Deliverable

D4.4 SSI Ecosystem Cookbook

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[1] R = Report, P = Prototype, D = Demonstrator, O = Other)

Short description of the content of the deliverable

This deliverable is a hands-on SSI ecosystem “cookbook” that describes a standardised methodology for facilitating best practices transfer and collaboration with other ecosystem members, across regions in and outside of Europe, across application sectors, technologies and value chains from research to production, and across ecosystem boundaries.

It focuses on the use of several tools developed in the frame of the EXPRESS project.

Table of contents:

[2] PU = Public, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for members of the consortium (including the Commission Services)

1 Executive summary

A standardised methodology for facilitating best practices transfer and collaboration with other ecosystem members, across regions in and outside of Europe, across application sectors, technologies and value chains from research to production, and across ecosystem boundaries, will be created and documented in a hands-on SSI ecosystem "cookbook".

Given the inherent complexity of SSI, the structure of the cookbook will have a modular composition so that users can quickly identify with the specific aspects that are relevant to their particular activity within the SSI value chain. Beneficiaries will include all players along the SSI value chain but the cookbook will be conceived and written in such a way as to allow players new to the SSI ecosystem to quickly identify with their respective activity within the ecosystem, thereby maximizing the impact to these members and thus increasing the overall effectiveness of the cookbook.

Finally, the cookbook is a manual including all the tools developed in EXPRESS for the SSI ecosystem community and describing what they should be used for and how to use them.

It includes four modules listed below:

- The ecosystem schematics, which helps anyone finding his place in the ecosystem.
- The ecosystem knowledge Gateway (D4.5), which helps visitors to find the right information they are looking for independently of their proximity to Smart Systems.
- The augmented SRA (D3.2), which intends to help companies searching value opportunities based on the application Smart Systems Integration in their offering.
- The Strategy and Implementation Plan (D3.4), in which one can easily identify the topics where he can contribute, according to his position in the SSI ecosystem.

2 Background

The realisation of the cookbook is based on many other deliverables listed above and could only be achieved after their completion. The initial deadline was largely underestimated and not realistic, which explains the delayed delivery of the cookbook.

3 Methodology

The cookbook started with a meeting in Madrid attended by the three co-authors on May 21st 2015.

The first work was identifying the EXPRESS outputs that can be useful for an existing or a new actor, companies or other organisations such as clusters or associations, willing to engage or collaborate within the SSI ecosystem. We have been looking for anchors on which a company could rely to be part of the game.

Starting from the EXPRESS deliverables, we identified the relevant inputs for the cookbook and organised them into modules. Some of them were subdivided into submodules.

- Ecosystem schematics
- Ecosystem knowledge Gateway
    - Application sectors and showcases
    - EU Capability radar

- Augmented SRA consultancy
    - Clinic
    - Immersion
    - Roadmap

- Strategy and implementation plan
  - Sharing expensive infrastructures
  - Address finances
  - Increase public awareness

We then defined a common template to be used for each modules or submodules.

Template:

- Short description
  Purpose and objective of the module. Input used as reference. Tools.
- How to use (standardised methods)
  Will be different for each module
- Example
  Use an example of a company and one of a public organisation

The first draft of the structure was circulated among the EXPRESS partners. The final version was validated, based on the feedback provided by the consortium.

The first draft of the deliverable was also circulated among the EXPRESS partners. The final version was validated, based on the feedback provided by the consortium.

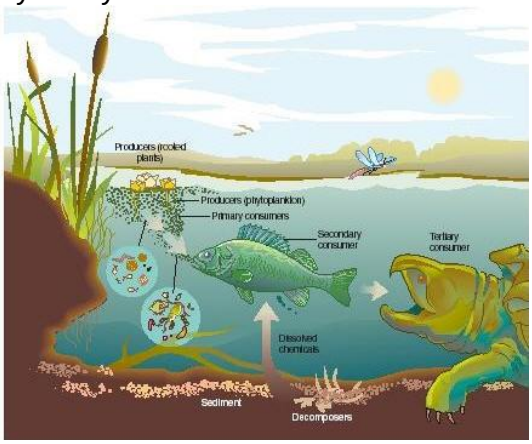
4 Cookbook Modules

4.1 Ecosystem schematics

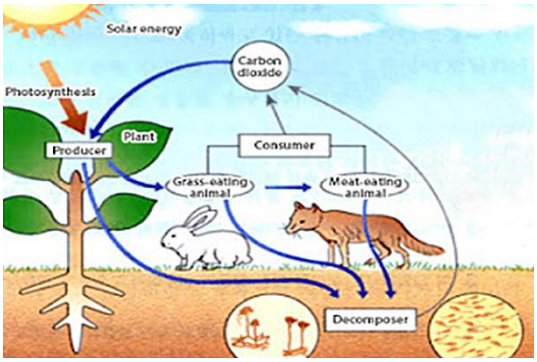
4.1.1 Short description

The concept of ecosystem applies first to living organisms and known as natural ecosystem. It describes a community of living species in a given environment and their complex interactions. It's all about taking and giving resources, eating and feeding, predators and preys and the internal and external factors that control or disturb the equilibrium of the ecosystem.

Many ecosystems have been described and are continuously studied:



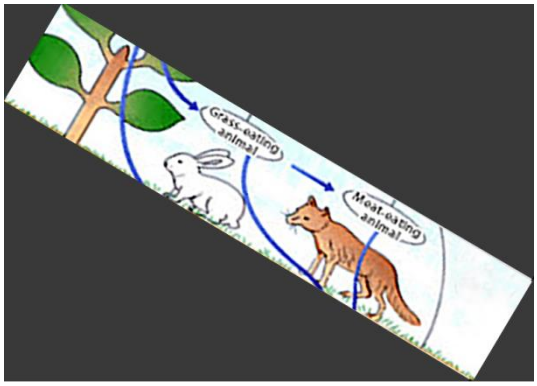
Aquatic ecosystem
©The Gale Group



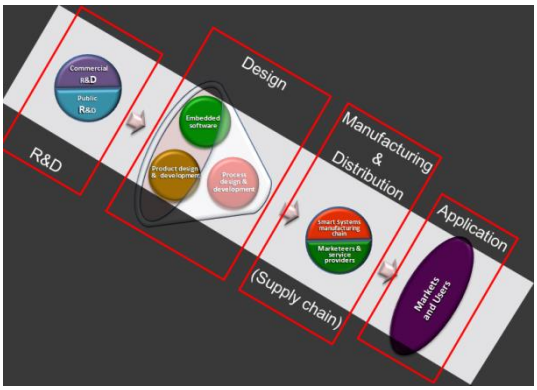
Terrestrial ecosystem
©Ministry of Environment, Korea

The concept of business ecosystems appeared in the 1990s and is widely used to describe a specific community or branch in the economic world, with its individual organizations and their interactions, with taking and giving resources, predators and preys, internal and external factors influencing the equilibrium in the flow of energy, goods and cash.

Basically, the analogy starts with the food chain becoming the value chain, with ideas, R&D, design and prototyping, manufacturing, sales and distribution and finally the market.



Food chain of a natural ecosystem
© David Topham 2014



Smart Systems value chain
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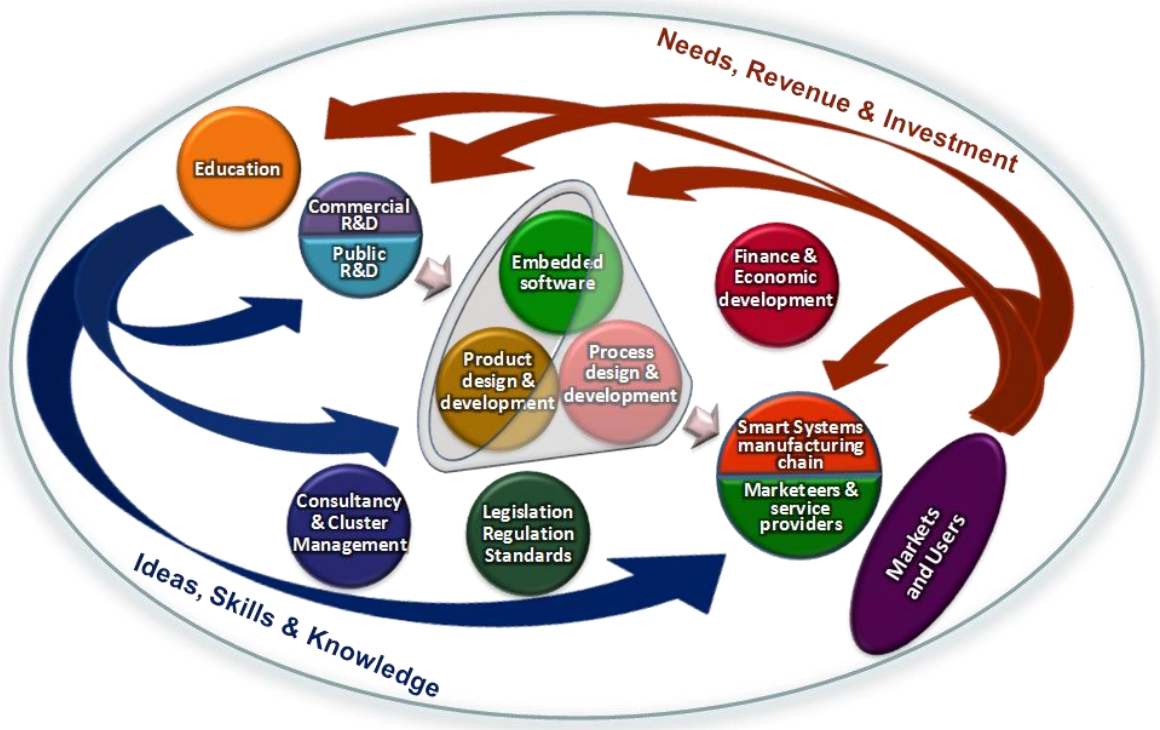
Adding to the value chain all the external factors influencing the ecosystem, such as education, continuous education, legislation, intellectual property, funding and needs from the market, the final Smart Systems Ecosystem schematics, elaborated and adopted by EXPRESS partners looks as follow.



Schematics of the SSI Ecosystem
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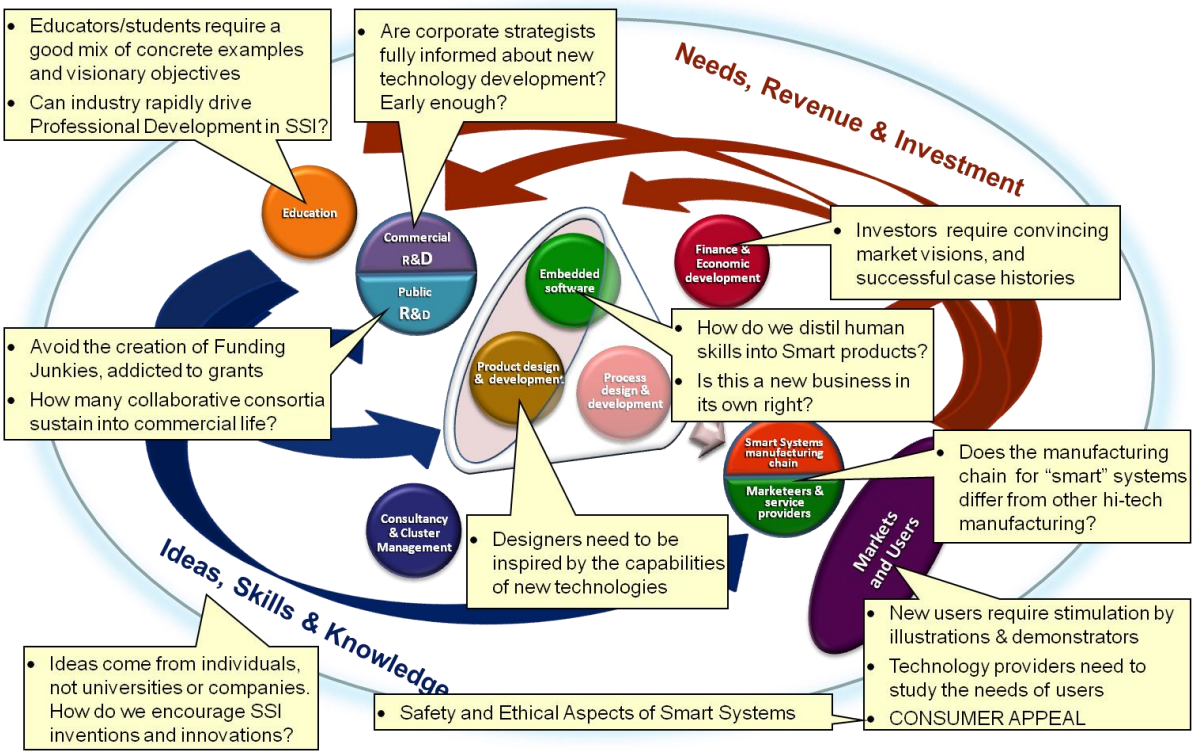
The ecosystem schematics help anyone finding his place in the ecosystem. It also raises many questions, as shown in the next picture.



Questions raised by the SSI Ecosystem
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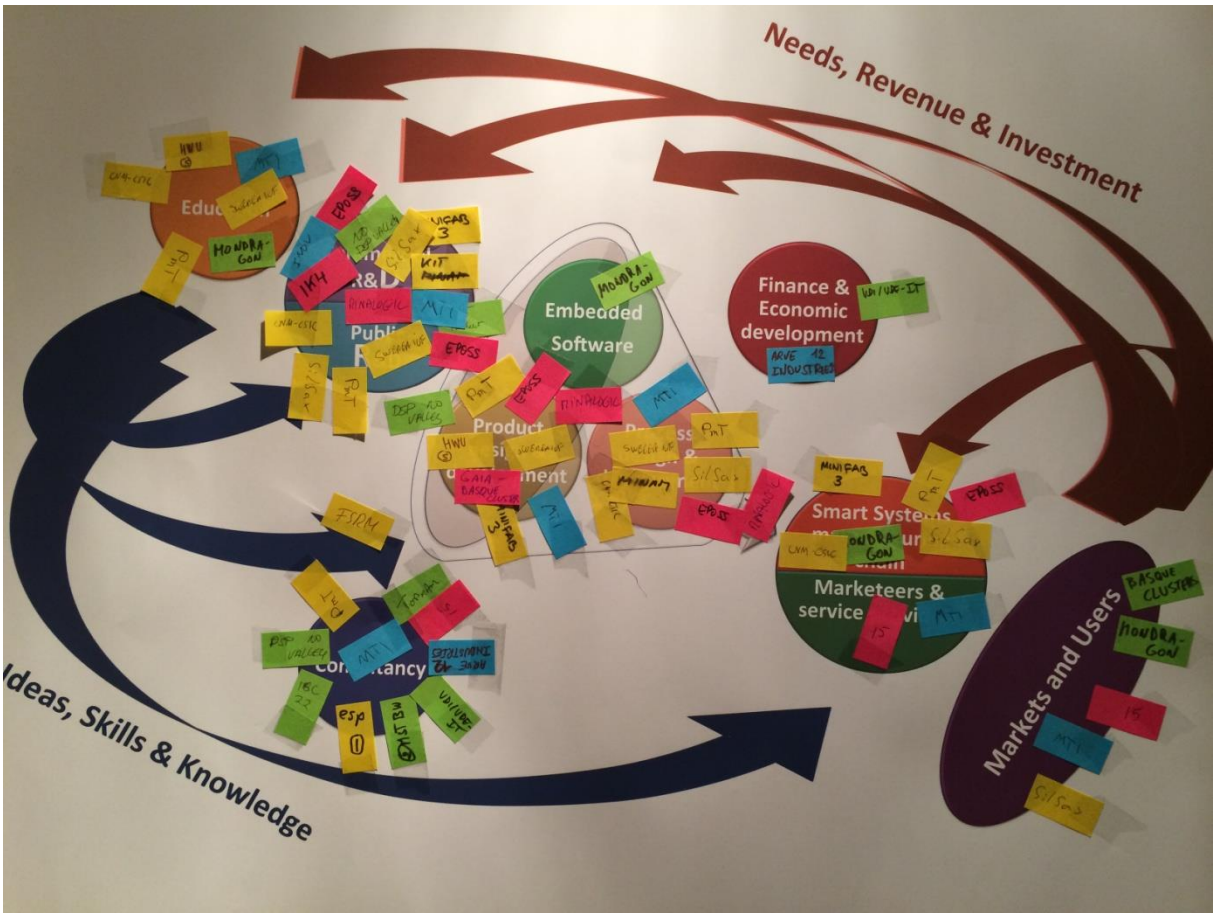
4.1.2 How to use (standardised methods)

The exercise was done by all EXPRESS partners (9 beneficiaries and several associated ones) who tried to position themselves within the SSI Ecosystem. The picture below shows the many post-its stuck to the wall on March 26th 2014 in Vienna.



Position of EXPRESS partners in the SSI Ecosystem schematics

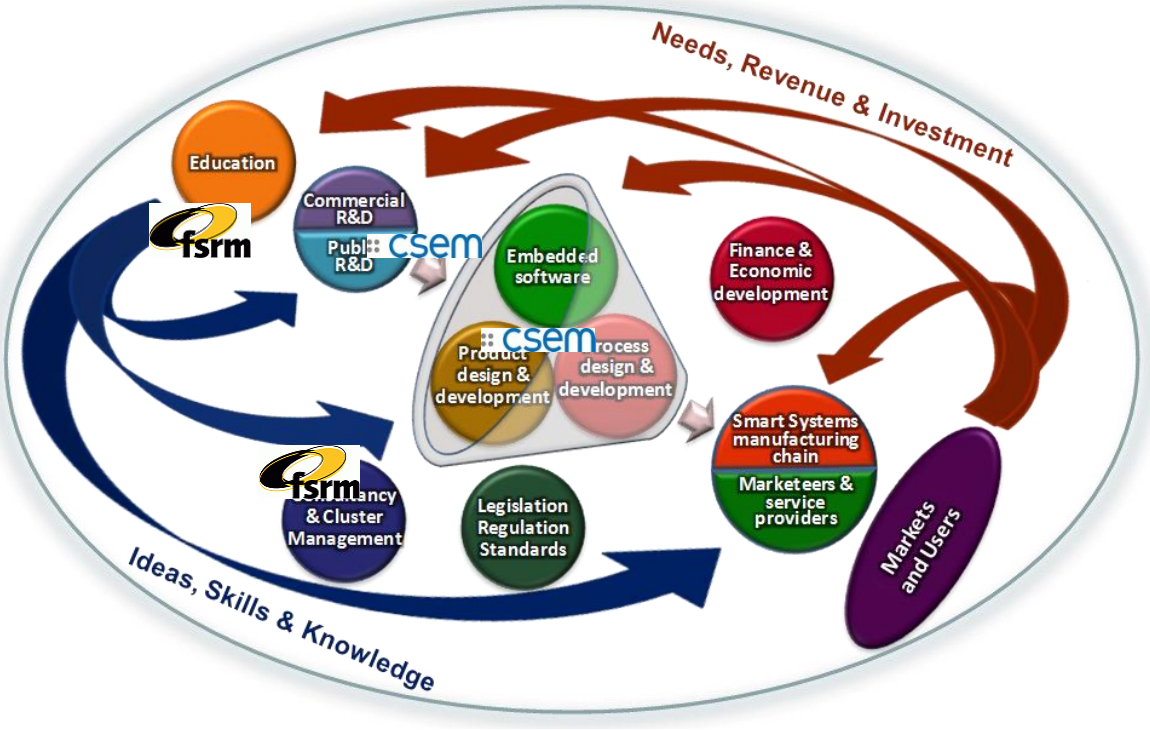
It is clear that most companies and organisations are involved or active in more than one sector of the Ecosystem.

Understanding where one stays in the chart allows him defining the interactions with others, the expectations and the needs of each others, the resources that can be provided and finally which partnerships one is looking for to develop his own business.

4.1.3 Example

As an example of positioning an organisation on the SSI Ecosystem schematics, we start by placing the FSRM (fsrm), a provider of continuous education courses and manager of the Micronarc cluster. It is active in the "tokens" Education and Consultancy & Cluster Management. As shown on the schematics, FSRM provides services to all organisations active in the value chain - R&D, Products Design & Development, Process Design & Development, Manufacturing Chain - but it has no direct interaction with Market and Users or with Finance & Economic Development, which reflects pretty well the reality.

A second example is CSEM (csem), a private R&D centre, which is active as half public, half commercial research centre, but also as designer and developer of products and processes for and with companies. It clearly takes science and technologies from the Education and Public R&D institutions and takes them to commercial high tech companies.



4.2 Ecosystem knowledge Gateway

4.2.1 Short description

The Smart Systems Knowledge Gateway has been designed as a signposting and one-stop-shop resource repository for ecosystem members and public authorities. It is open for any visitors to find the right information they are looking for independently of their proximity to Smart Systems or of their precognition about Smart Systems.

A personalized introduction to smart systems is provided for users entering with a broad range of different viewpoints, from the designer to the venture capitalist through educators, general public, manufacturer or potential user.

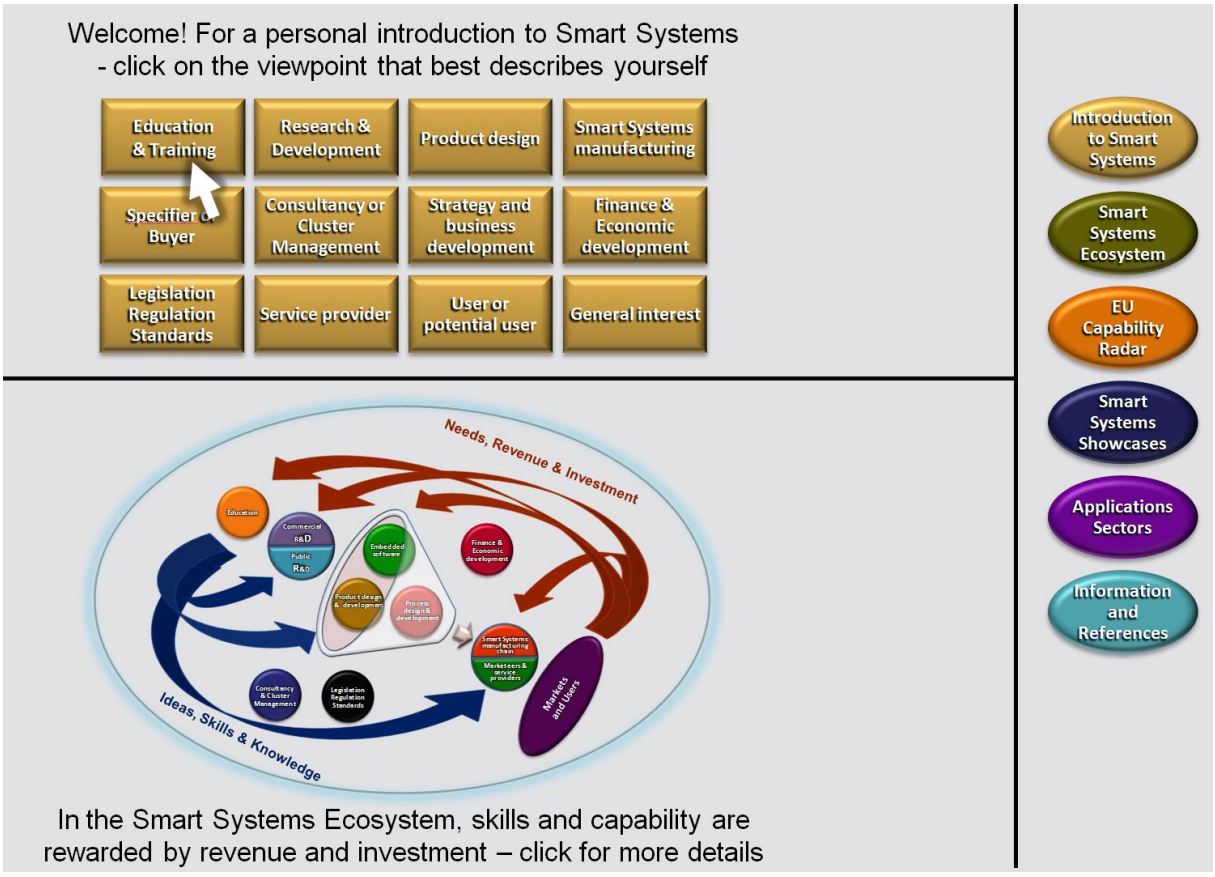
Many different entry points in the Knowledge Gateway Homepage

Apart from the descriptive entry points seen above, the Knowledge Gateway Homepage provides several sections directly accessible by menu items, such as

- **Smart Systems Ecosystem**, which reproduces the schematics described under 5.1 and gives an entry point through all of the buttons on the schematics.
- **EU Capability Radar** is a map on which a user can find any actor involved in SSI in Europe with a sophisticated search function. It is based on a database provided by all partners and associated partners of EXPRESS and EPoSS.
- **Smart Systems Showcases** provides examples of successful integration of Smart Systems into products.
- **Application Sectors** provides business analysis of Smart Systems in 12 different application sectors, with barriers and drivers, benefits and market opportunities as well as key enabling technologies.
- **Information and References** gives access to a lot of further information, such as event calendar, links, news, funding schemes, research priorities, etc.

4.2.2 How to use

The picture below shows the many different entry points into the SSI Knowledge Gateway, depending on who you are (yellow matrix), what you are looking for (right menu) or your position in the ecosystem (ecosystem schematics).



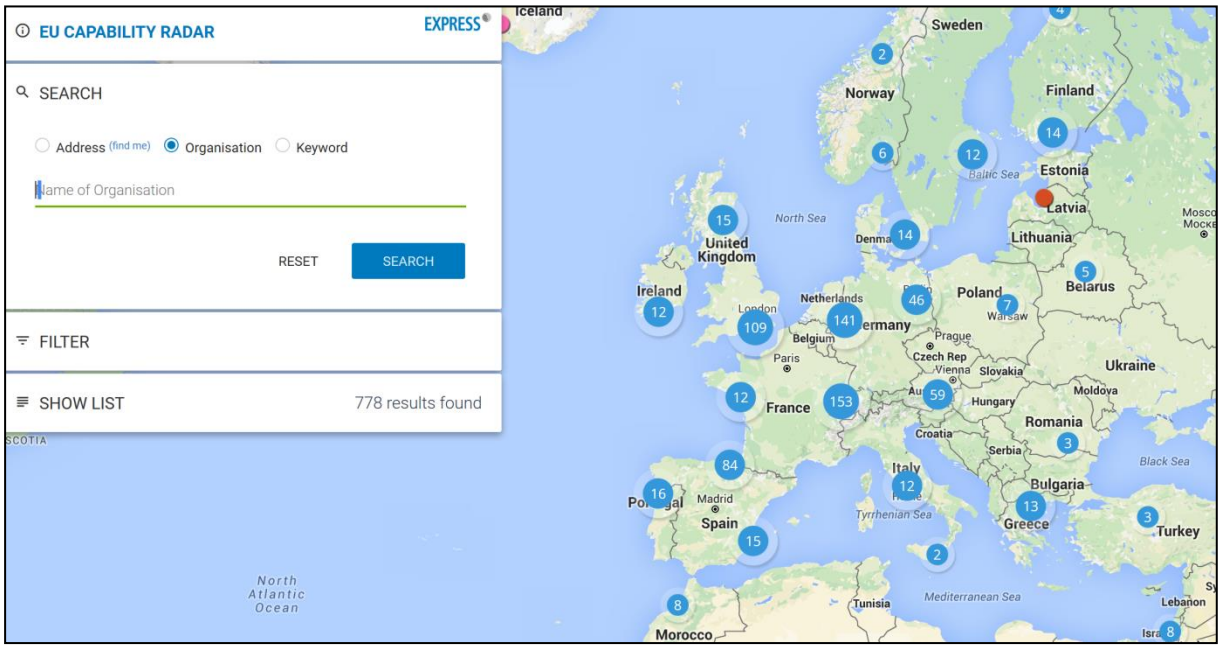
Home page with the many different entry points

The **EU SSI Capability Radar** (right menu) provides thorough insights into the Smart Systems Ecosystem by introducing all stakeholders in Europe on a single chart. This reference tool aims at increasing awareness, providing new networking opportunities, and at initiating fruitful partnerships and allows advanced searches within the ecosystem.

The system provides very powerful search and filter option to rapidly find the stakeholders of interest.

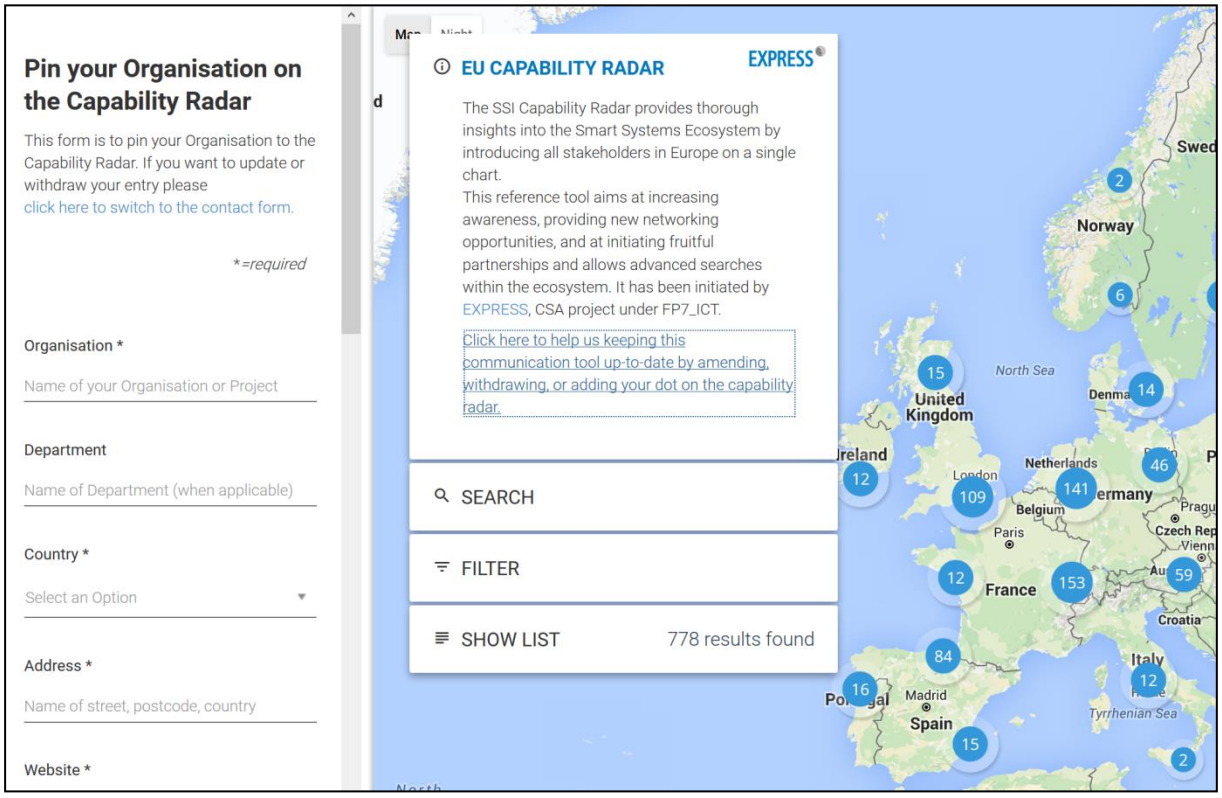
Filter options in the SSI Capability Radar

The search options allow a very efficient geographical search, as well as searching a stakeholder by name or by keywords. The keywords may include information on the application area, the services available or the business segments.



Search options available in the SSI Capability Radar

The SSI Capability Radar can be updated by any of the stakeholders, with a validation process that makes sure only valid information is published. A submission form is provided on line for new entries or for updates of existing dots.



Any new stakeholder can submit an entry form to pin its organisation on the chart

The chart shows clusters of stakeholders by countries or regions. The individual organisations appear when zooming in a specific region. The results of a searching criteria can be shown on the chart or as a list.

4.2.3 Examples

4.2.3.1 Venture capital

The use of the SSI Knowledge Gateway for someone in charge of investing venture capital in promising start-ups can provide some very useful information to start with.

Exploring the "smart systems application sectors" can show him the economic potential of smart systems in those fields corresponding to his investment strategy. If it includes for example the "green" economy, he can look at the sectors "Energy", "Transport & Mobility" and "The Environment" to find out more precisely which fields. He will find out that, and this is only an example, smart systems will be of most importance in a completely revamped lighting sector, with the introduction of solid-state, intelligent lighting.

Using the EU Capability Radar, he will then be able to find companies or academic groups working on this field, even in a limited geographic sector.

4.3 Augmented SRA consultancy

The Augmented SRA (D3.2) gathers the links between the EPoSS SRA and other platforms as opportunities to build bridges and to encourage collaboration. Two main issues have been addressed to fulfil the objective of getting the Augmented SRA: identification of links between the EPoSS SRA and other relevant information sources from other ETPs, and analysis of the gathered information in order to identify the strengths, weaknesses, opportunities and threats that may act for or against the development of an ecosystem for Smart System Integration in Europe.

The Augmented SRA highlights the conclusions of the analysis of the links found in the 77 reviewed documents. These conclusions are organised in accordance with the three types of linksthat were identified:

- *Application Opportunities for Smart Systems:* Introduction of Smart Systems in the specific applicationdomains (e.g.: Transport & Mobility, Automotive, Energy, ICT...)
- Sector *drivers and barriers*to compel the use of new devices or techniques.
- *Technology challenges* (as hurdles thatSmart Systems technologiesshould overcome) andresearch priorities (actions concerning research themes (priority, mid-term, long-term)).

The cookbook components included in this section intend to help companies searching value opportunities based on the application Smart Systems Integration in their offering.Three consultancy services based on the Augmented SRA. CLINIC is a quick hands-on approach to check potential of Smart Systems Integration to provide value opportunities to the company. If the company wants to work more carefully on the a-SRA contents, IMMERSION (consultant to one person) or WORKSHOP (team work based) services should be offered depending on the type of approach that is more suited to the company.

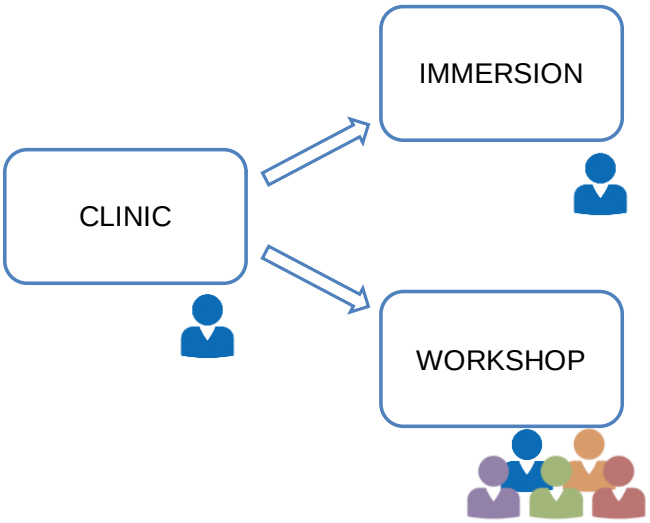


Figure 1: a-SRA cookbook components

- **CLINIC**: It has been designed as a 20 minute face-to-face consultation service that guides companies in identifying value opportunities by navigating the Augmented SRA.

- **IMMERSION**: A one day face-to-face consulting service provided by EXPRESS partners that will sit down with a company's representative to identify and characterise in detail the most suitable value opportunities for the company arising

from the Augmented SRA contents. The outcomes from each consultation service are:

- Types of value streams suited to the company.
- Identification of new value opportunities based on Smart Systems Integration.
- Value Proposition definitions of the selected opportunities
- Smart Systems Integration technology areas and challenges to catch the opportunities.

- **WORKSHOP**: A one day workshop at a company's premises that will promote a participatory identification and characterisation of value opportunities for the company arising from the Augmented SRA, and define a roadmap for future action. The outcomes from each consultation service are:
  - A landscape of market needs inspired by the Augmented SRA contents.
  - Value opportunities germs from the intersection of needs and technology challenges.
  - Characterised new potential value propositions.
  - Roadmaps for value propositions development

4.3.1 CLINIC

This free consultancy service has been designed to be provided during conferences and forums where EXPRESS project and results are presented. The aim is to allow company's representatives to have a quick review of the main findings of the Augmented SRA and to identify potential value opportunities for its company.

4.3.1.1Short description

The CLINIC is a 20 minute face-to-face consultation service that guides companies in identifying value opportunities by navigating the Augmented SRA. The outcomes from each consultation service include:

- New value opportunities based on Smart Systems Integration.
- Smart Systems Integration technology areas required to build these opportunities.

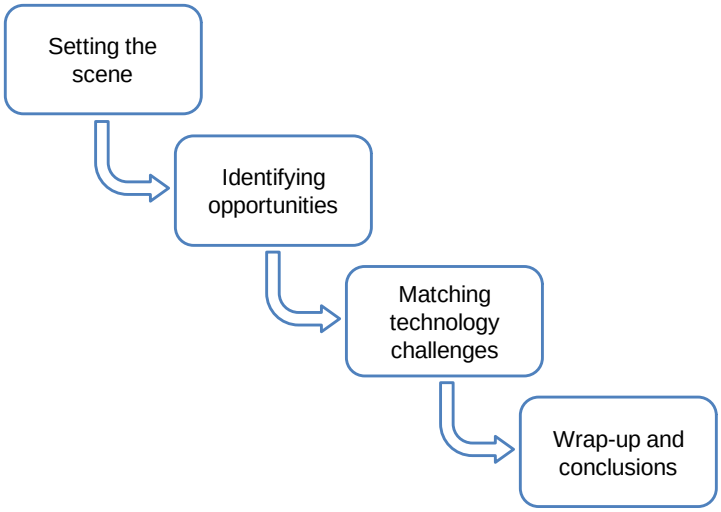


Figure 2: CLINIC schedule

The CLINIC schedule is as follows

- Setting the scene: First, interviewee and company's contact data are gathered. Then, company's main activity is identified, and positioned in the EXPRESS ecosystem. Finally, the main type of value stream of the interviewee's company is identified.
- Identifying opportunities: To identify new value opportunities for the company. To describe the specific objectives of the value opportunity
- Matching technology challenges: Previously identified opportunities are matched to the Augmented SRA technology challenges. Next, company's key technology capabilities regarding the opportunities are identified. Finally, we proceed to identify technology areas where collaboration would potentially be required.
- Wrap-up and conclusion: A general overview of the consultation results is made, and the outputs are validated, and further actions are identified.

During the exercises, the consultant will be a key person to manage the risks by:

- Assuring that the interviewee follows the procedure.
- Doing a first contribution to unfreeze the interviewee, if required.
- Explaining Augmented SRA key information to the interviewee.
- Coming to some conclusion in each step.
- Being aware of remaining time for each exercise.

4.3.1.2How to use

Specific materials for consultants have been produced to provide this CLINIC consultancy service. These materials include:

- A consultant guide.
- A template for information gathering.
- A powerpoint presentation on the Augmented SRA contents to support the consultant during the service.

The procedure to use this cookbook component has two main parts. The first part will allow the consultant to be prepared to provide the service. This part consists of:

- **Being aware of the Augmented SRA contents**:A prerequisite to provide this consultancy service is to be aware of the Augmented SRA contents. This implies to read the deliverable D3.2, especially the "Executive summary" and the "Integrated view", allowing the consultant to be familiar with the contents of the Augmented SRA.
- **Being aware of the consultancy service**: This is also a prerequisite for the consultant in order to know the specific activities, templates and support tools available to provide the service.

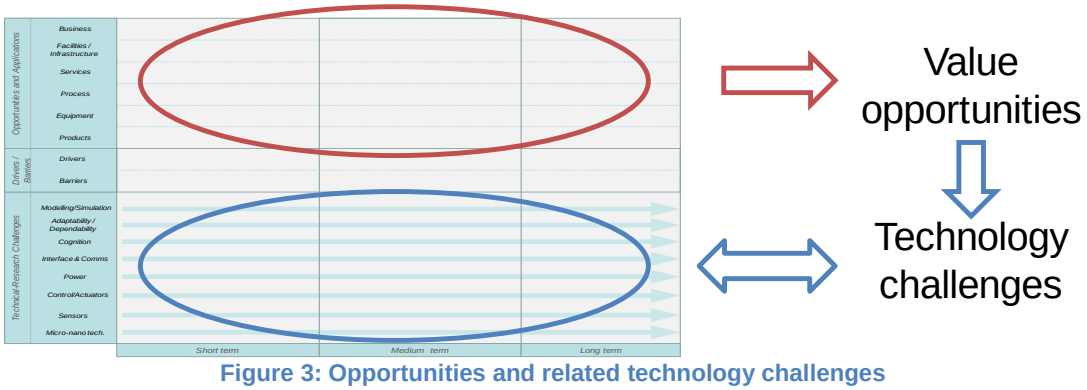


Figure 3: Opportunities and related technology challenges

The second part is the execution of the consultancy service. The activities that are presented below will start once a person from a company has shown interest in the service. This part consists of four steps:

1. Setting the scene: The objective of this activity is to identify the interviewee and the company he represents, and to identify the position of the company in the Smart Systems Integration ecosystem. For that purposes, the following tasks will be carried out:

    - To gather the interviewee and company's contact data.
    - To identify company's main activity and classify in the EXPRESS ecosystem.
    - To identify the type of value stream of the interviewee's company.

    This will be done by asking directly the interviewee about the required data and filling the form provided for this purpose. To get the presentation card of the interviewee will ease this activity.

2. Identifying opportunities: The objective of this activity is to identify new value opportunities for the company and to describe the specific objectives of the value opportunity.For that purposes, the following tasks will be carried out:

    - To identify new value opportunities for the company: This will be done concentrating on the main value stream of the company identified while "Setting the scene". A specific support for each value stream opportunity types will be available in the powerpoint presentation.
    - To describe the specific objectives of the value opportunity:This will be done filling the form provided for this purpose, describing the value perception dimensions where the opportunity focuses.A specific support to help on the description of a value opportunity is provided in the powerpoint presentation.

3. Matching technology challenges: The objective of this activity is to match the previously identified opportunities to the Augmented SRA technology challenges. This match will be complemented with the identificationof the company's key technology capabilities matching with the opportunities and the technology areas where development collaboration would potentially be required.For that purposes, the following tasks will be carried out:

    - Identify the Smart Systems Integration technology areas that are critical for the opportunities
    - Review the challenges identified in the Augmented SRA
    - Match key technology areas with company's technology capabilities
    - Set specific challenges according to the company
    - Identify technology areas where collaboration may be required.

    This will be done filling the form provided for this purpose, describing the technology challenges for each opportunity, and identifying if the company can address them by itself or requires collaboration.A specific support for each technology area and challenges arisen in the Augmented SRA will be available in the powerpoint presentation.

4. Wrap-up and conclusion: A general overview of the consultation results is made, the outputs are validated, and further actions are identified.For that purposes, the following tasks will be carried out:

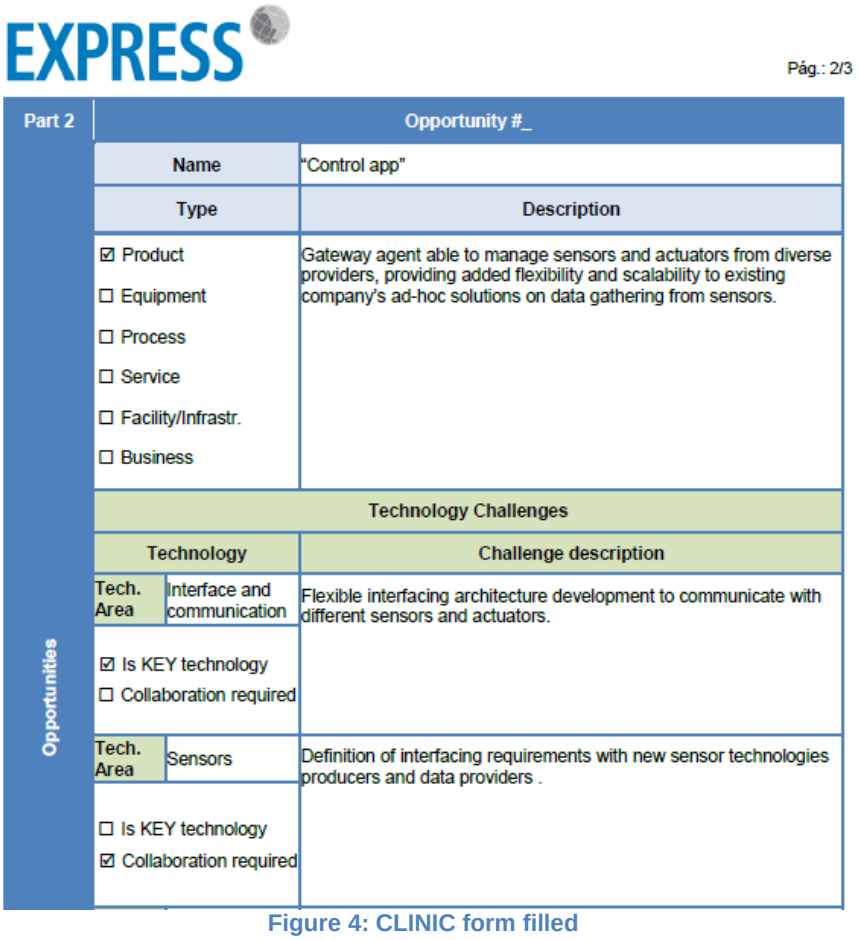
- Review the results of the consultancy as they have been gathered in the forms.
- Check if the “customer” demands further specialised actions.
- Check opportunity for further consultancy services like IMMERSION and WORKSHOP.

4.3.1.3Example

The following form shows an example of innovation opportunity gathered using the CLINIC consultancy service. It shows how new opportunities and related technology challengesare identified.

In this case the company has identified in the Augmented SRA a trend that points to a future need for easily connect and interface to existing and new sensors networks. This trend has risen for the company the opportunity of complementing its existing portfolio with a new solution oriented to solve the connectivity and interfacing issues when implementing a sensor network or scaling-up an existing one with new sensors.

A technology challenge regarding interfacing and communication technology area has been identified, as we as a further collaboration with sensors producers and data providers to gain access their communication and interfacing strategies and protocols.



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Part 2	Opportunity #_	
Opportunities	Name	“Control app”
	Type	Description
	☑ Product ☐ Equipment ☐ Process ☐ Service ☐ Facility/Infrastr. ☐ Business	Gateway agent able to manage sensors and actuators from diverse providers, providing added flexibility and scalability to existing company’s ad-hoc solutions on data gathering from sensors.
	Technology Challenges	
	Technology	Challenge description
	Tech. Area: Interface and communication ☑ Is KEY technology ☐ Collaboration required	Flexible interfacing architecture development to communicate with different sensors and actuators.
	Tech. Area: Sensors ☐ Is KEY technology ☑ Collaboration required	Definition of interfacing requirements with new sensor technologies producers and data providers .

Figure 4: CLINIC form filled

4.3.2 IMMERSION

This consultancy service aims to identify and deep into a detailed definition of new value opportunities arisen from the Augmented SRA integrated view applied in the specific scenario of a company. It is designed to be carried out by a consultant working face to face with one representative of the company.

A fee should be applied considering that it requires three day involvement for the consultant:

- Day 1: Service preparation and customization to the company plus travelling.
- Day 2: Consultancy.
- Day 3: Output production and way back travel.

Travel and tuition costs should also be considered.

4.3.2.1Short description

This is a one day face-to-face consulting service provided by EXPRESS partners that will sit down with a company's representative to identify and characterise in detail the most suitable value opportunities for the company arising from the Augmented SRA contents. The outcomes from each consultation service are:

- Types of value streams suited to the company.
- Identification of new value opportunities based on Smart Systems Integration.
- Value Proposition definitions of the selected opportunities.
- Smart Systems Integration technology areas and challenges to catch the opportunities.

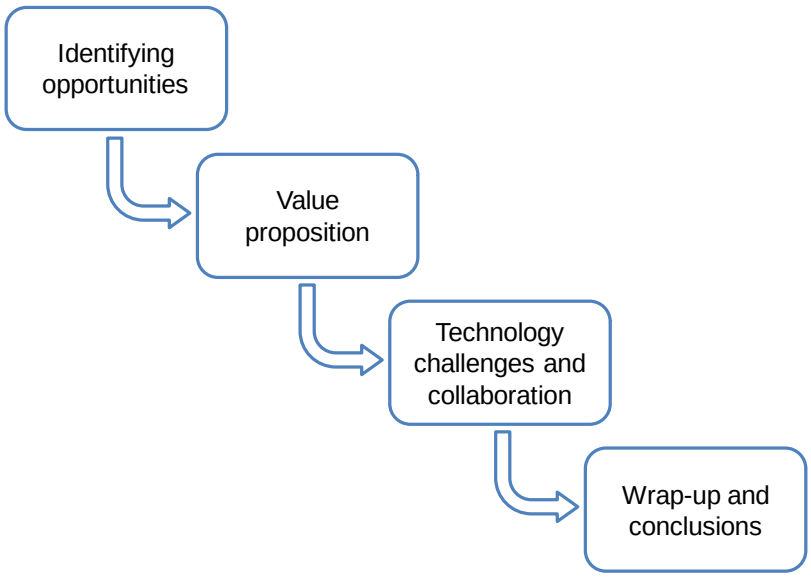

Figure 5: IMMERSION schedule

The IMMERSION schedule is as follows:

- Identifying opportunities: Once the main value stream where the company focuses is set, new value opportunities will be identified inspired on the opportunity areas gathered in the Augmented SRA. Then, adjacent value streams will also be explored in order to identify potential new to the company value propositions.
- Defining value propositions: Each value opportunity identified in the previous phase will be characterised in the form of a value proposition, defining its performance dimensions and producing a first-cut value curve showing the main differentiation aspects.

- Technology challenges and collaboration: Previously identified value propositions are matched to the Augmented SRA technology areas and company's key technology capabilities. This matching will allow identifying the key technologies that will impact on the competitiveness of the value propositions, based on the value curves. Next, technology performance will be reviewed based on the Augmented SRA contents, and challenges to overcome will be set. Finally, we proceed to identify technology areas where collaboration would potentially be required.
- Wrap-up and conclusion: Consultation results are reviewed and outputs are validated: Finally a set of further actions are identified.

During the exercises, the consultant will be a key person to manage the risks by:

- Assuring that the interviewee follows the procedure.
- Doing a first contribution to unfreeze the interviewee, if required.
- Explaining Augmented SRA key information to the interviewee.
- Coming to some conclusion in each step.
- Being aware of remaining time for each exercise.

4.3.2.2How to use

Specific materials for consultants have been produced to provide this IMMERSION consultancy service. These materials include:

- A consultant guide.
- A template for information gathering.
- A powerpoint presentation on the Augmented SRA contents to support the consultant during the service.

The procedure to use this cookbook component has two main parts. The first part will allow the consultant to be prepared to provide the service. This part consists of:

- **Being aware of the Augmented SRA contents**:A prerequisite to provide this consultancy service is to be aware of the Augmented SRA contents. This implies to read the deliverable D3.2, especially the "Executive summary" and the "Integrated view", allowing the consultant to be familiar with the contents of the Augmented SRA.
- **Being aware of the consultancy service**: This is also a prerequisite for the consultant in order to know the specific activities, templates and support tools available to provide the service.

The second part is the execution of the consultancy service. This service is based on the concept of "opportunities spaces" [2]: *a value opportunity is an imaginary "volume" in a space defined by three axes (offering; market; technology) where technological solutions potentially address**specific market segments' needs** and can be embedded in a product or service for value exploitation purposes*.

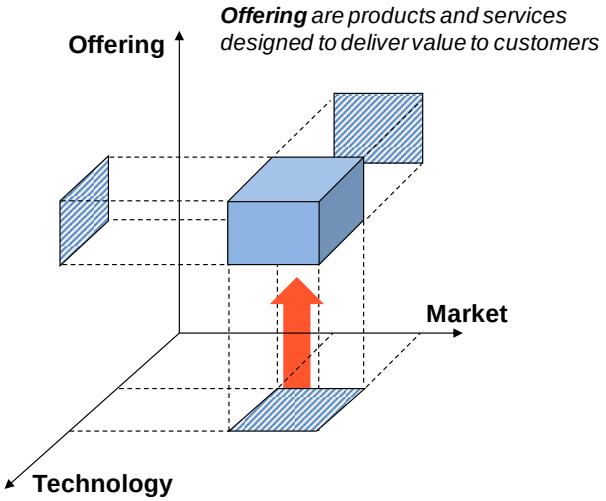

Figure 6: Opportunity space

The activities that are presented below will start once a person from a company has shown interest in the service. This part consists of four steps:

1. Identifying opportunities:The objective of this activity is to identify new value opportunities for the company inspired on the opportunity areas gathered in the Augmented SRA. Two types of opportunities will be explored: those focusing on the present main value stream of the company on the one hand, and opportunities arising in adjacent value streams on the other hand.

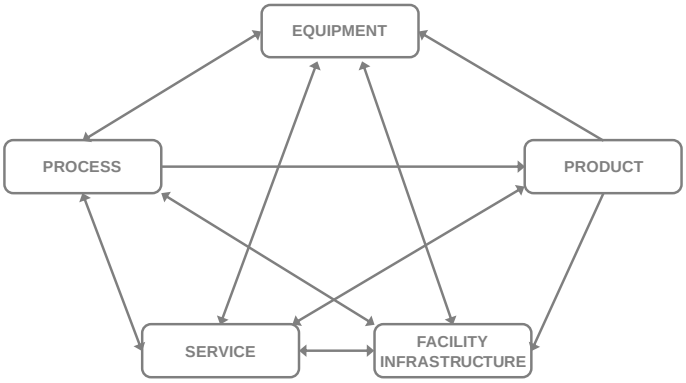

Figure 7: Value streams' adjacencies

For that purposes, the following tasks will be carried out:

- To set the value streams hierarchy pivoting on the present main value stream.
- To identify new value opportunities for the company focussing on the pivoting value stream.
- To explore potential new value opportunities in the adjacent value streams.

A specific support for each value stream opportunity typeis available in the powerpoint presentation.

2. Defining value propositions: Each value opportunity identified in the previous phase will be characterised in the form of a value proposition, defining its performance dimensions and producing a first-cut value curve showing the main differentiation aspects.

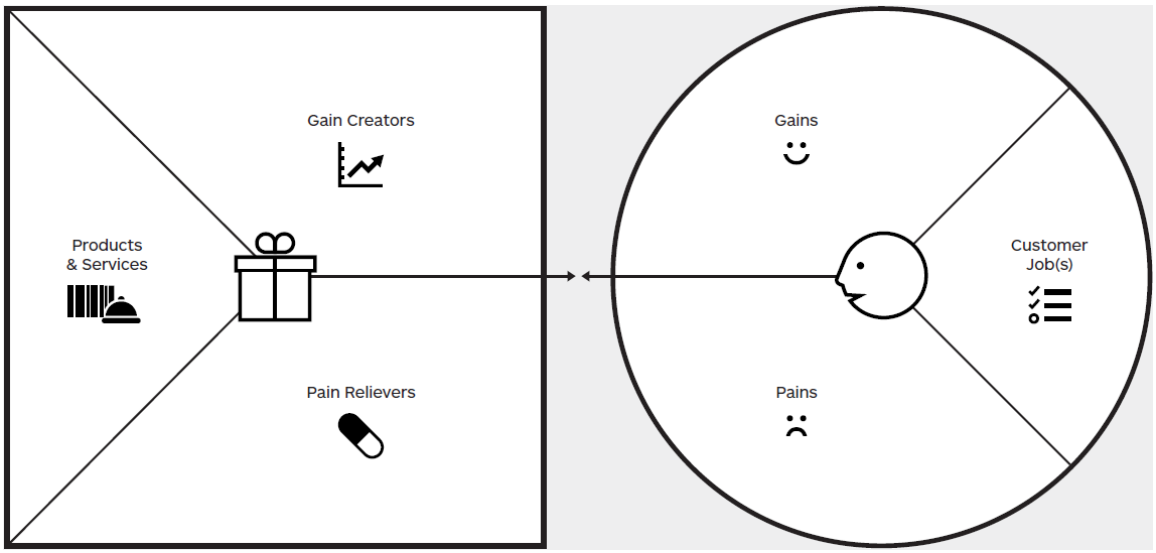

Figure 8: Value Proposition Canvas

For that purposes, the following tasks will be carried out:

- To identify the customer segments the value opportunities are pointing to, and their needs in terms of “gains and pains”.
- To identify the performance dimensions of the value opportunities and their contribution to solve customers’ “gains and pains”.
- To identify the differentiation characteristics of the new value proposition and depict the intended new value curve.

A specific support for value opportunity characterisation is available in the powerpoint presentation.

3. Technology challenges and collaboration: The objective of this activity is to determine the development challenges on Smart Systems Integration technology areas to be overcome in order to catch the opportunities.

   For that purposes, the following tasks will be carried out:

   - Identifying the key technologies that will impact on the competitiveness of the value propositions:previously identified value propositions are matched to the Augmented SRA technology areas and company’s key technology capabilities. This matching will be based on the product performance dimensions that solve the key “gains” and “pains” to be addressed in the analysed context.
   - Establishing the required technology performance progress, this will be inspired by the Augmented SRA contents. Thentechnology challenges to overcome will be set.
   - To finish with this phase, we proceed to identify technology areas where collaboration would potentially be required.

4. Wrap-up and conclusion: Consultation results are reviewed and outputs are validated: Finally a set of further actions are identified.

4.3.2.3Example

This example goes a step forward in the definition of an innovation opportunity gathered using the CLINIC consultancy service. It shows how new opportunities are defined in terms of a value proposition as well as in the corresponding technology challenges:

> *The opportunity of complementing the existing portfolio with a new solution oriented to solve the connectivity and interfacing issues when implementing a sensor network or scaling-up an existing one with new sensors.*
>
> *A technology challenge regarding interfacing and communication technology area has been identified, and we see a further collaboration with sensors producers and data providers to gain access to their communication and interfacing strategies and protocols*.

Manufacturing plant automation services companies have been identified as a specific target customer segment. These companies implement automation solutions in existing plants and require combining existing and new equipment in an integrated automated manufacturing solution. Up to now, this has implied to develop ad-hoc data gathering solutions adapted to the specific customer's problem. In addition to this relevant customisation effort required for the first implementation, additional troubles arise when new elements need to be integrated or when the systems requires an update.

So that, the customer has identified some gains and pains related to the problem of integrating new elements or equipment in the automated factory:

- Pains:
  - Ad-hoc software components development is required: Connectivity and interface software must be developed and integrated in the system in order to connect new devices.
  - Communication standards evolution makes difficult an up to date compliance of communication between subsystems.
- Gains:
  - Plug and play connection of new equipment in the automated factory.
  - Transparent dialogue between subsystems: each equipment unit or subsystem is able to dialogue with any other component without taking care of specific communication standards and protocols.

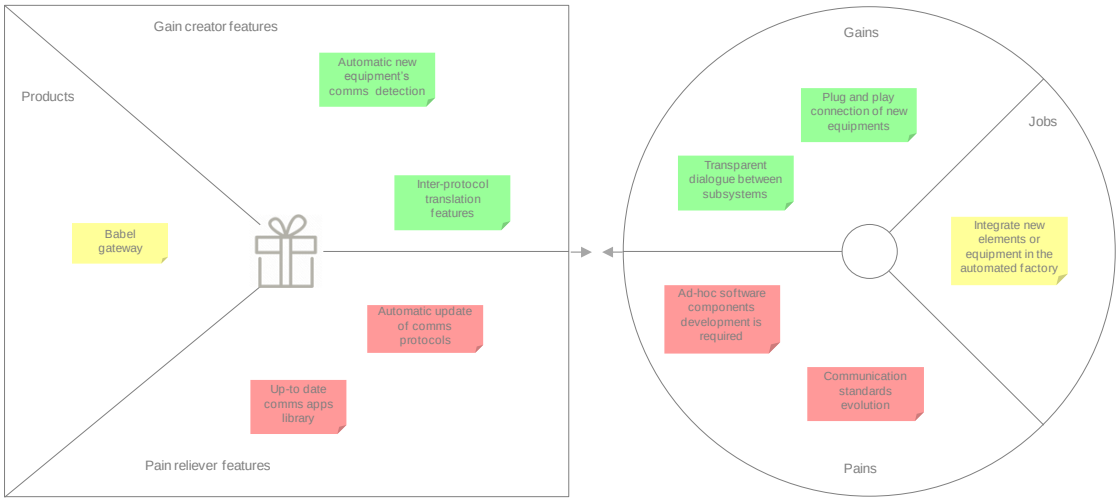

Figure 9: Value proposition definition example

A new offering called “Babel gateway” has been defined including, among others, the following features addressing the pains and gains:

- Automatic new equipment’s comms detection: the gateway detects new equipment in the factory and is able to identify its communication protocol.
- Up-to date comms apps library: A library of updated comms protocol is maintained enabling the effective communication between different equipment.
- Inter-protocol translation features: the gateway produces translations between the native protocols of the different devices.
- Automatic update of comms protocols: the Babel gateway can access the comms apps library and update its translation capabilities.

4.3.3 WORKSHOP

This consultancy service aims to identify and characterise value opportunities inspired by the Augmented SRA, and define a roadmap for future action to catch the opportunities. It is designed to be carried out by a consultant conducting a full day workshop within a company, and intends to take advantage of a participatory approach and bringing together three main perspectives of the company: market view, product-service view, and technology view.

A fee should be applied considering that it requires three days involvement for the consultant:

- Day 1: Service customization to the company
- Day 2: Workshop materials preparation plus travelling.
- Day 3: Consultancy (workshop).
- Day 4: Results consolidation.
- Day 5: Output presentation and way back travel.

Travel and tuition costs should also be considered.

4.3.3.1Short description

It consists on one day workshop at a company’s premises that will promote a participatory approach to achieve the following outcomes:

- A landscape of market needs inspired by the Augmented SRA contents.
- Value opportunities germs from the intersection of needs and technology challenges.
- Characterised new potential value propositions.
- Roadmaps for value propositions development.

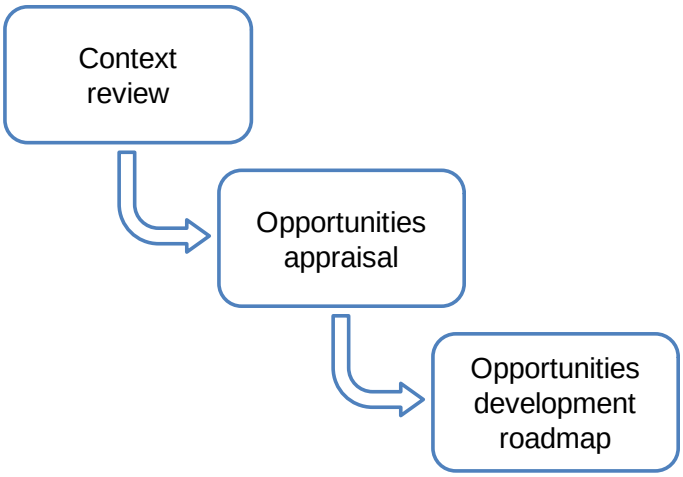

Figure 10: WORKSHOP schedule

The workshop is organised in three parts:

- Context review: The development of a context for new opportunities will be based on presentations of the contents of the Augmented SRA that will stimulate abrainstorming activity, using aroadmap-like template to place participants' contributions. The aim is to share and capture at least the three main perspectives (market, offering, technology).
- Opportunities appraisal: Previously populated landscape will be used toidentify strategic opportunities. Market needs and technology challenges layers will be searched to find matching contents that potentially rise a new value opportunity as show in figure 1. This matching will show key technologies to market needs impacts matrix as germs of potential value propositions. After identification, a quick prioritisationwill be made.
- Opportunities development roadmap: Working in small groups, priority opportunities will be characterised in the form of value propositions. Then, they will be explored in more detail in order to identify development activities and deploy them in a first-cut roadmap template that serves as a "canvas" to organise these actions. Finally, short presentations of the roadmaps will be made followed by questions and discussion.

The workshop will be complemented with a second day devoted to formalise the workshop outputs and consolidate the final results.

Sometimes, participants´ agendas may require to divide the workshop into two half days. In such a case, the first day should be devoted to the first and second parts. The second day should concentrate on roadmaps definition.

During the exercises, the consultant will be a key person to manage the risks by:

- Assuring that participants follow the procedure.
- Doing a first contribution to unfreeze participants, if required.
- Explaining Augmented SRA key information to participants.
- Being aware of remaining time for each exercise.

4.3.3.2How to use

Specific materials for consultants have been produced to provide this WORKSHOP consultancy service. These materials include:

- A consultant guide.
- Templates for information gathering.
- A powerpoint presentation on the Augmented SRA contents to support the consultant during the service.

The procedure to use this cookbook component has two main parts. The first part will allow the consultant to be prepared to provide the service. This part consists of:

- **Being aware of the Augmented SRA contents**:A prerequisite to provide this consultancy service is to be aware of the Augmented SRA contents. This implies to read the deliverable, especially the "Executive summary" and the "Integrated view", allowing the consultant to be familiar with the contents of the Augmented SRA.
- **Being aware of the consultancy service**: This is also a prerequisite for the consultant in order to know the specific activities, templates and support tools available to provide the service.

The second part is the execution of the consultancy service. This service is based on two complementary concepts: the strategic roadmapping approach [1] and the concept of “opportunities spaces” [2].

The activities that are presented below will start once a company has shown interest in the service. Theworkshop consists of three steps:

1. Context review: The objective of this part is to depict a context or landscape where new value opportunities can be raised. Workshop participants will populate the landscape with potential future events or expected impacts to the company, classified in three main types of layers: market, offering (product-service-systems), and technology (technology-resources).

   For that purposes, stimulation-brainstorm-population tasks will be carried out on a cyclic way:

   - Stimulation: the consultant will present a type of content from the Augmented SRA to stimulate workshop participants. They include: each type of value stream opportunities, barriers, enablers, and each type of technology area. The presentation of each contents will be followed by a slide with a few stimulating questions.
   - Brainstorming: After the presentation of each content,workshop participants will be encouraged to capture issuesthat arise during the presentations, and will begiven 5 minutes time to write down on sticky notes theevents or expected impacts induced by the presented content.
   - Population: Consists of placing each sticky note in the corresponding layer of the wall chart landscape templateand the right position according to the time horizon of the template.

   To finish this part of the workshops a landscape components clustering activity will be carried out. This clustering must respect main three layers, i.e., clusters containing sticky notes from two different layers aren’t recommended. The participants will be clustered in three groups, focusing each one on one type of layer (market, product, technology).

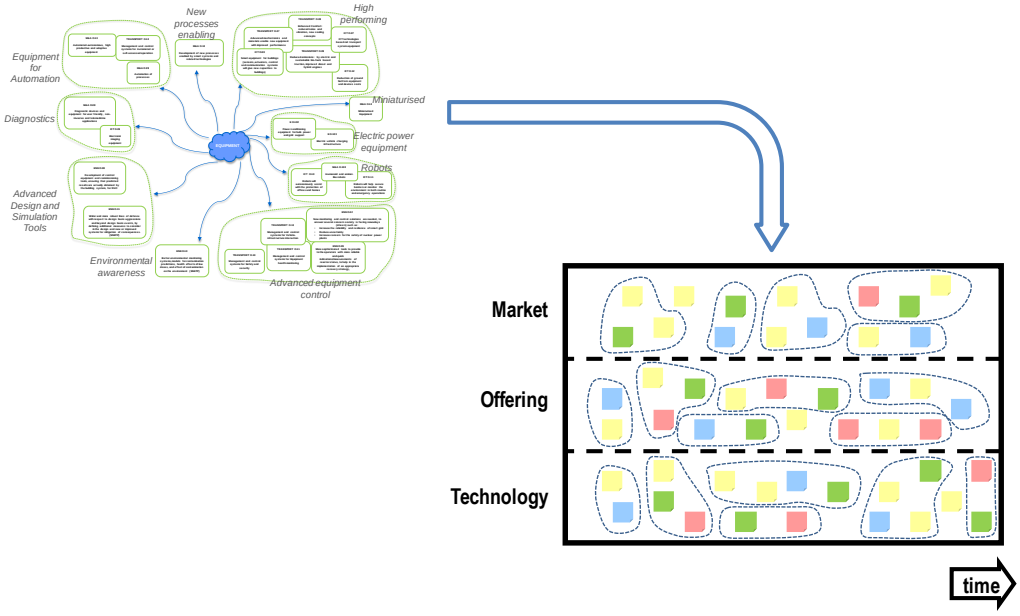

Figure 11: a-SRA inspired populated landscape

A specific support for stimulation activity is available in a powerpoint presentation, as well as a reference landscape template.

2. Opportunities appraisal: The objective of this part of the workshop is to identify new value opportunities for the company inspired on the landscape contents raised in the previous part.

   For that purposes, the following tasks will be carried out:

   - Axes characterisation: participants are separated into three groups, each focusing on one main layer. First, they will identify opportunity seeds clusters and prepare their axis configuration in the opportunities space wall chart. Then, they will draw their axis.
   - Seeds matching exercise:this activity consists of finding matches between the three axes'contents. The procedure is based on a round presentation of each axis contents:
     - The spokesman of an axis presents one cluster as a seed of a value opportunity.
     - The other axesrepresentatives try to identify a cluster in their axis that could potentially match to build the value opportunity.
     - If so, a matching will be drawn in the wall chart by the consultant.
     - Then, the spokesman continues with the next cluster.
     - Once an axis presentation is finished, the spokesman of the next axis will proceed in the same way.
   - Value opportunities identification:this activity consists of reviewing the matches from the previous step and to identify the candidates of new value opportunities.The group reviews the matches one by one, starting by opportunities matching three axes clusters, following by those matching twoaxes clusters, and ending with no matching clusters. Each opportunity is assessed with a set of criteria provided by the consultant (a specific support for value opportunity assessment is available) with the aim of having a first-cut prioritisation to proceed with the next part of the workshop.

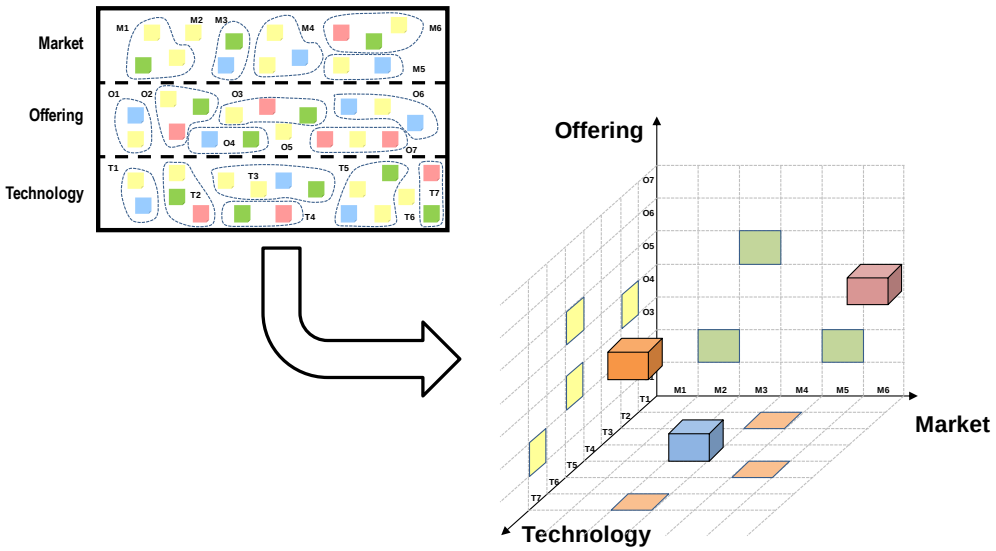

Figure 12: Identifying value opportunities

3. Opportunities development roadmap: Theobjective of this part of the workshop is to draw tentative plans to develop the prioritised opportunities. Participants will work in pairs and the approach has two steps:

   - Value opportunity characterisation: the opportunities prioritised in the previous phase will be defined in the form of a value proposition. A simplified approach of the last phase of the IMMERSION consultancy service will be used. For that purposes, the following tasks will be carried out:
     - To identify potential customers' needs in terms of "gains and pains".
     - To identify the value opportunities'performance dimensions contributing to solve customers' "gains and pains".
     - To identify the differentiation characteristics of the new value proposition.
   - Roadmap production:each group will be provided with a roadmap template as a "canvas" where it has to draw the value opportunity development plan. The template presents three main layers (market, offering, and technology) and a free time that must be customized by each team for each value opportunity. The approach for roadmap production will be beside on the following steps:
     - Define the "vision" as the final value proposition we want to achieve from each of the three layers' perspective.
     - Set the present status on each layer.
     - Develop a sound and coordinated action plan approach to achieve the vision starting from the present state.

   This phase will finish with a round the table presentation of all the developed roadmaps. Each team will be given a ten minutes time to present their value proposition and the action plan.

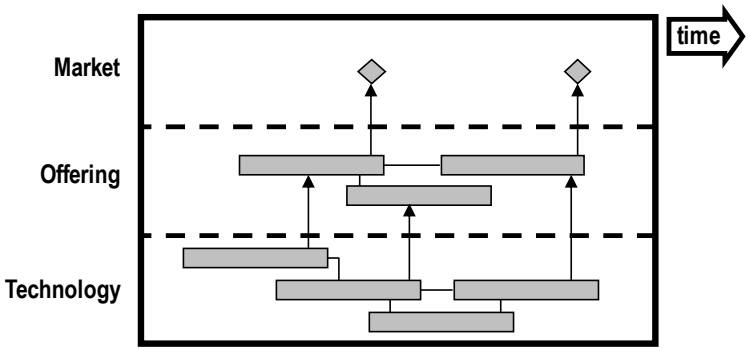

Figure 13: Opportunity development roadmap

4.3.3.3Example

The following figure shows a draft development roadmap for the "Babel gateway" new offering previously presented in the example of the IMMERSION consultancy service.

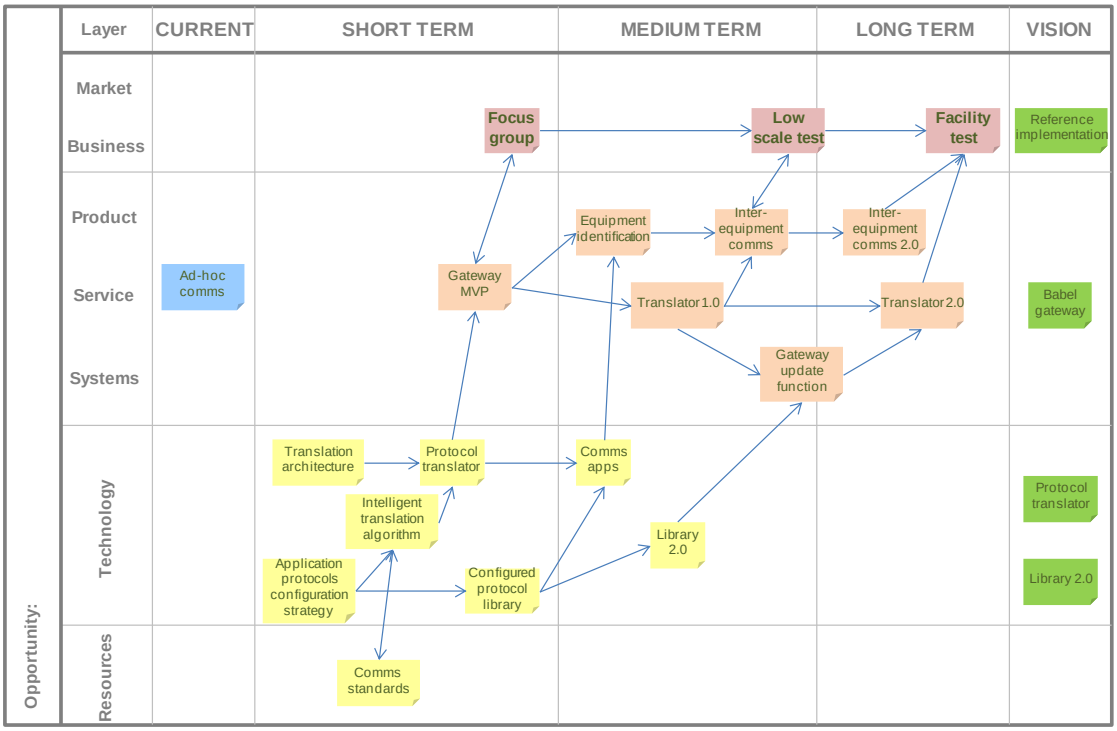

Figure 14: Babel gateway implementation roadmap

An initial technology development effort is required to define the adequate solution architecture and configuration strategy aiming to have the flexibility characteristics that will make this product unique.

A communication application protocols configuration strategy is defined and then implemented in an intelligent translation algorithm that supports present communications standards. The algorithm is implemented in a protocol translator module based in flexible translation architecture.

This functions and modules are integrated in the first “minimum viable product” version of the “Babel gateway”, which is tested in a focused market group. This test will provide feedback to orient adequately product characteristics and their development.

This feedback launches the development of a protocol library and communication apps that enable the development of equipment identification and inter-equipment communication functionalities in the “Babel gateway”. In parallel, translation functionality version 1.0 is also developed.

Then a second market test is performed in a small scale industrial demonstrator consisting on a machine and its peripherals (feeder, tooling and inspection).

With the feedback from this test, version 2.0 of the product is developed containing a complete library of comms apps that allows a full manufacturing facility implementation as final market.

4.4 How to use the strategy and implementation plan

4.4.1 Short description

The strategy and implementation plan was elaborated using a 4-step process adopted continuously including:

1. a mission statement and a vision that were elaborated in the Kick-off meeting of EXPRESS (provided in D3.1)
2. key objectives that were agreed in the workshop in Spain (provided in D3.3)
3. a strategic analysis (as part of D3.4) and
4. the overall strategy (also as part of D3.4)

As a summary, the table shows the process steps, the related objectives, platform issues as well as representative activities.

Table 1: Strategy Development Process

Strategy Development Process	Objective	Platform Issues	Representative Activities
Mission, Vision, and Values (What activity are we in, and why?) => Kick-off in Germany D.3.1	To reaffirm the highest-level guidelines about organisational purpose and conduct	Establish the vision in terms that are conductive to execution	• Mission analysis • Vision statement • Core Values • Enhanced vision
Key Objectives (Where are we going?) => Workshop in Spain D.3.3	To clearly define the highest-level financial or mission goals that will drive the strategy	Establish the economic model that will be used throughout the strategy management process	• Macro mission-measure • Value gap decomposition • Strategic themes • 3- to 10-year goals
Strategic Analysis (What are the key issues?) => D.3.4	To identify, through structured analysis, the events, forces, and experiences that impact and modify the strategy	Define the linkage between the influencing forces and the process of the value creation	• Environmental scan • Internal scan (SWOT) • strategy of record review • key issue identification
Strategy Formulation (How can we best compete) =>D.3.4	To define where and how the organisation will compete	- Ensure that changes in the strategy are linked to changes in the planning and execution process - Establish the boundaries of permissible change	• Where to compete • Differentiators (value proposition) • how to compete (strategy map) • Strategy change Agenda

Theextended procedure to develop an implementation plan is displayed here:

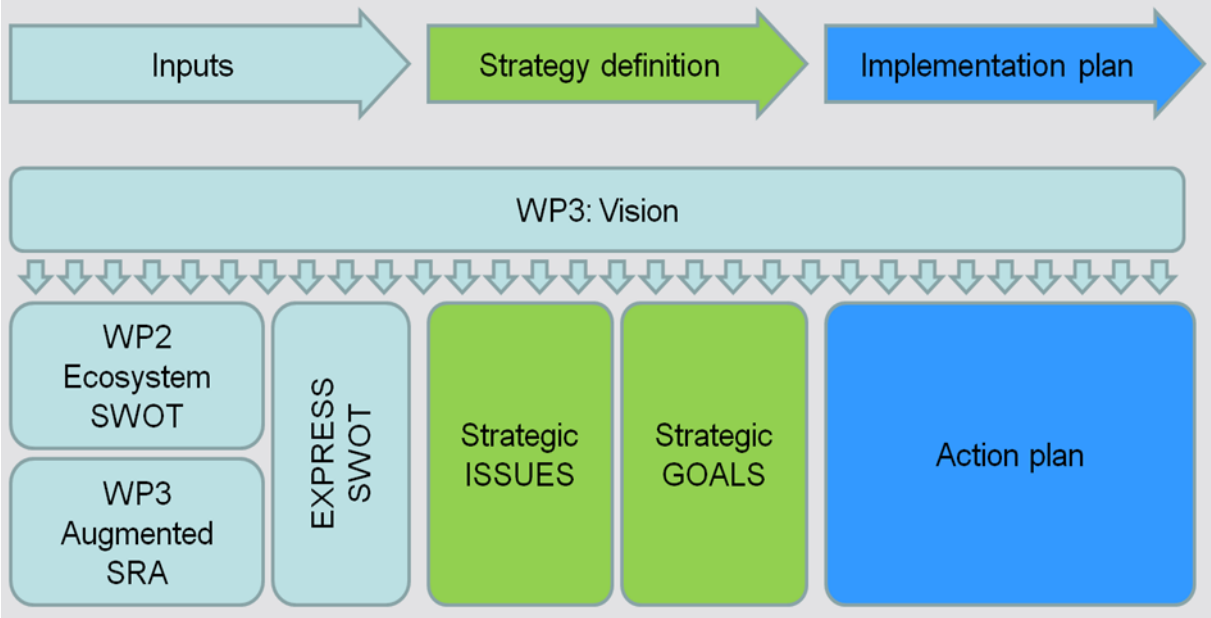

Figure 15: Stages to develop strategy and implementation

As a result, the strategic goals were referred to the ecosystem and the implementation measures were deduced:

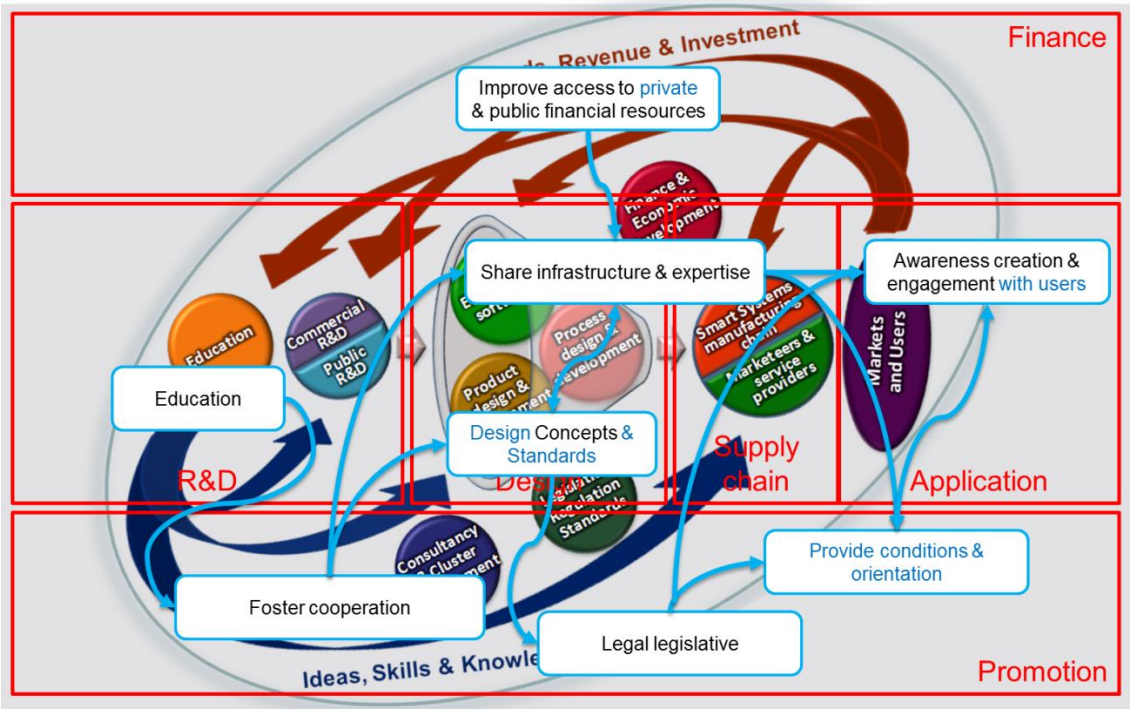

Figure 16: Referring the strategic goals to the SSI ecosystem

Figure 16 provides a good overview of the primary ingredients for the strategy including the players responsible for its implementation. In contrast to the implementation plan of a company, it is necessary to motivate the entire SSI ecosystem to contribute to the

implementation since there is no group/organisation with the authority to give directives. This is one of the major challenges of the ecosystem.

The summarised implementation plan is given in the table below:

Implementation plan of the SSI ecosystem.

Strategic issues		Strategic goals	Actions as part of the implementation plan
1	Cooperation between SSI ecosystem players	Foster cooperation	• To promote and improve relation with financial sector • Foster academia industry links • Cross sectoral exchange, multidisciplinary
2	European SSI Industry innovation and competitiveness	Share infrastructure & expertise	• Flexible production resources • Connect Education/ academia with Industry • Government regulation / Regulation
3	Actions for communication strategy	Improve access to private & public financial resources	• Address finance: • Address benefits: • Standardization
4	Take up of SSI technologies by old and new players	Provide conditions & orientation	• Entrepreneurship • End-user needs • Security • Technology
5	Best Practice transfer	Education	• Education & beyond • Competitiveness / security
6	Stimulate interest in Smart Systems	Awareness creation & engagement with users	• Communicate success stories • Education • Need for demonstrators • SI simulation tools
7	Excellence and World-class performance of SSI value chain	Design concepts & standards	• SSI components • Industrial driven development • Secure communication

5.4.2 How to use

The strategy and implementation plan addresses players within the whole SSI ecosystem. Figure 16 shows, which strategic goals are relevant for the different stakeholders. Within these strategic goals actions are displayed which are planned or delivered to implement the strategy.

Different to a company, the providers and initiators of the actions are coming from multiple organisations, so the alignment is much more difficult. Therefore, technology platforms such as EPoSS provide a gateway to these actions as well as to the stakeholders in the SSI ecosystem.

5.4.3 Example

According to one's position in the SSI ecosystem, one can easily identify the topics in the strategy implementation where he can contribute. Going to figure 16 provides reference to the strategic goals.

As a policy maker, you will probably provide conditions and orientation (#4). So you can compare your strategy with the strategic issues and goals of the implementation plan and decide how you can contribute to the strategy implementation. If you are convinced that SSI plays an important role in your region, you might agree that #4 “Take up of SSI technologies by old and new players” is critical. In this case you could implement means or boundary conditions that support entrepreneurship and e.g. set up funding programmes for end-user driven technology development.As a cluster organisation in SSI or related user areas you might share the goal to foster cooperation (#1). So your contribution to foster academia industry links might be part of your cluster activities, including working groups which bring together users, suppliers, academia and industry from a dedicated technology or business area. Or you are organising events which set the scene for academia and industry cooperation. With these measures you could at the same time contribute to strategic goal #5 and give input for best practice transfer as well as to goad #2 by sharing expertise.

5 References

[1]. Phaal, R., Farrukh, C. J., & Probert, D. R. (2007). Strategic roadmapping: A workshop-based approach for identifying and exploring strategic issues and opportunities.*Engineering Management Journal*,*19*(1), 3-12.

[2]. Goenaga, J.M., Castellano, E. (2008) Strategic roadmaps as a key driver for collaborative innovation networks design and coordination. A case study. *XIX ISPIM Conference: Tours, France. Open Innovation: Creating Products & Services through Collaboration*.

[3]. Osterwalder, A., Pigneur, Y., Bernarda, G., Smith, A., Papadakos, T (2014). *Value Proposition Design: How to Create Products and Services CustomersWant*. ISBN: 978-1-118-96805-5