how many times an ad can hypothetically be seen. Putting an advertisement on a Web page does not guarantee that someone sees it, so the online advertising industry developed a second measure, the **click-through**. This is measure of how many people click on a given advertisement, how much the active interest they display in a given ad. The goal of advertising is, of course, more than just interest, so even click-through is still an imperfect measure.

The most direct measurement of advertising effectiveness is the **sell-through**, which is a specific to advertisements where something is for sale. It is a measure of how many people actually bought a given product based on a given advertisement.

AWARENESS

Advertising effectiveness is the subject of a large branch of research, but three common metrics that appear in Web site research are: brand awareness, brand affinity and product sales.

Brand awareness measures how many people are aware of the product. **Brand affinity** measures how much they like it and, more generally, what associations they have with it. **Product sales** is the bottom line, how many people bought whatever it was that was advertised, or soon thereafter. These three metrics are not necessarily dependent, and can sometimes work against one another

COMPONENTS OF BRAND

People experience brand can be expressed through three areas: visual, tone and behaviour.

Visuals: Visuals comprise the graphic elements used to communicate the brand, including the logo, typeface, images, and other elements of a common style guide.

Tone: Tone is the style of communication the brand uses, from the text on a website to the messaging developed and used in targeted advertisements and to the manner in which staff speak to customers.

Behaviour: It represents how the company acts in certain situations. Does the company reflect the morals and values on their customers? Do they actively express those values through their actions?

THE RELATIONSHIP BETWEEN BRAND AND DIGITAL USER EXPERIENCE

The user experience is an important component of branding. Only when all three brand components, visual, tone and behaviours, are present and true to the core brand message, do customers have a consistent user experience across interactions with a company or product.

In digital systems, customers interact with the representation of the brand in the form of websites and other interactive services, making behaviour a crucial attribute of brand. Furthermore, most people cannot differentiate how they feel about a brand from how they feel about the experiences they have with the brand, thus in many situations, UX becomes the brand differentiator. It can be part of the reason a customer chooses the engage with a company or its products.

4. VISUALIZATION TECHNIQUES

The aim of any data visualization software is to communicate information clearly and efficiently. Often, information is conveyed via statistical graphics, plots and graphs. A proper visualization makes data more accessible and discoverable, understandable and usable. This section describes the main visualization techniques that may be applied to visualize different types of information.

For comparison, we will examine the use of these techniques in existing software. More specifically, we will focus on Kibana, Grafana, IBM Watson Analytics, Power BI, Tableau Public, and the open source data visualization framework Sefarad.

4.1. TYPES OF VISUALIZATION

We will cover the most common types of data visualization. Namely: column graphs, bar graphs, pie charts, line graphs, area charts, scatter plots and spider/radar charts. We will not cover visualization of dynamic data, which is left for future revisions of this deliverable, should the need for such types of visualization arise.

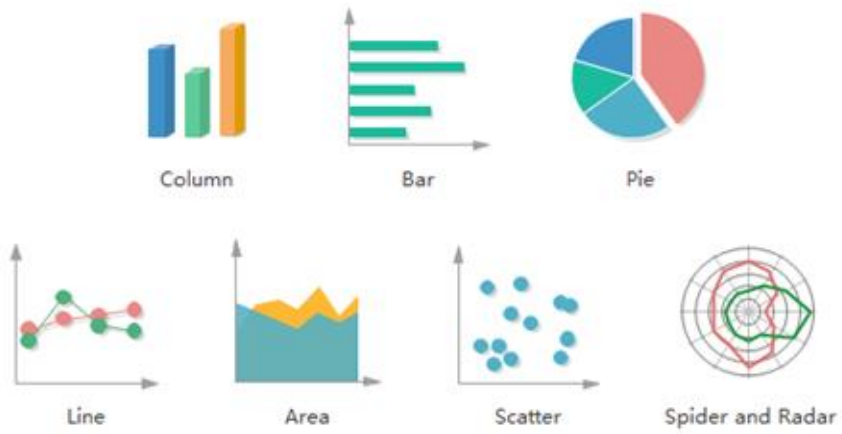


FIGURE 13 DIFFERENT TYPES OF VISUALIZATION

In addition to plain visualization, some of these techniques can be combined with interactive controls. These controls allow users to focus on a specific subset of the original data either by eliminating them (filtering and zooming) or by modifying how the elements are presented (i.e. changing opacity, colour, size and position). Adding interactivity is common in media that allow for it (e.g. HTML websites and data analysis tools), when the volume of information is too large for the level of aggregation available, and when either the data or the target of study is not known in advance and further analysis is needed. The latter is known as exploratory analysis.

Scatter plot:

A scatter plot is a type of plot or mathematical diagram using Cartesian coordinates to display values for typically two variables for a set of data. The main purpose of this chart is to

identify the type of relationship (if any) between two variables. Each point is represented with a visual marker.

Usually, the points are combined with additional markers/signs such as a line to show a regression function for the data, or a centroid. For higher dimensional data, additional information can be represented through different characteristics such as colour, shape and size. For instance, the colours and shapes of the markers may convey belonging to a given group. Scatter plots can also be drawn in 3 dimensions, although their use is less common.

An interactive scatter plot usually allows users to highlight a specific point, to select the range of values in one (or two) of the axis, and to get the value of the x and y coordinates in a given point.

All in all, scatter plots are useful to visualize tendencies, identify groups of similar data, and to pinpoint outliers. For instance, in the context of SoMeDi project, a scatter plot can be used to compares the number of followers (x axis) and the mean number of messages per day which may reveal a correlation between both values, or groups of users with similar values. This could be used to identify potentially influential users, which the company may target in the future, or to identify posts from the company that were unusually successful in social media.

Line chart:

This type of chart is a variation of the scatter plot, where points are ordered, and each point is connected to the next node through a line (straight or otherwise). Line charts are mostly used as timelines (chronograms), where the x axis represents a time dimension, and their purpose is to visualize trends in data over intervals of time. This is also known as a time series. For example, this chart can be used to represent the sentiment polarity evolution over time.

As with scatter plots, line charts may be interactive, allowing users to filter and zoom on specific values or ranges in either axis.

Due to their inherent ordering, line charts are usually intuitive and their application is straightforward. For instance, line charts can be used to plot the evolution over time of the general sentiment about a given company. In SoMeDi, line charts could be used to monitor time-related indicators, such as activity (e.g. number of tweets, retweets, favourites or followers) or the evolution of public sentiment about the company. This information can be used to aid marketing campaigns or to evaluate the results of the social media strategy of a company.

Area chart:

The area chart is a line chart where the area under the line (area under the curve) is filled with a colour, texture or hatching. They are commonly used to compare more than one value, since the highlighted area makes comparison much easier, especially when the lines intersect. For instance, an area chart could compare the social media activity of a company with that of its competitors.

Pie chart:

This chart is a circular statistical graphic divided into slices to illustrate numerical proportion. In a pie chart, the arc length of each slice is proportional to the quantity it represents. It is named pie chart for its resemblance to a pie that has been sliced; there are variations on the way it can be presented. A variation of pie charts include several concentrically layers, where outer layers of the chart represent subgroups, each of them split into several slices.

Interactive pie charts allow users to zoom in on specific slices at several layers, which expands outer layers.

A possible application of pie charts in the context of this project could be to compare the ratio of positive, negative and neutral social media comments about an entity.

Radar chart:

This type of chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on axes starting from the same point. The relative position and angle of the axes is typically uninformative. The value of each component is marked by a point in the appropriate axis, and the points in every axis are connected by straight lines. The result is a polygon. The values in the axis are typically normalized in such a way that a more regular polygon corresponds to a balanced (or neutral) set of values. Radar charts are typically used to compare more than one entity by superimposing their polygons in the chart.

An example of application in SoMeDi could be the representation of activity in different social media of different entities. Each dimension could represent a type of activity (e.g. comments in Facebook, tweets on Twitter), normalized by the mean value of activity for every company.

Bar chart:

This chart presents categorical data with rectangular bars whose heights or lengths are proportional to the values that they represent. The bars can be plotted vertically or horizontally. One axis of the chart shows the specific categories being compared, and the other axis represents a measured value. They are very useful to compare the values of an attribute of different entities. The bars can be laid ordered on an axis to plot the evolution of a variable, as an alternative to line charts.

Some subtypes of bar charts used stacked bars, either to represent components of a given value (e.g., parts that contribute to a total sum), or to compare the contribution of several entities to a total. For the latter, the total value is usually normalized, and the result is equivalent to a linear pie chart, and the advantage is that it takes less space and can be plotted alongside other bars.

In SoMeDi, the daily distribution of positive, negative and neutral reactions in social media can be represented with a stacked bar chart, where the size of each bar represents the relative amount of activity that day. Note that the same information could be represented with a line chart. However, comparing values in different days with a line chart would be harder. Moreover, this representation lends itself to including additional bars per day, with the values for other companies, either alongside (in the same chart) or in side-by-side subgraphs. This highlights the power of bar charts for comparison purposes, and the fact the subtle differences between different types of representation can be exploited to present a much richer and more useful view to the customer.

Map chart:

The map chart displays a map in any form (e.g., satellite, terrain), with different markers and visual artefacts overlaid on top. Sometimes, the different visual layers can be selected/deselected on demand. The texture of the map and the location of the markers is

typically obtained through services like Google Maps or OpenStreetMaps. Data values can be coordinates (lat-long pairs) or areas (polygons). The map is usually scaled so that it includes all the identified points. If the data is geographically sparse, interactive maps are used instead to allow for zooming and panning. Interactive maps usually include some form of aggregation of markers, to avoid visual clutter. The aggregation depends on the zoom level. For instance, in a map of Points of Interest (PoI) in a city, instead of plotting a single point per PoI several PoIs are added in crowded areas and a single marker may indicate that there are several nearby PoIs. In some cases, the markers are combined with alterations on the real geography. Some alterations include enlarging the areas with more information density (more markers) and using a non-cartesian distance metrics (e.g. Manhattan distance).

There are a handful of subtypes of maps, including heat maps, sector maps and isobaric maps.

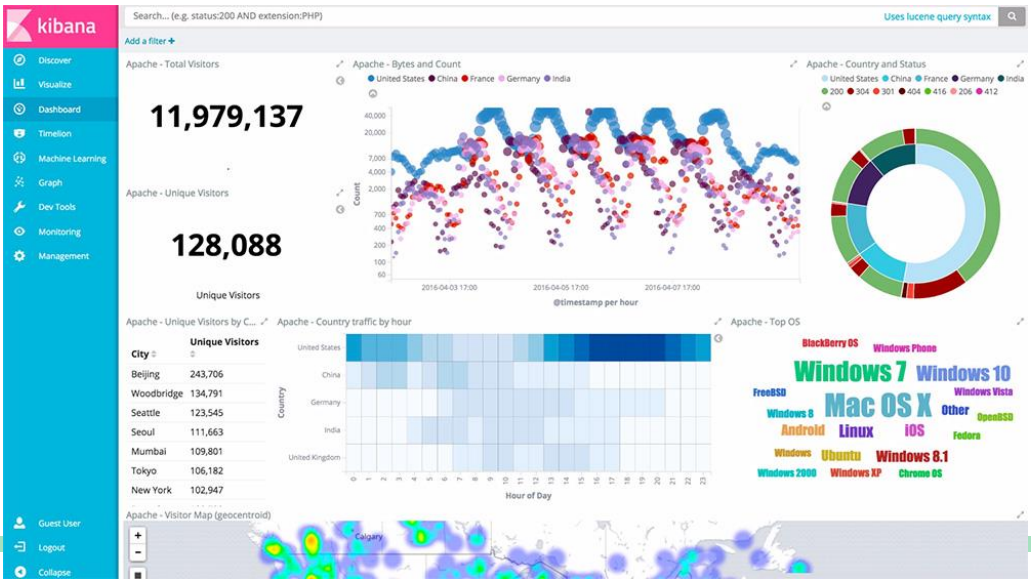
In the context of SoMeDi, map charts are very useful in any scenario where location context is important. For instance, a dashboard for an international company may show the social media perception of the company in different countries with a map chart and pointers with the number of interactions in each country. The advantage of using maps in this case in contrast with a plan table representation is twofold: first of all, it provides a geographical context which the table is lacking, which could reveal geographical patterns (e.g. the company is more popular in southern countries); second of all, an interactive map can easily adapt the same visualization to different scales (zoom levels), which allows customers to seamlessly explore the data at different levels of aggregation. A map chart can also be used to compare detected sentiment about a brand, using a heatmap layer on top of the map which shows sentiment in every area with a gradient between positive and negative colours (e.g. red and blue).

4.2. DATA VISUALIZATION SOFTWARE

In this subsection each data visualization software feature is going to be explained in detail.

Kibana:

Kibana is an open source data visualization plugin for Elasticsearch. It provides visualization capabilities on top of the content indexed on an Elasticsearch cluster. Users can create bar, line and scatter plots, or pie charts and maps on top of large volumes of data. The main limitation is that only supports Elasticsearch data source and this data must have timestamp.



Kibana can also analyse relationships with Graph, this means it takes relevance capabilities of a search engine, combine them, and uncover the uncommonly common relationships in your Elasticsearch data. Kibana is open source and is licensed under the Apache License, Version 2.0

Grafana:

Grafana is an open-source, general purpose dashboard and graph composer, which runs as a web application. Grafana is more oriented for monitoring systems but it can also be used for visualizing time series data for infrastructure and application analytics.

Grafana supports dozens of databases, is possible to combine data from different data sources like Elasticsearch and AWS.

FIGURE 14 KIBANA DASHBOARD

FIGURE 15 GRAFANA DASHBOARD

Grafana offers the possibility to configure plug-ins and, supported by the Grafana community, to add more functionalities. Grafana is open source and is licensed under the Apache License, Version 2.0

IBM Watson Analytics:

Watson analytics is a cloud application that does all of the heavy lifting related to big data processing by retrieving the data, analysing it, cleaning it, building sophisticated visualizations and offering an environment for communicating and collaborating around the data.

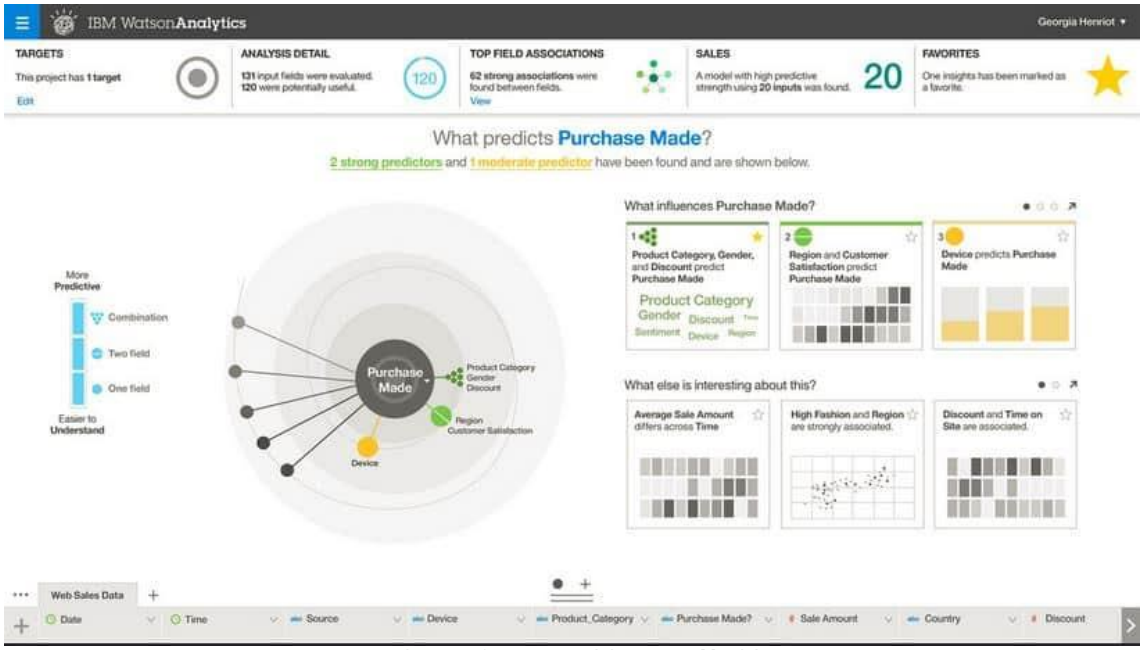


FIGURE 16 IBM WATSON ANALYTICS

Watson analytics users can create bar, line and scatter plots, or pie charts and maps, also is possible to make some analysis to your stored data, like sentiment analysis and name entity recognition.

Watson analytics has a free layer but is necessary to acquire a license to get all the product features.

Power BI:

Microsoft has created Power BI, a suite of analytics tools that deliver insights. It supports hundreds of data sources, such as SQL servers, JSON files and includes big data sources like Hadoop and Spark.

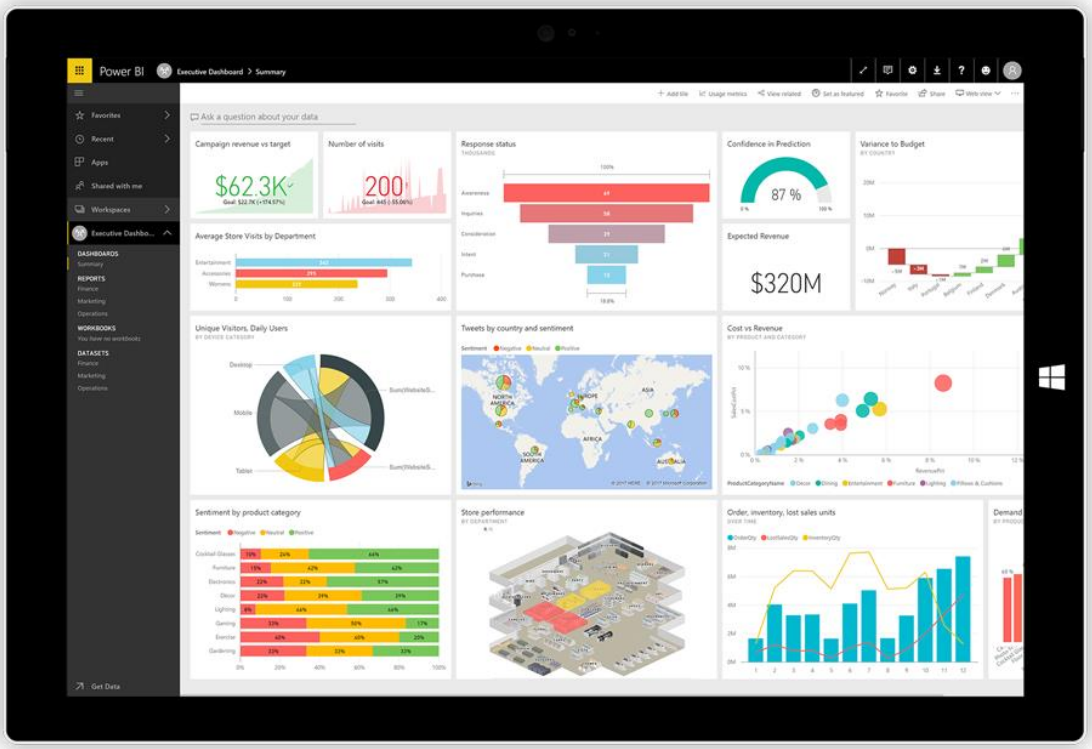


FIGURE 17 POWER BI DASHBOARD

Power BI, as shown in the above picture, offers a great collection of widgets like bar charts or maps to visualize your data.

The main limitation of Power BI is that is not a web service, is a Desktop application. It is necessary to make reports to share your data. Power BI Desktop is a free app but is necessary to acquire a license to get all the product features like publishing your results.

Sefarad:

Sefarad is an environment developed by UPM (partners in the SoMeDi consortium) to explore, analyse and visualize data. In contrast with the technologies already covered, Sefarad provides a modular architecture that enables the development of custom-tailored and advanced visualizations.

The visualisation in Sefarad can be done by means of interactive ad-hoc charts, or by reusing already existing widgets (modular and reusable visualization components). The visualisation is structured in dashboards, which are web pages oriented to display all the collected information. These dashboards are in turn divided into widgets (Polymer Web Components) that globally form the dashboard itself.

Sefarad has a library that offers many types of graphs: bar, line and scatter plots, or pie charts, maps, bag of words, etc. Due to its high flexibility, it enables the display any kind of information, either user custom data sets.

This environment offers also the possibility of creating your own new components to visualize your data; this is possible because is based in D3.js library.

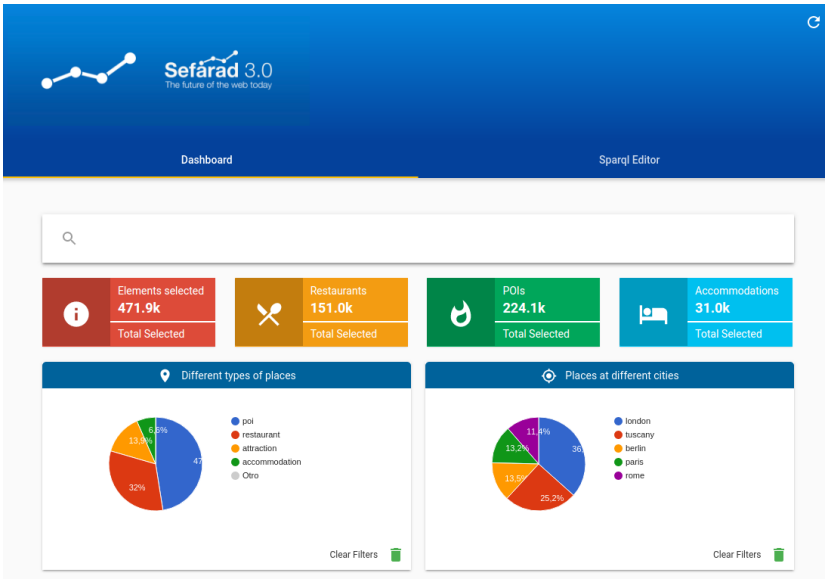


FIGURE 18 DASHBOARD POWERED BY SEFARAD

Sefarad is used in the Marketing demonstrator in SoMeDi.

QLIK View

Qlikview is a third party business intelligence and data visualization tool. It provides immersively detailed visualization and BI capabilities on any data model. Users have a wide variety of customizable charts like pivot tables, bar charts, scatter and box plots, geographic maps, filters for dynamic reporting from big data. There aren't any limitations with its usage.

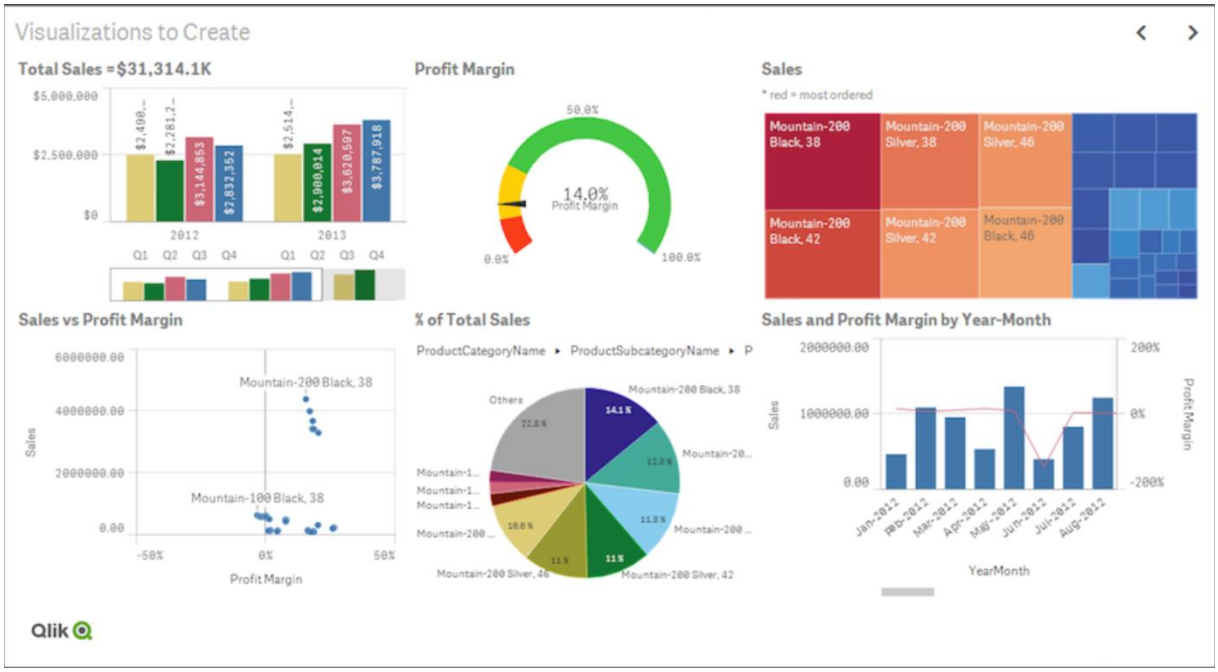


FIGURE 19 QLIKVIEW

As shown above, QLIK View offers a wide variety of options to users for creating, distributing or sharing needed data for better and on point analysis.

4.3. DATA VISUALIZATION SOFTWARE COMPARISON

Below is a comparison of which visualization techniques are available in each data visualization software and which data sources are supported:

Data Visualization Software	Supported Chart Types							
	Line	Timeline	Scatter	Area	Pie	Radar	Bar	Geo Maps
Kibana	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Grafana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Watson Analytics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power BI	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Sefarad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Data Visualization Software	Supported Data Sources		
	Elasticsearch	Local Files	Other online sources
Kibana	Yes	No	No
Grafana	Yes	No	Yes
Watson Analytics	No	Yes	No
Power BI	No	Yes	No
Sefarad	Yes	Yes	Yes

udied provide similar
rce. Conversely, the
omprised of different storage solutions (e.g. ElasticSearch, MongoDB, MariaDB).

Hence, Sefarad is the only alternative that can be integrated in the generic architecture. Additionally, Sefarad can be effortlessly embedded into existing dashboard and websites, which is not the case with most of the alternatives under study. However, other tools could be used in specific scenarios, where a given data storage is provided, and a more powerful exploratory analysis is required. For instance, if the data for a use case is stored in ElasticSearch, a Kibana dashboard could be provided to the customer for advanced analysis, in addition to a customized Sefarad dashboard that shows metrics and visualizations that have already been identified.

4.4. TOOLS FOR MOCK-UPS AND DESIGN

Terms as “wireframe”, “mockup”, “prototype” are used when referring to the design of user interface.

The wireframe is the low-fidelity static representation of the user interface that indicates the structure of the information, how it is grouped and how the user will interact with it. Usually there are no many colours in wireframes and there is not much effort spend on the aesthetic part of a wireframe. Wireframes are used when documenting a project.

The prototype represents a simulation of the final product, even it does not have to look exactly as the final product. Prototype has to have a better fidelity as the wireframe and it should allow user to interact with the interface. Prototype is used in testing the usability of a system before the development begins.

The mockup is a static high fidelity design representation of the content, the structure of the information and the basic functionalities. Mockups are used when evaluate the visual side of a project.

Following these definition, we started the design by producing wireframes, on the basis of the user requirements in accordance with the established use cases, followed by mockups creation.

Several tools for wireframe and/or mockup design are available. Below, we mentioned few of them.

Photoshop[5] - is commonly used by the designers because they can design the wireframes very fast using it. Photoshop does not offer a library of interface elements but it is a very good tool for sketching out quick ideas.

Visio[6] – it’s a tool well-known for technical diagrams but can be used in wireframing by those who are familiar with it due to its add-on tools such as Swipr, which allows the designer to create and export a usable HTML prototype.

Balsamiq Mockups[7] – is a user interface design tool that can be used to generate sketches; it includes a wide variety of elements, grouped together in UI library that can be easily drag-and-drop on the mockup canvas. The designer can simulate a flow of action by adding links on elements. Several mock-ups can be stored together in a project.

UXPin[8] – it’s a collaborative design tool that offers libraries for Bootstrap, Android, iOS. You may start by creating wireframe directly in UXPin or by using Photoshop and then easily convert them in mock-ups and/or in a prototype. UXPin provides the functionality to create and pin documentation to the prototypes and auto-generate specs and style guides for developers.

We used Photoshop to create the wireframes and Balsamiq Mockups to create the mock-ups.

[5] http://www.adobe.com/uk/products/photoshop.html?sdid=9J8K4JR6&mv=affiliate
[6] https://products.office.com/en-gb/visio/flowchart-software?tab=tabs-1
[7] https://balsamiq.com/products/mockups/
[8] https://www.uxpin.com/

5. METHODOLOGICAL APPROACH FOR TESTING USER INTERFACE

In this section, we will present the concepts behind Web automation and Mobile automation, and also a description of the SoTA tools used for testing user interface designs.

5.1. WEB AUTOMATION

Web automation[9] may incorporate the actions of filling forms, navigating on web pages or selecting links. For instance, numerous meetings now utilize a web site to get papers, disperse them to reviewers, and gather the audits. A reviewer that has 10 papers to peruse, to first download them, then print them and finally upload the review, will waste time by tedious repetition, so that automation represents a great solution.

Different cases include submitting numerous queries and making a comparison between the outcomes and gathering multiple pages of indexed results into a solitary page for simple printing or extra sorting and filtering.

The approaches that already exist for web automation utilize a scripting language that resides outside the web browser, like Perl, WebL, or Python. The contrast is significant for an end user. Elements like session identifiers, authentication, user agents, plug-ins, cookies, proxies collude to compose the Web to have a different appearance than an agent who runs outside the browser. Also, many users can benefit from a web automation system because there would be no need for learning programming language syntax.

A challenge[10] for web automation can be the web sites which change without warning, but that is because no one has characterized the types of changes that may appear.

5.2. SOTA TOOLS

Selenium[11] is a collection of various software tools each with an alternate way to deal with supporting test automation. Most Selenium QA Engineers concentrate on a couple devices that most address the issues of their task, however learning all the tools will give the users various choices for dealing with many of the test automation obstacles.

The whole suite instruments bring an abundant set of testing capacities particularly equipped to the requirements of testing of web applications of various kinds. These operations are very adaptable, permitting numerous alternatives for finding UI (user interface) components and making a comparison between the expected test results against genuine application performance. The help for executing one's tests on different browser platforms, is one of Selenium's highlights.

Selenium is made out of different software devices, each with its particular function. Selenium 2 (otherwise known as Selenium WebDriver) is the most up to date expansion to the Selenium toolbox. This innovative automation tool gives a wide range of features, including a more unitary and object oriented API, but also a response to the confinements of the old execution. It bolsters the WebDriver API and underlying innovation, alongside the Selenium 1

[9] http://up.csail.mit.edu/projects/chickenfoot/uist05.pdf
[10] https://s3.amazonaws.com/academia.edu.documents/30665679/weuse-proceedings.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1505303927&Signature=kPdZpiMg%2F%2BMtoJhvRks7PMPgDf8%3D&response-content-disposition=inline%3B%20filename%3DHuman_factors_affecting_dependability_in.pdf#page=14
[11] http://www.seleniumhq.org/docs/01_introducing_selenium.jsp

technology underneath the WebDriver API for greater adaptability in tests porting. Furthermore, Selenium 2 still runs Selenium RC interface for in reverse compatibility.

Selenium-WebDriver supports the following browsers along with the operating systems these browsers are compatible with.

- Google Chrome
- Internet Explorer 7, 8, 9, 10, and 11 on appropriate combinations of Vista, Windows 7, Windows 8, and Windows 8.1. As of April 15 2014, IE 6 is no longer supported. The driver supports running 32-bit and 64-bit versions of the browser where applicable
- Firefox: latest ESR, previous ESR, current release, one previous release
- Safari
- Opera
- HtmlUnit
- phantomjs
- Android (with Selendroid or appium)
- iOS (with ios-driver or appium).

Selenium 1 (Selenium RC or Remote Control) was the principal project, before the WebDriver/Selenium combination raised Selenium 2, the most up to date and powerful tool. Selenium IDE (Integrated Development Environment) is a prototyping apparatus for building test scripts. It is a Firefox module and gives a simple to-utilize interface for creating automated tests. Selenium IDE has a feature with what it can record users' activities as they are performed and after that deploys them as a reusable script in one of many programming languages that can be further executed. Selenium-Grid permits the Selenium RC solution to scale for substantial test suites and for test suites that must be run in different conditions. Selenium Grid enables the running of tests in parallel, which means, distinctive tests can be run at the same time on various remote machines. This has two advantages. To start with, if one has an expansive test suite, or a moderate running test suite, you can boost its execution significantly by utilizing Selenium Grid to isolate the tests suite to run distinctive tests at the same time utilizing those diverse machines. Additionally, if one has to run the test suite on more situations, it is possible to have some distinctive remote machines supporting and running the tests in them at the same time. For each situation Selenium Grid enormously enhances the time it takes to run your suite by making utilization of parallel processing.

Cucumber[12] is a software tool utilized by programming engineers for testing different software. It runs computerized acceptance tests written in a BDD (Behavior-Driven Development) style.[13] Central to the Cucumber BDD approach is its plain language parser called Gherkin. It permits anticipated software practices to be determined in a coherent language that clients can comprehend. Accordingly, Cucumber permits the execution of feature documentation written in business-facing text.[14]

Capybara, which is a piece of the Cucumber testing framework,[15] is a case of web-based test automation software. Cucumber is composed in the Ruby programming language[16] [17] and was initially utilized solely for Ruby testing as a supplement to the RSpec BDD system.

[12] "Automated testing with Selenium and Cucumber". *www.ibm.com*. 2013-08-06

[13] Soeken, Mathias; Wille, Robert; Drechsler, Rolf (2012-05-29). Furia, Carlo A.; Nanz, Sebastian, eds. *Objects, Models, Components, Patterns*. Lecture Notes in Computer Science. Springer Berlin Heidelberg. pp. 269–287. ISBN 9783642305603. doi:10.1007/978-3-642-30561-0_19.

[14] Fox, Armando; Patterson, David (2016). *Engineering Software as a Service*. Strawberry Canyon. pp. 218–255. ISBN 978-0-9848812-4-6.

[15] "Introduction to Writing Acceptance Tests with Cucumber". *semaphoreci.com*.

[16] "The Pragmatic Bookshelf | The Cucumber Book". Pragprog.com.

[17] The Pragmatic Bookshelf | The RSpec Book". Pragprog.com. 2010-12-02.

Cucumber now supports a wide range of programming languages through different usages. For instance, Cuke4php and Cuke4Lua are software bridges that empower testing of PHP and Lua projects, individually. Different usages may essentially use the Gherkin parser while executing whatever is left of the testing structure in the objective language.

Gherkin is the language that Cucumber uses to characterize test cases. It is intended to be non-specialized and intelligible, and collectively portrays use cases identifying with a product system. [18] [19]. The reason behind Gherkin's syntax is to advance BDD proceedings over a whole improvement group, including business investigators and managers.[20] It tries to uphold firm, unambiguous prerequisites beginning in the initial periods of requirements definition by business administration and in different phases of the advancement lifecycle. Moreover, giving a content to automated testing, Gherkin's normal syntax is intended to give straightforward documentation of the code under test. At this time, Gherkin underpins keywords in many languages.[21] Syntax is based on a line-oriented plan, like that of Python. The structure of a record is characterized utilizing whitespace and other control characters. # is used as the line-comment character and can be put anywhere in a file. Instructions are any non-comment and non-empty line. They comprise of a perceived Gherkin keyword followed by a string. All Gherkin documents have the feature file expansion. They contain a solitary Feature definition for the framework under test and are an executable test script[22].

Cucumber tests are partitioned into singular Features. These Features are subdivided into Scenarios, which are groupings of Steps. An element is a use case that depicts a particular capacity of the software being tested. There are three sections to a Feature: the keyword, the name, and the optional portrayal on the accompanying lines. Each Feature is mode of gathering of situations. A single situation is a stream of occasions through the Feature being portrayed and maps 1:1 with an executable experiment for the system. Keeping with the example ATM withdrawal feature, a situation may depict how a client demands cash and what happens to their account. The essence of a Scenario is characterized by an arrangement of Steps laying out the preconditions and stream of events that will happen. The first word of a Step is a keyword.

Capybara[23] is a web automation software which simulates scenarios for user stories and automates web application testing for behaviour-driven software development. It is a part of the Cucumber testing system written in the Ruby programming language which reproduces different parts of a web browser from the point of view of a genuine user. Imitating a user, it can interface with the application to get pages, parse the HTML and submit the forms.

Capybara is a library/gem made to be utilized over a hidden online driver. It offers an easy to understand DSL (Domain Specific Language) that is used to portray activities that are executed by the hidden web driver.

At the point when the page is stacked utilizing the DSL (and hidden web driver), Capybara will attempt to find the significant component in the DOM (Document Object Model) and execute the activity, for example, click button, link, and so on. Written in Ruby, Capybara's default driver RackTest does not require a server to be started since it specifically collaborates with Rack interfaces. Thusly, it must be utilized for Rack applications.

Selenium-webdriver, which is for the most part utilized as a part of web-based automation structures, is bolstered by Capybara. Unlike Capybara's default driver, it bolsters JavaScript,

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[18] "cucumber/cucumber". *GitHub*
[19] "Gherkin". *Github*
[20] "TOOLSQA". *TOOLSQA*
[21] "GherkinSupportedLanguages". *Github*
[22] "Reference-Cucumber". *Cucumber*.
[23] *Engineering Software as a Service: An Agile Approach Using Cloud Computing*. ISBN 9780984881246

can get to HTTP assets outside of application and can likewise be set up for testing in headless mode which is particularly helpful for CI (Continuous Integration) scenarios.

Capybara-webkit driver (gem) is utilized for genuine headless browser testing with JavaScript bolster. It utilizes QtWebKit and it is fundamentally quicker than Selenium as it doesn't stack the whole browser.

5.3. A/B TESTING

A / B testing [24] involves the comparison of two seemingly identical versions of a web site, A and B, which present some very fine differences that may affect the user's behaviour - the concept presented in Figure 6. Version A may be the initial control version and B is an improved version A. For example, when we talk about A / B testing, it is the site's or the campaign's goals and how the owner interacts with users so that they can follow the steps for the desired action, such as buying a product.

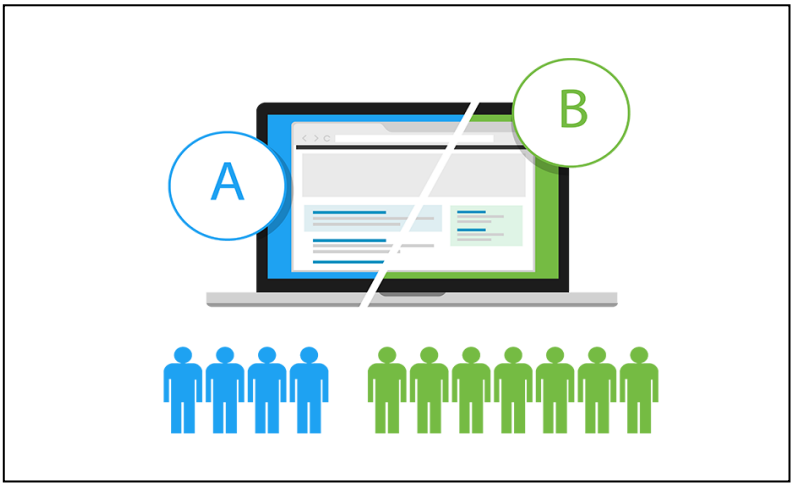


FIGURE 20 A/B TESTING CONCEPT [25]

The safest way to perform an A / B test involves the following steps:

1. Site data studying using a specific tool to find problems. For example, a page with a very high rejection rate can be identified.
2. Observation of the user's behaviour and the discovery of the user's stopping from "conversion". The creation of a hypothesis to increase conversions and the testing of the hypothesis are also very important.
3. Data analysis and conclusion: concludes which variation has the best results.
4. Data presentation: presents the results of marketing, IT and UI / UX.

Some useful tools that can be used to perform the A/B test:

Instapage[26] sets priorities (for example - ease of use) and offers multiple capabilities, allowing the integration of other software used simultaneously. It helps establish conversion goals, build hypotheses, and make adjustments.

[24] https://blog.kissmetrics.com/ab-testing-introduction
[25] https://www.reliablesoft.net/ab-testing-principles-optimize-your-marketing-and-skyrocket-conversions/

[26] https://instapage.com/

Kissmetrics[27] adds some new features because it can also provide a summary of the duration of the test, the total number of conversions, the number of visitors who participated in the test, and the level of improvement.

AlephBet[28] is a developer A / B testing JavaScript framework with multiple features such as tracking unique visitors and completing goals or supporting multiple variants and goals. It has a clear vision of experiments, variants and goals. Users can create their own tracking adapter for both unique visitors and those who are not unique. The application's user interface is simple and easy to use.

Abba[29] is an A / B testing JavaScript tool built to help improve conversion rates on websites. Users can see the conversion rates per day for a period of time that can be edited. It also calculates the score for displayed conversion rates in order to appreciate the accuracy of the tests.

Sixpack[30] is a framework for A / B testing with an easy to use API, and with client libraries which can be written in any programming language. It consists of two parts:
- Sixpack-server: responds to web requests;
- Sixpack-server (optional): tracks and performs A / B tests.

Proctor[31] is an A / B test framework written in Java, which can provide consistent tests across multiple applications. Test results are easy to understand. It consists of:
- data model
- client specifications
- charger client
- matrix constructor
- java code generator.

Considering the large availability for testing the functionalities within the SoMeDi platform on different web browsers we consider a viable solution for performing this task, Selenium package.

Also, considering that the SoMeDi platform has various purposes, use cases, will require some analytics for assessing the level of usability and user acceptance, Google analytics is one option that can provide the needed metadata.

[27] https://www.kissmetrics.com/
[28] https://github.com/Alephbet/alephbet
[29] https://github.com/maccman/abba

[31] https://github.com/indeedeng/proctor

6. LAYOUT DESIGN AND WIREFRAMES PRESENTATION

Following the UCD methodology described in Chapter 2, we had performed a functional analysis, starting from the use cases, functional and non-functional requirements presented in deliverable “D1.2 SoMeDi Requirements” as a first step in designing the initial version of user interfaces.

The SoMeDi DID toolkit will be developed as a web site, accessible through the http (Hypertext Transfer Protocol) and https (Hypertext Transfer Protocol with a Transport Layer Security) protocols on the World Wide Web. Access to the DID tool will be allowed only to registered users.

The front end part of the platform is the area that users will see and with which they will interact, it is also called the graphical user interface (GUI) of the platform and it is very important to be clear, easy to use and optimized, as described in Chapter 3 of this document. We have approached responsive web. This approach will be beneficial in terms of compatibility and scalability, making the SoMeDi platform optimized and usable on different devices and web browsers.

After development of the conceptual design performed during the work made for the first version of D2.1, we have evaluated the design, collected feedback which we’ve also implemented, and in this phase of the document we are providing the second version of user interface.

6.1. DEFINITION OF PERSONAS

We had already mentioned in Chapter 2 that to have a successful UCD, the main characters that have to be taken into consideration are the users themselves: users are split into categories, each has a profile with its own characteristics. In UCD, defining user personas helps in designing User Interface.

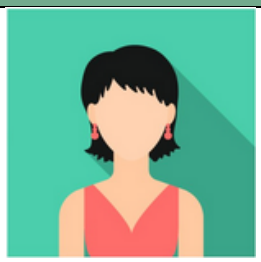
Personas are fictional characters that represent different types of users that might use a site or a product. They have a name, relevant characteristics – such as a role, activities, behaviours, and attitudes – and a goal, which is the problem that has to be addressed.

The following personas have been conceived for the purpose of identifying the functional requirements that will be implemented into the SoMeDi platform. We have considered the roles that we identified in D1.2: ANON = unregistered user; AUTH = registered user; AUTH_A = registered user Applicant type; AUTH_C = registered user Company type and ADMIN=platform administrator.

Name	Details	Goals
 John	39 years old married, 3 kids Math teacher at college Unregistered user of SoMeDi. Hobbies: Internet, Books, running	Helping people in finding all kind of opportunities in different fields

Name	Details	Goals
Andrew	21 years old single student Registered user of SoMeDi. Hobbies: Books, travelling	Wants to explore as many places as possible Wants to earn his own money while he is still at University Wants to get a good job after he graduates

Name	Details	Goals
Maria	43 years old married, 1 kid marketing manager Registered user of SoMeDi Hobbies: Family, dancing, watching movies	Build awareness Generate leads for the sale team Improve planning process

Name	Details	Goals
 **Alice**	25 years old married, no kids, a dog works as Application Manager in IT department Registered user of SoMeDi Hobbies: Cooking healthy food, ride bicycle, playing guitar	Manage user accounts of SoMeDiplatform Configure scenarios

6.2. USER STORIES

In this step we define the user stories as a specific type of requirements expression in the form of scenarios. User stories are simple statements that define the functionalities users request for and are expressed by following a simple template: As a <type of user>, I want <the functionality> so that <the reason why>. User stories can be written at various levels of detail. User stories are based on personas that need the functionalities and they are meant to capture user perspectives. In this way, connection between end users and development team is created. Moreover, user stories can be grouped under epics so that a common understanding about the use cases can be achieved.

Functional requirements presented in “D1.2 SoMeDi Requirements” are reformulated bellow as user stories.

AS A/AN	I WANT TO	SO THAT
Unregistered User	Register into the platforms	I can sign in into SOMEDI platform
Registered User	Login into SOMEDI platform	I can access the general dashboard
Registered User	Ask to retrieve forgotten password	I can sign in into SOMEDI platform
Registered User	Create a new profile (scenario) by selecting the goals, the sources, the filters	I can execute the scenario in order to view the results on my profile dashboard
Registered User	Save a new profile (scenario)	I can execute the same scenario anytime in the future
Registered User	Edit a profile (scenario)	I can expand/restrict the area of interest
Registered User	View details of a profile (scenario)	I can visualize the statistics
Administrator User	Have access to a list with all users	I can perform maintenance tasks (change user status)
Administrator User	Add new data source	Registered user can use them when creating profiles (scenario)
Administrator User	Remove existing data source	Registered user does not use them anymore as an input source of data in their profiles (scenario)
Administrator User	Create a new Administrator	The new Administrator to have access to the Administration section
Administrator User	Have access to a list with all Data Sources	I can check what data source have been added to DID

The user stories list has been extended so to the initial list have been added the user stories for the Romanian pilot, which are detailed with mock-ups in the next section. These user stories are mainly oriented to the functionalities offered to the applicants and to the companies

User stories for Romanian pilot

AS A/AN	I WANT TO	SO THAT
Unregistered User	Register into the platforms as an applicant/company	I can create an account on SoMeDi platform as appplicant/company
Registered User	Change my password	I can sign in into SoMeDi platform using

		a new password
Registered User	Ask to reset my password	I can sign in into SoMeDi platform
Registered User	Logout from SoMeDi platform	I can sign out from SoMeDi platform
Registered User (Applicant)	Login into SoMeDi platform	I can access the Personal Space page (specific information for applicant)
Registered User (Applicant)	Edit my profile	I can complete/modify information from my profile
Registered User (Applicant)	See the list of the available programs	I can see all the options, details of a program
Registered User (Applicant)	See the details of a program	I can decide if I want to apply for that program
Registered User (Applicant)	Apply to a program	I can be enrolled into that program
Registered User (Applicant)	Cancel the sign-up for a program	I can give up to the enrolment in that program
Registered User (Applicant)	See my stages	I can see all the options, details of a program
Registered User (Company)	Login into SoMeDi platform	I can access the Personal Space page (specific information for companies)
Registered User (Company)	Edit my profile	I can complete/modify information from my profile
Registered User (Company)	See the list of programs	I can add a program, edit a program, publish a program, cancel a program
Registered User (Company)	Add a program	I can expand the list of programs for applicant
Registered User (Company)	Edit a program	I can update/modify information from my profile
Registered User (Company)	Publish a program	I can make available a program for applicants
Registered User (Company)	See the list of candidates	I can choose the appropriate candidates for my program
Registered User (Company)	Manage the candidates	I can accept/reject a candidate to my programs

7. GUI - CONCEPTUAL DESIGN FOR SOMEDI PLATFORM

At this phase of the project, after personas and the user stories are defined, in order to see how the UI will work we can develop a conceptual design. In the conceptual wireframes, the navigation of the application's sections, detailed design, like buttons, colour palette, pictures and icons that are easily recognisable by the users, are developed.

In this section we explain the core elements of the design language for SoMeDi by providing two core results:

- A preliminary interaction flow, in which the different actions to be performed by users of the system are described and the flows of interactive elements summarily explained.
- A series of mock-ups that showcase a general design language for the different steps of the interactive flow.

The preliminary interactive flow is as follows:

The entry point to the interactive system is the login screen, from which users can insert their credentials to access the system. Upon successful login, the users are redirected to a general overview dashboard that contains all of their active profiles and a summary of the results. From there, the user can go to (1) the system settings, where some common actions such as adding

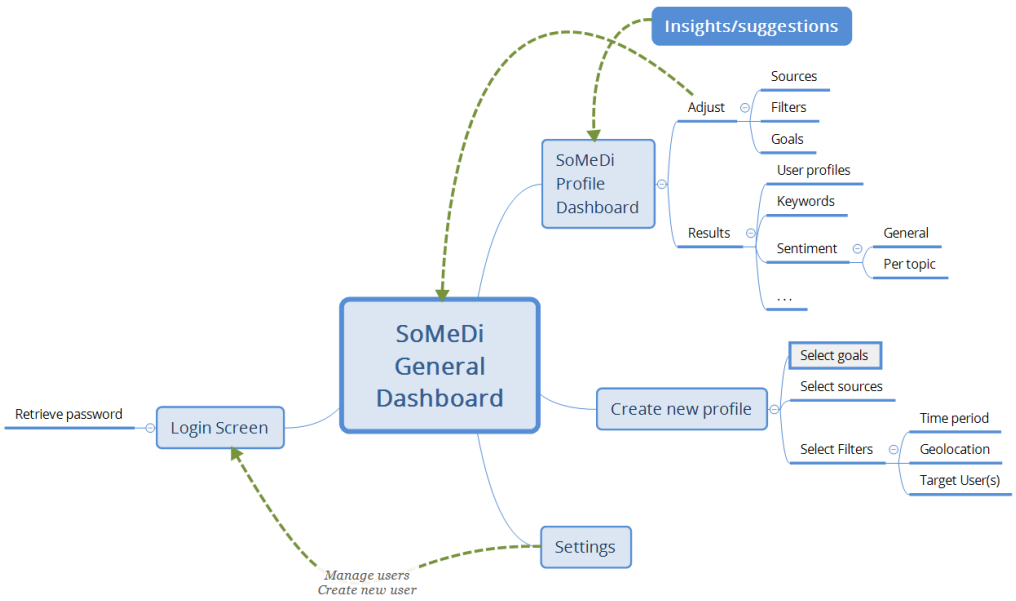
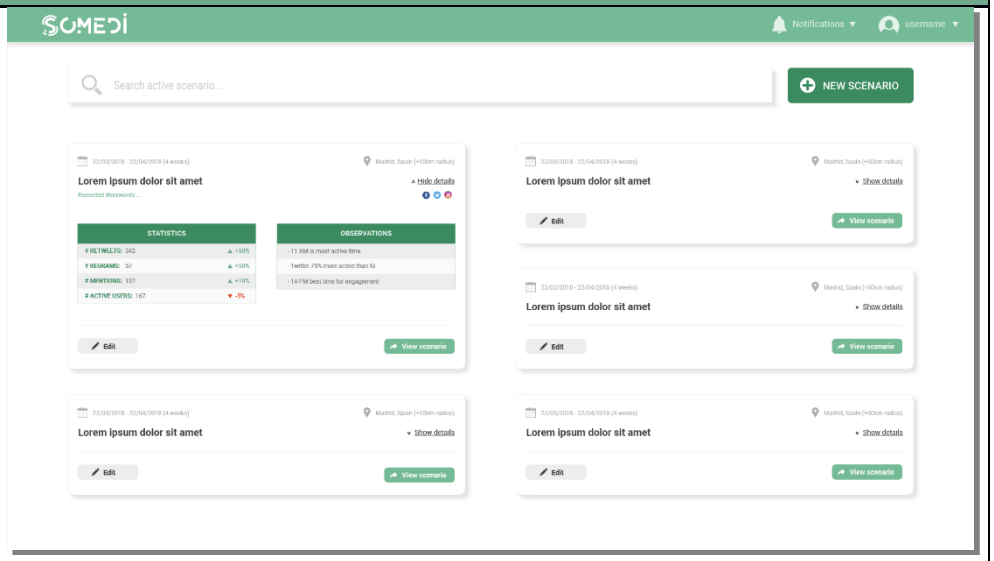


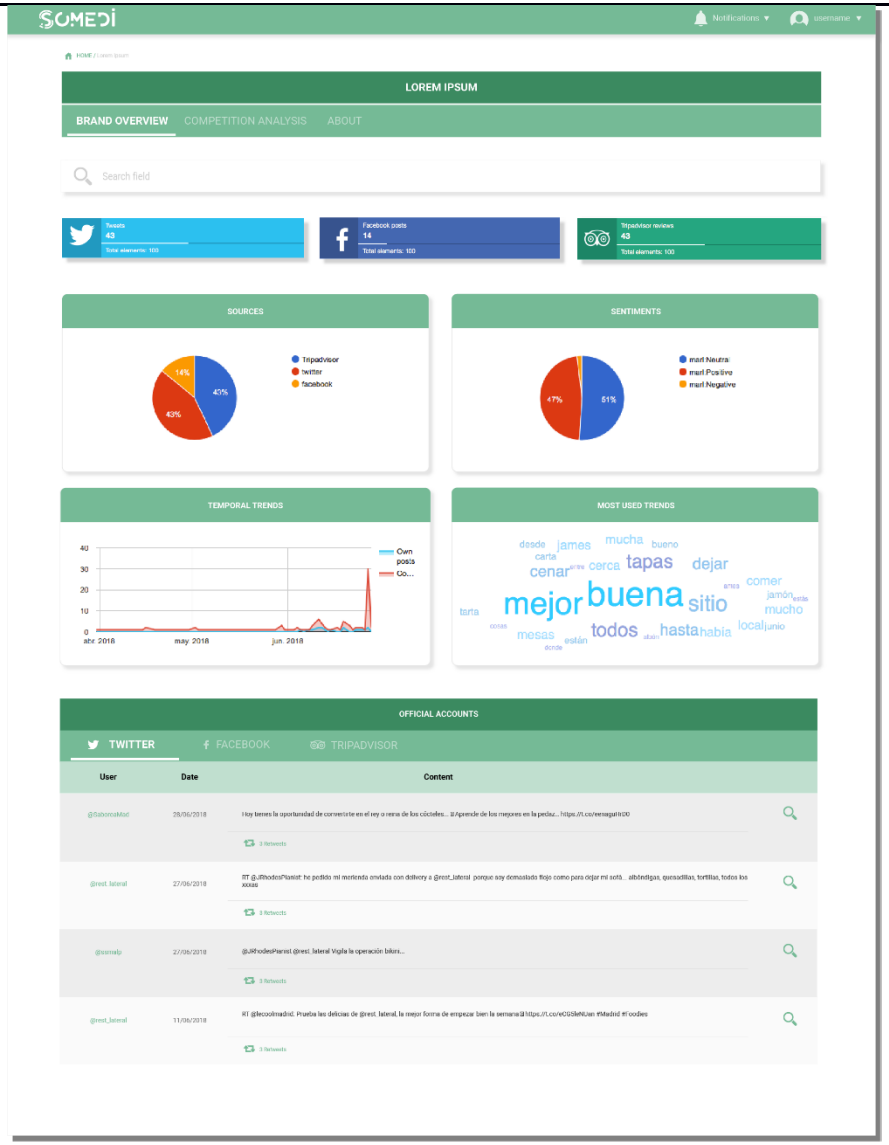
FIGURE 21 PRIMARY INTERACTIVE FLOW OF ACTIONS

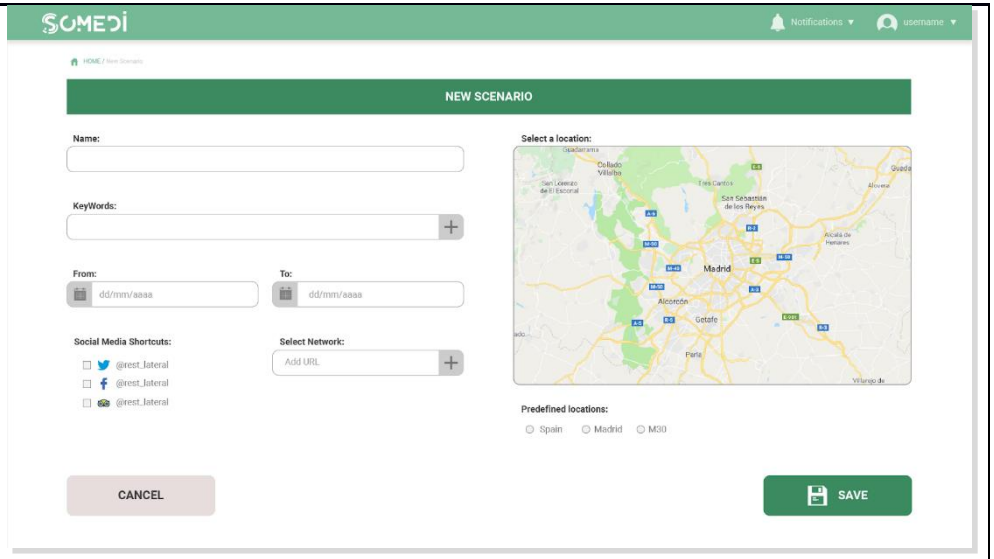
new authorized users can be done, (2) the creation of a new monitoring profile, in which the basic parameters of the profile such as the sources, target keywords and other filtering options can be set and (3) the dashboard for a specific profile which has been previously created, in which the basic results displayed in the generic dashboard are expanded with new information and suggestions from the SoMeDi system.

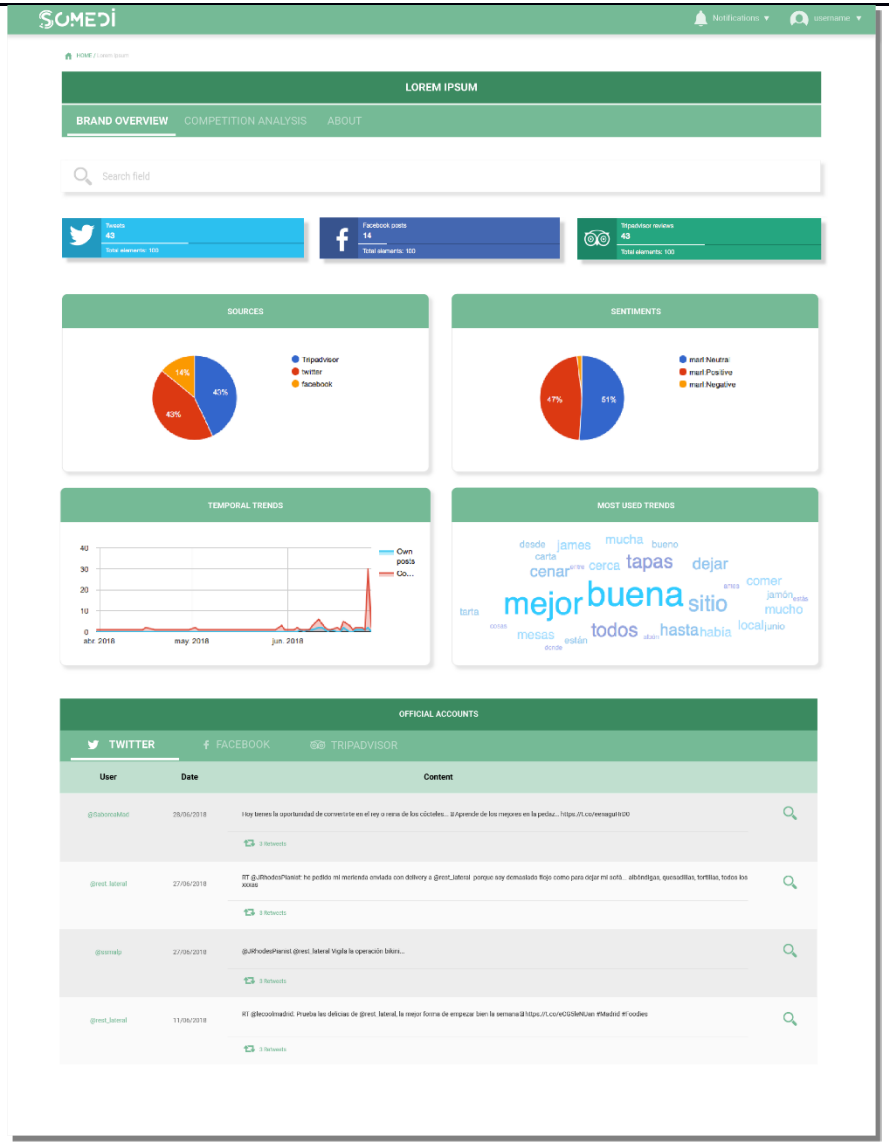
7.1. DID TOOLKIT/MARKETING PILOT

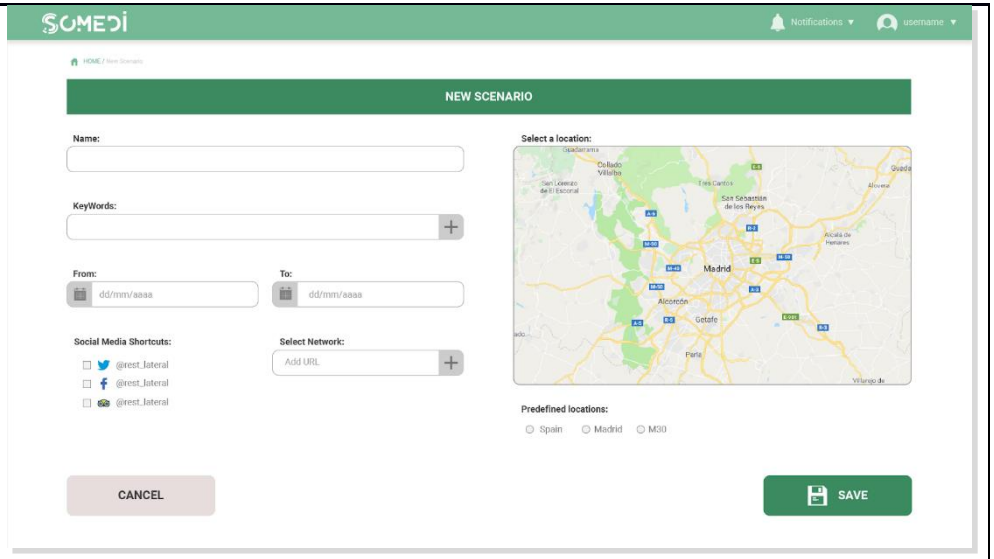
System allows authorized user to save their preferences when configuring their dashboard (preferences like parameters and/or target goals).

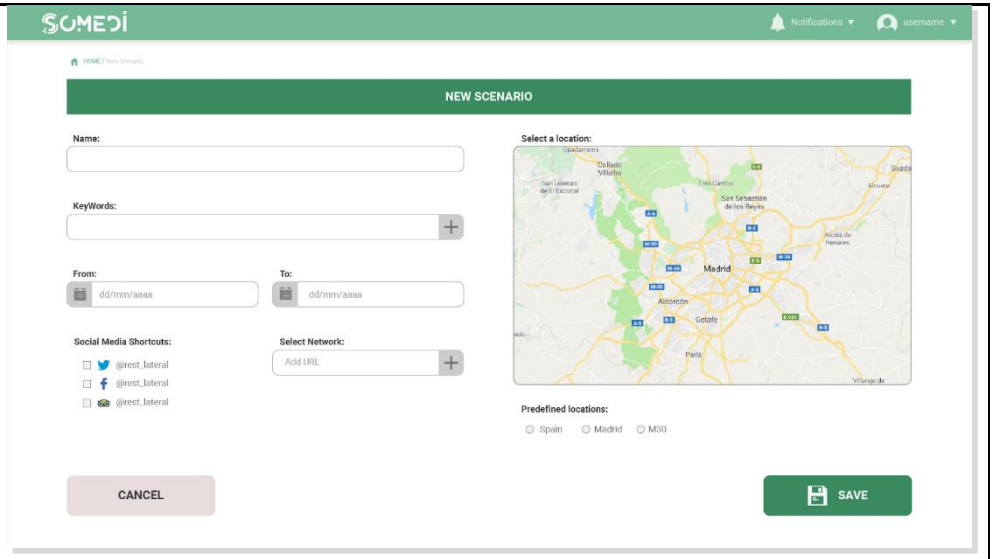
USER	NAME	DESCRIPTION	WIREFRAME
AUTH	General dashboard	Once the authorized user is logged into SoMeDi Platform, the active profiles are displayed through the dashboard and some key summary statistical analysis are provided for each campaign as well as a summary of the profile itself including the selected geo-location, the keywords or the social media where the profile is working. The information of each active profile can be expanded for more details.	

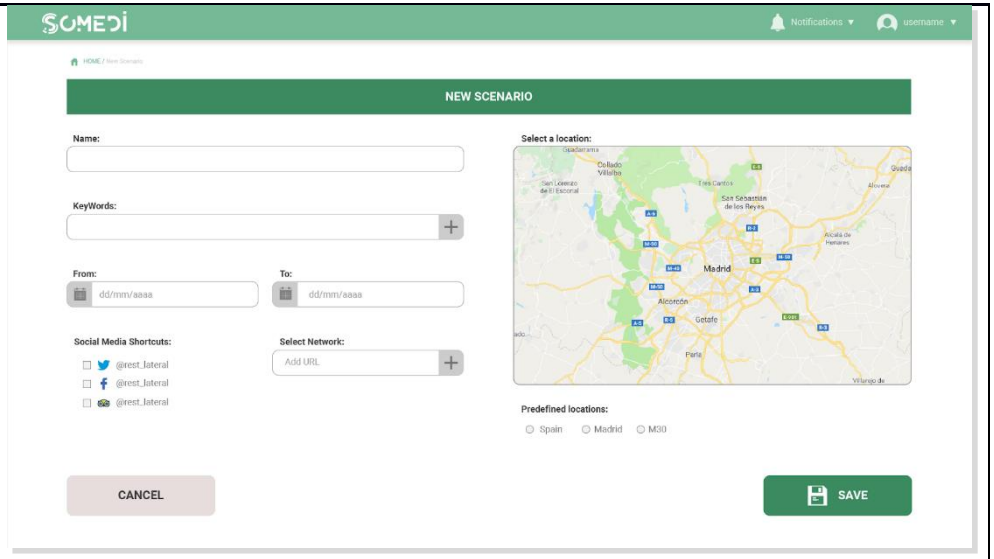
AUTH	Campaign dashboard	If the user clicks on an active profile, more details are displayed through a specific dashboard. Among the available information the user can visualize the statistics, the set of most popular key words and the percentage of change in social media activity, the repercussion of previous publications or the more active spotlights through a heat map. In this page, also the active campaign can be edited.	

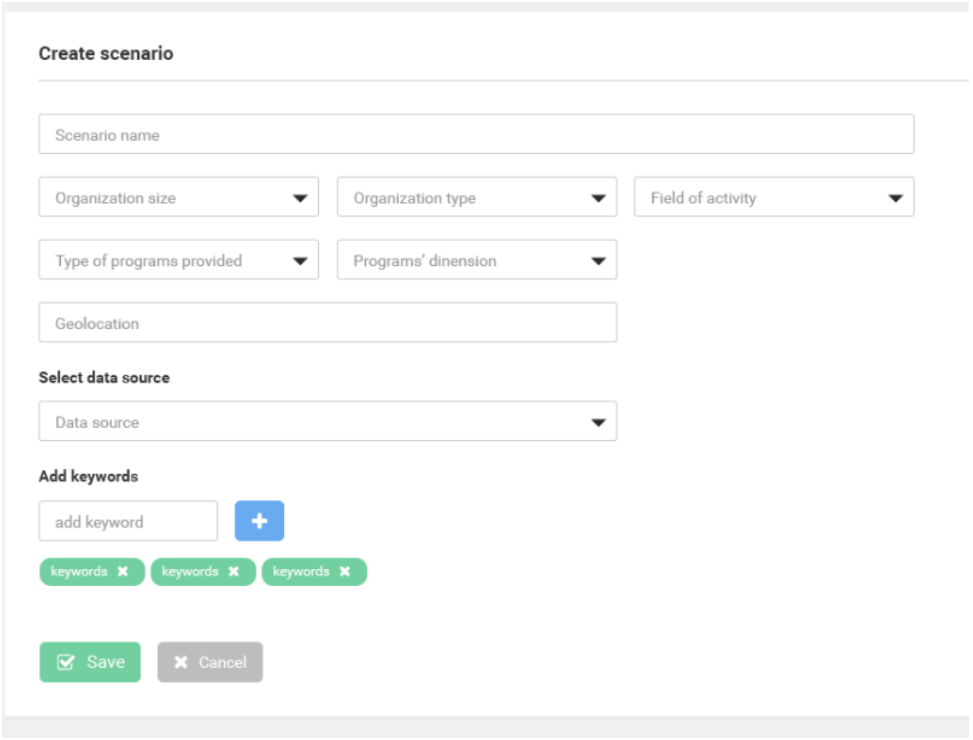
AUTH`	Editing active campaign	The editing of the campaign allows the user to change the keywords, to select the social networks where the campaign is executed or to change the location where the profile is launched. The procedure for editing is the same as of creating a new campaign.	

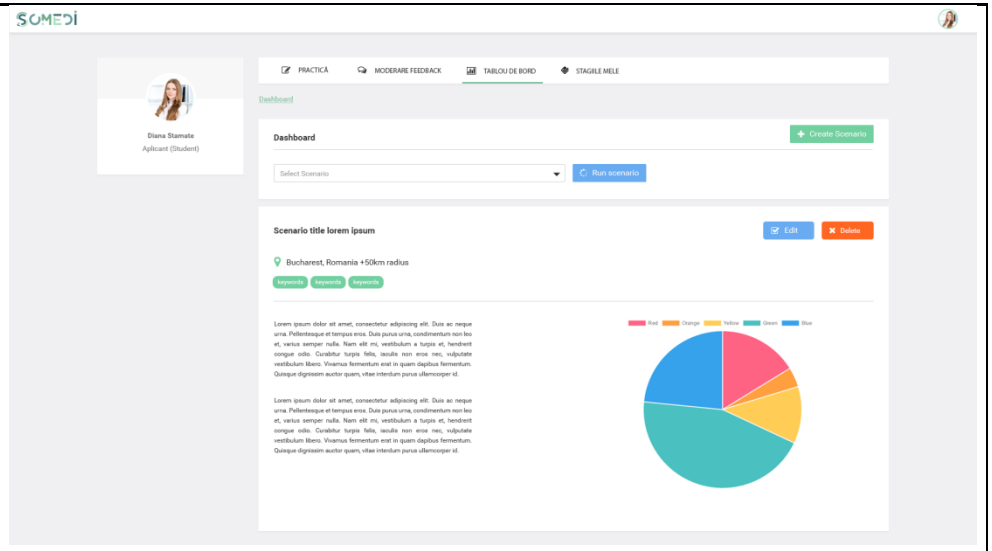
AUTH	Detailed analysis – Statistics	For each campaign, also a detail of data analytics is displayed including for example the number of the reviews or the percentage of tweets containing sentiments information. The appearance of this will be customizable and based on the dashboard presentation technologies capabilities. Here we see some Sefarad widgets.	

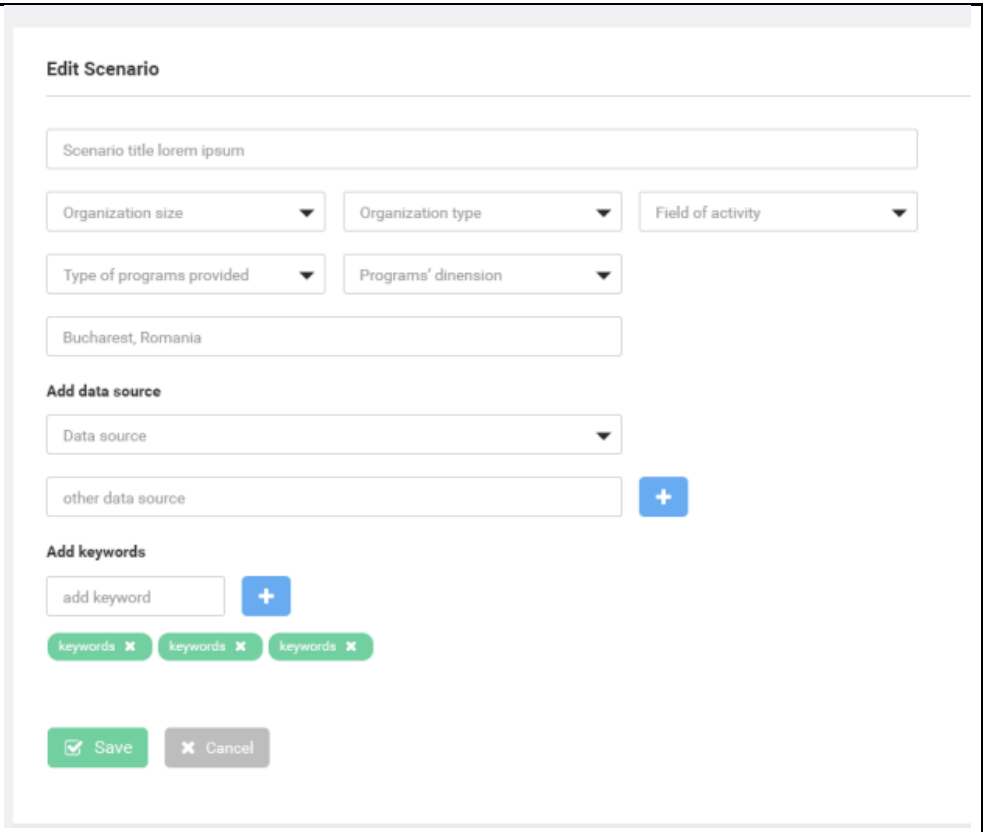
AUTH	Create New Campaign	Creating a new campaign involves following a sequence of forms in which the basic parameters are selected for the campaign. Here, the process starts with selecting the location of the analysis. Some customizable shortcuts are provided so that it may be easier for the user to select some recently used regions or parameters	

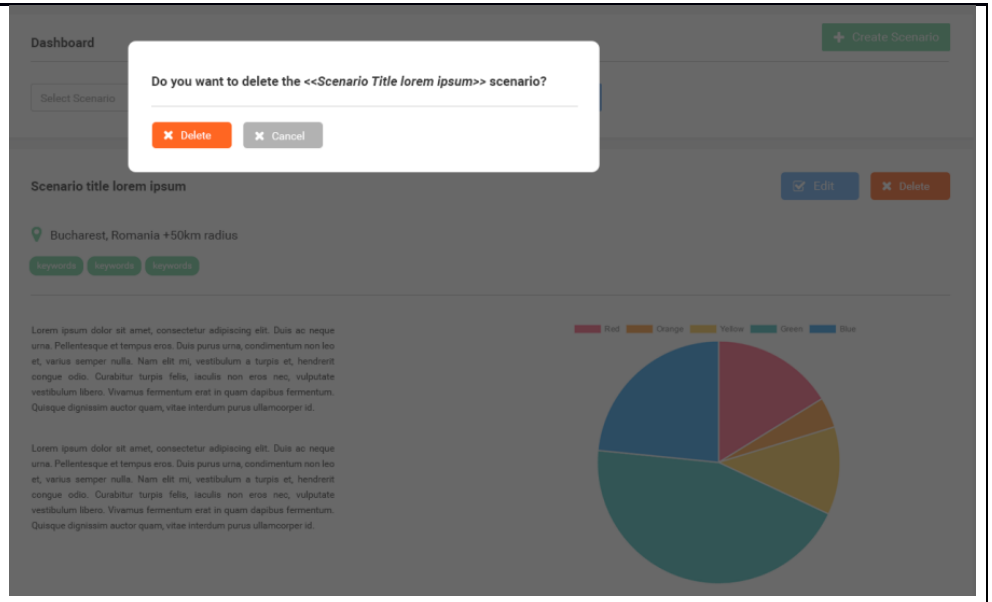
AUTH	Choose the social media for the campaign	For each campaign is necessary to choose the social media that will be scanned. A series of customizable inputs (e.g., the full Twitter stream or particular accounts of Twitter or other social media) are provided so that users can quickly launch search profiles. A field is provided so that users can insert static URLs (e.g., a webpage).	

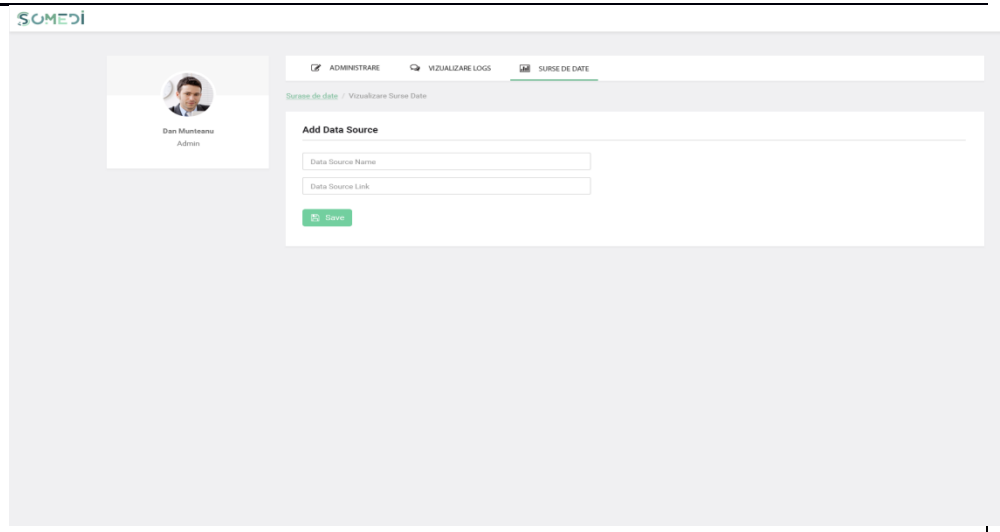
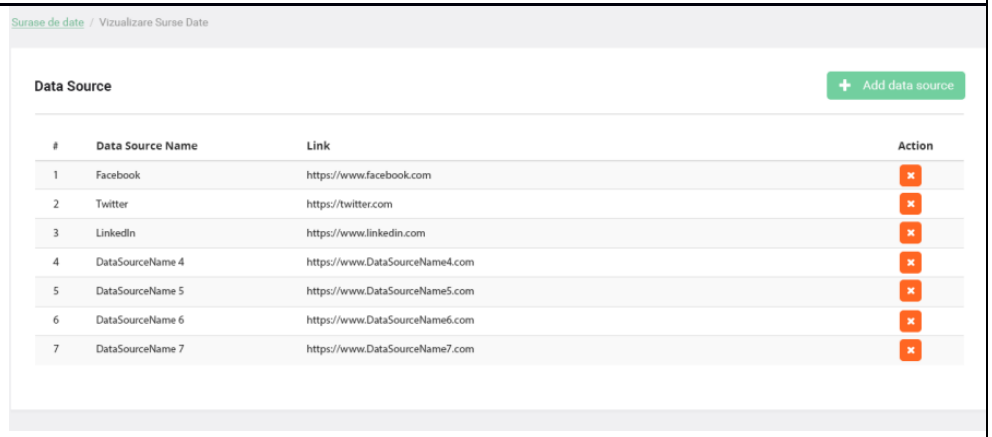
AUTH	Choose the topics of interest	For each campaign the system allows the user to feed particular topics of interest that will be used in the profile. Also, some frequently used or user customizable shortcuts are available for common actions.	

AUTH`	Create scenario	Create a new scenario page where specific information such as name, organization size, field activity, geo-location, keywords will be required.	

AUTH	Run scenario	Run each created scenario. A scenario selected for execution provides information about the data sources required. The data collection access the data sources and retrieves them in the backend service.	

AUTH	Edit scenario	For each created scenario there will be the option to edit scenario details. This will be possible by accessing his edit scenario page.	

AUTH	Delete scenario	For each created scenario there will be the option to delete the scenario. This will be possible by accessing his delete scenario button.	

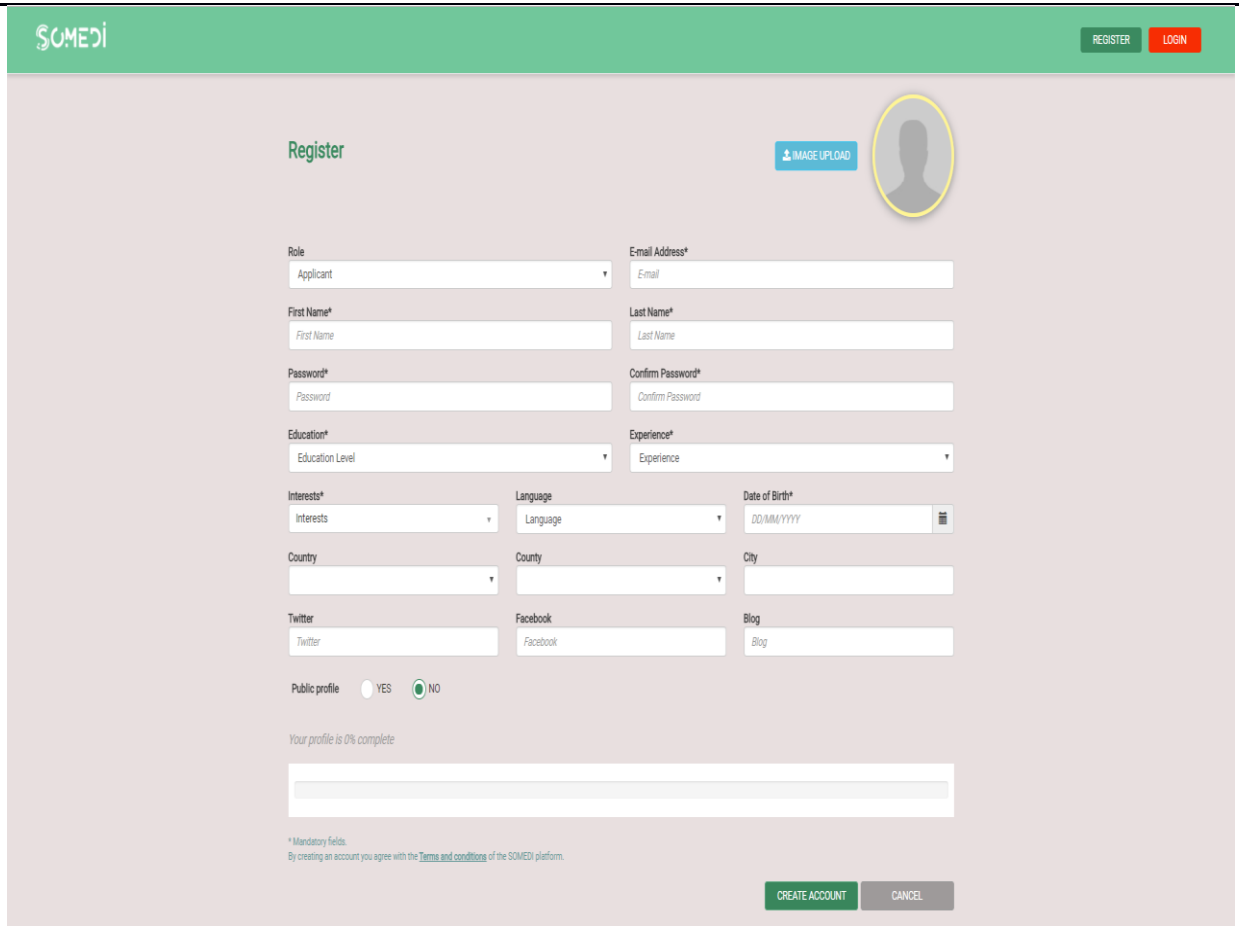
ADMIN	Create Domain Date	The Administrator page will have a Add Data Source button.	
ADMIN	List of Data Sources	The list of existing Data Sources can be displayed on Administrator section	

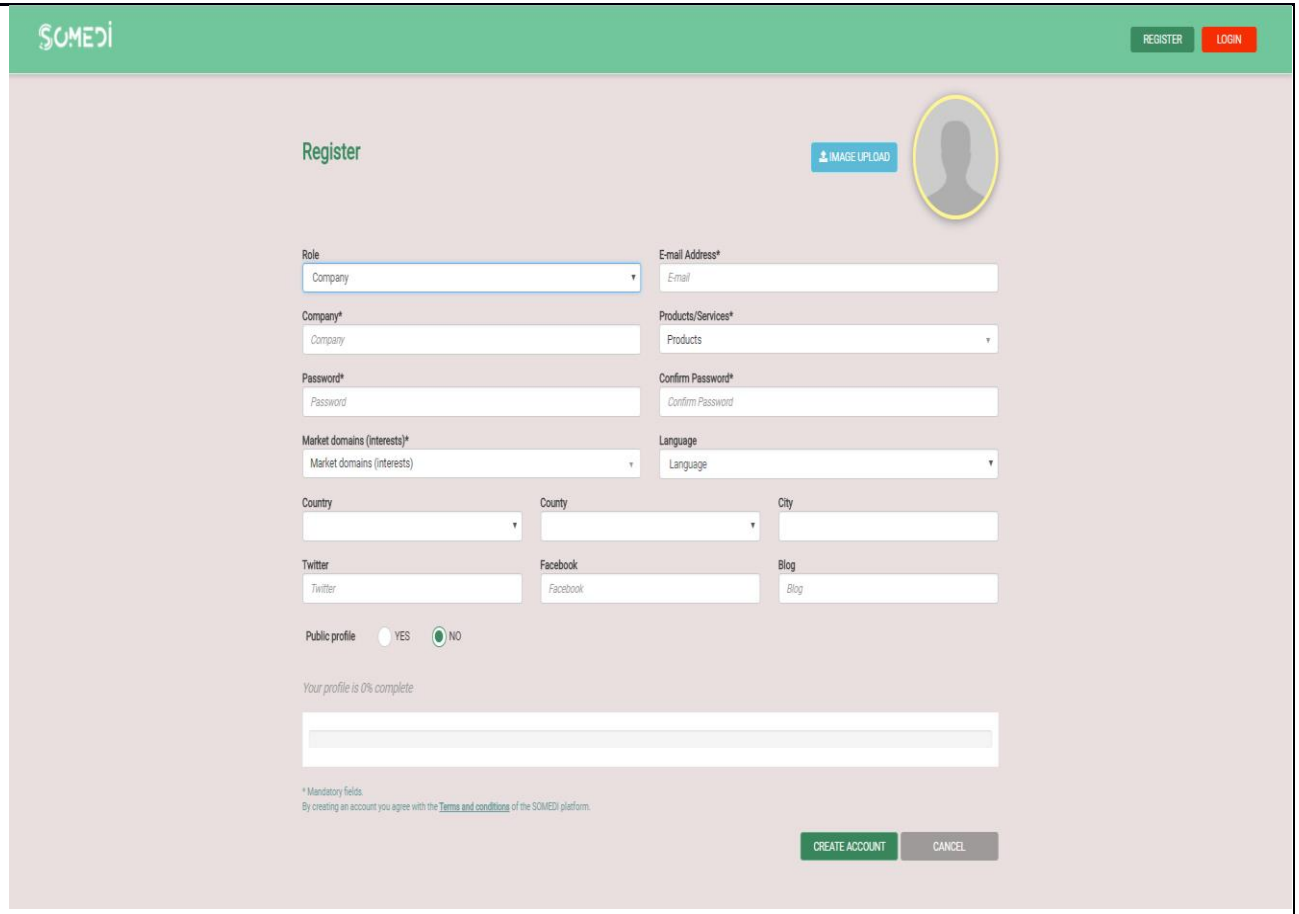
7.2. ROMANIAN PILOT

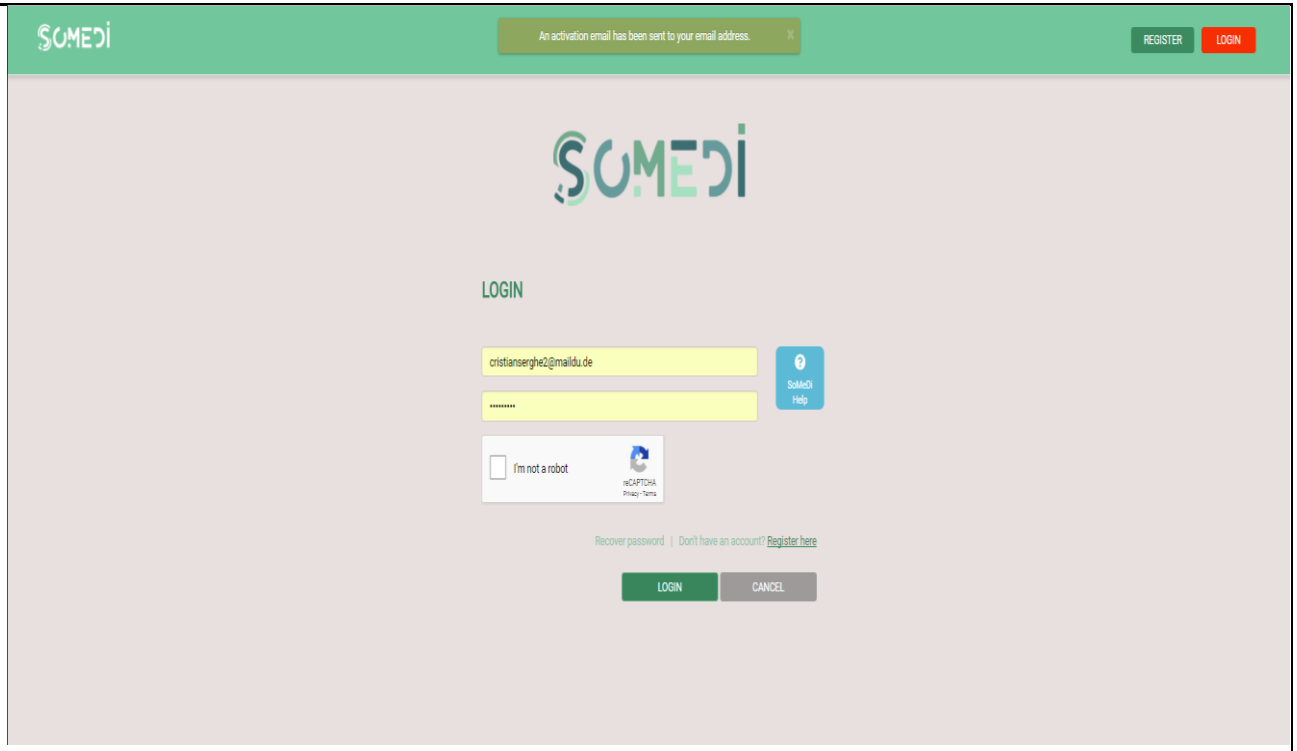
The mock-ups corresponding to user stories for the Romanian pilot are the following:

PUBLIC SECTION – ROMANIAN PILOT

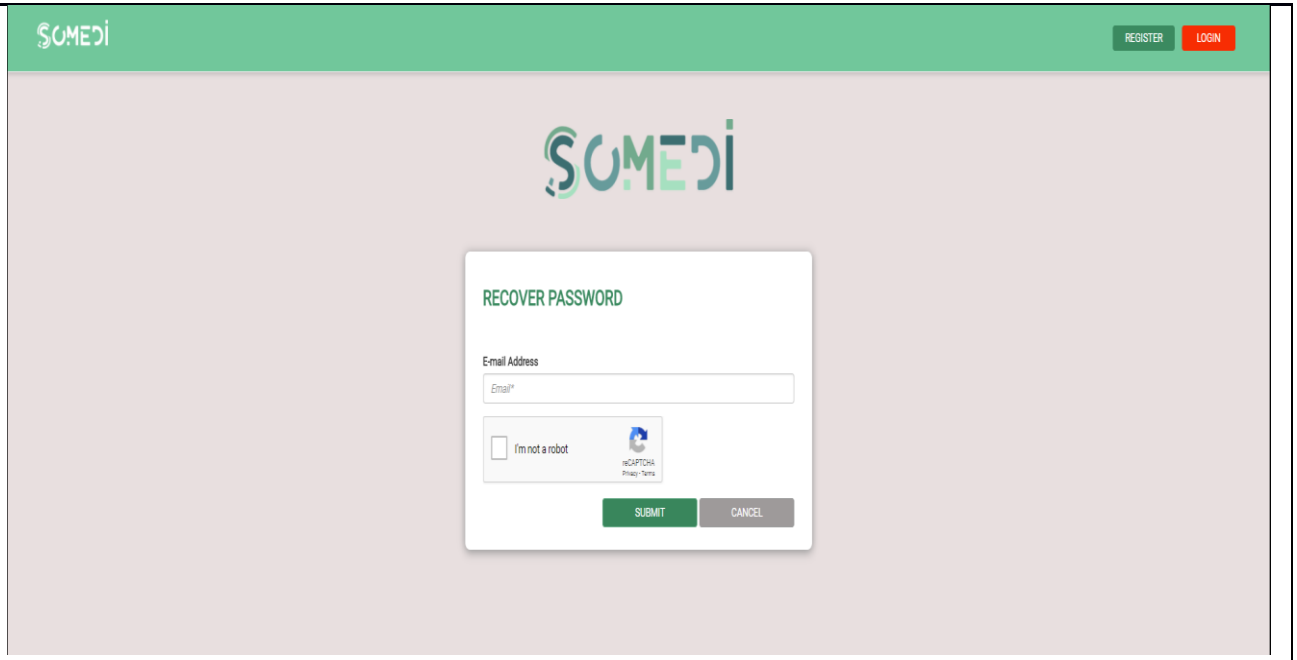
USER	NAME	DESCRIPTION	WIREFRAME
ANON	First page	There shall be an initial page displayed by all accesses to the Web Site. This shall be the First Page of the site.	

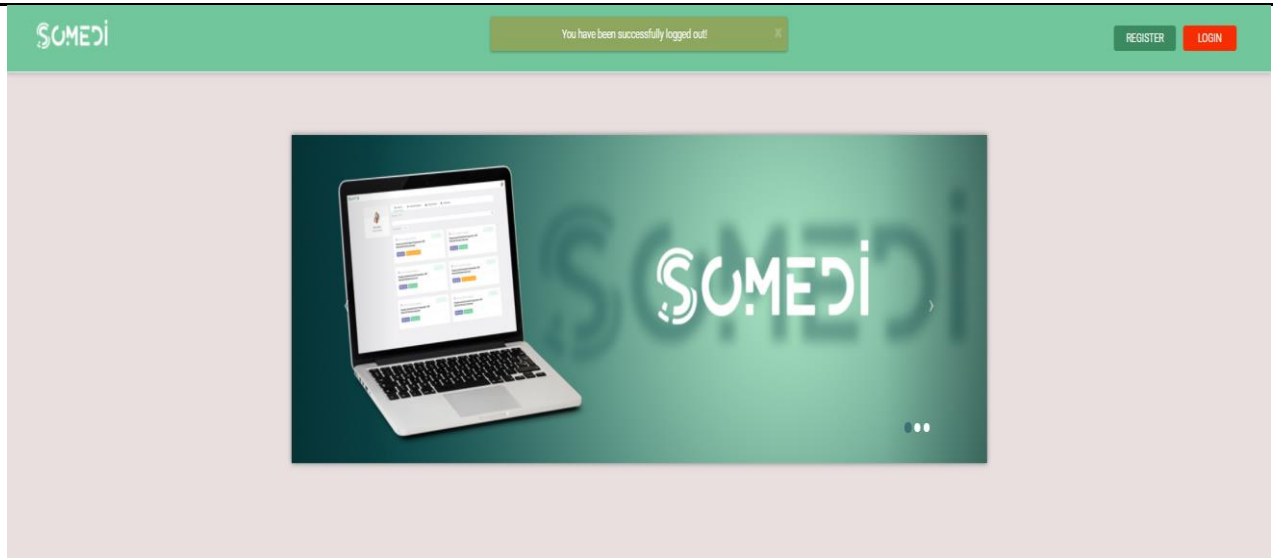
ANON	Login – Registration Applicant	A new user must be able to register into the platform. A registration label will be provided in order to facilitate such functionality; by clicking the registration label the user will be redirected to another page where information such as name, user category, details, e-mail address, password and a password confirmation will be required. There will be two different screens, one for applicants and one for companies, the difference being made by the detail fields.	

ANON	Login – Registration Company		

ANON	Confirmation screen	A confirmation of the account creation screen will be received.	

AUTH, ADMIN	Login - Authentification	This is the Login page for the SoMeDi platform where registered users can log into their profile with their user and password, using the Login label. The “SoMeDi Help” button provides a set of FAQs for helping the user with logging problems. This feature is available also for Administrator users.	

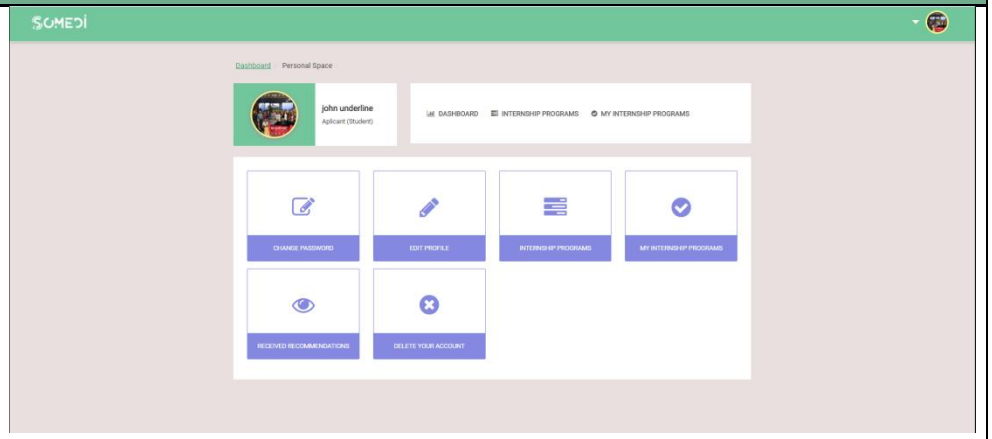
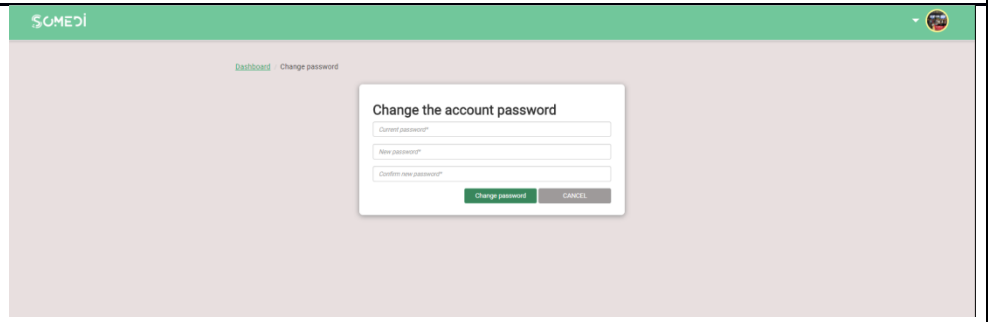
AUTH_A, AUTH_C ADMIN	Reset password	User can change his password.	

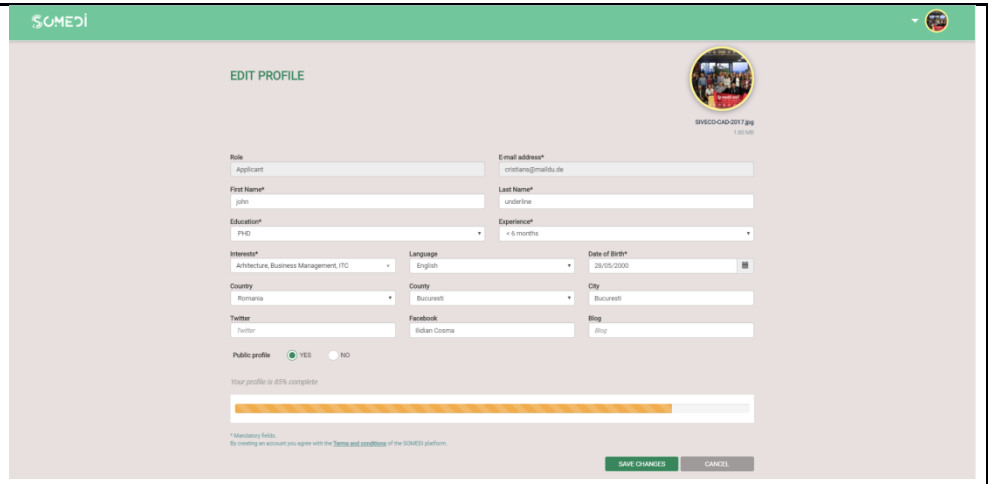
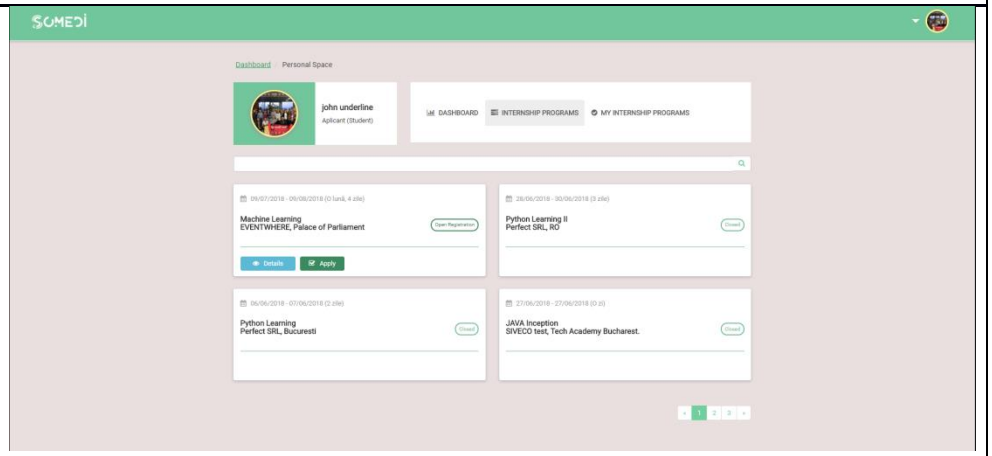
AUTH_A, AUTH_C ADMIN	Log-out from SoMeDi applications	User can sign out from SoMeDi application	

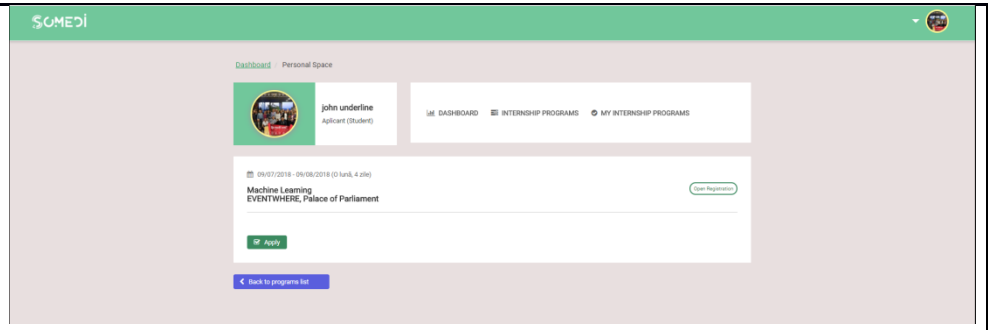
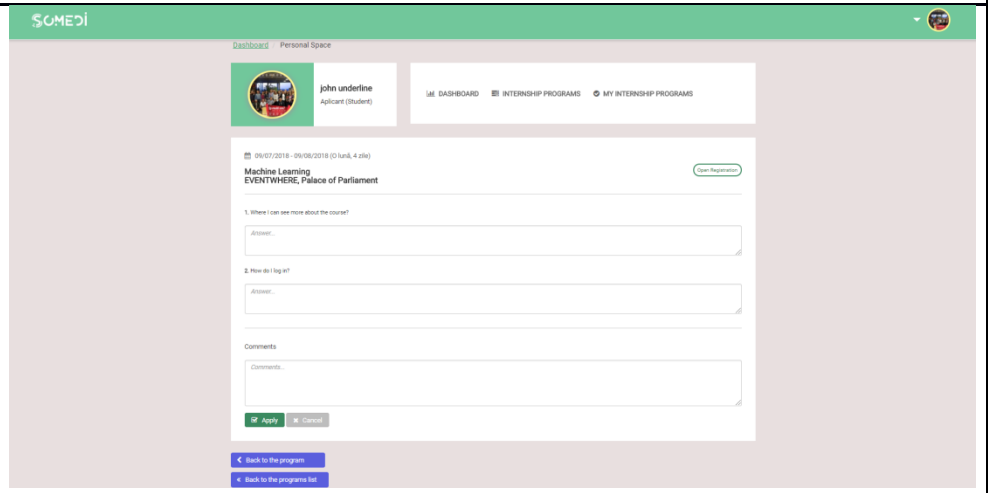
PRIVATE SECTION – ROMANIAN PILOT

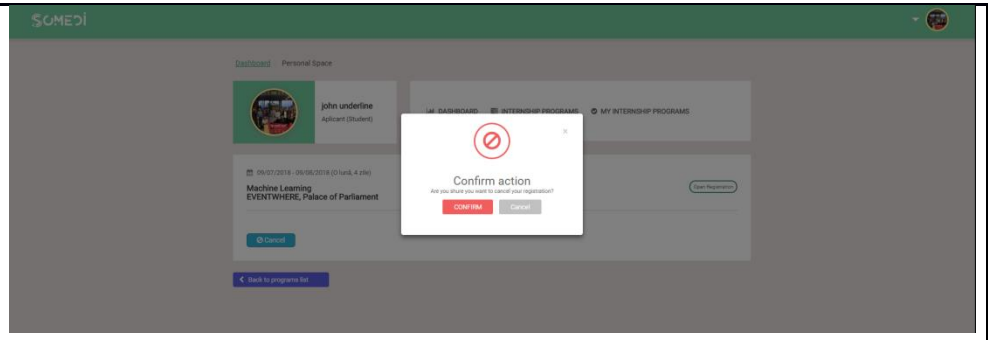
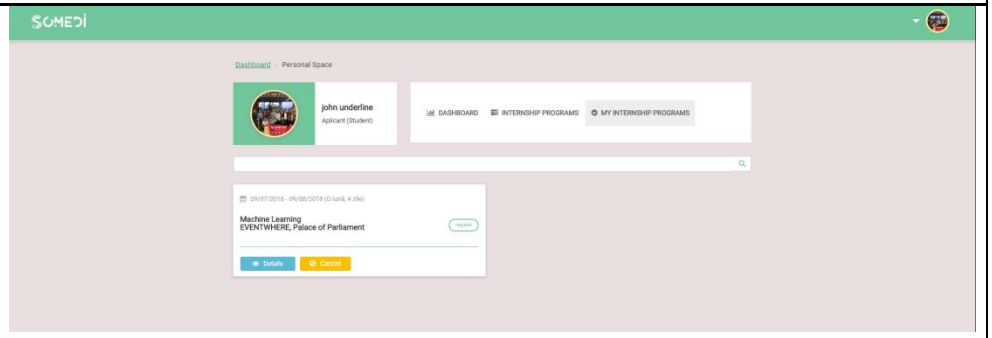
System allows authorized user to have their personal space page, where the existing functionalities are in line with the type of registered user, Applicant (Student) or Company.

The user registered as **applicant** can change password, edit his profile, see all the practical programs available, apply to a desired program, cancel the sign-up for a program, see all the practical programs for which he/she applied and see the received recommendations.

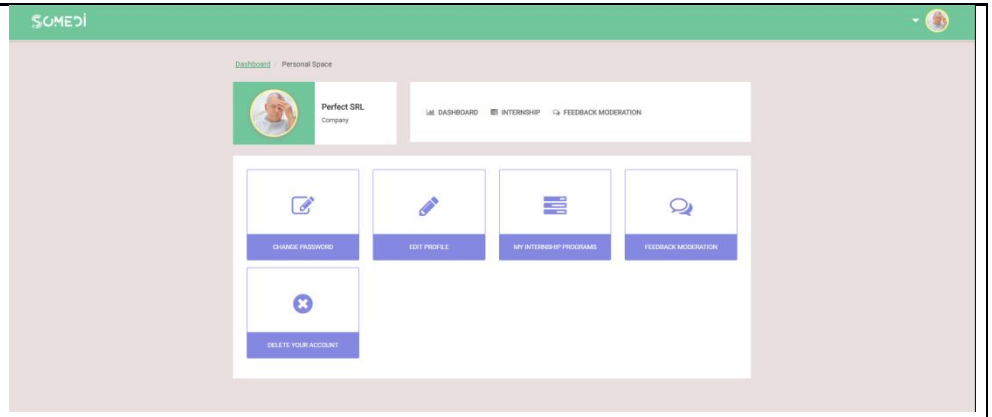
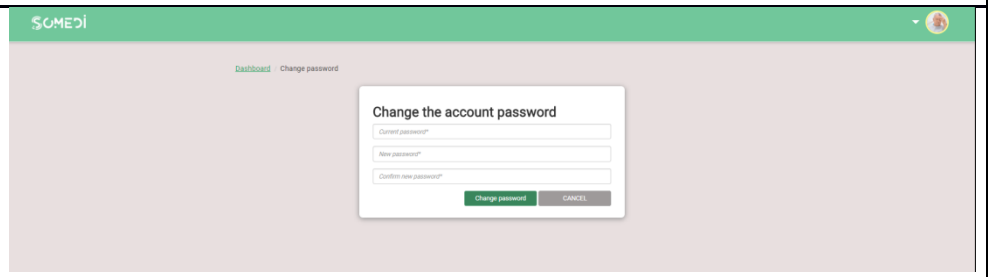
USER	NAME	DESCRIPTION	WIREFRAME
AUTH_A	Student Personal Space	Once the student authorized user is logged into SoMeDi Platform, his personal space will be displayed, allowing access to functionalities like Change password, Edit Profile, Practical Stages, My Stages, Received Recommendations, Registered Companies, Dashboard.	
AUTH_A	Change password	Using the link Change Password from the Personal Space page, the authorised user can change his password, by entering the new password.	

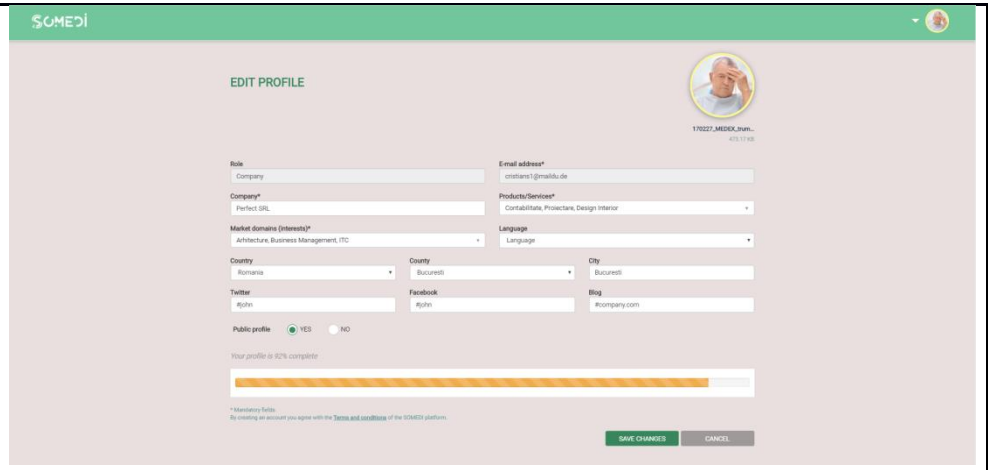
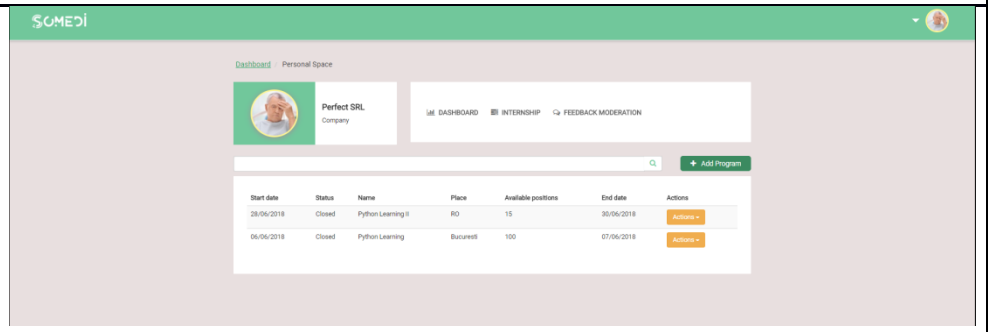
AUTH_A	Edit Profile	Using the link Edit Profile from the Personal Space page, the authorised user can complete/modify data from his profile	
AUTH_A	List of Program	Using the link Practical Programs from the Personal Space page, the authorised user can see the list of program existing in the system with start date over the current date. From this page the user can see the details of a program, can apply for it or can cancel the application.	

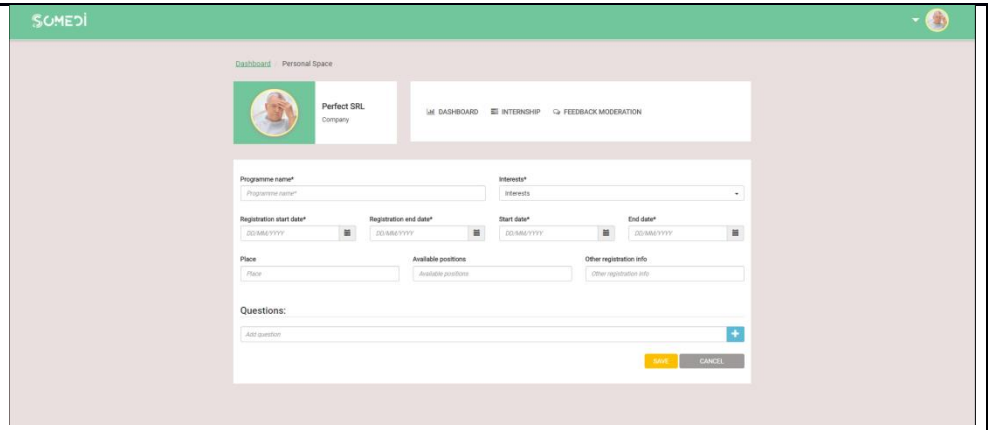
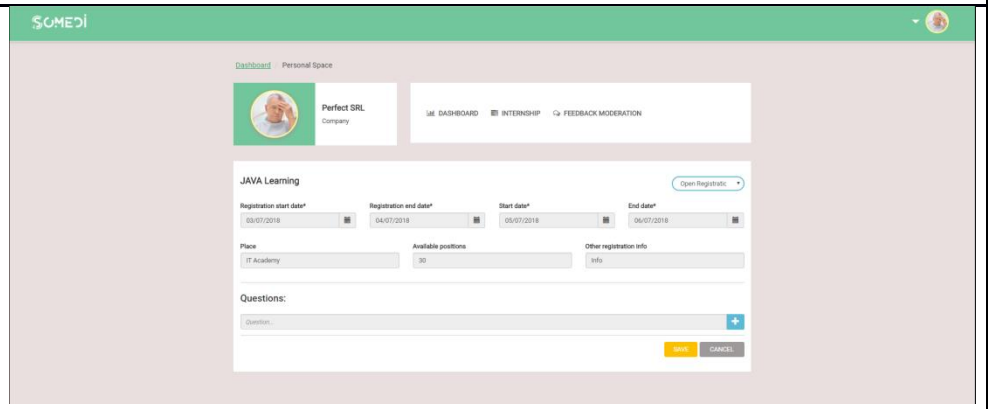
AUTH_A	Details of a Program	Using the link Details from each program, the user can see the specific details of the program and can apply to it.	
AUTH_A	Apply for a program	Using the link Apply from the program's detail page, the user can complete the necessaries information in order to apply for a program.	

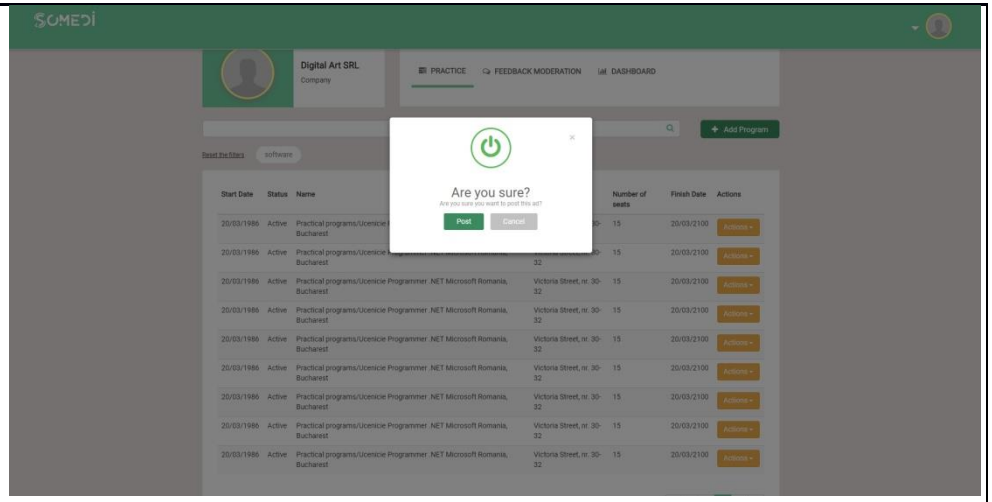
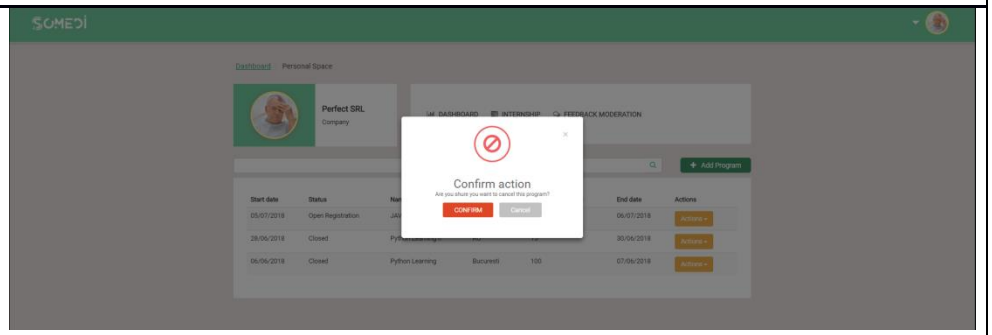
AUTH_A	Cancel the sign-up to a program	Using the button Cancel from Practical Programs link, the user can cancel the sign-up to a program.	
AUTH_A	My stages	Using the link My stages from the Personal Space page, the user can see the program to which applied. The user can access the options to complete feedback and view the recommendation.,	

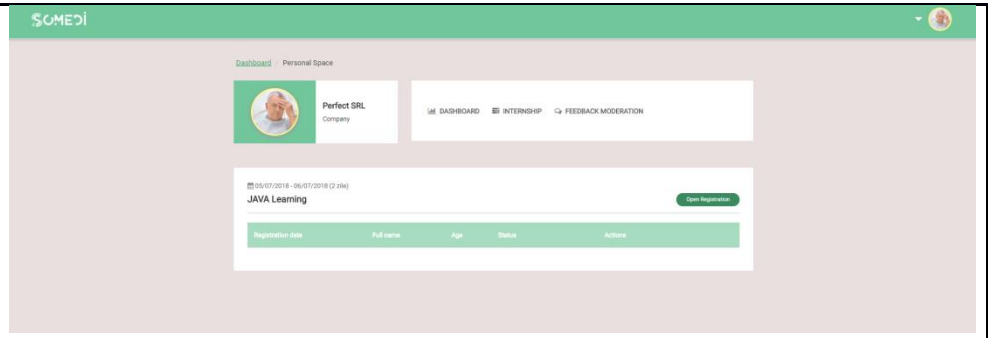
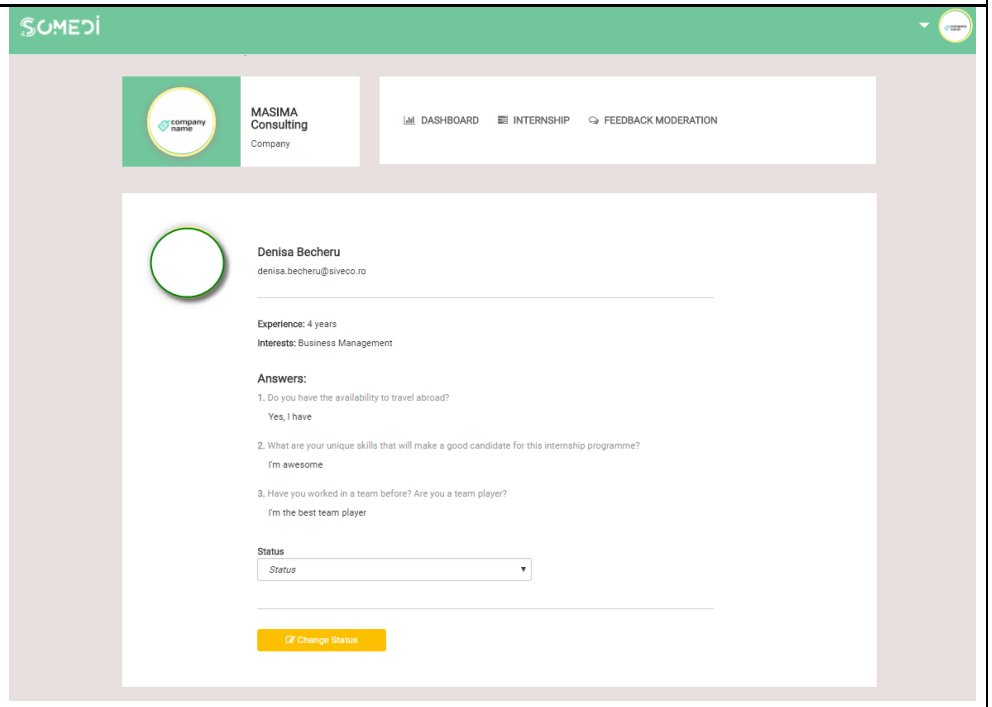
The user registered as **company** has access to functionalities like Change Password, Edit profile, a list of all program, add new program, edit the program details, publish the program, cancel the program, view the list of candidates, manage the candidates.

AUTH_C	Company Personal Space	Once the company authorized user is logged into SoMeDi Platform, his personal space will be displayed, allowing access to functionalities like Change password, Edit Profile, Practical Stages, Feedback Mediation, Dashboard.	
AUTH_C	Change password	Using the link Change Password from the Personal Space page, the authorised user can change his password, by entering the new password.	

AUTH_C	Edit profile	Using the link Edit Profile from the Personal Space page, the authorised user can change data from his profile	
AUTH_C	List of Practical programs	Using the link Practical Programs, the user can see its own program. The user can add new program, edit a program, publish a program or cancel a program.	

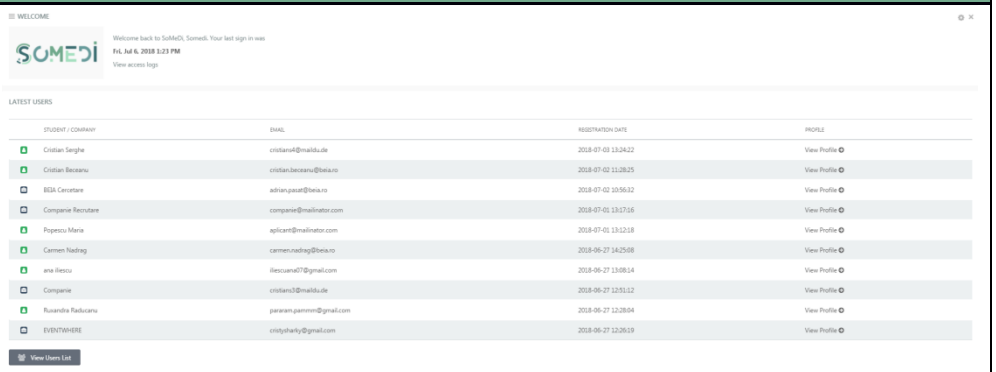
AUTH_C	Add a program	Using the button Add a Program from Practical Programs page, the user can add new program, by completing the necessaries details.	
AUTH_C	Edit an existing program	Using the Actions button from Practical Programs page, the user can edit an existing program. For program with “Draft” status, all fields can be modified. For other status, only the field Status can be modified..	

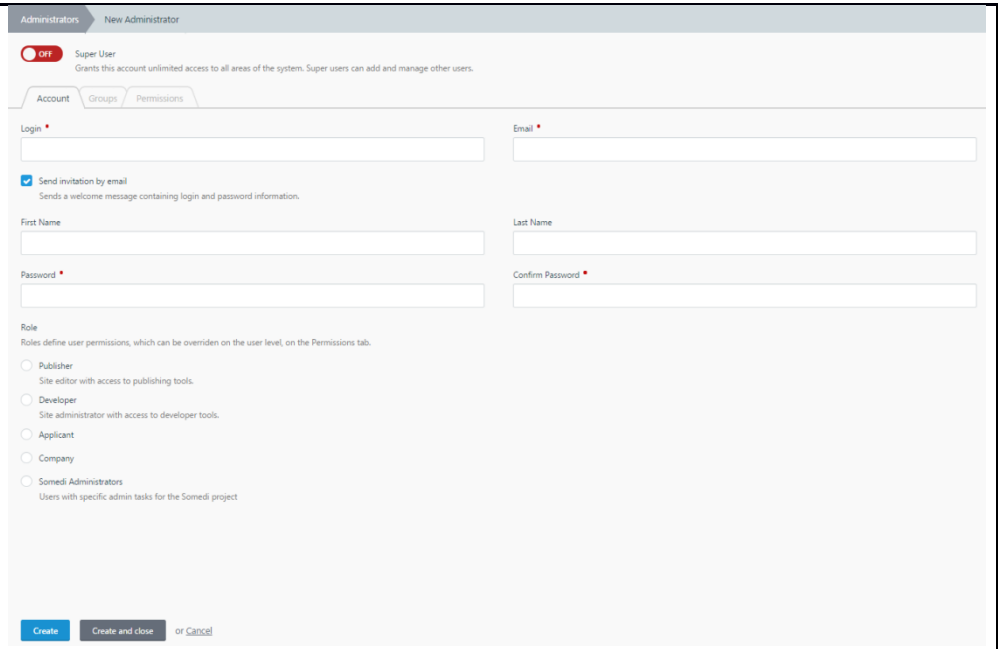
AUTH_C	Publish a program	Using the Actions button from Practical Programs page , the user can publish a program with “Draft” status.	
AUTH_C	Cancel a program	Using the Actions button from Practical Programs page, the user can cancel a program.	

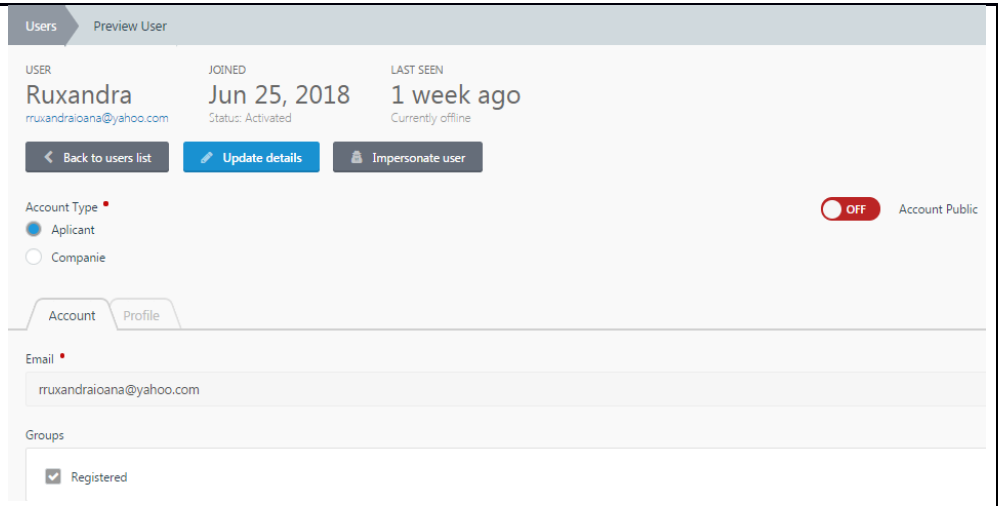
AUTH_C	List of candidates for a program	Using the Actions button from Practical Programs page, the user can see list of candidates which apply to a program.	
AUTH_C	Management of candidates	Using the link Management applicant from List of candidates page, the user can change the candidate's status (Accepted, Rejected, In the analysis, Graduate) and can complete recommendation.	

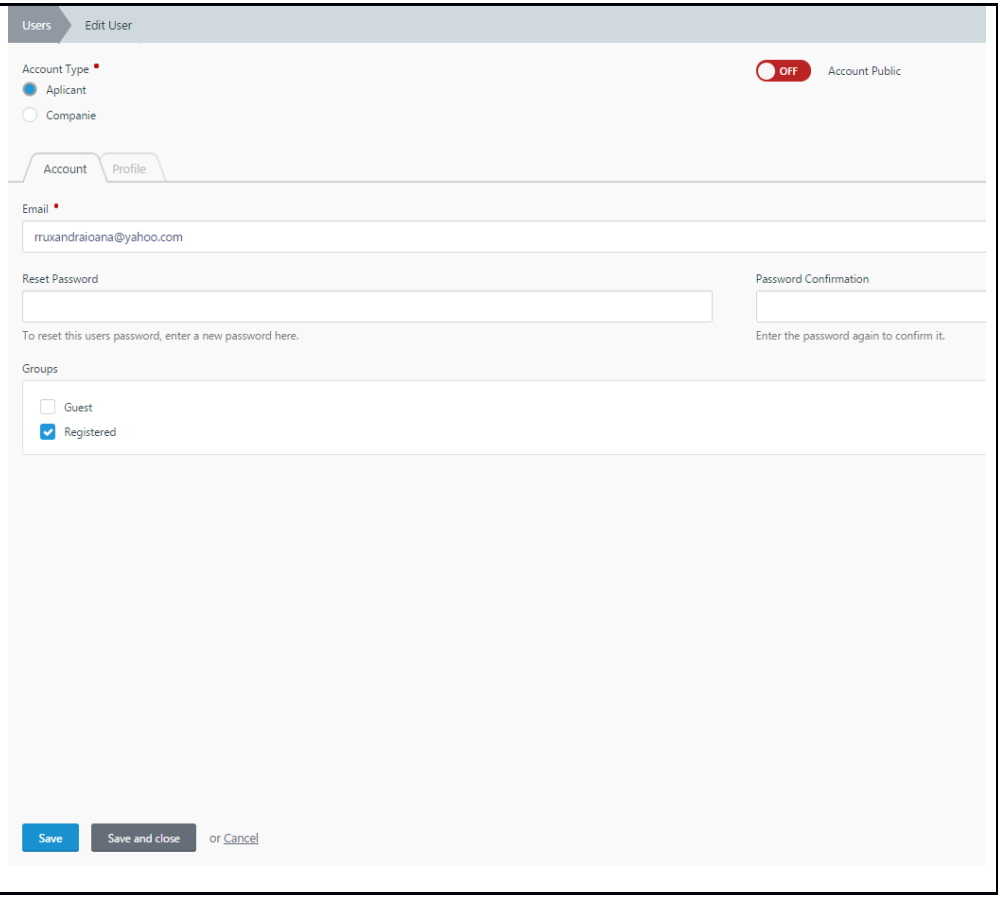
ADMINISTRATION SECTION – ROMANIAN PILOT

The Administration settings section of the SoMeDi platform will show a list of Users and Data Sources created by the administrators. For each User there will be the option to view/edit User details. For each Domain Data there will be the option to edit Data Sources details or delete it.

USER	NAME	DESCRIPTION	WIREFRAME
ADMIN	Administration settings section	The platform will have an administration section, available only for users with Administration role. This section will show a list of Users. For each User there will be the option to view/edit User details..	

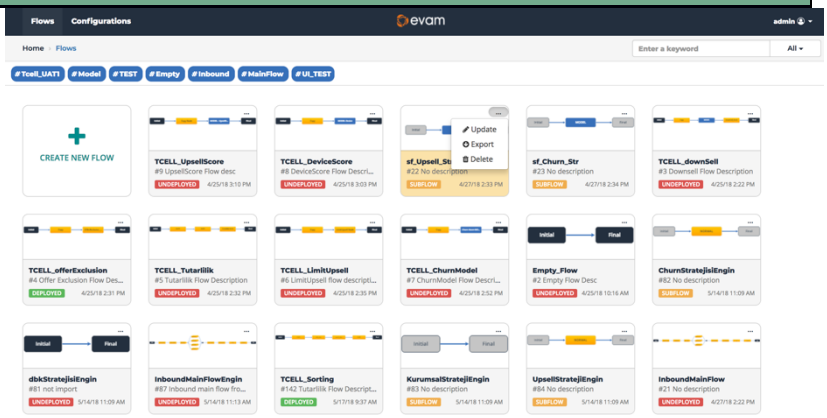
ADMIN	Create user	The Administrator page will have Create new user button. The created users will have Administrator role.	

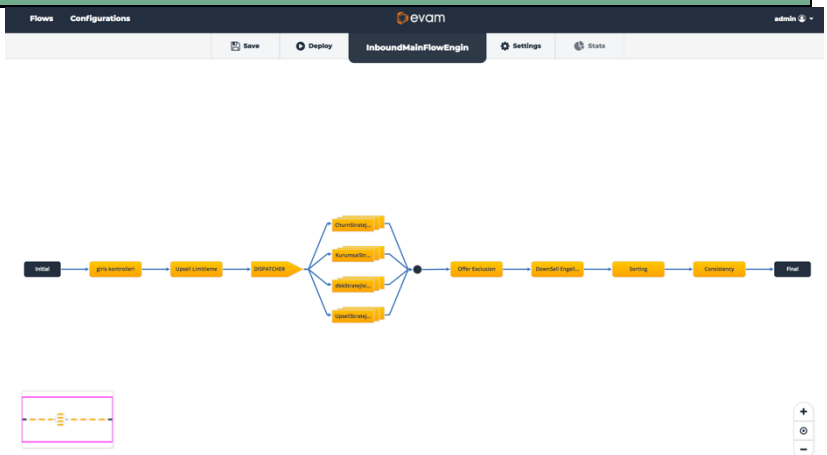
ADMIN	View user	For each created user there will be the option to view user details.	

ADMIN	Edit user	For each User there will be the option to edit user status.	

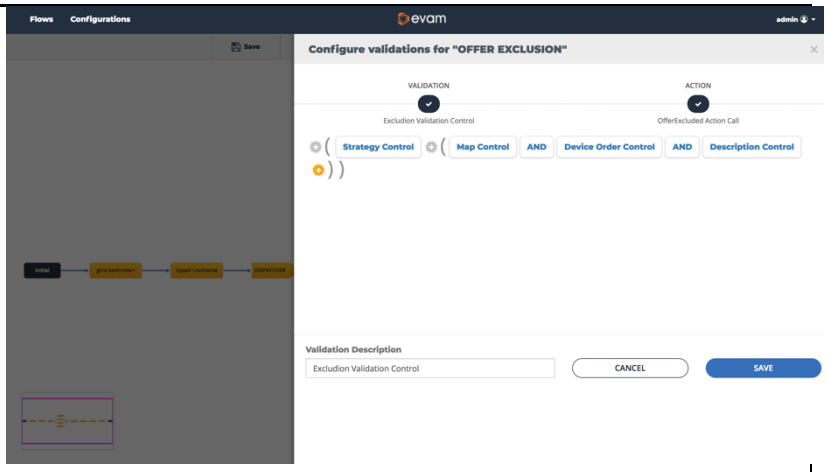
7.3. TURKISH PILOT

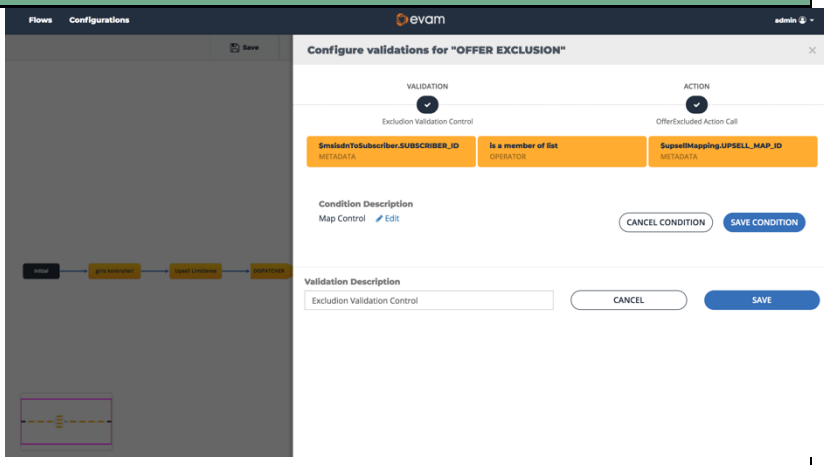
The Authorized User settings section of the SoMeDi platform will display a list of workflows and functions that a user can see and run some operations on it.

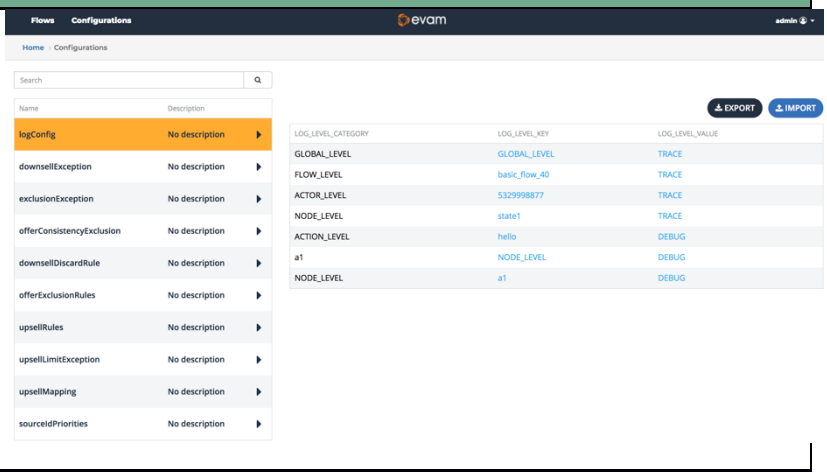
USER	NAME	DESCRIPTION	WIREFRAME
AUTH	Flows	Main screen of the product to see the list of workflows in the environment for operations Functionalities of the screen ; - Listing the workflows : it can be filtered with Types subflows or mainflow), names state and status or tags - Creating or importing a workflow - Operational Functions like Deploy, Undeploy and Suspend	

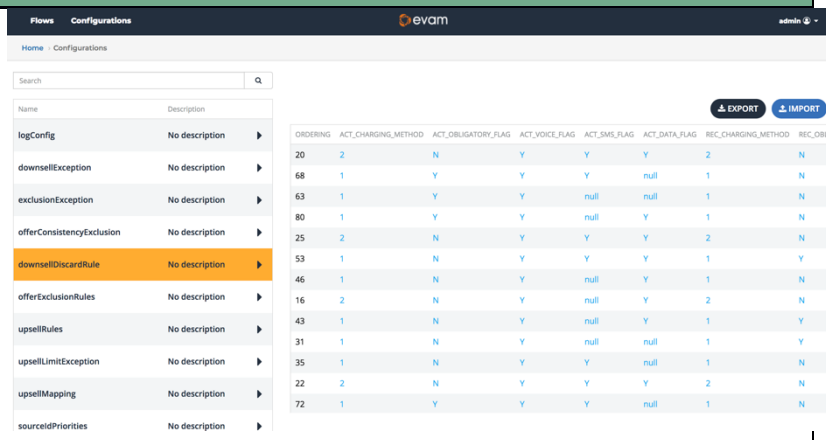
USER	NAME	DESCRIPTION	WIREFRAME
AUTH	Edit Flow	By selecting the update function of the flow on Flows screen; Functionalities of the screen ; - adding/updating/deleting items on the flow - Items: there are two types of functionalities of an item, Validation and Action. Action will be run if the validation is true - Item types o Node : basic item it contains validation and action o Dispatcher : to call subflows with a validation checks o Sublow : reusable flows with its own flow o Model : to call a Analytic Model for evaluations	

USER	NAME	DESCRIPTION	WIREFRAME

AUTH	Formula Entry	Editing/creating of a validation on Items; Easy way to create complex validation	

USER	NAME	DESCRIPTION	WIREFRAME
AUTH	Configure Validations	Editing/creating of a validation in the complex validation;	

USER	NAME	DESCRIPTION	WIREFRAME
AUTH	Manage Configuration	Editing the configuration of Built In Functions like Log Level	

USER	NAME	DESCRIPTION	WIREFRAME
AUTH	Import & Export Configuration	Editing the configuration of Custom Logics by import and export	

8. CONCLUSIONS

Wireframing is a very simple way to start the development of visual prototype and project the tasks end users have to fulfil to accomplish the goals set in accordance with the identified requirements. It allows designers to express their ideas and transpose them into a tangible form that can be debated amongst the team and revised both by project members and end users. Wireframes are not only quick and easy to create and change, they also help focus on the "big picture" regarding structure and functionality without getting lost in details about fonts or colours.

The result of T2.1 is valuable to the successful completion of WP2 outcomes, as it offers the basic understanding for graphical user interface. This second version of deliverable is providing a new version for mock-ups. This version of mock-ups was developed starting from the initial wireframes, included in the first version of this deliverable, and applying the users' feedback for those wireframes.

9. ANNEX 1 QUESTIONNAIRE FOR EVALUATION

In order to evaluate the interface design of the SoMeDi, we can use motivational qualitative interviews to receive feedback from users.

Research questions	Interview questions	Questions to help answering
Effectiveness	Describe how the interface supports your task in terms of achieving the goal. Explain how you solved the tasks?	What obstacles prevent users from completing task?
Satisfaction	How satisfied are you with the product and the interface?	What causes frustration or satisfaction? Describe the feature.
Conformity with regard to expectations	Explain how the solution might be of value for you? How does it correlate with your expectations? Which suggestions could you contribute to improve the design?	
Functionality	What do you think of the functionality of the web site? How does the menu work for you? How did you experience the navigation on the homepage? How satisfied are you with the design: colours, size, contrast, symbols etc. How do you think the information you got on the homepage was usable? Describe missing features regarding functionality.	How do you understand the text on the site? Are the functions of the site easy or difficult to use? Did you need to request help? At which points do you actively request help? Describe interface elements you find problematic or helpful. Are some interface elements problematic? Can you describe some good elements? Did you miss some functions?
Affect	Describe how you felt, while you tested the solution.	
Marketing analyses questions	Which adjustments would make this product more attractive for you?	