Interreg BSR OSIRIS

PROJECT PERIOD 5

GA 3.4

Designing Smart Silver Framework (SSF) REPORT

GA 3.4 Leader: **VIA University College**
DENMARK

CONTENT

1. Brief summary of outputs

The Smart Silver Framework is the main output of GA 3.4. It is composed of headlines and descriptions that can be used for supporting co-creation and co-evolution of project regions. The Smart Silver Framework will support each region to grow a stronger innovation ecosystem by giving the opportunity to gain information about Smart Silver actors and connecting to innovative networks. The Smart Silver Framework covers the journey from setting a strategy for collaboration to implementing mutually beneficial business models or policy models (RIS3). The Smart Silver Framework will help organizations and regions to involve the quadruple helix innovation actors and end-users in developing new innovative technologies to support the Smart Silver economy. The Smart Silver Framework is a joint model, with regionally specific elaborations, making it relevant to actors seeking international collaboration as well as actors solely interested in national or regional partnerships or commonalities.

2. Introduction

The main output of GA 3.4 is the Smart Silver Framework (hereafter SSF). The aim of the Smart Silver Framework is to create a structure for implementation into the Smart Silver Hub and for use by the Smart Silver Labs. It therefore provides opportunities for collaboration between stakeholders within the Silver Economy. The Smart Silver Framework is a theoretical pilot model for increasing quadruple helix innovation actor's (target groups) capacity to generate economic growth by using smart specialization approaches. The SSF are as a theoretical model and a point of departure for creating the Smart Silver Lab (SSL) and the Smart Silver Hub (SSH), which have been simultaneously developed. The SSF will support each region to grow a stronger smart silver innovation ecosystem. The SSF methodology represents a natural continuation of work done with the knowledge maps, the development of knowledge management models and the open innovation toolkit.

Working plan

GA 3.4 set out to create regional Smart Silver Frameworks. The Smart Silver Framework was designed by integrating the developed Knowledge Management Model and Open Innovation Toolkit using the TRIZ design tool. Furthermore, the SSF was created using co-creation. Four Joint Expert Panel Meetings (JEP) were conducted. In between the JEP meetings, activity leader (PP11) invited the partners to individual meetings with the aim of providing sparring and guidance in the development process of the SSF. The regional Smart Silver Frameworks were developed by local experts informed by international collaboration across different partners and experts in the project, and were then tested and validated. Afterwards, the collective SSF was adjusted for the use in the SSH. To succeed, the activity leaders (PP11) created six initial milestones to be accomplished, and produced a working plan for their sequential completion. These initial milestones where:

- Milestone 1: Development of a roadmap and methodology for using TRIZ approach (Final methodology completed May 22th 2020)
- Milestone 2: Constitution of a JOINT Expert panel. (Completed June 1st, 2020)
- Milestone 3: Proposal and approval of the beta form of the Smart Silver Framework as well as two scenarios for testing it with target groups (Completed January 27th, 2021)
- Milestone 4: Three day learning session with target groups (Completed January 22th 2021)
- Milestone 5: Preparation of Assessment Report and validation of Smart Silver Framework (Completed April 28th 2021)
- Milestone 6: Publication of Smart Silver Framework on website.

The development, discussions and presentations of each partners regional Smart Silver showed the complexity of the different infrastructures and the derived challenges, needs and interests. Lead Partner (PP1) presented a model of the SSF. The model was discussed as an example of a regional innovation structure – which further informed the JEP. The discussions confirmed the previous decision to make a common SSF model, having in mind, that the content descriptions should be adapted to regional infrastructures, contexts and references as well as end-users challenges and needs. This made sense in relation to the regional users and stakeholders of the later development of SSL in WP 4.1.

The partners described the content, limited to the regional priorities (RIS) as well as the challenges and needs of citizens and companies, to the next layers of the framework. For this, more direct guidance and sparring from PP11 was needed and provided.

All content was described by partners. PP11 completed their SSF with the various features, as an example of a regional model. All partners managed to create their own regional SSF. Originally, the 3-day learning session was to be held in Aarhus, Denmark but due to the Covid-19 virus, the learning session was altered to virtual learning camps instead. The completion of milestone 3 was followed by test and validation scenario by external Quadruple Helix representatives in each region.

The implementation of milestone 6 is a collaboration with activity leaders of GA 6.1, where the final publication of the SSF is located. The question of how SSF will build over to SSL has become more precise as the requirements and expectations for SSL became clearer. An ongoing dialogue between the partners in WP 3.4 and WP 4.1 made it easier to navigate and understand the pathways.

In the following, the methodology for each milestone will be explained, and in the concluding section , the Smart Silver Framework will be presented, including tests and validation. Each milestone and outputs will be described and assessed sequentially.

Milestone 1: Development of a roadmap and methodology for using TRIZ approach.

The core of the methodology for creating the SSF is the TRIZ design tool. Compared to sustainable design practices, the TRIZ design tool provides a structured problem-solving guideline based on the TRIZ-principles, which were integrated into the Smart Silver Framework. After studying the definitions and applications of each of the 40 TRIZ principles, the Smart Silver Framework were linked to the individual principles (Table 2). Firstly, the 40 TRIZ principles were ranked by participating experts based on a total score (1-7) as can be seen in Table 1. The highest scoring principles were the ones appraised as most relevant to include in the work with creating a smart sliver framework, as it was deemed irrelevant and too time-consuming to include and relate to all 40 principles. The 10 highest ranked principles were selected and later used in a solution generation process of the Smart Silver Framework. After determining the requirement of the elements of the Smart Silver Framework,

solutions were generated using the associated TRIZ-principles as listed in the following TRIZ Design Tool. Concept and partial analysis was reiterated until the Smart Silver Framework met the design specifications.

Table 1 SMART Silver Frame Work element ranking matrix

Total score/ Element	1	2	3	4	5	6	7

No	Inventive Principles	Description
1	Segment	Divide a process or service into independent parts or segment it, or make it easy to disassemble
2	Taking Out	Separate an interfering part or property from a service, or single out the only necessary part.
3	Local quality	Customise a service based on location, time and condition.
4	Asymmetry	Differentiate the service from standard methods
5	Combining	Bring things together in order to produce or develop a new method or a new service.
6	Universality	Provide a service with multiple functions
7	Nesting	Add a new service inside current service
8	Compensate	Avoid heavy resource or load on the system
9	Counteract	Prevent potential failure or counteract them before they happen.
10	Prior action	Perform a prior action before the service is launched.
11	Cushion in advance	Mitigate harmful effects of the service
12	Keep at Same Level	Provide the service with minimum energy spent in connecting processes
13	Invert	Operate a service in an opposite way or a different viewpoint
14	Use Curved Features	Change a linear service to nonlinear one.
15	Be Dynamic	Make services more movable, flexible, and adaptable in different situations.
16	Less or More Action	Do more or less functions, efforts, tasks, or activities
17	Different Dimension	Consider the process in a new dimension in relation to the space in which it operates
18	Vibration	Use instability or variability to make services perform better
19	Periodic action	Break a continuous process to periodic actions or to increase the frequency of periodic actions/events
20	Continuity of useful action	Keep flow, eliminate waste, or self-correct
21	High Speed	Reduce the wait times for the service
22	Convert harm into benefit	Convert a negative effects associated with a service process or event into achieving a positive effect
23	Feedback	Use outputs as inputs to improve a process or action
24	Use a Mediator	Find or add a temporary element that to carry improve the service
25	Self-service	Allow the customer to play a role in the delivery of the service
26	Copying	Use a simple copy a /process/service from used elsewhere into your process
27	Inexpensive short life	Replace a service with cheaper and short-lived one.
28	Change Mechanism	Change the mechanism of the operation process
29	Consider Softer Elements	Focus on intangible issues, such as quality, customer thoughts, reputation, etc.
30	Flexible Material	Isolate functions, process, activities, or problems by using thin barrier or using a flexible structure in order to improve service quality, reduce costs, and increase reliability.
31	Space or Holes	Create space/environment in a service operations to allow other tasks or functions to be performed
32	Colour, Aesthetic and Transparency Changes	Focus on colours, aesthetic factor for comforting customers or transparency to improve trust of a service
33	Homogeneity	Focus on consistency of a service with other services which have similar features and functions
34	Discarding and Recovering	Remove, modify or reuse elements in a service directly after they have fulfilled their functions.
35	Change State	Focus on the changing properties of a service such as service flexibility, consistency, shape, quality, etc.
36	Use Natural Phases	Exploit an existing phenomenon (any changes in the environment, culture, occasion, or events) to create new services or add value to a current service.
37	Utilise Relative Change	Respond to changes (e.g., market expansion and contraction, or fluctuating customer demands)
38	Enrich Atmosphere	Enrich a service with different capabilities or activities.
39	Dormant Environment	Create some dormant environment as a foundation for the service
40	Combine different elements/channels	Use process parts that interact better with each other

Table 2

The 40 elements for SMART Silver ranking matrix (Source: Field, B.W., 2006. Introduction to Engineering Design. 1st Edn., Monash University, Australia, ISBN: 0732622867, pp: 316).

During the early development of the Smart Silver Framework four Joint Expert panel meetings were held on June 5th , 2020 (JEP, 1), June 25th ,2020 (JEP, 2), August 27th, 2020 (JEP, 3) and December 1st , 2020 (JEP, 4). Additionally, further regional and transnational meetings took place. Thus, although it was originally planned to have 6-9 joint expert panel meetings in the methodology, a lower number of meetings was found to be satisfactory, on the basis of further regional development of the SSF. The regional Smart Silver Frameworks were developed by local experts informed by international collaboration across different partners and experts in the project.

The joint Expert panel (see milestone 2) is a complete overview of participating partners and experts at joint expert meetings. Most but not all were present at all meetings.

Milestone 2: Constitution of a JOINT Expert panel.

After deciding the methodology for the creation of the SSF, the JOINT Expert Panel had to be constituted. Each country selected 2-3 experts that should participate in the Joint Expert Panel meetings together with some partners. Each expert presented expertise and relevance of participation, after this it was shortly discussed whether perspectives were lacking, this was quickly found not to be the case, the combined expert panel was therefore constituted.

The following list is a complete overview of participating partners and experts of the joint expert panel. It represents the width of representatives and broad interdisciplinary scope of the expert panel, not all representatives on the list, were present at every meeting henceforth.

No.	Name Surname	Institution	Signature for participation
1	Michael Smærup	VIA (PP11)	X
2	Bodil Sørensen	VIA (PP11)	X
3	Kirsten Maibom	VIA (PP11)	X
4	Mads Lund Andersen	VIA (PP11)	X
6	Marina Weck	HAMK (PP1)	X
7	Ingrid Pappel	(PP8) Expert	X
8	Alexander Gamaletev	(PP6) Partner	x

9	Gintaras Kucinskas	KVK (PP3)	x
10	Pia Tamminen	HAMK (PP1) Expert	x
11	Dainius Urbanavičius	KVK (PP3)	x
12	Fernando Ferreira	HAMK (PP1) Expert	x
13	Igors Graurs	RTU (PP6)	x
15	Arnis Sauka	RTU (PP6)	x
16	Egils Rupeks	RTU (PP6)	x
17	Nijole Galdikiene	KVK (PP3) Expert	
18	Dmitrii Trutnev	ITMO (PP12)	x
19	Svetlana Bazueva	ITMO (PP12)	X
20	Kseniya Bulatova	ITMO (PP12)	X
21	Aarne Toomsala	Taltech (PP8)	X
22	Jurga Kucinskiene	KVK (PP3) Expert	x
23	Iris Humala	HAMK, (expert)	x
24	Kimmo Vänni	HAMK	x
25	Katariina Välikangas	HAMK (Expert)	x

Milestone 3: Proposal and approval of the beta form of the Smart Silver Framework as well as two scenarios for testing it with target groups

In June 2020 the partners started cooperating on the production of the Smart Silver Framework. With inspiration from selected inventive principles from the TRIZ methodology, as mentioned in milestone 1, partners and experts described the initial understanding of the Smart Silver Framework, based on structure and content. Furthermore, discussions followed on how to include existing knowledge maps, knowledge manegement tools, inovation tools and financial mechanisms, in the Smart Silver Framework. A preliminary SSF structure emerged consisting of the Quadruple Helix actor categories. At the third JEP meeting in August, 2020 the new version of SSF was presented including the partners descriptions of SSF level one: The quadruple helix actors were decided to be the core of the SSF.

The following creative discussions of each partner's descriptions of the quadruple helix actors, and the second layer, the infrastructure focua area, showed the complexity of the different infrastructures and the resulting challenges, needs and interests. Lead partners model of the SSF was discussed as an example of a regional innovation structure. The discussions confirmed the previous decision to make a common SSF model, having in mind, that the content descriptions should be adapted to regional infrastructures, contexts and references as

well as end-users challenges and needs. This made sense in relation to the regional users and stakeholders of the later development of SSL in WP 4.1.

The partners described the regional content, limited to the regional priorities (RIS) as well as the challenges and needs of citizens and companies in the next layers (infrastructure focus area) of the framework. For this, more direct guiddance and sparring from PP11 was needed. PP11 completed their SSF with the various features, as an exemplary, regional model. All partners managed to create their own regional SSF. The regional frameworks were to be tested internally and by external Quadruple Helix representatives in February and the begining of March 2021 (see milestone 5), after partners participated in the learning session (milestone 4).

Milestone 4: Three-day learning session with target groups

The learning session was originally planned to have a duration of three days. However, due to the covid19 pandemic, it was decided to reduce the learning session to a one day, virtual event. It was held on a secure server on the Zoom-platform, on January 22nd 2021. The learning session was planned by VIA University College as the activity leader (PP11). The aim of the learning session was to present the Smart Silver Framework to all partner-experts, and to give specific instructions to regional expert groups on how to organize the workshop, complete usability testing as well as how to practice usability testing internally before subjecting the stakeholders to the test. The latter perspective provided both further knowledge and feedback on the SSF, but also provided a more specific and well established test of usability as a result.

The participation list for the virtual event can be seen below, and involved experts as well as and partners from all involved partner-organizations.

Participation list Learning Session Milestone 3, WP 3.4

22nd of January 2021

No.	Name Surname	Institution	Signature for participation
1	Michael Smærup	VIA (PP11)	x
2	Bodil Sørensen	VIA (PP11)	x
3	Kirsten Maibom	VIA (PP11)	x
4	Mads Lund Andersen	VIA (PP11)	x
5	Leena Lemola	RTOY (PP2)	x
6	Marina Weck	HAMK (PP1)	x
7	Ingrida Tinfaviciene	LIC (PP5)	x
8	Vaida Svidriene	IAMUS (PP4)	x
9	Søren Aalykke	Aarhus Kommune (PP10)	x
10	Gintaras Kucinskas	KVK (PP3)	x
11	Karin Rava	TalTech (PP8)	x
12	Dainius Urbanavičius	KVK (PP3)	x
13	Eglė Brezgytė	KVK (PP3)	x
14	Igors Graurs	RTU (PP6)	x
15	Tatjana Volkova	RTU (PP6)	x
16	Arnis Sauka	RTU (PP6)	x
17	Egils Rupeks	RTU (PP6)	x
18	Sidra Azmat Butt	TalTech (PP8)	x
19	Dmitrii Trutnev	ITMO (PP12)	x
20	Svetlana Bazueva	ITMO (PP12)	x
21	Kseniya Bulatova	ITMO (PP12)	x
22	Merilin Liutkevicius	Taltech (PP8)	x
23	Elena Klimshina	Technopark of St.Petersburg (PP13	x
24	Oksana Fedorova	Technopark of St.Petersburg (PP13)	x
25	Kimmo Vänni	HAMK (PP1)	x

Table 3: Participation list at learning session

During the learning session, he SSF-structure was presented and an introduction to the SSF testing methodology, including test questions. This was followed by an instruction of partners in testing the methodology in practice (train the trainer). The testing of the SSF followed the principles of usability testing for websites (Wisler-Poulsen & Gregersen, 2013). Thus, usability was founded on four main criteria:

1. Functionality: Usefulness, relevance and experienced obstacles
2. Efficiency: How easily does one find and understand headings, references and content description.
3. Satisfaction: How do you experience using the SSF (quality and user-friendliness)?
4. Overall suggestions for improvement: Do you have suggestions for improvement?

Therefore, the usability test revolved around four main questions, each pertaining to a specific criteria for usability testing. These were: 1) What content do you find useful, relevant or problematic? (functionality) 2) Do you find what you are looking for in the headings, references and content descriptions? (efficiency) 3) What is your experience when using the SSF? (satisfaction) and 4) Do you have suggestions for improvement? Further ellaborations on the actual testing and involvment of actors can be found under Milestone 4 and 5.

Information on the method.

The following instructions and itinerary were given to partners concerning the usability test interviews.

- The persons should meet online on zoom or a similar program with the necessary functionalities and encryptions.
- Give a short introduction to the SSF and the test procedure, specifically the “thinking aloud” methodology.
- Start the video/screen recorder.
- Get informed consent from each of the test participants.
- Moderator should present and navigate in the SSF model on his/her computer – whilst sharing their screen.

- During navigation the moderator ensures that test questions are directly or indirectly answered through open communication with the participants.
- The moderator and test persons are “thinking aloud” during the whole trial (this is recorded).
- The duration of the individual test interview should not exceed a maximum of one hour.

- After the testing the moderator will fill in the ”Documentation and Validation Report”

At the learning session testing was done by one interviewer and a moderator, as well as test persons. Furthermore, the experts from acitvity leader (PP11) acted as secretaries throughout the testing.

After being instructed on how to complete the usability testing in practice, partners were divided into four groups that trained the usability testing in practice (teach the trainer) on one SSF model . These groups were as follows:

Group 1: Bodil (secretary), Gintares (test person), Dainius (moderator), Eglé, Ingrida (test person), Elena (interviewer). The Lithuanian SSF was to be tested

Group 2: Kirsten (secretary) Marina, Leena (test person), Vaida (moderator), Søren (interviewer), Oksana (test person) The Latvian SSF was to be tested

Group 3: Michael (secretary) Merilin (test person), Sidra (test person), Karin, Arnis (moderator) and Eigils (interviewer), The Russian SSF was to be tested

Group 4: Mads (secretary), Dmitrii (test person), Svetlana (moderator), Kseniya, Igors (interviewer), Tjatjana (test person) The Estonian SSF was to be tested.

During the test we used the following questions:

- How easily and successfully do users find the information, they are looking for?
- What content is useful for the QH participants?
- What content is missing for the QH participants?
- How well do QH actors understand the different naming (headings and other elements)?
- What content are problematic or helpful?
- What causes frustration / satisfaction among the users and about what feature?
- How do QH participants conceive the SSF solution?

- How does the SSF have value to QH participants?
- How well does the SSF support the user's to find what they look for?

After having trained the usability testing in the abovementioned scenarios, it was decided to reduce the number of test questions to four main questions based on the previously mentioned criteria's as the workload of the interview otherwise would be too heavy.

The questions was revised and decided to be:

1. What content do you find useful, relevant or problematic? (functionality)
2. Do you find what you are looking for in the headings, references and content descriptions? (efficiency)
3. How do you experience to work with the SSF? (satisfaction)
4. Do you have suggestions for improvement?

Milestone 5: Preparation of Assessment Report and validation of Smart Silver Framework

The test and validation of the SSF was divided into two parts. Firstly, it consisted of the usability test (interviews) with quadruple helix actors. Secondly, it consisted of a combined and regional validation workshop (GA 3.4/4.1) with quadruple helix actors, as well. PP11 suggested two different options for testing and validating the SSF. Partners could choose to conduct 4-8 individual test sessions with quadruple helix actors along with the validation workshop or alternatively as seperate scenarios. The two different ways of testing didn´t affect the findings, as long as the instructions for test and validation were followed. The details of the methodology and conditions for the usability test and validation procedure, are described under the learning session. The basis for the validation of the Smart Silver Framework was the result from the usability test interviews performed in each country.

At the combined validation workshop 3.4/4.1, the regional Smart Silver Framework was presented and validated. Partners were asked to describe questions, comments and recommendations from the external quadruple helix actors in relation to the presented regional Smart Silver Framework. The results from the test and validation process of the Smart Silver Framework contributes to the overall quality and user experience of the silver lab and the silver hub as the findings will be used in the continued work on the silver hub.

Each partner subsequently prepared a documentation and validation report. Each partner report formed the basis for the final validation of the Smart Silver Framework with partners, in April 2021. The final validation of the Smart Silver Framework took place at a partner meeting on April 28th, with participation from: LP, PP11, PP3, PP6, PP12 and PP8. At the meeting three main points of emphasis in relation to the Smart Silver Framework were in focus:

1. Presentation and discussion of the outcome of test interviews with QH actors and the validation workshops conducted by partners.
2. Joint decisions on suggested adjustments in SSF validation for implementation into SSL and SSH.
3. Other issues before finalizing the Silver framework.

Firstly, activity leader (PP11) represented by Bodil Sørensen, presented the results of the validation and test interviews based on an analysis of the outcome in the individual partner reports produced beforehand. Afterwards the test and validation findings were discussed and alterations in the Smart Silver Framework decided upon by the joint panel. All findings were discussed and relevant points of emphasis located for alteration and implementation in the final Smart Silver Framework through assessments from each participating partner. In relation to the testing, the following is an overview of the number of quadruple helix actors participating at the testing interviews in each partner region (moderators and secretaries have been excluded from the list):

PP1	13
PP3	9
PP6	12
PP8	8
PP11	6
PP12	12

The test results done by each group of experts generally showed that the SSF was meaningful, however in need of minor, primarily rhetorical alterations. Below, are the overall findings presented at the validation meeting with partners. The summed-up findings are given in the four usability categories:

Satisfaction: - The SSF is overall easy to work with, but is also a complicated structure - The quadruple helix concept is a solid foundation for the interaction of all Actors - The framework seems quite intuitive and flexible - The SSF is logically structured - The content is useful and relevant - Overall people were happy with the model - Seniors with no prior knowledge of the field, will have difficulties when navigating and understanding the SSF - The website for the SSF, will not be a natural stopping point for seniors - Content regarding active aging seems to be lacking -	**Functionalities**: - There is a need to describe the vision for the framework - It is unclear to whom the information is relevant - Unclear who the precise target group is. Is it, elderly people or primarily for growth? - How will we ensure that the information is up to date and links will be active? - Where will the website be hosted and further developed?
Efficiency: - The wording infrastructure focus areas was found difficult to understand, and not meaningful, it was therefore recommended that this wording should be altered. - Links for different actors were found very relevant, however, there was a need for short descriptions of each link. - Some English titles were deemed irrelevant or too difficult to understand (e.g. Voluntary program, digital labs, incubator network,	**Other comments:** - Might be relevant to add pictures or instructional videos - A possibility for the addition of products or projects worked on at relevant institutions might be added. - A glossary containing the terminology might be relevant.

innovators of technology, financial mechanisms and more. - It is unclear what the category "extended family" includes. - Information in the descriptions of actors is found to be too general and in some places too long.	

Alterations where primarily semantical or focused on definitions and wording. Specifically, the categories and naming under each Quadruple Helix actor were considered to be the most important issue to adjust. Furthermore, there was an emphasis on providing a clear structure for the Smart Silver Hub, so it would be easy to navigate.

Other issues included:

1) The depth of references to laws, strategies and policies

2) Whether or not each actor type description would remain country-specific

3) If one more subdivision (for example based on domain of activity) was needed (this was decided against due to the technical make-up of the Smart Silver Hub)

4) The addition of further actors to the *academia* and *policy* categories.

5) The addition of "region" to actor-description where relevant, in order for the data structure to remain the same across partner-countries.

It was decided, that based on the validation, changes would be made in conjunction with the above-mentioned points of emphasis. On this basis, the Smart Silver Framework has been validated and altered accordingly. The structural suggestions for changes in the Smart Silver Framework and category descriptions is attached in the appendix.

Milestone 6: Publication of Smart Silver Framework on website

The implementation of milestone 6 primarily represents a collaboration with activity leaders of GA 6.1, where the final publication is located. The Smart Silver Framework will primarily be implemented on the smart silver hub where visualizations and specific functionalities are subject to alterations based on the technical possibilities of the hub. On the smart silver hub, the content of the SSF will be available to all stakeholders, where each stakeholder might locate relevant information based either on a specific need they might currently have, or through exploration of the different quadruple helix actors, much like with the open innovation toolkit's specific functionalities. The visual representation of the Smart Silver Framework, is furthermore subject to alterations on the basis of streamlining the visual outputs on the smart silver hub.

The material, methodology and final Smart Silver Framework is as of the date of completion, available for usage in GA 6.1 when implementing the smart silver hub. This implementation is currently underway, which includes the publication of the Smart Silver Framework on the smart silver hub.

3. RESULTS – The SMART SILVER FRAMEWORK

Proposed Smart Silver Framework

In the following the overall design of the Smart Silver Framework will be described. The design of the front page of the Smart Silver Framework is also shown i figure II. At the top of the Smart Silver Framework, the regional priorities are placed.

The framework consists of three levels. The first layer being the quadruple helix actors.

The second layer consists of four infra structure focus area, each belonging to a category based on a helix actor. The naming of infrastructure focus area is to be altered on the silver hub, as decided at the validation workshop. The four infrastructure focus areas each contain four descriptions of different elements, in total 16 element description have been made, by each partner. Partners from each region could chose between an element list, and decide which elements they find relevant to place under each infrastructure focus area. As an example the Danish list of elements under each category are shown in figure 2.

The outer layer is the third layer of the Smart Silver Framework, it is named ”classifications and references”. It contains links to relevant references (websites) in the local region. Three groups of classifications are coupled to each quadruple helix actor and color coded, providing a total of 12 groups of classifications. Links to relevant websites to each classification group was furthermore placed i conjunction with their respective description.

The classifications and references are:

- Senior citizens: Associations/NGO´s; Assisted living services; voluntary program.
- Business: Business development services; Companies; Incubator Network & Digital Lab.
- Academia: Universities; Vocational institutes; Research and development organisations
- Policy makers: Municipalities/Cities; Region; Government

The quadruple helix actors were visually placed in the center of the Smart Silver Framework (Senior citizens, business, academia and policy makers), to show the prioritization of these as central to the framework. The Smart Silver Framework is interactive, thus, each of the illustrated ”fields” in figure II act as a button and under each field relevant information about the subject is described. It was decided, that the front page design of the Smart Silver Framework was to be the same in all regions. However, the four elements in each of the four infrastructure focus-areas varied between partners.

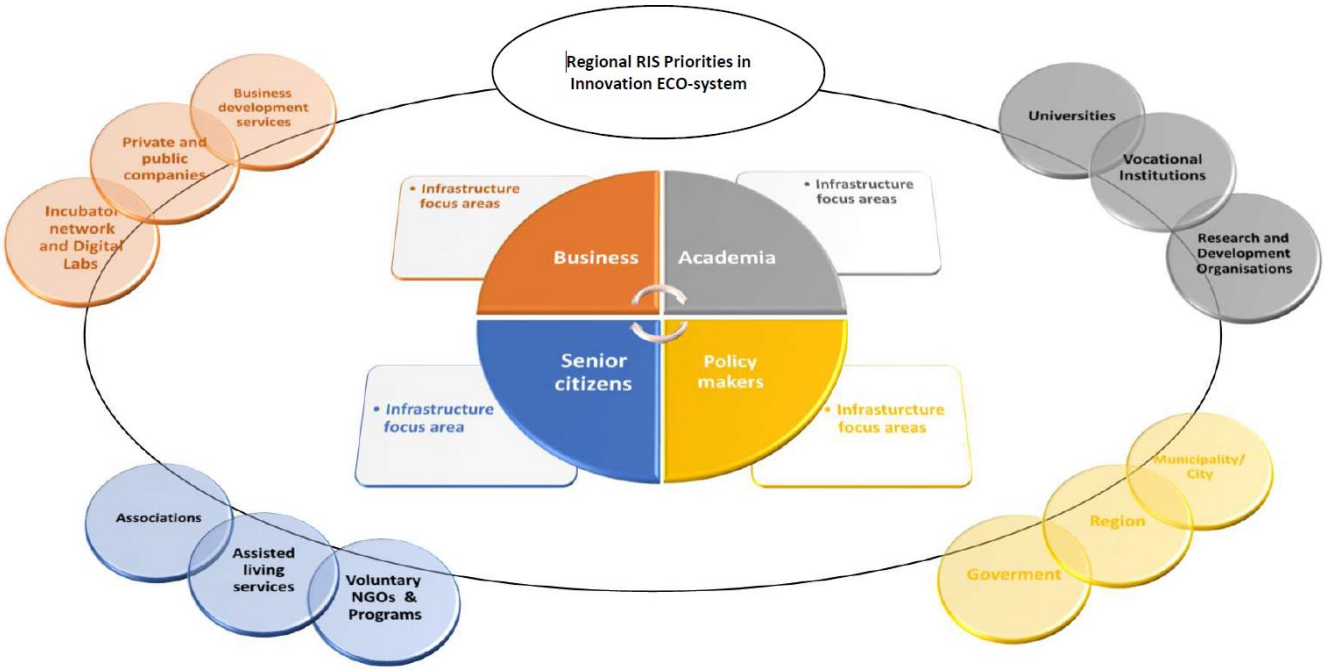

Figure I The front page of the Smart Silver Framework

The elements belonging to the infrastructure focus areas under each of the four categories, was decided to be produced, as described in figure 2.

CATEGORY SENIOR CITISENS	CATAGORY ACADEMIA	CATEGORY BUSINESS	CATEGORY POLICY MAKERS
Actors and organisations	Common Practice	Growth Drivers	Legal Authorities
Family and extended family	Users and citizens	Compagny culture	Users and citizens
Innovators of technology	Smart services	Market Analysis	Legislations and Laws
Ethics	Professionals	Financial Mechanisms	Regional Innovation Strategies

Figure 2 The Danish example of the element list in the SSF

4. CONCLUSION

The created Smart Silver Framework (SSF), which is the output of GA 3.4, provided a structure for the regional open innovation ecosystems – Smart Silver Lab (SSLs) – that connect researchers, product and service developers, financers, local authorities, and user organisations, who are innovation actors involved in the implementation of national or/ regional innovation strategies for smart specialisation.

SSF has a three-level structure SSF with quadruple helix actors (academia, business, community, and policy-makers) as the central layer and the focus area of the infrastructure or silver market characteristics as the second layer. The third layer consists of classifications and references with relevant links. The two layers, quadruple helix actors (academia, business, community, and policy-makers) and the focus area infrastructure, correspond to the content and information now published on the Digital Silver Hub (DSH) (www.silverhub.eu). The third layer, classifications, and references contain information about and link to relevant sites. The SSF contains a lot of information prepared for publication on SSH platform and at the same time it serves as a structure for the Smart Silver Lab (SSL). Practically, the whole content from SSF is already published on the SSH, but not finalised yet. However, the SSH structure presented digitally is modified to be more user-friendly.

Each partner completed their regional SSF in accordance with RIS priorities. In March 2021, partners tested their own regional SSF by interviewing of min two representatives of each quadruple helix about their experience of the validity and accuracy of the content of SSF and the extent to which they rated SSF as useful

as a structure for regional SSLs (open innovation ecosystems). The interviews revealed that the SSF is considered flexible and has the potential to create an overall understanding and overview of the regional ecosystems for any user and, at the same time, provide support for collaboration in the innovation development process within the ecosystems.

Thus, the output of GA3.4 has been utilised in the development process of both SSL and DSH.

All target groups (quadruple helix actors) participated during and after the project with equal influence. The SSF model invites to collaboration between actors and makes partners dependent on each other's knowledge and expertise in the innovation processes. In the evaluation of the SSF, the companies welcome the participation of seniors in the entire innovation process. For companies it means a shorter path to testing, marketing and implementing new products.

The Smart Silver Framework consist of a three-layered structure and provides knowledge and insight for stakeholders. The first layer, quadruple helix (QH) actors and the second layer, the focus area infrastructure, correspond to the knowledge and information published on the Digital Silver Hub (DSH) (www.silverhub.eu), the collaborative platform built within WP6. Each OSIRIS partner involved in GA 3.4 creation of SSF made short descriptions for each of the QH actors and the four chosen infrastructure focus areas under each QH actor. However, it has been decided that the structure should be more user-friendly when published on a website. Therefore, the original construction of the SSF changes when content is published on the SSH. The information and the descriptions from first and second layer are published on the Silver Hub under the heading “Smart Silver Lab Structure”. The third layer, classifications and references, contain information and links to relevant regional business, market environments and institutions and is published under Silver Market Characteristics at www.Silverhub.eu. Stakeholders will be able to use the SSF published at the Silver hub to find partners for collaboration and internationalise their business and research activities.

The regional or national RIS3 authorities / policy makers participated in the project meetings and events, and contributed with insights and input in relation to the implementation of the SSF model in future eco systems after the project period. Local authorities and policy makers are represented in the Smart Silver Labs, and thus participate in the further implementation of the RIS3 strategies in the regions, including designing new policy tools and to change or identify new instruments for enhancing silver economy growth opportunities.

The SSF are deployed through the regional Smart Silver Labs (SSL). The core of the SSF, the quadruple helix actors (QH), inspire stakeholders and innovators to develop products and create innovative processes, products and services together in the eco-system. We expect, the QH actors will be in close collaboration and they will seek out each other in the innovative processes to test, adjust and evaluate as well as make results that can create growth in the Silver Market and solve challenges in the aging population of the BSR countries. The SSF structure will frame the innovation processes in the SSLs and all SSF content produced in the Osiris project, is available on Silver Hub to support the collaboration between partners, customers, or actors relevant to their project or product.

APPENDIX

Structural suggestions for changes in the SSF:

Category descriptions

QH Business

Business development services: Offer assistance in starting up, developing and growing your business requiring capital and financing opportunities. Non-financial services and products are offered to entrepreneurs at various stages of their business needs.

Private and public companies: In silver economy, private and public companies provide technologies and services for the benefit of the senior citizens and the health and care sector. Public authorities own the public companies. Assisted Living Services is a sub-category of "Private & Public Companies": One of the purposes using assistive digital technologies in health and eldercare services is to promote independent living and to support elderly people in need of care. Assistive digital technologies can be significant in gaining successful aging. Another advantage is that technology assists the health personnel in the daily work and the workflows become more efficient.

Incubator networks and Digital Labs: An incubator network accelerates the growth and success of entrepreneurial companies through collaborative business support and coaching services. A Digital Lab is a place where new products and online services can be developed, tried out and tested in order to drive companies' digitalization.

QH Senior Citizens

Associations: The associations represent the aged population and provide support and counseling in welfare, health and social policy issues. The members pay membership fees, why the economy is rather good in these organizations. They offer a variety of social and cultural activities such as lectures, travel, and meeting places. These associations often have important political influence.

Voluntary NGOs & Programs:
Voluntary NGOs and programs formed by citizens with an element of voluntary participation in the organization. The overall purpose is to improve the prospects of senior citizens and address concerns and issues related to their well-being and living conditions.

QH Policy makers

Municipality/city: A city or district possessing a corporate existence usually with its own local government. As for the oldest citizens the municipality is responsible for ensuring that people are able to live independently and participate in society for as long as possible. Some municipalities have a representation of senior citizens in a senior citizens´ council.